BULLETIN OF THE AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS

1957-58

BULLETIN

OF THE

AGRICULTURAL AND MECHANICAL

COLLEGE OF TEXAS

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RECORD OF SESSION 1956-57

ANNOUNCEMENTS FOR THE SESSION 1957-58

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COLLEGE STATION, TEXAS

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COLLEGE 1957

SUMMER SESSION 1957

JUNE 1957

S	M	T	W	T	F	S
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16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

JULY 1957

S	M	T	W	T	F	S
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28	29	30	31			

AUGUST 1957

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18	19	20	21	22	23	24
25	26	27	28	29	30	31

June 3, Monday
Registration for the first term, 8 a.m. to 12 noon.

June 4, Tuesday
Beginning of classes, 7 a.m.

June 6, Thursday
Last day for enrolling in the College for the first term.

June 7, Friday
Last day for making changes in registration.

July 4, Thursday
A holiday.

July 12, Friday
First term final examinations.

July 15, Monday
Registration for the second term, 8 a.m. to 12 noon.

July 16, Tuesday
Beginning of classes, 7 a.m.

July 18, Thursday
Last day for enrolling in the College for the second term.

July 19, Friday
Last day for making changes in registration.

August 23, Friday
Second term final examinations.

FALL SEMESTER 1957

SEPTEMBER 1957

S	M	T	W	T	F	S
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29	30					

OCTOBER 1957

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NOVEMBER 1957

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24	25	26	27	28	29	30

September 6, Friday
Opening day of New Student Week.

September 13, Friday
Registration of new Basic Division students who have had no college work, 8 a.m. to 5 p.m.

September 14, Saturday
Registration of all other students, 8 a.m. to 5 p.m.

September 16, Monday
Beginning of classes, 8 a.m.

September 21, Saturday
Last day for enrolling in the College for the fall semester or for adding new courses.

September 28, Saturday
Last day for dropping courses with no grade.

October 19, Saturday
Official Corps trip.

November 11, Monday
Mid-semester grade reports.

November 16, Saturday
Official Corps trip.

November 28-December 1, Thursday-Sunday, inclusive
Thanksgiving holidays.

CALENDAR
1958

December 21, Saturday
Beginning of Christmas recess, 12 noon.

January 6, 1958, Monday
End of Christmas recess, 8 a.m.

January 20, Monday
First day of semester examinations.

January 25, Saturday
Last day of semester examinations.

DECEMBER 1957

S	M	T	W	T	F	S
1	2	3	4	5	6	7
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15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

SPRING SEMESTER 1958

January 29, Wednesday
Opening day of New Student Week.

January 31, Friday
Registration of New Basic Division students who have had no college work, 1 p.m.

February 1, Saturday
Registration of all other students, 8 a.m. to 5 p.m.

February 3, Monday
Beginning of classes, 8 a.m.

February 8, Saturday
Last day for enrolling in the College for the spring semester or adding new courses.

February 15, Saturday
Last day for dropping courses with no grade.

February 17, Monday
Beginning of Religious Emphasis Week.

February 21, Friday
End of Religious Emphasis Week.

March 31, Monday
Mid-semester grade reports.

April 2, Wednesday
Beginning of spring recess, 5 p.m.

April 8, Tuesday
End of spring recess, 8 a.m.

May 23, Friday
Commencement.

May 24, Saturday
Final Review.

May 26, Monday
First day of semester examinations.

May 31, Saturday
Last day of semester examinations.

JANUARY 1958

S	M	T	W	T	F	S
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5	6	7	8	9	10	11
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FEBRUARY 1958

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2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
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MARCH 1958

S	M	T	W	T	F	S
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16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

APRIL 1958

S	M	T	W	T	F	S
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6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

MAY 1958

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

The Texas Agricultural and Mechanical College System

Composed of all colleges, agencies and services under the supervision of the Board of Directors of the Agricultural and Mechanical College of Texas, including:

The Agricultural and Mechanical College of Texas
The Arlington State College
The Tarleton State College
The Prairie View Agricultural and Mechanical College
The Texas Agricultural Experiment Station
The Texas Agricultural Extension Service
The Texas Forest Service
The Texas Engineering Experiment Station
The Texas Engineering Extension Service
The Texas Transportation Institute

Board of Directors

W. T. DOHERTY ..... *President*
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INDUSTRIAL EXECUTIVE, AMARILLO

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L. H. RIDOUT, JR., *Business Executive* ..... Dallas

PRICE CAMPBELL, *Utilities Executive* ..... Abilene

H. B. ZACHRY, *Construction Engineer* ..... San Antonio

HERMAN F. HEEP, *Agriculturist and Businessman* ..... Austin

EUGENE B. DARBY, *Construction Engineer* ..... Pharr

Administrative Officers

M. T. HARRINGTON ..... *Chancellor*

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E. L. ANGELL ..... *Assistant Chancellor and Secretary of the Board*

R. H. SHUFFLER ..... *Director of Information and Publications*

W. C. FREEMAN ..... *Comptroller*

T. R. SPENCE ..... *Manager of Physical Plants*

The Agricultural and Mechanical College of Texas

Administrative Officers

DAVID H. MORGAN*, PH.D.....*President*

D. W. WILLIAMS**, M.S.....*Acting President*

W. W. ARMISTEAD, D.V.M., PH.D.....*Dean, School of Veterinary Medicine*

JOHN C. CALHOUN, JR., PH.D.....*Dean, School of Engineering*

WALTER H. DELAPLANE, PH.D.....*Dean, School of Arts and Sciences*

J. C. MILLER, PH.D.....*Dean, School of Agriculture*

J. BOYD PAGE, PH.D.....*Dean, Graduate School*

ROBERT B. KAMM, PH.D.....*Dean, Basic Division and Student Personnel Services*

JOE E. DAVIS, B.S., Colonel, Inf., U.S.A.R.....*Commandant of the School of Military Sciences*

CHARLES A. ROEBER, B.A., B.B.A.....*Business Manager*

H. LLOYD HEATON, M.S.....*Director of Admissions and Registrar*

ROBERT A. HOUZE, B.S., B.L.S.....*Librarian*

C. R. LYONS, M.D.....*Superintendent, College Hospital*

W. HOWARD BADGETT, M.S.....*Manager, Physical Plants*

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*Resigned December 21, 1956.
**Effective December 22, 1956.

FACULTY

(Correct as of December 1, 1956)

ACADEMIC COUNCIL

(Figures in parentheses indicate date of first appointment on the College Staff and date of appointment to present position respectively.)

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*Morgan, David Hitchens, President of the College. (1952, 1953)

**Williams, David Willard, Acting President of the College. (1919, 1956)

Heaton, Homer Lloyd, Director of Admissions and Registrar, and Secretary of the Academic Council. (1934, 1945)

Adriance, Guy Webb, Professor of Horticulture. (1921, 1935)

Anderson, Delmer Pearl, Colonel, Professor of Military Science and Tactics. (1955)

Armistead, Willis William, Dean of the School of Veterinary Medicine. (1940, 1953)

Bryant, Paul William, Athletic Director. (1954)

Burchard, Donald Dix, Professor of Journalism. (1948)

Burgess, Archie Rostron, Professor of Industrial Engineering. (1948, 1950)

Burns, Patton Wright, Professor of Veterinary Physiology and Pharmacology. (1926, 1935)

Butler, Ogbourne Duke Jr., Professor of Animal Husbandry. (1947, 1956)

Calhoun, John C., Jr., Dean of the School of Engineering. (1955)

Chalk, Alfred Franklin, Professor of Economics. (1936, 1956)

Colbert, Charles Ralph, Professor of Architecture. (1956)

Crawford, Charles William, Professor of Mechanical Engineering. (1919, 1929)

Cronk, Alfred Edward, Professor of Aeronautical Engineering. (1956)

Davis, Joe Eugene, Colonel, Inf., U.S.A.R., Commandant of the School of Military Sciences. (1930, 1951)

Davis, William B., Professor of Wildlife Management. (1937, 1946)

Delaplane, John Paul, Professor of Veterinary Microbiology. (1950)

Delaplane, Walter Harold, Dean of the School of Arts and Sciences. (1948, 1953)

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*Resigned December 21, 1956.
**Effective December 22, 1956.

DeWerth, Adolphe Ferdinand, Professor of Floriculture and Landscape Architecture. (1946, 1949)

Dittman, Henry, Colonel, Professor of Air Science. (1955)

Doak, Clifton Childress, Professor of Biology. (1926, 1937)

Gaines, J. C., Professor of Entomology. (1947, 1952)

Godbey, Chauncey Barger, Professor of Genetics. (1926, 1946)

Groneman, Chris Harold, Professor of Industrial Education. (1940, 1942)

Houze, Robert Alvin, Librarian. (1949, 1951)

Hughes, Martin Collins, Professor of Electrical Engineering. (1923, 1932)

Jensen, Frederick William, Professor of Chemistry. (1926, 1947)

Jones, Fred Rufus, Professor of Agricultural Engineering. (1921, 1940)

Kamm, Robert B., Dean of the Basic Division and of Student Personnel Services. (1955, 1956)

Klipple, Edmund Chester, Professor of Mathematics. (1935, 1952)

Leipper, Dale F., Professor of Oceanography. (1949)

Leland, Thomas William, Professor of Business Administration. (1922, 1926)

Lenert, August Albert, Professor of Veterinary Medicine and Surgery. (1919, 1937)

Lindsay, James Donald, Professor of Chemical Engineering. (1938, 1946)

Lyman, Carl M., Professor of Biochemistry and Nutrition. (1949)

Lynch, Shirley Alfred, Professor of Geology. (1946)

Lyons, Charles Roger, Superintendent of the College Hospital. (1956)

Miller, James Carlton, Dean of the School of Agriculture. (1940, 1956)

Milliff, John Henry, Professor of Veterinary Anatomy. (1936, 1941)

Morgan, Stewart Samuel, Professor of English. (1921, 1952)

Page, John Boyd, Dean of the Graduate School. (1950, 1956)

Parker, Grady P., Professor of Education. (1940, 1954)

Penberthy, Walter Lawren, Head of the Department of Student Activities. (1926, 1954)

Potter, James Gregor, Professor of Physics. (1945)

Quisenberry, John Henry, Professor of Poultry Science. (1936, 1946)

Ransdell, Clifford Howell, Associate Dean of the Basic Division. (1937, 1956)

Roeber, Charles Arthur, Business Manager. (1929, 1954)

Rogers, John Sinclair, Professor of Agronomy. (1956)

Rupel, Isaac Walker, Professor of Dairy Science. (1945)

Schlesselman, George Wilhelm, Professor of Geography. (1934, 1945)

Smith, Hilton Atmore, Professor of Veterinary Pathology. (1949)

Steen, Ralph Wright, Professor of History. (1935, 1954)

Street, William Ezra, Professor of Engineering Drawing. (1941)

Timm, Tyrus Raymond, Professor of Agricultural Economics and Sociology. (1947, 1953)

Tishler, Carl Edward, Professor of Physical Education. (1941, 1947)

Turk, Richard Duncan, Professor of Veterinary Parasitology. (1944)

Walton, Ernest Vernon, Professor of Agricultural Education. (1946, 1953)

Watkins, Gustav McKee, Professor of Plant Physiology and Pathology. (1949, 1950)

Whiting, Robert Louis, Professor of Petroleum Engineering. (1946, 1954)

Woolket, Joseph John, Professor of Modern Languages. (1925, 1945)

Wright, Samuel Robert, Professor of Civil Engineering. (1923, 1946)

Young, Vernon Alphus, Professor of Range and Forestry. (1929, 1946)

Zinn, Bennie A., Head of the Department of Student Affairs. (1945, 1954)

GENERAL FACULTY

(Figures in parentheses indicate date of first appointment on the College Staff and date of appointment to present position respectively.)

Abbott, John Paul, Distinguished Professor of English. (1926, 1956)
B.A., Vanderbilt, 1925; Ph.D., Iowa, 1939.
(On leave of absence)

Adams, William Floyd, Associate Professor of Engineering Drawing. (1944, 1953)
B.S., Agricultural and Mechanical College of Texas, 1923; M.S., 1954; Reg. Prof. Engr.

Adamson, Arthur Douglas, Professor of Physical Education. (1939, 1949)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1944.

Adkins, William Gray, Associate Professor of Agricultural Economics and Rural Sociology. (1956)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., 1953.

Adriance, Guy Webb, Professor of Horticulture and Head of Department. (1921, 1935)
B.S., Agricultural and Mechanical College of Texas, 1915; M.S., California, 1917; Ph.D., Michigan State College, 1929.

Albritton, Oscar Willard, Instructor of Mechanical Engineering. (1956)
B.S., Texas College of Mines and Metallurgy, 1951.

Aldred, William Hughes, Instructor of Agricultural Engineering. (1953)
B.S., Georgia, 1951.

Alexander, Robert Benjamin, Instructor of Chemistry. (1952)
B.A., Baylor, 1945; M.A., 1946.

Alter, Alan Brian, Assistant Professor of Mechanical Engineering. (1949, 1952)
B.S., Pittsburgh, 1948; M.S., Agricultural and Mechanical College of Texas, 1953.
(On leave of absence)

Amann, John William, Instructor of Physical Education. (1956)
B.S., Mankato State Teachers College, 1955; M.A., Wyoming, 1956.

Amyx, James William, Associate Professor of Petroleum Engineering. (1953, 1956)
B.S., Agricultural and Mechanical College of Texas, 1946; Reg. Prof. Engr.

Anderson, Delmer Pearl, Colonel, Professor of Military Science and Tactics. (1955)
B.S., Oklahoma, 1928.

Anderson, John Quincey, Associate Professor of English. (1953, 1956)
A.B., Oklahoma Agricultural and Mechanical College, 1939; M.A., Louisiana State, 1948; Ph.D., North Carolina, 1952.

Anderson, Jack Walter, Assistant Professor of Agronomy. (1955)
B.S., Agricultural and Mechanical College of Texas, 1942; M.S., 1947.

Andrew, Edward Harris, Jr., Associate Professor of Electrical Engineering. (1947, 1956)
B.S., Agricultural and Mechanical College of Texas, 1947; S.M., Massachusetts Institute of Technology, 1950; Ph.D., Agricultural and Mechanical College of Texas, 1954; Reg. Prof. Engr.

Andrews, Paul Milton, Associate Professor of Physical Education. (1943, 1951)
B.S., Sul Ross State Teachers College, 1934; M.Ed., Agricultural and Mechanical College of Texas, 1945.

Armistead, Willis William, Dean of the School of Veterinary Medicine. (1940, 1953)
D.V.M., Agricultural and Mechanical College of Texas, 1938; M.S., Ohio State, 1950; Ph.D., Minnesota, 1955.

Ashcraft, Allan Coleman, Instructor of History. (1956)
B.A., Agricultural and Mechanical College of Texas, 1950; M.A., Columbia, 1951.

Atkinson, Robert Leon, Assistant Professor of Poultry Science. (1955)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1950.

Bader, Richard George, Associate Professor of Oceanography. (1955, 1956)
B.S., Maine, 1948; S.B., Chicago, 1949; M.S., 1950; Ph.D., 1952.

Bailey, Kenneth Ralph, Assistant Professor of Mathematics. (1946, 1954)
B.A., Texas, 1937; M.A., 1941.

Baker, James Cullens, Instructor of Engineering Drawing. (1956)
B.S., Agricultural and Mechanical College of Texas, 1952.

Baldauf, Richard John, Assistant Professor of Wildlife Management. (1952, 1956)
B.S., Albright College, 1949; M.S., Agricultural and Mechanical College of Texas, 1951.

Ballinger, Richard Henry, Associate Professor of English. (1954)
B.A., Texas, 1936; M.A., 1938; Ph.D., Harvard, 1953.

Banks, William Carl, Professor of Veterinary Medicine and Surgery. (1941, 1955)
D.V.M., Agricultural and Mechanical College of Texas, 1941; M.S., 1952.

Bardell, North Bruce, Jr., Instructor of Engineering Drawing. (1953)
B.S., Agricultural and Mechanical College of Texas, 1953.

Barker, Palmer Winfield, Associate Professor of Physics. (1946, 1949)
B.S., Missouri, 1932; M.A., 1933.

Barzak, Robert William, Instructor of English. (1955)
B.A., Agricultural and Mechanical College of Texas, 1949; M.A., Illinois, 1951.

Bass, Daniel Materson, Jr., Assistant Professor of Petroleum Engineering. (1954)
B.S., Louisiana State, 1950; M.S., Agricultural and Mechanical College of Texas, 1955; Reg. Prof. Engr.

Bass, James Horace, Professor of History. (1940, 1955)
B.A., North Texas State Teachers College, 1924; M.A., Texas, 1931; Ph.D., 1933.

Basye, Robert Eugene, Professor of Mathematics. (1940, 1952)
B.A., Missouri, 1929; M.A., Princeton, 1931; Ph.D., Texas, 1933.

Baty, James Bernard, Professor of Civil Engineering. (1948, 1950)
B.S., Agricultural and Mechanical College of Texas, 1925; M.C.E., Cornell, 1950; Reg. Prof. Engr.

Baugh, Orville Lee, Instructor of Mathematics. (1956)
B.S., North Texas State College, 1941; M.S., 1951.

Bayliss, Garland Erastus, Instructor of History. (1956)
B.S., Arkansas, 1951; M.A., Texas, 1953.

Beamer, Russell James, Lecturer in Veterinary Medicine and Surgery. (1954)
D.V.M., Iowa State College, 1940.

Beckham, John Blair, Assistant Professor of Chemistry. (1946, 1954)
A.B., Daniel Baker College, 1936; B.S., 1937; M.S., Agricultural and Mechanical College of Texas, 1950.

Bell, Roy Chester, Instructor of Physical Education. (1952)
B.S., Agricultural and Mechanical College of Texas, 1931; M.Ed., 1952.

Bennett, Alvin Lowell, Assistant Professor of English. (1954)
B.A., Texas, 1927; M.A., Washington, 1931; Ph.D., Texas, 1952.

Bernard, Cicero Henry, Associate Professor of Physics. (1941, 1947)
A.B., Phillips, 1928; M.S., Kentucky, 1931.

Berry, Raymond Orville, Professor of Animal Husbandry. (1931, 1950)
B.S., North Texas State Teachers College, 1928; M.S., Agricultural and Mechanical College of Texas, 1932; Ph.D., Johns Hopkins, 1939.

Berry, William Thomas, Jr., Instructor of Animal Husbandry. (1954)
B.S., Agricultural and Mechanical College of Texas, 1942; M.S., 1955.

Bertrand, Clint Albert, Instructor of Industrial Education. (1953)
B.S., Agricultural and Mechanical College of Texas, 1953.

Biard, James Robert, Instructor of Electrical Engineering. (1956)
B.S., Agricultural and Mechanical College of Texas, 1954; M.S., 1956.

Birkner, John Francis, Major, Associate Professor of Military Science and Tactics. (1953)
B.A., The Citadel, 1942.

Blank, Horace R., Professor of Geology. (1949, 1953)
B.S., Pennsylvania, 1919; Ph.D., 1924.

Bloodworth, Morris Elkins, Associate Professor of Agronomy. (1956)
B.S., Agricultural and Mechanical College of Texas, 1941; M.S., 1953.

Bonney, Warren Chester, Personal and Vocational Counselor and Assistant Professor, Basic Division. (1954)
B.A., Ohio State, 1948; M.A., North Texas State College, 1950.

Boone, James Leroy, Jr., Assistant Professor of Industrial Education. (1952, 1955)
B.S., Agricultural and Mechanical College of Texas, 1947; M.Ed., 1948.

Boothe, Billie Wallingford, Instructor of English. (1955)
A.B., Concord College, 1949; M.A., West Virginia, 1951.

Boriskie, Ben Bernard, Assistant Professor of Physics. (1941, 1948)
B.S., Agricultural and Mechanical College of Texas, 1936; M.S., 1948.

Bossler, Robert Burns, Professor of Petroleum Engineering. (1956)
B.S., Pittsburgh, 1918.

Boughton, Ivan Bertrand, Professor of Veterinary Pathology. (1948, 1953)
D.V.M., Ohio State, 1916.

Boyd, Vaughn Frank, Jr., Instructor of Biology. (1956)
B.S., Virginia Polytechnic Institute, 1949; M.S., 1953.

Branson, Robert Earl, Associate Professor of Agricultural Economics and Sociology. (1955)
B.S., Southern Methodist, 1941; M.P.A., Harvard, 1948; M.A., 1949; Ph.D., 1954.

Breitenkamp, Edward Carlton, Associate Professor of Modern Languages. (1953, 1956)
B.A., Drake, 1936; M.A., 1938; Ph.D., Iowa State, 1951.

Brewer, Alexander Van, Professor of Mechanical Engineering. (1922, 1930)
B.S., Purdue, 1913; M.E., 1925; M.S., Agricultural and Mechanical College of Texas, 1937; Reg. Prof. Engr.

Bridges, Charles Hubert, Associate Professor of Veterinary Pathology. (1955)
D.V.M., Agricultural and Mechanical College of Texas, 1945; M.S., 1954.

Briles, Worthie Elwood, Associate Professor of Poultry Science. (1948, 1951)
B.A., Texas, 1941; Ph.D., Wisconsin, 1948.

Brison, Fred Robert, Professor of Horticulture. (1926, 1938)
B.S., Agricultural and Mechanical College of Texas, 1921; M.S., Michigan State College, 1931.

Brooks, Melvin Shubert, Associate Professor of Rural Sociology. (1941, 1947)
B.A., Washington State College, 1935; M.S., Iowa State College, 1937; Ph.D., Wisconsin, 1941.
(On leave of absence)

Brown, Murray Allison, Instructor of Dairy Science. (1955)
B.S., Michigan State College, 1950; M.S., Agricultural and Mechanical College of Texas, 1953.

Brown, Stewart Ellsworth, Instructor of Mechanical Engineering. (1951)

Brown, Sidney Overton, Professor of Biology. (1936, 1949)
B.A., Texas, 1932; Ph.D., 1936.

Bruckart, Richard F., Associate Professor of Industrial Engineering. (1949, 1952)
B.S., Pennsylvania State College, 1940; M.S., Agricultural and Mechanical College of Texas, 1952; Reg. Prof. Engr.

Brundidge, Kenneth Cloud, Instructor of Meteorology. (1955)
B.A., Chicago, 1952; M.S., 1953.

Bryant, Paul William, Athletic Director. (1954)
B.S., Alabama, 1936.

Buchanan, Spencer Jennings, Professor of Civil Engineering. (1946)
B.S., Agricultural and Mechanical College of Texas, 1926; M.S., Massachusetts Institute of Technology, 1931; C.E., Agricultural and Mechanical College of Texas, 1948; Reg. Prof. Engr.

Burchard, Donald Dix, Professor of Journalism and Head of Department. (1948)
A.B., Beloit College, 1925; A.M., Missouri, 1938.

Burgess, Archie Rostron, Professor of Industrial Engineering and Head of Department. (1948, 1951)
B.S., Washington, 1932; M.S., 1938; Reg. Prof. Engr.

Burke, Robert Claire, Instructor of Industrial Engineering. (1956)
B.S., Oklahoma Agricultural and Mechanical College, 1951.

Burkhalter, Thomas S., Associate Professor of Chemistry. (1952, 1954)
B.S., Oklahoma, 1947; M.S., 1948; Ph.D., Louisiana State, 1950.

Burns, Edward Eugene, Assistant Professor of Horticulture. (1956)
B.S., Purdue, 1950; M.S., 1952; Ph.D. 1956.

Burns, Patton Wright, Professor of Veterinary Physiology and Pharmacology and Head of Department. (1926, 1935)
B.S., Agricultural and Mechanical College of Texas, 1923; D.V.M., 1926.

Butler, Marvin Harold, Assistant Professor of Economics. (1948)
A.B., McKendree College, 1940; M.A., Illinois, 1948.

Butler, Ogbourne Duke, Jr., Professor of Animal Husbandry and Head of Department. (1947, 1956)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1947; Ph.D., Michigan State College, 1953.

Byers, James Norman, Instructor of Business Administration. (1955)
B.B.A., Texas Technological College, 1951; M.B.A., 1955.

Caddess, James Harvey, Associate Professor of Mechanical Engineering. (1940, 1953)
B.S., Agricultural and Mechanical College of Texas, 1932; M.S., 1934; Reg. Prof. Engr.

Cain, Roy Edward, Instructor of English. (1956)
B.A., North Texas State College, 1953; M.A., 1954.

Calhoun, John C., Jr., Dean of the School of Engineering and Professor of Petroleum Engineering. (1955)
B.S., Pennsylvania State, 1937; M.S., 1941; Ph.D., 1946; Reg. Prof. Engr.

Calvert, Wesley Donald, Acting Assistant Professor of Journalism. (1954)
A.B., Missouri, 1951; B.J., 1951.

Cannon, Deore J., Counselor and Assistant Professor, Basic Division. (1956)
A.B., Georgia, 1950; M.A., 1951.

Carroll, Gerald Vincent, Assistant Professor of Geology. (1954)
B.A., Lehigh, 1943; Ph.D., Yale, 1952.

Carson, Charles Victor, Major, Associate Professor of Air Science. (1956)
B.S., Virginia Military Institute, 1934; M.Ad.E., New York, 1948.

Chalk, Alfred Franklin, Professor of Economics and Head of Department. (1936, 1956)
B.A., Baylor, 1934; M.S., Agricultural and Mechanical College of Texas, 1936; Ph.D., Texas, 1950.

Chumlea, Wesley Sission, Instructor of Government. (1956)
B.A., Texas, 1949; M.A., 1951.

Clark, Stanley P., Associate Professor of Chemical Engineering. (1956)
B.S., Kansas, 1941.

Clayton, William Howard, Instructor of Mathematics. (1954)
B.S., Bucknell, 1949; Ph.D., Agricultural and Mechanical College of Texas, 1956.

Cleland, Samuel Miles, Associate Professor of Engineering Drawing. (1941, 1950)
B.A., West Texas State Teachers College, 1931; M.Ed., Agricultural and Mechanical College of Texas, 1940.

Cochrane, John Douglas, Assistant Professor of Oceanography and Meteorology. (1956)
B.A., University of California at Los Angeles, 1943; M.S., Scripps Institute of Oceanography, 1948.

Cofer, David Brooks, Professor of English and Archivist. (1910, 1950)
A.B., Centre College, 1907; M.A., Wisconsin, 1927.

Colbert, Charles Ralph, Professor of Architecture and Head of Division. (1956)
B.Arch., Texas, 1943; M.Arch., Columbia, 1947.

Collier, Ivan Thayer, Instructor of Chemistry. (1956)
B.A., Baylor, 1936.

Comfort, Thomas Edwin, Assistant Professor of Modern Languages. (1954)
A.B., Northwestern, 1943; A.M., Illinois, 1951; Ph.D., 1954.

Conoley, Rufus Knox, Major, Associate Professor of Air Science. (1955)
B.A., Baylor, 1937.

Cook, Benjamin Davy, Assistant Professor of Agricultural Education. (1950)
B.S., Agricultural and Mechanical College of Texas, 1934; M.Ed., 1950.
(On leave of absence)

Coon, Jesse Bryan, Associate Professor of Physics. (1946)
A.B., Indiana, 1932; M.A., 1935; Ph.D., Chicago, 1949.

Cooper, William Anderson, Jr., Instructor of Biology. (1955)
B.S., North Texas State Teachers College, 1948; M.S., 1950.

Couch, James Russell, Professor of Biochemistry and Nutrition and of Poultry Science. (1948, 1949)
B.S., Agricultural and Mechanical College of Texas, 1931; M.S., 1934; Ph.D., Wisconsin, 1948.

CoVan, Jack Phillip, Professor of Industrial Engineering. (1946, 1956)
B.M.E., Ohio State, 1935; B.I.E., 1935; M.S., Illinois, 1942; Reg. Prof. Engr.

Cox, Sidney Saunders, Assistant Professor of English. (1948, 1952)
B.A., Southwest Texas State Teachers College, 1932; M.A., 1939.

Craig, Robert Neal, Assistant Professor of Agricultural Engineering. (1940, 1946)
B.S., Agricultural and Mechanical College of Texas, 1937.

Crawford, Charles William, Professor of Mechanical Engineering and Head of Department. (1919, 1929)
B.S., Agricultural and Mechanical College of Texas, 1919; M.S., 1929; Reg. Prof. Engr.

Creswell, Horace Staley, Assistant Professor of English. (1946, 1951)
B.S., Texas Technological College, 1935; M.A., Texas Christian, 1938.

Crittenden, Elmer Pratt, Assistant Professor of English. (1956)
B.A., Boston, 1939; M.A., Southern Methodist, 1946.

Cronk, Alfred Edward, Professor of Aeronautical Engineering and Head of Department. (1956)
B.S., College of Saint Thomas, 1937; M.S., Minnesota, 1946.

Cunningham, Newton William, Acting Instructor of Meteorology. (1956)
B.S., Texas, 1954.

Cunningham, Worthy Millard, Lieutenant Colonel, Associate Professor of Military Science and Tactics. (1956)
A.B., Glenville State College, 1937.

Dabbs, Jack Autrey, Associate Professor of Modern Languages. (1950, 1953)
B.A., Texas, 1935; M.A., 1936; Ph.D., 1950.

Dahlberg, Frank Iver, Professor of Animal Husbandry. (1936, 1947)
B.S., Agricultural and Mechanical College of Texas, 1925;
M.S., Wisconsin, 1930.

Daniels, Marion Gordon, Assistant Professor of Economics. (1953, 1956)
A.B., Doane College, 1947; M.A., Texas, 1949.

Darnell, Albert Laurie, Professor of Dairy Science. (1914, 1925)
B.S., Mississippi State College, 1914; M.A., Missouri, 1916.

Darrow, Robert Arthur, Professor of Range and Forestry. (1948, 1951)
B.S., New York State College of Forestry, 1932; M.S., Arizona, 1935;
Ph.D., Chicago, 1937.

Davey, Ralph Hemmings, Jr., Instructor of Engineering Drawing. (1955)
B.S., United States Military Academy, 1932.

Davids, Lewis Edmund, Professor of Business Administration. (1951)
B.S., New York, 1941; M.B.A., 1942; Ph.D., 1949.

Davis, Donald Edgar, Assistant Professor of Veterinary Microbiology. (1954)
D.V.M., Ohio State, 1952; M.S., 1953.

Davis, Daniel Rowland, Associate Professor of Rural Sociology. (1935, 1947)
B.S., Agricultural and Mechanical College of Texas, 1932; M.S., 1935.

Davis, Joe Eugene, Colonel, Commandant of the School of Military Sciences.
(1930, 1951)
B.S., Agricultural and Mechanical College of Texas, 1930.

Davis, John Peter, Jr., Instructor of Veterinary Medicine and Surgery. (1953)
B.S., Agricultural and Mechanical College of Texas, 1952; D.V.M., 1953.

Davis, Richard Harvey, Jr., Associate Professor of Veterinary Physiology
and Pharmacology. (1951, 1956)
D.V.M., Agricultural and Mechanical College of Texas, 1941; M.S., 1956.

Davis, William B., Professor of Wildlife Management and Head of Department. (1937, 1946)
B.A., Chico State Teachers College, 1933; M.A., California, 1936;
Ph.D., 1937.

Decker, John Petty, Instructor of Physics. (1956)
B.S., Arkansas, 1949; M.S., Agricultural and Mechanical College of
Texas, 1953; Reg. Prof. Engr.

Degenhardt, William George, Instructor of Biology. (1955)
A.B., Syracuse, 1950; M.S., Northeastern, 1953.

Dehlinger, Peter, Associate Professor of Geophysics. (1954)
B.S., Michigan, 1940; M.S., California Institute of Technology, 1943;
Ph.D., 1950.

Delaplane, John Paul, Professor of Veterinary Microbiology and Head of
Department. (1950)
D.V.M., Ohio State, 1929; M.S., 1931.

Delaplane, Walter Harold, Dean of the School of Arts and Sciences and
Professor of Economics. (1948, 1953)
A.B., Oberlin College, 1929; A.M., 1931; Ph.D., Duke, 1934.

Denison, John Scott, Associate Professor of Electrical Engineering. (1949,
1954)
B.S., New Mexico Agricultural and Mechanical College, 1948; M.S.,
Agricultural and Mechanical College of Texas, 1949; Reg. Prof. Engr.

Denton, Allen Eugene, Jr., Vocational Counselor and Instructor, Basic
Division. (1951)
B.A., Agricultural and Mechanical College of Texas, 1948; M.Ed., 1949.

DeVilbiss, Cecil Floyd, Associate Professor of Civil Engineering. (1946, 1955)
B.S., Agricultural and Mechanical College of Texas, 1941; M.Eng., 1950; Reg. Prof. Engr.

DeWerth, Adolphe Ferdinand, Professor of Floriculture and Landscape Architecture and Head of Department. (1946, 1949)
B.S., Ohio State, 1930; M.S., 1931.

Dickson, Cecil Herman, Instructor of Chemistry. (1948)
B.S., Agricultural and Mechanical College of Texas, 1948; M.S., 1955.

Dillingham, Harley Clay, Professor of Electrical Engineering. (1922, 1930)
B.S., Agricultural and Mechanical College of Texas, 1922; A.M., Columbia, 1930; Reg. Prof. Engr.

Dillon, Lawrence Samuel, Associate Professor of Biology. (1948, 1955)
B.S., Pittsburgh, 1933; M.S., Agricultural and Mechanical College of Texas, 1950; Ph.D., 1954.

Dittman, Henry, Colonel, Professor of Air Science. (1955)
B.A., Agricultural and Mechanical College of Texas, 1939.

Dixon, Keith Lee, Assistant Professor of Wildlife Management. (1952)
A.B., San Diego State College, 1943; M.S., California, 1948; Ph.D., 1953.

Doak, Clifton Childress, Professor of Biology and Head of Department. (1926, 1937)
B.S., North Texas State Teachers College, 1922; M. S., Agricultural and Mechanical College of Texas, 1928; Ph.D., Illinois, 1933.

Dobson, William Jackson, Professor of Biology. (1947, 1956)
B.A., Austin College, 1939; Ph.D., Texas, 1946.

Donaldson, Joseph, Jr., Lecturer on Architecture. (1956)

Dowell, William Merl, Professor of Physical Education. (1942, 1950)
B.S., Sam Houston State Teachers College, 1929; M.A., George Peabody College, 1932.

Downard, Richard Walter, Assistant Professor of Mechanical Engineering. (1913, 1939)

Dozier, James Hall, Instructor of Business Administration. (1955)
LL.B., Texas, 1950.

Druce, Albert John, Associate Professor of Electrical Engineering. (1946, 1956)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1950.

Duncan, John Thomas, Assistant Professor of History. (1943, 1951)
B.A., Simmons College, 1924; M.A., Texas Technological College, 1942.

Dunlap, Thomas James, Captain, Assistant Professor of Air Science. (1955)
B.S., Oklahoma Agricultural and Mechanical College, 1939.

Edmondson, Vance Ward, Assistant Professor of Agricultural Economics. (1956)
B.S., Arkansas, 1948; M.S., Oklahoma Agricultural and Mechanical College, 1950; Ph.D., Cornell, 1956.

Edwards, Kenneth Johnson, Jr., Major, Associate Professor of Military Science and Tactics. (1955)
B.S., Agricultural and Mechanical College of Texas, 1943.

Edwards, William Webster, Jr., Major, Associate Professor of Military Science and Tactics. (1954)
B.S., Alabama Polytechnic Institute, 1951.

Egar, Joseph Michael, Instructor of Geology. (1955)
B.S., Oklahoma, 1952.

Eisner, Melvin, Associate Professor of Physics. (1948)
B.A., Brooklyn College, 1942; M.S., North Carolina, 1947; Ph.D., 1948.

Ekfelt, Fred Emil, Professor of English. (1938, 1951)
B.A., Iowa, 1931; M.A., 1932; Ph.D., 1941.

Elkins, Rollin Lafayette Associate Professor of Business Administration. (1935, 1946)
B.S., Agricultural and Mechanical College of Texas, 1933; M.S., 1935.

Elliott, William Paul, Assistant Professor of Meteorology. (1956)
A.B., St. John's College, 1947; M.S., Chicago, 1952.

Ellis, Elmer Carlos, Assistant Professor of Education. (1956)
B.S., Agricultural and Mechanical College of Texas, 1941;
M.S., Texas, 1948.

Ellis, Harry Van Horn, Jr., Lieutenant Colonel, Associate Professor of Military Science and Tactics. (1955)
B.S., United States Military Academy, 1951.

Elmquist, Karl Erik, Associate Professor of English. (1935, 1947)
A.B., Southern Methodist, 1932; M.A., Texas, 1939.

Ennis, Malcolm Eugene, Associate Professor of Physics. (1955)
B.A., Texas, 1937; M.A., 1937; Ph.D., 1953.

Esten, Clarence Kenyon, Assistant Professor of English. (1946, 1951)
A.B., Baylor, 1931; M.A., 1949.

Ewens, William Price, Professor of Education and Psychology. (1954, 1956)
B.S., Missouri, 1936; M.Ed., 1946; Ed.D., Stanford, 1949.

Farha, Harry Maurice, Instructor of Architecture. (1956)
B.Arch., Agricultural and Mechanical College of Texas, 1956.

Ferrell, Wilfred Anderson, Instructor of English. (1952)
B.A., Texas, 1951; M.A., 1952.

Fitch, David R., Associate Professor of Business Administration. (1949)
B.A., Agricultural and Mechanical College of Texas, 1942;
M.S., Wisconsin, 1948; Ph.D., Oklahoma, 1956.

Flatt, Douglas Evans, Instructor of Civil Engineering. (1956)
B.S., Agricultural and Mechanical College of Texas, 1953; B.S., 1956.

Fleming, David Winston, Associate Professor of Mechanical Engineering. (1927, 1945)
B.S., Agricultural and Mechanical College of Texas, 1930; M.Ed., 1942.

Fletcher, Robert Holton, Assistant Professor of Mechanical Engineering. (1947, 1950)
B.S., Pennsylvania State College, 1928; Reg. Prof. Engr.

Foster, Robert Porter, Jr., Lieutenant, Assistant Professor of Air Science. (1955)
B.S., Southwestern Louisiana Institute, 1950.

Franceschini, Guy Arthur, Acting Assistant Professor of Meteorology. (1952, 1954)
B.S., Massachusetts, 1950; M.S., Chicago, 1952.

Frazier, Charles Edward, Jr., Instructor of History. (1956)
B.A., Tennessee, 1949; M.A., New York, 1950.

French, Richard Aubrey, Instructor of English. (1955)
B.A., Louisiana State, 1948; M.A., Chicago, 1950.

Gaafar, Sayed Mohammed H., Assistant Professor of Veterinary Parasitology. (1955, 1956)
B.C.Sc., College of Veterinary Medicine, Cairo, Egypt, 1944; M.S., Kansas State College, 1949; Ph.D., 1950; D.V.M., Agricultural and Mechanical College of Texas, 1955.

Gabbard, Letcher P., Professor of Agricultural Economics. (1947)
B.S.A., Tennessee, 1915; M.S., Wisconsin, 1921.

Gaddis, Alvis Mathew, Assistant Professor of Mechanical Engineering. (1942, 1946)
A.B., Austin College, 1930.

Gaines, J. C., Professor of Entomology and Head of Department. (1947, 1952)
B.S., Alabama Polytechnic Institute, 1925; M.S., 1926; Ph.D., Iowa State College, 1937.

Gallaway, Bob Mitchel, Associate Professor of Civil Engineering. (1944, 1956)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1946; Reg. Prof. Engr.

Gammon, Samuel Rhea, Professor of History. (1925)
A.B., Washington and Lee, 1911; M.A., 1913; Ph.D., Johns Hopkins, 1921.

Garrett, Roy Curtis, Professor of Agricultural Engineering. (1944, 1956)
B.S., Agricultural and Mechanical College of Texas, 1938; M.S., 1949; Reg. Prof. Engr.

George, Thomas Alexander, Major, Associate Professor of Military Science and Tactics. (1955)
B.S., Ohio State, 1936; M.A., 1940.

Gibbons, Eldred Harris, Associate Professor of Microbiology. (1925, 1939)
B.S.A., Tennessee, 1925; S.M., Chicago, 1929.

Gibbs, Leon Wilford, Assistant Professor of Veterinary Anatomy. (1949, 1951)
B.S., Agricultural and Mechanical College of Texas, 1939; D.V.M., 1949.

Gibbs, Robert H., Associate Professor of Mechanical Engineering. (1956)
B.S., United States Naval Academy, 1925.

Gibson, Roy Howard, Instructor of Mechanical Engineering. (1933, 1947)

Gingles, Tommy J., Instructor of Civil Engineering. (1956)
B.S., Agricultural and Mechanical College of Texas, 1955.

Gladish, Robert Willis, Instructor of English. (1956)
M.A., Chicago, 1956.

Glaser, Arnold Henry, Associate Professor of Meteorology. (1953, 1955)
B.S., Washington, 1940; M.S., 1941; Sc.D., Massachusetts Institute of Technology, 1952.

Godbey, Chauncey Barger, Professor of Genetics and Head of Department. (1926, 1946)
B.S., Kentucky, 1925; M.S., Agricultural and Mechanical College of Texas, 1926.

Godfrey, Curtis L., Associate Professor of Agronomy. (1954)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1948; Ph.D., Iowa State College, 1951.

Godwin, Charles Jackson, Assistant Professor of Architecture. (1955)
B.S., Agricultural and Mechanical College of Texas, 1947; Reg. Prof. Arch., Reg. Prof. Engr.

Goode, Phillip Barron, Professor of Business Administration. (1946, 1949)
B.S., Southern Methodist, 1933; LL.B., 1936; LL.M., Texas, 1953.

Gooding, Harry Wilmont, Instructor of Architecture. (1953)
B.Arch., Agricultural and Mechanical College of Texas, 1949; Reg. Prof. Arch.

Gould, Frank Walton, Associate Professor of Range and Forestry and Curator of College Museum. (1949)
B.S., Northern Illinois State College, 1935; M.S., Wisconsin, 1937; Ph.D., California, 1941.

Gravett, Howard L., Professor of Biology. (1946, 1954)
A.B., James Millikin, 1933; M.A., Illinois, 1934; Ph.D., 1939.

Gray, Jarrell D., Assistant Professor of Agricultural Education. (1955)
B.S., Arkansas, 1947; M.S., 1950; D.Ed., 1955.

Greer, Clayton Alvis, Associate Professor of English. (1938, 1949)
B.A., Texas, 1921; M.A., 1927; Ph.D., 1937.

Griffith, Rolla Edwin, Captain, Assistant Professor of Air Science. (1955)
B.S., Oklahoma Agricultural and Mechanical College, 1954; M.S., 1955.

Groneman, Chris Harold, Professor of Industrial Education and Head of Department; Coordinator of Teacher Education. (1940, 1956)
B.S., Kansas State Teachers College, 1931; M.S., 1935; D.Ed., Pennsylvania State College, 1950.

Grumbles, Leland Creed, Associate Professor of Veterinary Microbiology and Poultry Science. (1949, 1956)
D.V.M., Agricultural and Mechanical College of Texas, 1945.

Guthrie, William Spurgeon, Associate Professor of Mechanical Engineering. (1942, 1950)
B.S., Central State Teachers College, 1930; M.A., Oklahoma, 1935; Reg. Prof. Engr.

Hadley, Henry Hultman, Associate Professor of Genetics. (1946, 1951)
B.S., Illinois, 1940; M.S., Agricultural and Mechanical College of Texas, 1942; Ph.D., Illinois, 1951.

Hale, Fred, Professor of Animal Husbandry in Charge of Swine Investigations. (1922, 1927)
B.S., Agricultural and Mechanical College of Texas, 1922; M.S., 1925.

Hall, Claude Hampton, Assistant Professor of History. (1951, 1955)
B.A., Virginia, 1947; M.A., 1949; Ph.D., 1954.

Hall, Dan, Associate Professor of Mathematics. (1928, 1944)
A.B., North Carolina, 1927; A.M., 1928.

Hall, Wayne C., Professor of Plant Physiology and Pathology. (1949, 1954)
B.S., Iowa, 1941; M.S., 1946; Ph.D., 1948.

Hall, William Jarvis, Lieutenant Colonel, Associate Professor of Air Science. (1953)
B.S., Idaho, 1932.

Hallmark, Glen Duncan, Professor of Electrical Engineering. (1942, 1954)
B.S., Agricultural and Mechanical College of Texas, 1935; M.S., 1946; Ph.D., 1953.

Halstead, Maurice Howard, Associate Professor of Meteorology. (1954)
B.A., California, 1940; Aero. Engr. Certificate, United States Naval Academy, 1943; Ph.D., Johns Hopkins, 1951.

Ham, Joe Strother, Assistant Professor of Physics. (1956)
Ph.B., Chicago, 1948; M.S., 1951; Ph.D., 1954.

Hamilton, Thomas Rowan, Professor of Business Administration. (1929, 1937)
A.B., Washington and Lee, 1917; M.S., Columbia, 1924; Ph.D., 1938.

Hamner, Bennet Barron, Professor of Aeronautical Engineering. (1946, 1954)
B.S., Agricultural and Mechanical College of Texas, 1938; M.S., 1953; Reg. Prof. Engr.

Hampton, Herbert Elwood, Professor of Agronomy. (1938, 1948)
B.S., Agricultural and Mechanical College of Texas, 1937; Ph.D., Missouri, 1943.

Hancock, Charles Kinney, Professor of Chemistry. (1946, 1949)
B.S., Southwest Texas State Teachers College, 1931; M.A., Texas, 1936; Ph.D., 1939.

Hanna, Ralph Lynn, Associate Professor of Entomology. (1949, 1956)
B.A., Stephen F. Austin State Teachers College, 1939; Ph.D., Agricultural and Mechanical College of Texas, 1951.

Hardaway, Bernice Aubrey, Assistant Professor of Engineering Drawing. (1946, 1951)
B.S., East Texas State Teachers College, 1933; M.Ed., Agricultural and Mechanical College of Texas, 1948.

Hardeman, Lyman Bryce, Assistant Professor of Industrial Education. (1947, 1950)
B.S., Kansas State Teachers College, 1939; M.Ed., Agricultural and Mechanical College of Texas, 1949.

Harrington, Edwin Lincoln, Associate Professor of Civil Engineering. (1939, 1947)
B.S., Wyoming, 1927; C.E., 1937; M.S., Agricultural and Mechanical College of Texas, 1943; Ph.D., 1952; Reg. Prof. Engr.

Harris, Robert Leigh, Assistant Professor of History. (1951, 1955)
A.B., Alabama, 1945; M.A., 1946; Ph.D., Duke, 1956.

Harris, William Birch, Associate Professor of Chemical Engineering. (1956)
B.S., Colorado, 1941.

Harris, William Donald, Professor of Chemical Engineering. (1935, 1949)
B.S., Iowa State College, 1929; M.S., 1931; Ph.D., 1934; Reg. Prof. Engr.

Harrison, Luther Asbery, Jr., Assistant Professor of Physical Education. (1941, 1949)
B.S., Agricultural and Mechanical College of Texas, 1940.

Harter, Edward Lin, Associate Professor of Chemistry. (1921, 1943)
A.B., Missouri Wesleyan, 1919; M.A., Kansas, 1927.

Hauer, Louis Frederick, Assistant Professor of English. (1937, 1944)
B.A., Dubuque, 1931; M.A., Iowa, 1933.

Haupt, Lewis McDowell, Jr., Professor of Electrical Engineering. (1930, 1948)
B.S., Agricultural and Mechanical College of Texas, 1927; M.S., 1935; Reg. Prof. Engr.

Hawkins, Leslie Virgle, Associate Professor of Industrial Education. (1954)
B.S., Panhandle Agricultural and Mechanical College, 1938; M.S., Oklahoma Agricultural and Mechanical College, 1946; D.Ed., Pennsylvania State, 1953.

Hayes, William Bell, Instructor of Chemical Engineering. (1956)
B.S., Agricultural and Mechanical College of Texas, 1953; M.S., 1956.

Hays, John Q., Professor of English. (1929, 1945)
A.B., Missouri, 1929; M.A., 1932; Ph.D., California, 1942.

Heaton, Homer Lloyd, Director of Admissions and Registrar, and Secretary of the Academic Council. (1934, 1956)
B.S., Stephen F. Austin State Teachers College, 1929; M.S., Agricultural and Mechanical College of Texas, 1936.

Hedgcock, Ernest Duval, Professor of English. (1936,1949)
B.A., Tennessee, 1917; M.A., Texas, 1936.

Hedges, Charles Cleveland, Professor of Organic Chemistry. (1912, 1913)
B.S., Kentucky, 1906; A.B., Cornell, 1908; Ph.D., 1912.

Hierth, Harrison Ewing, Assistant Professor of English. (1946, 1951)
A.B., Illinois Wesleyan, 1935; B.Ed., Illinois State Normal, 1936; M.A., Illinois, 1942; Ph.D., Wisconsin, 1956.

Hildreth, Roland James, Assistant Professor of Agricultural Economics and Sociology. (1954)
B.S., Iowa State College, 1949; M.S., 1950; Ph.D., 1954.

Hildreth, William Wesley, Assistant Professor of Meteorology. (1956)
B.S., New Hampshire, 1941; M.S., Massachusetts Institute of Technology, 1953.

Hill, John Hugh, Professor of History. (1934, 1954)
A.B., Austin College, 1925; M.A., 1926; M.A., California, 1939; Ph.D., Texas, 1946.

Hillman, John Rolfe, Assistant Professor of Mathematics. (1938, 1946)
B.S., Millsaps College, 1923; M.A., Missouri, 1929.

Hirsch, Teddy James, Instructor of Civil Engineering. (1956)
B.S., Agricultural and Mechanical College of Texas, 1952; M.Engr., 1953.

Hobgood, Price, Professor of Agricultural Engineering. (1939, 1949)
B.S., Agricultural and Mechanical College of Texas, 1938; M.S., 1940; Reg. Prof. Engr.

Holcomb, Robert Marion, Professor of Civil Engineering. (1947)
B.S., Arizona, 1936; M.S., Iowa State College, 1941; Reg. Prof. Engr.

Holdredge, Edwin Sereno, Associate Professor of Mechanical Engineering. (1939, 1949)
B.S., Tennessee, 1938; M.S., 1939; Reg Prof. Engr.

Holland, Charles Donald, Associate Professor of Chemical Engineering. (1952, 1956)
B.S., North Carolina State College, 1943; M.S., Agricultural and Mechanical College of Texas, 1949; Ph.D., 1953.

Holleman, Theo Rufus, Associate Professor of Architecture. (1946, 1953)
B.Arch., Agricultural and Mechanical College of Texas, 1940; M.Arch., 1951; Reg. Prof. Arch.

Holt, Oris Milton, Assistant Professor of Agricultural Education. (1954)
B.S., Agricultural and Mechanical College of Texas, 1942; M.Ed., 1946.

Hood, Donald Wilbur, Associate Professor of Oceanography. (1946, 1954)
B.S., Pennsylvania State College, 1940; M.S., Oklahoma Agricultural and Mechanical College, 1942; Ph.D., Agricultural and Mechanical College of Texas, 1950.

Hopkins, Sewell Hepburn, Professor of Biology. (1935, 1947)
B.S., William and Mary College, 1927; M.A., Illinois, 1930; Ph.D., 1933.

Hord, Asa Andrew, Captain, Assistant Professor of Military Science and Tactics. (1953)
B.S., Agricultural and Mechanical College of Texas, 1942.

Houze, Robert Alvin, Librarian. (1949, 1951)
A.B., Denver, 1940; B.L.S., 1941.

Hovorak, Ludwig M., Instructor of Mathematics. (1946)
B.S., Agricultural and Mechanical College of Texas, 1943; M.Ed., 1952.

Howard, John Richard, Instructor of Geography. (1956)
B.A., Washington, 1947; M.A., 1951.

Hoyle, Samuel Cooke, Jr., Associate Professor of Business Administration. (1947, 1949)
LL.B., Texas, 1926; B.A., 1946; M.A., 1948.

Hubert, Patrick Laverne, Instructor of Veterinary Medicine and Surgery. (1955)
D.V.M., Agricultural and Mechanical College of Texas, 1952.

Huggett, Milton Alfred, Assistant Professor of English. (1946, 1951)
B.A., Rochester, 1929; B.D., Episcopal Theological School, 1933;
M.A., Baylor, 1952.
(On leave of absence)

Huggins, Frank Norris, Instructor of Mathematics. (1954)
B.A., Howard Payne College, 1948; M.S., North Texas State College, 1950.

Hughes, Martin Collins, Professor of Electrical Engineering and Head of Department. (1923, 1932)
B.S., Illinois, 1917; E.E., 1926; Reg. Prof. Engr.

Hunt, Robert Lee, Professor of Agricultural Economics. (1927, 1935)
B.S., Agricultural and Mechanical College of Texas, 1924; M.S., North Carolina State College, 1927; Ph.D., Wisconsin, 1934.

Hunter, Parks Caldwell, Jr., Instructor of English. (1955)
B.A., Miami, 1948; B.Ed., 1949; M.A., 1950.

Hurley, Charles Lee, Instructor of English. (1955)
B.A., Saint Mary's, 1939; M.A., Texas, 1941.

Hurt, John Tom, Professor of Mathematics. (1936, 1947)
B.A., Rice Institute, 1931; M.A., 1932; Ph.D., 1935.

Huss, Donald Lee, Instructor of Range and Forestry. (1955)
B.S., Agricultural and Mechanical College of Texas, 1949.

Isbell, Arthur Furman, Associate Professor of Chemistry. (1953, 1956)
B.A., Baylor, 1937; M.S., Texas, 1941; Ph.D., 1943.

Jache, Albert William, Assistant Professor of Chemistry. (1955)
B.S., New Hampshire, 1948; M.S., 1950; Ph.D., Washington, 1952.

Jackson, John Raleigh, Assistant Professor of Agricultural Education. (1952)
B.S., Agricultural and Mechanical College of Texas, 1938; M.Ed., 1948.

Jaggi, Frederick Putnam, Jr., Professor of Veterinary Microbiology and Assistant to the Dean of Veterinary Medicine. (1937, 1949)
B.S., Agricultural and Mechanical College of Texas, 1924; D.V.M., 1926.

Jefferies, Charles Webb, Captain, Assistant Professor of Air Science. (1954)
B.S., Oklahoma Agricultural and Mechanical College, 1942.

Jensen, Ernest Ray, Assistant Professor of Floriculture and Landscape Architecture. (1956)
B.S., Oklahoma Agricultural and Mechanical College, 1941; M.S., 1947; Ph.D., Agricultural and Mechanical College of Texas, 1955.

Jensen, Frederick William, Professor of Chemistry and Head of Department. (1925, 1947)
B.S., Nebraska, 1920; M.S., 1923; Ph.D., 1925.

Jernigan, Jesse Stewart, Assistant Professor of English. (1952, 1954)
B.A., North Texas State College, 1933; M.A., Southern Methodist, 1946; M.A., California, 1950.

Joham, Howard Ernest, Associate Professor of Plant Physiology and Pathology. (1946, 1955)
B.A., Santa Barbara College, 1941; M.S., Agricultural and Mechanical College of Texas, 1943; Ph.D., Iowa State College, 1950.

Jones, Fred Rufus, Professor of Agricultural Engineering and Head of Department. (1921, 1940)
B.S., Wisconsin, 1915; M.S., Iowa State College, 1931; Reg. Prof. Engr.

Jones, Glendon Pennington, Captain, Assistant Professor of Air Science. (1955)
B.S., Agricultural and Mechanical College of Texas, 1947.

Jung, Glenn Harold, Assistant Professor of Oceanography and Meteorology. (1953, 1955)
S.B., Massachusetts Institute of Technology, 1949; S.M., 1952.

Jungerman, Paul Frank, Assistant Professor of Veterinary Microbiology. (1956)
D.V.M., Agricultural and Mechanical College of Texas, 1947.

Kadow, William Bruce, Instructor of English. (1954)
A.B., Arkansas, 1951; M.A., 1952.

Kamm, Robert B., Dean of the Basic Division and of Student Personnel Services. (1955, 1956)
B.A., Iowa State Teachers College, 1940; M.A., Minnesota, 1946; Ph.D., 1948.

Kasten, Frederick H., Instructor of Biology. (1956)
B.A., Houston, 1950; M.A., Texas, 1951; Ph.D., 1954.

Kavanaugh, Milam Shelby, Associate Professor of Psychology. (1947, 1951)
B.A., Texas, 1934; M.A., 1934.

Keel, Loyd Bush, Assistant Professor of English. (1942, 1947)
B.A., Texas, 1927; M.A., 1933.

Keese, Charles J., Associate Professor of Civil Engineering. (1955)
B.S., Agricultural and Mechanical College of Texas, 1941; M.S., 1952.

Keese, Carroll Wayne, Instructor of Agricultural Engineering. (1954)
B.S., Agricultural and Mechanical College of Texas, 1952.

Kenagy, Herbert Glenn, Acting Associate Professor of Business Administration. (1955)
Ph.B., Central Missouri Teachers College, 1912; A.B., Missouri, 1916; B.S., 1916; M.A., Minnesota, 1917.

Kennedy, Harvey Thomas, Distinguished Professor of Petroleum Engineering. (1949)
B.S., Cornell, 1921; Ph.D., Johns Hopkins, 1928; Reg. Prof. Engr.

Kent, Jack Thurston, Associate Professor of Mathematics. (1936, 1952)
A.B., Lambuth College, 1930; M.A., Arkansas, 1931.

Keown, Ernest Ray, Associate Professor of Mathematics. (1952, 1954)
B.S., Texas, 1946; Ph.D., Massachusetts Institute of Technology, 1950.

Keren, Joseph, Instructor of Physics. (1956)
B.S., Melbourne, 1953; M.S., 1955.

Kerley, Sidney Auston, Associate Director of Guidance, Basic Division, and Assistant Professor of Education. (1952)
B.A., Agricultural and Mechanical College of Texas, 1939; M.Ed., North Texas State College, 1950.

Key, Percy Clark, Associate Professor of English. (1924, 1941)
B.A., Texas Christian, 1917; M.A., Vanderbilt, 1918.

Kidd, Harry Lee, Jr., Associate Professor of English. (1939, 1950)
B.A., Texas, 1935; M.A., 1938.

Kindall, Sheldon Milam, Instructor of Mathematics. (1956)
B.S., Agricultural and Mechanical College of Texas, 1954; M.S., Louisiana State, 1956.

King, Donald Roy, Assistant Professor of Entomology. (1953)
B.S., Baldwin-Wallace College, 1949; M.S., Ohio State, 1951; Ph.D., 1952.

King, General Tye, Assistant Professor of Animal Husbandry. (1953, 1956)
B.S., Kentucky, 1950; M.S., 1951.

Klipple, Edmund Chester, Professor of Mathematics and Head of Department. (1935, 1952)
B.A., Texas, 1926; Ph.D., 1932.

Knebel, Earl, Assistant Professor of Agricultural Education. (1955)
B.S., Montana State College, 1946; M.Ed., Agricultural and Mechanical College of Texas, 1951; D.Ed., Oklahoma Agricultural and Mechanical College, 1955.

Koenig, Karl Joseph, Acting Associate Professor of Geology. (1955)
B.S., Illinois, 1941; M.S., 1946; Ph.D., 1949.

Koss, Walter Eddie, Associate Professor of Mathematics. (1937, 1956)
A.B., Alabama, 1935; M.A., 1936; Ph.D., Illinois, 1956.

Kranz, Edward Douglas, Instructor of Mechanical Engineering. (1952)

Krezdorn, Alfred Herman, Associate Professor of Horticulture. (1946, 1956)
B.S., Agricultural and Mechanical College of Texas, 1942; M.S., Florida, 1949; Ph.D., Agricultural and Mechanical College of Texas, 1955.

Krueger, Willie F., Associate Professor of Poultry Science. (1953, 1956)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1949; Ph.D., Missouri, 1952.

Kunkel, Harriott Orren, Associate Professor of Animal Husbandry and of Biochemistry and Nutrition. (1951, 1955)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1948: Ph.D., Cornell, 1950.

Kunze, George William, Associate Professor of Agronomy. (1952, 1956)
B.S., Agricultural and Mechanical College of Texas, 1948; M.S., 1950; Ph.D., Pennsylvania State College, 1952.

Kunze, Otto Robert, Associate Professor of Agricultural Engineering. (1956)
B.S., Agricultural and Mechanical College of Texas, 1950; M.S., Iowa State, 1951.

Kutach, Wilbur Dee, Vocational Counselor and Assistant Professor, Basic Division. (1952, 1956)
B.S., Agricultural and Mechanical College of Texas, 1951; M.Ed., 1952.

LaMotte, Charles, Professor of Biology. (1930, 1939)
B.A., Texas, 1929; M.A., 1929; Ph.D., Illinois, 1937.

Landiss, Carl Wilson, Professor of Physical Education. (1943, 1954)
B.S., Abilene Christian College, 1935; M.Ed., Agricultural and Mechanical College of Texas, 1947; D.Ed., Pennsylvania State College, 1951.

Lang, Herbert Howard, Assistant Professor of History. (1956)
B.A., Texas, 1949; M.A., 1950; Ph.D., 1954.

Lang, Walter Sidney, Jr., Acting Instructor of Mathematics. (1956)
B.A., Agricultural and Mechanical College of Texas, 1951.

Langford, Ernest, Professor of Architecture. (1915, 1929)
B.S., Agricultural and Mechanical College of Texas, 1913; M.S., Illinois, 1924; Reg. Prof. Arch.

Laverty, Carroll Dee, Professor of English. (1939, 1955)
A.B., Colorado, 1933; A.M., 1934; Ph.D., Duke, 1951.

Lee, Dean Ralph, Assistant Professor of Chemistry. (1941, 1947)
B.S., Memphis State College, 1937; M.S., Agricultural and Mechanical College of Texas, 1939.

Leighton, Rudolph Elmo, Professor of Dairy Science. (1947, 1956)
B.S., Oklahoma Agricultural and Mechanical College, 1932; M.S., 1943; Ph.D., Agricultural and Mechanical College of Texas, 1956.

Leipper, Dale F., Professor of Oceanography and Meteorology and Head of Department. (1949, 1950)
B.S., Wittenberg College, 1937; M.A., Ohio State, 1939; Ph.D., California, 1950.

Leland, Thomas William, Professor of Business Administration and Head of Division. (1922, 1926)
B.A., Wisconsin, 1921; M.S., 1922; C.P.A., 1928.

Lenert, August Albert, Professor of Veterinary Medicine and Surgery and Head of Department. (1919, 1937)
B.S., Agricultural and Mechanical College of Texas, 1914; D.V.M., Kansas City Veterinary College, 1917.

Letbetter, Thomas Doyle, Associate Professor of Business Administration. (1948)
B.B.A., Texas, 1933; M.S., Agricultural and Mechanical College of Texas, 1947; C.P.A., 1949.

Leutzinger, Rudolph Leslie, Associate Professor of Aeronautical Engineering. (1956)
B.S., Iowa State College, 1943; M.S., Michigan, 1951.

Liebhafsky, Erwin Eugene, Associate Professor of Economics. (1956)
B.S., Agricultural and Mechanical College of Texas, 1947; M.S., 1948; Ph.D., Illinois, 1950.

Ligda, Myron George Herbert, Associate Professor of Meteorology. (1954, 1956)
B.A., New York, 1943; M.S., Massachusetts Institute of Technology, 1948; Sc.D., 1953.

Lindsay, James Donald, Professor of Chemical Engineering and Head of Department. (1938, 1944)
B.S., Michigan, 1924; M.S., 1925; Ph.D., 1934; Reg. Prof. Engr.

Little, Van Allen, Professor of Entomology. (1923, 1937)
B.A., Sam Houston State Teachers College, 1922; M.S., Agricultural and Mechanical College of Texas, 1925; Ph.D., 1943.

Liverman, James Leslie, Associate Professor of Biochemistry and Nutrition. (1953, 1956)
B.S., Agricultural and Mechanical College of Texas, 1949; Ph.D., California Institute of Technology, 1952.

Logan, Earl, Jr., Instructor of Mechanical Engineering. (1955)
B.S., Agricultural and Mechanical College of Texas, 1949.

Longley, John Browder, Instructor of Business Administration. (1951)
B.S., Agricultural and Mechanical College of Texas, 1943; C.L.U., 1952.

Lowe, Dan Copeland, Instructor of Business Administration. (1955)
B.S., Stephen F. Austin State College, 1946; M.Ed., 1951.

Loyd, Coleman Monroe, Instructor of Physics. (1953)
B.S., Nebraska State Teachers College, 1939; M.A., Wayne, 1948; M.S., Agricultural and Mechanical College of Texas, 1955.

Luther, Herbert Adesla, Professor of Mathematics. (1937, 1947)
B.A., Pittsburgh, 1934; M.S., Iowa, 1935; Ph.D., 1937.

Lyle, Robert Reed, Assistant Professor of Mathematics. (1937, 1946)
B.S., Washington and Jefferson College, 1931; M.A., Buffalo, 1933.

Lyman, Carl Morris, Professor of Biochemistry and Nutrition and Head of Department. (1940, 1949)
B.S., Oregon, 1931; A.M., Oregon State College, 1933; Ph.D., Pittsburgh, 1937.

Lynch, Shirley Alfred, Professor of Geology and Head of Department of Geology and Geophysics. (1946)
B.S., Missouri, 1928; M.S., 1931; E.M., 1935; Reg. Prof. Engr.

Lynd, Frederick Theodore, Assistant Professor of Veterinary Pathology. (1954)
B.S., Washington State College, 1947; D.V.M., Oklahoma Agricultural and Mechanical College, 1953.

Lyon, Ervin F., III, Lecturer in Electrical Engineering. (1956)

Lyons, Charles Roger, Superintendent of the College Hospital. (1956)
A.B., Miami, 1938; M.D., Ohio State, 1941.

McAfee, Thomas Edison, Associate Professor of Agronomy. (1939, 1953)
B.S., Oklahoma Agricultural and Mechanical College, 1939; M.S., 1940; Ph.D., Agricultural and Mechanical College of Texas, 1953.

McCasland, William Richard, Instructor of Civil Engineering. (1956)
B.S., Agricultural and Mechanical College of Texas, 1955.

McCaulley, Roger Allan, Captain, Instructor of Air Science. (1955)
A.B., San Francisco State, 1955.

McCoy, William Harrison, Assistant Professor of Chemical Engineering. (1956)
B.S., Youngstown, 1950; Ph.D., Pittsburgh, 1955.

McCulley, William Straight, Assistant Professor of Mathematics. (1937, 1946)
B.A., Iowa, 1932; M.S., Agricultural and Mechanical College of Texas, 1936; Ph.D., Texas, 1956.

McFarland, Frank Eugene, Personal and Vocational Counselor, Basic Division, and Assistant Professor of Psychology. (1951, 1955)
B.A., Baylor, 1950; M.A., Columbia, 1953.

McGarrah, James Eugene, Instructor of Engineering Drawing. (1955)
B.S., United States Naval Academy, 1951.

McGee, Roger Valentine, Associate Professor of Mathematics. (1928, 1948)
B.S., Agricultural and Mechanical College of Texas, 1922; M.S., 1938.

McGuire, John Gilbert, Professor of Engineering Drawing and Assistant to the Dean of Engineering. (1935, 1956)
B.S., Agricultural and Mechanical College of Texas, 1932; M.S., 1937; B.S., 1944; Reg. Prof. Engr.

McKenna, Vincent Thomas, Assistant Professor of Economics. (1956)
B.A., College of the City of New York, 1939; A.M., Columbia, 1944; M.P.A., Harvard, 1945.

McKinney, Barbara Joan, Instructor of English. (1956)
B.A., Colorado State College of Education, 1954; M.S., Wisconsin, 1956.

McMurry, Edgar Dowling, Assistant Professor of Veterinary Physiology and Pharmacology. (1955)
D.V.M., Agricultural and Mechanical College of Texas, 1951.

McNeely, John Gordon, Professor of Agricultural Economics. (1947, 1950)
B.S., South Dakota State College, 1933; M.S., 1934; Ph.D., Wisconsin, 1941.

Mackin, John Gilman, Professor of Marine Biology. (1950)
B.S., East Central State College, Ada, Oklahoma, 1924; M.S., Illinois, 1927; Ph.D., 1933.

MacQueen, John W., Assistant Professor of Floriculture and Landscape Architecture and Head of Department of Care and Maintenance of Grounds. (1953, 1956)
B.S., Ohio State, 1934.

Magee, Aden Combs, Professor of Agricultural Economics. (1955, 1956)
B.S., Kansas State College, 1924; M.S., Agricultural and Mechanical College of Texas, 1926.

Mamaliga, Emil, Assistant Professor of Physical Education. (1947, 1951)
B.S., Ohio State, 1943; M.Ed., Agricultural and Mechanical College of Texas, 1950.

Manning, Walter Scott, Associate Professor of Business Administration. (1941, 1947)
B.B.A., Texas College of Arts and Industries, 1932; M.B.A., Texas, 1940; C.P.A., 1952.

Markle, Elias Ward, Professor of Electrical Engineering. (1921, 1930)
B.S., Pennsylvania State College, 1913; M.S., Agricultural and Mechanical College of Texas, 1930.

Martin, Dial Franklin, Professor of Entomology. (1939, 1954)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1942; Ph.D., Iowa State College, 1950.

Martin, Lee Jackson, Assistant Professor of English. (1946, 1951)
B.S., Texas, 1941; M.A., 1948; Ph.D., Stanford, 1956.

Mason, Paul M., Assistant Professor of Engineering Drawing. (1946, 1952)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1946.

Mattern, Terrence John, Instructor of English. (1953)
B.A., George Peabody College, 1947; M.A., 1947.

Matthews, Norman DeVere, Instructor of Physical Education. (1950)
A.B., Syracuse, 1950.

Matzen, Walter Theodore, Jr., Associate Professor of Electrical Engineering. (1949, 1955)
B.S., Iowa State College, 1943; M.S., Agricultural and Mechanical College of Texas, 1950; Reg. Prof. Engr.

Mauer, William Alan, Instructor of Economics. (1956)
B.A., San Jose State College, 1955.

Medlen, Ammon Brown, Associate Professor of Biology. (1946, 1955)
B.A., Baylor, 1930; M.A., 1932; Ph.D., Agricultural and Mechanical College of Texas, 1952.

Myers, Edward Arthur, Assistant Professor of Chemistry. (1956)
B.S., Michigan, 1950; Ph.D., Minnesota, 1955.

Middleton, Errol Bathurst, Professor of Chemistry. (1922, 1942)
B.A., Illinois, 1919; M.S., 1921; Ph.D., 1938.

Miles, Henry James, Professor of Civil Engineering. (1947)
C.E., Brooklyn Polytechnic Institute, 1929; M.S., Rutgers, 1931; Ph.D., 1950; Reg. Prof. Engr.
(On leave of absence)

Millen, Earl Thomas, Instructor of History. (1955)
B.A., Washington, 1950; Ph.D., 1954.

Miller, Horace Otis, Associate Professor of Journalism. (1947, 1948)
A.B., Texas, 1918; M.J., 1920; LL.B., 1928.

Miller, James Carlton, Dean of the School of Agriculture and Professor of Animal Husbandry. (1940, 1956)
B.S., Missouri, 1928; M.S., 1929; Ph.D., 1937.

Miller, Marshall Middleton, Assistant Professor of Poultry Science. (1956)
B.S., Agricultural and Mechanical College of Texas, 1952; M.S., 1956.

Miller, Robert Ernest, Psychometrist and Instructor, Basic Division. (1953)
A.B., Northwestern, 1947; M.A., Boston, 1948.

Miller, Thomas Lloyd, Assistant Professor of History. (1946, 1953)
B.A., East Texas State Teachers College, 1935; M.A., 1945; Ph.D., Texas, 1956.

Milliff, John Henry, Professor of Veterinary Anatomy and Head of Department. (1936, 1941)
B.S., Agricultural and Mechanical College of Texas, 1931; M.S., 1934; D.V.M., 1936.

Mills, Jim Frank, Assistant Professor of Agronomy. (1946, 1954)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1953.

Mitchell, Richard Warren, Assistant Professor of Physics. (1947, 1954)
B.S., Lynchburg College, 1943; M.S., Agricultural and Mechanical College of Texas, 1953.

Mogford, Joseph Sayers, Professor of Agronomy. (1925, 1937)
B.S., Agricultural and Mechanical College of Texas, 1916; M.S., 1920.

Mohr, Hubert Charles, Associate Professor of Horticulture. (1946, 1956)
B.S., Ohio State, 1938; M.S., 1939; Ph.D., Agricultural and Mechanical College of Texas, 1955.

Moore, Albert Vernon, Professor of Dairy Science. (1937, 1944)
B.S., Purdue, 1927; M.S., 1933; Ph.D., Michigan State College, 1948.

Moore, Bill C., Associate Professor of Mathematics. (1937, 1948)
A.B., Kansas, 1929; A.M., 1931; A.M., Princeton, 1937.

Moore, Gilbert Fetcher, Major, Associate Professor of Military Science and Tactics. (1956)
B.S., Louisiana State, 1942.

*Morgan, David Hitchens, President of the College. (1952, 1953)
A.B., Occidental College, 1932; M.A., California, 1933; Ph.D., 1938.

Morgan, Stewart Samuel, Professor of English and Head of Department. (1921, 1952)
B.A., Cincinnati, 1926; M.A., Ohio State, 1927; Ph.D., 1933.

Morgner, Aurelius, Professor of Economics. (1947, 1956)
B.S., Missouri, 1938; M.A., 1940.
(On leave of absence)

Moskovits, George, Acting Assistant Professor of Oceanography. (1956)
B.A., New York, 1949; M.S., Rhode Island, 1951.

Mullins, Benjamin Franklin Kelso, Professor of Engineering Drawing. (1921, 1954)
A.B., Emory, 1919; M.S., 1922; M.R.E., Southwestern Baptist Theological Seminary, 1927; M.S., Agricultural and Mechanical College of Texas, 1944; Reg. Prof. Engr.

Musa, Raiq Shukri, Instructor of Physics. (1954, 1956)
B.S., Agricultural and Mechanical College of Texas, 1953; M.S., 1955.

Nance, Joseph Milton, Associate Professor of History. (1941, 1951)
B.A., Texas, 1935; M.A., 1936; Ph.D., 1941.

Neal, Frederick Carlton, Assistant Professor of Veterinary Medicine and Surgery. (1952)
D.V.M., Agricultural and Mechanical College of Texas, 1944.

Nedderman, Wendell Herman, Associate Professor of Civil Engineering. (1947, 1952)
B.S., Iowa State College, 1943; M.Eng., Agricultural and Mechanical College of Texas, 1949; Ph.D., Iowa State College, 1951; Reg. Prof. Engr.

Nelson, Al B., Professor of History. (1937, 1956)
B.A., Texas Christian, 1932; M.A., 1933; Ph.D., California, 1937.

Nelson, Bardin Hubert, Professor of Rural Sociology. (1950, 1956)
B.S., Louisiana, 1942; M.A., 1943; Ph.D., 1950.

Nelson, Thomas Robert, Associate Professor of Mathematics. (1925, 1939)
B.A., East Texas Normal College, 1917; M.A., Texas, 1922.

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*Resigned December 21, 1956.

Nixson, Frank Derrill, Jr., Instructor of Industrial Education. (1953)
B.S., Agricultural and Mechanical College of Texas, 1950.

Noel, James Sheridan, Instructor of Civil Engineering. (1956)
B.S., Agricultural and Mechanical College of Texas, 1952.

Noyes, Theodore Alvan, Instructor of Mechanical Engineering. (1954)
B.S., Agricultural and Mechanical College of Texas, 1949.

O'Bannon, Lester Severance, Professor of Mechanical Engineering. (1948)
B.M.E., Kentucky, 1915; M.E., 1939; Reg. Prof. Engr.

Oliver, John Percy, Professor of Engineering Drawing. (1936, 1956)
B.S., Agricultural and Mechanical College of Texas, 1926; M.S., 1936; Reg. Prof. Engr.

Orr, Joseph Anderson, Professor of Civil Engineering. (1928, 1944)
B.S., Agricultural and Mechanical College of Texas, 1922; M.S., 1933; Reg. Prof. Engr.

Overall, John Wayne, Instructor of Physics. (1943, 1951)
A.B., Baylor, 1921; M.Ed., Agricultural and Mechanical College of Texas, 1950.

Packenham, Edward S., Associate Professor of Business Administration. (1947, 1955)
B.S., Lombard College, 1928; M.S., Agricultural and Mechanical College of Texas, 1950; C.P.A., 1949.

Page, John Boyd, Dean of the Graduate School and Professor of Agronomy. (1950, 1956)
B.S., Brigham Young, 1936; M.A., Missouri, 1937; Ph.D., Ohio State, 1940.

Page, John Orion, Associate Professor of Chemistry. (1948, 1951)
B.S., Rochester, 1927; Ph.D., Illinois, 1933.

Palmer, Jack Merrill, Captain, Assistant Professor of Air Science. (1955)
B.S., United States Military Academy, 1947.

Palmer, Leslie Lloyd, Assistant Professor of Physical Education. (1951, 1955)
B.S., Agricultural and Mechanical College of Texas, 1948; M.Ed., 1951.

Parker, Grady P., Professor of Education and Head of Department of Education and Psychology. (1940, 1954)
B.A., North Texas State Teachers College, 1929; M.A., Southern Methodist, 1935; Ed.D., Texas, 1942.

Parker, Travis Jay, Professor of Geology. (1947, 1952)
B.S., Texas Technological College, 1933; M.A., Texas, 1939; Ph.D., 1952; Reg. Prof. Engr.

Parnell, Edward Douglas, Professor of Poultry Science. (1938, 1943)
B.S., Agricultural and Mechanical College of Texas, 1923; M.S., 1934.

Parry, Douglas Farlow, Director of Remedial Services and Professor, Basic Division. (1956)
B.A., Utah, 1937; M.A., 1938; Ph.D., Syracuse, 1942.

Pate, Henry Addison, Jr., Captain, Assistant Professor of Military Science and Tactics. (1955)
B.A., Agricultural and Mechanical College of Texas, 1949.

Patterson, LaVerne Victory, Assistant Professor of Industrial Education. (1956)
B.S., Illinois, 1940; M.S., 1948.

Paulson, Walter Ernest, Professor of Agricultural Economics. (1947)
Ph.B., Wisconsin, 1917; Ph.D., 1923.

Pedigo, John Randolph, Associate Professor of Petroleum Engineering. (1953)
B.S., Texas, 1935; B.A., 1935.

Peirce, James Franklin, Assistant Professor of English. (1946, 1951)
A.B., Illinois, 1940; M.A., Iowa, 1942.

Penberthy, Walter Lawren, Head of Department of Student Activities. (1926, 1954)
B.S., Ohio State, 1926.

Perry, Haile Deucalion, Instructor of Mathematics. (1955)
B.S., Sam Houston State Teachers College, 1939; M.A., 1949.

Perry, John Vivian, Jr., Assistant Professor of Mechanical Engineering. (1949, 1955)
B.S., Virginia Polytechnic Institute, 1947; M.S., Agricultural and Mechanical College of Texas, 1954.

Peters, Isaac Isaac, Associate Professor of Dairy Science. (1950, 1952)
B.S.A., Manitoba, 1942; M.S., Michigan State College, 1944; Ph.D., Iowa State College, 1947.

Peurifoy, Robert Leroy, Professor of Civil Engineering. (1946)
B.S., Texas, 1927; M.S., 1929; Reg. Prof. Engr.

Philips, David Everett, Major, Associate Professor of Military Science and Tactics. (1954)
B.S., State Teachers College, West Chester, Pennsylvania, 1940; M.A., Alabama, 1948.

Phillips, Henry Lemle, Colonel, Associate Professor of Military Science and Tactics. (1953)
B.S., Agricultural and Mechanical College of Texas, 1928.

Ponthieux, Nicholas Archibald, Associate Professor of Physical Education. (1941, 1956)
B.S., Agricultural and Mechanical College of Texas, 1941; M.Ed., 1950.

Porter, Walter Lee, Professor of Mathematics. (1918, 1927)
A.B., Howard College, 1911; M.S., Agricultural and Mechanical College of Texas, 1926.

Potter, George Edwin, Professor of Zoology. (1939)
B.S., Ottawa, 1921; M.S., Iowa, 1923; Ph.D., 1927; D.Sc., Ottawa, 1946.

Potter, James Gregor, Professor of Physics and Head of Department. (1945)
B.S., Princeton, 1928; M.S., New York, 1931; Ph.D., Yale, 1939.

Potts, Richard Carmechial, Professor of Agronomy and Assistant to the Dean of Agriculture. (1936, 1956)
B.S., Oklahoma Agricultural and Mechanical College, 1935; M.S., Agricultural and Mechanical College of Texas, 1945; Ph.D., Nebraska, 1950.

Potts, William McDaniel, Professor of Chemistry. (1926, 1938)
B.S., Chicago, 1921; M.S., 1927; Ph.D., 1937.

Powell, Francis Warren, Assistant Professor of English. (1937, 1944)
B.A., Austin College, 1920; M.A., Texas, 1928.

Prescott, John Mack, Associate Professor of Biochemistry and Nutrition. (1952, 1956)
B.S., Southwest Texas State Teachers College, 1941; M.S., Agricultural and Mechanical College of Texas, 1949; Ph.D., Wisconsin, 1952.

Price, Alvin Audis, Assistant Professor of Veterinary Anatomy. (1949, 1951)
B.S., Agricultural and Mechanical College of Texas, 1940; D.V.M., 1949.

Price, Manning A., Assistant Professor of Entomology. (1940, 1949)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1941; Ph.D., Wisconsin, 1952.

Provost, Richard Leon, Vocational Counselor and Instructor, Basic Division. (1956)
B.A., Drake, 1951; M.S., 1956.

Putnam, Harlan Ray, Associate Professor of Economics. (1941, 1946)
B.S., Iowa State College, 1935; M.A., 1941.

Quick, Nicholas Wilson, Associate Professor of English and Assistant to the President. (1947, 1956)
A.B., Illinois, 1942; M.A., 1947; Ph.D., Texas, 1954.

Quisenberry, John Henry, Professor of Poultry Science and Head of Department. (1936, 1946)
B.S., Agricultural and Mechanical College of Texas, 1931; M.S., Illinois, 1933; Ph.D., 1936.

Rakoff, Henry, Assistant Professor of Chemistry. (1953)
B.S., City College of New York, 1944; M.S., Purdue, 1948; Ph.D., 1950.

Ransdell, Clifford Howell, Associate Dean of the Basic Division and Associate Professor of Engineering Drawing. (1937, 1956)
B.S., Texas Technological College, 1937; B.S., Agricultural and Mechanical College of Texas, 1953; Sc.D., Howard Payne College, 1956; Reg. Prof. Engr.

Rao, Narasimba Ramachandra, Instructor of Physics. (1956)
B.S., Bombay, 1941; M.S., 1950.

Redmond, Harold Edwin, Professor of Veterinary Medicine and Surgery. (1940, 1952)
D.V.M., Agricultural and Mechanical College of Texas, 1939.

Reed, James Calvin, Instructor of English. (1956)
B.A., Baylor, 1950; M.A., 1956.

Reel, Kermit Dean, Captain, Assistant Professor of Military Science and Tactics. (1956)
B.S., United States Military Academy, 1947.

Reeves, Robert Gatlin, Professor of Genetics. (1928, 1947)
B.S., Mississippi State College, 1922; M.S., 1923; Ph.D., Iowa State College, 1928.

Reid, Robert Osborne, Associate Professor of Oceanography and Meteorology. (1951, 1953)
B.E., Southern California, 1946; M.S., Scripps Institute of Oceanography, 1948.

Reinhard, Henry J., Professor of Entomology. (1947)
B.S., Ohio State, 1915.

Reiser, Raymond, Professor of Biochemistry and Nutrition. (1949, 1954)
A.B., Western Reserve, 1929; Ph.D., Ohio State, 1936.

Rekoff, Michael George, Jr., Instructor of Electrical Engineering. (1954)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., 1955. (On leave of absence)

Rhodes, Robert Raymond, Associate Professor of Range and Forestry. (1946, 1954)
B.S.F., Louisiana, 1937; M.S., Agricultural and Mechanical College of Texas, 1951.

Richardson, Luther Ray, Professor of Biochemistry and Nutrition. (1946, 1949)
B.S., Georgetown College, 1923, A.M., Missouri, 1928; Ph.D., 1932.

Riggs, John Kamm, Professor of Animal Husbandry. (1941, 1955)
B.S., Iowa State College, 1935; M.S., Agricultural and Mechanical College of Texas, 1941.

Roberts, Jesse Claude, Jr., Instructor of History. (1956)
B.S., Sam Houston State Teachers College, 1949; B.A., 1950; M.A., Texas, 1953; Ph.D., 1955.

Roberts, Sidney I., Instructor of History. (1956)
B.S., College of the City of New York, 1952; M.A., Columbia, 1953.

Robinson, Kid Frank, Assistant Professor of Architecture. (1952, 1953)
B.Arch, Agricultural and Mechanical College of Texas, 1940; Reg. Prof. Arch.

Rode, Norman Frederick, Professor of Electrical Engineering. (1922, 1930)
B.S., Clemson College, 1919; M.S., Agricultural and Mechanical College of Texas, 1929; E.E., Clemson College, 1939; Reg. Prof. Engr.

Rodgers, Edward Wesley, Major, Associate Professor of Air Science. (1953, 1955)
B.S., Maryland, 1953.

Rodgers, Glen Morris, Instructor of History. (1956)
A.B., Daniel Baker College, 1935; M.A., Southern Methodist University, 1940.

Rodgers, Mettie Azalee, Instructor of English. (1947)
A.B., Baylor, 1916; M.A., Chicago, 1932.

Roeber, Charles Arthur, Business Manager. (1929, 1954)
B.B.A., Texas, 1929; B.A., 1929.

Rogers, John Sinclair, Professor of Agronomy and Head of Department. (1956)
B.S., Agricultural and Mechanical College of Texas, 1938; M S., 1940; Ph.D., Harvard, 1949.

Romane, William Murry, Instructor of Veterinary Medicine and Surgery. (1956)
D.V.M., Agricultural and Mechanical College of Texas, 1943.

Romieniec, Edward John, Associate Professor of Architecture. (1956)
B.S., Illinois, 1947; M.S., 1948; M.A., Harvard, 1950.

Rosberg, David William, Associate Professor of Plant Physiology and Pathology. (1950, 1955)
B.A., St. Olaf College, 1940; M.S., Ohio State, 1946; Ph.D., 1949.

Rose, Norman Carl, Assistant Professor of Chemistry. (1956)
B.S., California, 1950.

Ross, Henry, Professor of Agricultural Education. (1935)
B.S., Agricultural and Mechanical College of Texas, 1923; M. S., 1935.

Rotsch, Melvin Medford, Professor of Architecture. (1950, 1955)
B.S., Texas, 1928; M.Arch., Harvard, 1930.

Rowell, Chester Morrison, Jr., Assistant Professor of Biology. (1949, 1955)
B.A., Texas, 1947; M.S., Agricultural and Mechanical College of Texas, 1949.

Rupel, Isaac Walker, Professor of Dairy Science and Head of Department. (1945)
B.S., Illinois, 1923; M.S., Wisconsin, 1924; Ph.D., 1932.

Russell, Daniel, Professor of Rural Sociology. (1926)
A.B., Baylor, 1922; A.M., Chicago, 1931.

Russell, Ralph Keith, Assistant Professor of Physics. (1946, 1955)
B.S., Nebraska State Teachers College, 1936; M.S., Agricultural and Mechanical College of Texas, 1954.

Russell, William Low, Professor of Geology. (1946, 1951)
B.A., Yale, 1920; M.S., 1922; Ph.D., 1927.

Ryan, Cecil Benjamin, Assistant Professor of Poultry Science. (1947, 1949)
B.S., Texas College of Arts and Industries, 1938; M.S., Agricultural and Mechanical College of Texas, 1947.

Sanderlin, Carroll Dee, Instructor of Mathematics. (1956)
B.S.E., Arkansas Agricultural and Mechanical College, 1952; M.Ed., Arkansas, 1955.

Sandstedt, Carl Edward, Professor of Civil Engineering. (1923, 1938)
A.B., Leland Stanford, 1910; M.S., Agricultural and Mechanical College of Texas, 1928; Reg. Prof. Engr.

Sandstedt, John Leonard, Instructor of Business Administration. (1954)
B.A., Texas, 1942; LL.B., 1947.

Sargent, Frederic Oberlin, Assistant Professor of Agricultural Economics. (1956)
B.A., Colby College, 1942; Ph.D., Wisconsin, 1952.

Sarma, Pramod Lal, Assistant Professor of Chemistry. (1955)
B.S., Calcutta, 1939; M.S., Banaras, 1948; M.S., Louisiana State, 1950; Ph.D., 1951.

Saucier, Walter Joseph, Associate Professor of Meteorology. (1952, 1954)
B.S., Southwestern Louisiana Institute, 1942; M.S., Chicago, 1947; Ph.D., 1951.

Schiller, Robert Edwin, Jr., Associate Professor of Civil Engineering. (1946, 1955)
B.S., Agricultural and Mechanical College of Texas, 1940; M.S., 1949; Reg. Prof. Engr.

Schleider, Robert Herman, Jr., Instructor of Civil Engineering. (1954)
B.S., Agricultural and Mechanical College of Texas, 1951.

Schlesselman, George Wilhelm, Professor of Geography and Head of Department. (1934, 1945)
B.A., Iowa State Teachers College, 1927; M.A., Clark, 1928; Ph.D., Nebraska, 1935.

Schram, Alfred Francis, Associate Professor of Chemistry. (1953, 1956)
B.A., Oklahoma, 1941; M.S., 1943; Ph.D., 1948.

Schroeder, Melvin Carroll, Associate Professor of Geology. (1954, 1956)
B.S., State College of Washington, 1942; M.S., 1947; Ph.D., 1953.

Schulz, Carl William, Professor of Veterinary Medicine and Surgery in Charge of Clinic. (1956)
D.V.M., Kansas State College, 1934.

Scoggins, Ruel Prentis, Major, Associate Professor of Military Science and Tactics. (1956)
B.S., Henderson State Teachers College, 1948.

Scott, Leon Singery, Instructor of Chemical Engineering. (1955)
B.S., Agricultural and Mechanical College of Texas, 1953.

Segner, Edmund Peter, Jr., Assistant Professor of Civil Engineering. (1954, 1956)
B.S., Texas, 1949; M.S., 1952; Reg. Prof. Engr.

Segrest, Herman Brazill, Associate Professor of Physical Education. (1945, 1949)
B.S., North Texas State Teachers College, 1937; M.S., 1946; M.Ed., Agricultural and Mechanical College of Texas, 1955.

Seward, Clay Luzenberg, Jr., Associate Professor of Geology. (1948, 1952)
B.S., Agricultural and Mechanical College of Texas, 1941; M.S., 1950; Geol.E., 1953.

Sheppard, James Nolen, Assistant Professor of English. (1941, 1947)
B.A., Texas, 1931; M.A., 1936.

Sherrill, Robert Glenn, Instructor of English. (1956)
B.A., George Pepperdine College, 1949; M.A., Texas, 1956.

Shrode, Robert Ray, Professor of Genetics. (1947, 1955)
B.S., Colorado Agricultural and Mechanical College, 1943; M.S., Iowa State College, 1945; Ph.D., 1949.

Simmang, Clifford Max, Professor of Mechanical Engineering. (1938, 1951)
B.S., Agricultural and Mechanical College of Texas, 1936; M.S., 1938; Ph.D., Texas, 1952; Reg. Prof. Engr.

Sims, Stillman Austin, Assistant Professor of Mathematics. (1942, 1950)
B.S., Southwest Texas State Teachers College, 1939; M.S., Agricultural and Mechanical College of Texas, 1944.

Skrabanek, Robert Leonard, Associate Professor of Rural Sociology. (1949, 1954)
B.S., Agricultural and Mechanical College of Texas, 1942; M.S., 1947; Ph.D., Louisiana, 1949.

Skrivanek, John Marion, Professor of Slavonic Languages. (1952)
B.A., Texas, 1938; M.A., 1946; Ph.D., Charles (Prague), 1948.

Slingerland, Douglas Alan, Lieutenant, Assistant Professor of Military Science and Tactics. (1955)
B.S. United States Military Academy, 1952.

Smith, Donald Hubbell, Jr., Lieutenant, Assistant Professor of Military Science and Tactics. (1956)
B.A., Michigan State, 1951.

Smith, Elmer Gillam, Professor of Physics. (1924, 1942)
A.B., Amherst College, 1919; M.S., Agricultural and Mechanical College of Texas, 1925; B.S., 1934; M.E., 1939; Ph.D., Texas, 1941.

Smith, Fred Emmett, Professor of Geology. (1948, 1956)
B.S., Louisiana, 1930; M.S., 1932.

Smith, Frank Miller, Assistant Professor of Civil Engineering. (1948)
B.S., Agricultural and Mechanical College of Texas, 1927; M.S., 1939; Reg. Prof. Engr.

Smith, Hilton Atmore, Professor of Veterinary Pathology and Head of Department. (1949)
D.V.M., Colorado Agricultural and Mechanical College, 1928; M.S., Michigan, 1935; Ph.D., 1949.

Smith, Robert Lee, Jr., Assistant Professor of Business Administration. (1956)
B.S., Agricultural and Mechanical College of Texas, 1952.

Snuggs, Roland Edward, Associate Professor of Chemistry. (1924, 1946)
A.B., Georgetown College, 1920; M.S., Florida, 1923; B.S., Agricultural and Mechanical College of Texas, 1937.

Somerville, Henry Lee, Major, Associate Professor of Air Science. (1954)
B.S., Sam Houston State Teachers College, 1946.

Sorensen, Anton Marinus, Jr., Assistant Professor of Animal Husbandry. (1955)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., Cornell, 1951; Ph.D., 1953.

Sorrels, Joseph Harrell, Professor of Civil Engineering. (1941, 1948)
A.B., Texas Christian, 1924; M.S., Vanderbilt, 1925; B.S., Agricultural and Mechanical College of Texas, 1946; Reg. Prof. Engr.

Southwell, Sam Beall, Associate Professor of English. (1947, 1956)
B.J., Texas, 1947; M.A., 1949; Ph.D., 1956.

Sperry, John Jerome, Professor of Biology. (1941, 1951)
B.A., Nebraska, 1936; M.A., Missouri, 1938; Ph.D., Nebraska, 1942.

Sperry, Omer Edison, Professor of Range and Forestry. (1946, 1949)
A.B., Peru, Nebraska, State College, 1925; M.A., Nebraska, 1931; Ph.D., 1934.

Stafford, Mebane Graves, Captain, Assistant Professor of Military Science and Tactics. (1956)
B.S., Agricultural and Mechanical College of Texas, 1949.

Stallings, Henry Green, Instructor of Mechanical Engineering. (1946)

Stark, Lawrence Edward, Associate Professor of Engineering Drawing. (1941, 1951)
B.S., Agricultural and Mechanical College of Texas, 1941; M.Ed., 1951.

Steen, Ralph Wright, Professor of History and Head of Department. (1935, 1954)
B.A., McMurry College, 1927; M.A., Texas, 1929; Ph.D., 1934.

Stein, Jerome Everett, Assistant Professor of Oceanography. (1955)
B.S., New Hampshire, 1949; M.S., 1951.

Stern, Louis Harold, Acting Assistant Professor of Economics. (1955)
B.S., Illinois, 1947; M.A., California, 1954.

Stevenson, Robert M., Professor of Business Administration. (1947)
B.A., Duke, 1937; M.A., Pennsylvania State College, 1946; C.P.A., 1948; D.B.A., Indiana, 1955; C.L.U., 1955.

Stewart, Billy Ray, Instructor of Agricultural Engineering. (1956)
B.S., Agricultural and Mechanical College of Texas, 1951.

Stewart, Norman Arthur, Jr., Assistant Professor of Business Administration. (1946, 1949)
LL.B., Baylor, 1938.

Stewart, Robert Blaylock, Assistant Professor of Plant Physiology and Pathology. (1956)
B.S., Oklahoma Agricultural and Mechanical College, 1950, M.S., 1953.

Stokes, Elmore Ewing, Jr., Assistant Professor of English. (1951, 1953)
B.A., Texas, 1943; M.A., 1948; Ph.D., 1951.

Street, William Ezra, Professor of Engineering Drawing and Head of Department. (1941)
B.S., Texas Technological College, 1930; M.A., 1933; LL.D., Harding College, 1947; Reg. Prof. Engr.

Taylor, Lloyd Chamberlin, Jr., Instructor of History. (1956)
B.A., Lehigh, 1949; M.A., 1951; Ph. D., 1956.

Thiers, Harry Delbert, Associate Professor of Biology. (1947, 1956)
B.A., Texas, 1941; M.A., 1947; Ph.D., Michigan, 1955.

Thompson, Herbert Gordon, Jr., Associate Professor of Business Administration. (1951, 1954)
B.S., Miami, 1947; M.B.A., 1949.

Thompson, John George Hatch, Professor of Mechanical Engineering. (1938, 1954)
B.S., Pennsylvania State College, 1933; M.E., 1938; M.S., Agricultural and Mechanical College of Texas, 1950; Reg. Prof. Engr.

Timm, Tyrus Raymond, Professor of Agricultural Economics and Sociology and Head of Department. (1947, 1953)
B.S., Agricultural and Mechanical College of Texas, 1934; M.S., 1936; M.P.A., Harvard, 1947; D.P.A., 1949.

Tishler, Carl Edward, Professor of Physical Education and Head of Department. (1941, 1947)
B.S., Ohio State, 1926; M.A., Western Reserve, 1935.

Tittle, Morris Edward, Assistant Professor of Mathematics. (1943, 1951)
B.A., East Texas State Teachers College, 1923; M.A., Texas, 1937.

Trevino, Gilberto Stephenson, Instructor of Veterinary Medicine and Surgery. (1954)
D.V.M., Agricultural and Mechanical College of Texas, 1952.

Trotter, Ide Peebles, Associate Dean of the Graduate School and Professor of Agronomy. (1936, 1956)
B.A., Mississippi College, 1915; B.S., Mississippi State College, 1918; M.S., 1921; Ph.D., Wisconsin, 1933.

Truettner, Willard Irving, Professor of Mechanical Engineering. (1930, 1943)
B.S., Michigan, 1928; M.S.E., 1930; Reg Prof. Engr.

Turk, Richard Duncan, Professor of Veterinary Parasitology and Head of Department. (1944)
D.V.M., Kansas State College, 1933; M.S., Agricultural and Mechanical College of Texas, 1939.

Ullah, Ahmad, Assistant Professor of Electrical Engineering. (1956)
I.Sc., Dacca Intermediate College, 1941; B.E., Sibpur Engineering College, 1945; M.Eng., Liverpool, 1950.

Van der Zant, Wilhalmus Carl, Assistant Professor of Dairy Science. (1953)
B.S., Wageningen, 1947; M.S., 1949; M.S., Iowa State College, 1950; Ph.D., 1953.

Varvel, Walter A., Professor of Psychology. (1941, 1945)
A.B., Kansas, 1932; M.A., 1933; Ph.D., 1938.

Vezey, Edward Earl, Professor of Physics. (1920, 1938)
B.S., Oklahoma Agricultural and Mechanical College, 1910; M.S., Agricultural and Mechanical College of Texas, 1927.
(On leave of absence)

Vrooman, Richard, Associate Professor of Architecture. (1949, 1955)
B.A., Oberlin College, 1941; B.Arch., Western Reserve, 1949; M.Arch., Agricultural and Mechanical College of Texas, 1952; Reg Prof. Arch.

Wagner, William Grant, Assistant Professor of Architecture. (1954, 1956)
B.Arch., Texas, 1949; Reg. Prof. Arch.

Waldrip, William Jasper, Assistant Professor of Range and Forestry. (1950, 1952)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1950.

Walker, Fred Arsenith, Captain, Assistant Professor of Military Science and Tactics. (1954)
B.S., Agricultural and Mechanical College of Texas, 1947.

Wallmo, Olof Charles, Assistant Professor of Wildlife Management. (1955)
B.S., Utah State Agricultural College, 1946; M.S., Wisconsin, 1948.

Walton, Ernest Vernon, Professor of Agricultural Education and Head of Department. (1946, 1953)
B.S., Agricultural and Mechanical College of Texas, 1937; M.S., 1947.

Walton, William Lawrence, Instructor of Engineering Drawing. (1956)
B.S., Agricultural and Mechanical College of Texas, 1954.

Wapple, Albert Russell, Instructor of Mathematics. (1942)
B.S., California, 1914; M.A., 1915.

Ward, James McCall, Assistant Professor of Agricultural Economics. (1941, 1946)
B.S., Agricultural and Mechanical College of Texas, 1924; M.S., 1938.

Ward, Robert Page, Professor of Electrical Engineering. (1925, 1943)
B.S., Agricultural and Mechanical College of Texas, 1924; M.S., 1934.

Watkins, Gustav McKee, Professor of Plant Physiology and Pathology and Head of Department. (1949, 1950)
B.A., Texas, 1929; M.S., 1930; Ph.D., Columbia, 1935.

Watkins, Thomas David, Jr., Professor of Animal Husbandry. (1954)
B.S., California, 1940; M.S., 1947; Ph.D., Maryland, 1954.

Watson, George Harvey, Lieutenant Colonel, Associate Professor of Military Science. (1954)
B.S., United States Military Academy, 1943.

Weaver, Paul, Distinguished Professor of Geology and Geophysics. (1953)
A.B., Columbia, 1908; Reg. Prof. Engr.

Webb, Conrad Casper, Jr., Instructor of Engineering Drawing. (1956)
B.S., Agricultural and Mechanical College of Texas, 1954.

Weekes, Donald Fessenden, Professor of Physics. (1937, 1945)
B.S., Middlebury College, 1924; M.A., Amherst College, 1926; Ph.D., Cornell, 1937.

Weiner, Peter Douglas, Instructor of Mechanical Engineering. (1956)
B.S., Agricultural and Mechanical College of Texas, 1954.

White, Robert Frederick, Professor of Floriculture and Landscape Architecture and College Landscape Architect. (1947, 1954)
B.S., Pennsylvania State College, 1934; M.Land., Michigan, 1951.

Whiting, Robert Louis, Professor of Petroleum Engineering and Head of Department. (1946, 1954)
B.S., Texas, 1939; M.S., 1943; Reg. Prof. Engr.

Whitmore, Frank Charles, Assistant Professor of Physics. (1951, 1956)
A.B., Gettysburg College, 1949; M.A., Delaware, 1951.

Whitney, Howard Stephen, Assistant Professor of Agricultural Economics. (1954)
B.S., Oklahoma Agricultural and Mechanical College, 1943; M.S., 1948.

Whittington, William, Assistant Professor of Business Administration. (1954)
B.B.A., Texas, 1939; M.B.A., 1947.

Wieder, Russell Karl, Instructor of Physical Education. (1956)
B.A., Kenyon College, 1942.

Wiening, Victor, Assistant Professor of English. (1952, 1956)
B.A., Valparaiso, 1947; M.A., Louisiana State, 1949.

Wilcox, George Barton, Professor of Education and Psychology. (1920, 1945)
B.S., Sam Houston State Teachers College, 1912; B.S., Agricultural and Mechanical College of Texas, 1923; A.M., Columbia, 1926.

*Williams, David Willard, Acting President. (1919, 1956)
B.S., Ohio State, 1915; M.S., Illinois, 1916.

Williams, George Robertson, Assistant Professor of Horticulture. (1956)
B.S., Agricultural and Mechanical College of Texas, 1947; M.S., Virginia Polytechnic Institute, 1951.

Williams, James Stanley, Instructor of Genetics. (1956)
B.S., State College of Washington, 1955.

Williams, Mack Lester, Instructor of Mathematics. (1955)
B.S., North Texas State College, 1942; M.S., 1949.

Wilson, Basil Wrigley, Acting Associate Professor of Oceanography. (1953)
B.S., Cape Town, 1931; M.S., Illinois, 1939; C.E., 1940; D.Sc., Cape Town, 1953.

Wilson, James Alexander, Instructor of Agronomy. (1956)
B.S., Oklahoma Agricultural and Mechanical College, 1952; M.S., 1954.

Wingren, Roy Matthew, Professor of Mechanical Engineering. (1928, 1943)
B.S., Agricultural and Mechanical College of Texas, 1927; M.S., 1934; Reg. Prof. Engr.

Wood, Norris Philip, Assistant Professor of Microbiology. (1955)
B.S., Hartwick College, 1949; M.S., Cornell, 1951; Ph.D., Pennsylvania, 1955.

Wood, Robert Porter, Associate Professor of Business Administration. (1948, 1955)
B.B.A., Sam Houston State Teachers College, 1947; M.S., Agricultural and Mechanical College of Texas, 1950; C.P.A., 1951.

Woods, Paul Joseph, Associate Professor of History. (1946, 1955)
B.A., Illinois, 1938; M.A., 1940; Ph.D., 1941.

Woolf, Jack Royce, Professor of Mechanical Engineering. (1947, 1956)
B.S., Agricultural and Mechanical College of Texas, 1948; M.S., 1948; Ph.D., Purdue, 1951.

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*Effective December 22, 1956.

Woolket, Joseph John, Professor of Modern Languages and Head of Department. (1925, 1945)
A.B., Oberlin College, 1924; M.A., 1925.

Woolsey, Isaac Wayne, Instructor of Engineering Drawing. (1956)
B.B.A., North Texas State College, 1952.

Worley, Willard Parker, Instructor of Electrical Engineering. (1956)
B.S., Agricultural and Mechanical College of Texas, 1947.

Wright, Billy Rhea, Captain, Assistant Professor of Military Science and Tactics. (1955)
B.S., Agricultural and Mechanical College of Texas, 1955.

Wright, Ernest Charles, Major, Associate Professor of Military Science and Tactics. (1953)
B.S., Pennsylvania State College, 1942.

Wright, Samuel Robert, Professor of Civil Engineering and Head of Department. (1923, 1946)
B.S., Agricultural and Mechanical College of Texas, 1922; M.S., 1928; C.E., 1931; Ph.D., 1946; Reg. Prof. Engr.

Wright, Thomas Alexander, Captain, Assistant Professor of Air Science. (1954, 1955)
B.S., North Texas State College, 1951.

Wykes, Stanley Allen, Professor of Industrial Engineering. (1947, 1951)
B.S., Pennsylvania State College, 1940; M.S., Virginia Polytechnic Institute, 1946; Reg. Prof. Engr.

Yantis, Theodore R., Professor of Business Administration. (1952, 1956)
A.B., Otterbein College, 1947; M.B.A., Ohio State, 1949; Ph.D., 1955.

York, Ernest Charles, Assistant Professor of English. (1946, 1955)
B.A., Concord Seminary, 1942; B.S., Houston, 1944; M.A., Texas, 1948.

Young, Vernon Alphus, Professor of Range and Forestry and Head of Department. (1929, 1946)
B.S., Utah State Agricultural College, 1923; M.S., Iowa State College, 1924; Ph.D., Minnesota, 1929.

Zimmerman, Howard Karl, Jr., Associate Professor of Chemistry. (1952, 1955)
B.S., Washington, 1942; M.A., Leland Stanford, 1944; Ph.D., Oregon, 1948.

Zingaro, Ralph Anthony, Assistant Professor of Chemistry. (1954)
B.S., City College of New York, 1946; M.S., Kansas, 1949; Ph.D., 1950.

Zinn, Bennie A., Head of the Department of Student Affairs. (1945, 1954)
B.S., Agricultural and Mechanical College of Texas, 1926; M.S., 1928.

SUMMARY OF THE TEACHING STAFF AS OF DECEMBER 1, 1956

	Active	On Leave	Total
Heads of Departments and Divisions of Instruction and Other Members of the Academic Council	64	0	64
Other Full Professors	118	5	123
Associate Professors	137	1	138
Assistant Professors	139	3	142
Instructors	104	1	105
Total	562	10	572

RETIRED FACULTY MEMBERS

Bagley, John Brewer, Professor Emeritus of Cotton Marketing. (1905, 1947)
B.A., Wake Forest College, 1900.

Bolton, Frank Cleveland, President Emeritus of the College. (1909, 1950)
B.S., Mississippi State College, 1905; M.S., Ohio State, 1928; LL.D., Austin College, 1932; LL.D., Agricultural and Mechanical College of Texas, 1951.

Campbell, Charles Boyle, Professor Emeritus of Modern Languages. (1903, 1948)
Ph.B., DePauw, 1900; Ph.D., Chicago, 1912.

Dunn, Ralph Clark, Professor Emeritus of Veterinary Bacteriology and Hygiene. (1911, 1950)
D.V.M., Ohio, 1911.

Finlay, Albert Edward, Associate Professor Emeritus of Mathematics. (1929, 1956)
B.S., Peabody College, 1929; M.A., 1929.

Gunter, Percy Glyndon, Professor Emeritus of English. (1911, 1955)
A.B., Elon College, 1909; M.A., North Carolina, 1910.

Hughes, William Lycurgus, Professor Emeritus of Education. (1920, 1947)
B.A., Howard Payne College, 1920; B.S., Agricultural and Mechanical College of Texas, 1921; M.S., 1922.

Humbert, Eugene Peter, Professor Emeritus of Genetics. (1916, 1951)
B.S.A., Iowa State College, 1906; M.S., Cornell, 1908; Ph.D., 1910.

Jones, Beecher Calvin, Assistant Professor Emeritus of Chemistry. (1921, 1947)
A.B., Baylor, 1921; B.S., Agricultural and Mechanical College of Texas, 1923; M.S., 1926.

Jones, David Cluie, Professor Emeritus of Mathematics. (1909, 1956)
A.B., Emory, 1908.

Kyle, Edwin Jackson, Dean Emeritus of the School of Agriculture. (1902, 1945)
B.S., Agricultural and Mechanical College of Texas, 1899; B.S.A., Cornell, 1901; M.S.A., 1902; D.Sc., Arkansas, 1941.

McGinnis, Nestor Massie, Professor Emeritus of Floriculture and Landscape Architecture. (1915, 1953)
B.S., Agricultural and Mechanical College of Texas, 1908.

Sherwood, Ross M., Professor Emeritus of Poultry Husbandry. (1949)
B.S., Iowa State College, 1910; M.S., Agricultural and Mechanical College of Texas, 1924.

Silvey, Oscar William, Professor Emeritus of Physics. (1916, 1951)
A.B., Indiana, 1907; A.M., 1910; Ph.D., Chicago, 1915.

Summey, George, Jr., Professor Emeritus of English. (1922, 1951)
A.B., Southwestern Presbyterian, 1897; M.A., 1898; Ph.D., Columbia, 1919.

Winkler, Charles Herman, Professor Emeritus of Psychology. (1923, 1946)
B.S., Texas, 1904; M.A., 1914; Ph.D., Missouri, 1916.

THE COLLEGE

LOCATION

The Agricultural and Mechanical College of Texas is located at College Station, Brazos County, Texas, 100 miles north of Houston, 100 miles east of Austin, and 170 miles south of Dallas. It is served by Greyhound and Kerrville Bus Lines with convenient connections to all parts of the State; and by Continental Airlines and Trans-Texas Airways, which maintain a terminal at Easterwood Field, the College airport, located about two miles from the campus.

HISTORICAL SKETCH

The Agricultural and Mechanical College of Texas, like the land grant institutions in other states of the Union, owes its origin to the Morrill Act, which was approved by Congress July 2, 1862. This act provided for the donation of a specified amount of public lands to the several states and territories. Proceeds from the sale of these lands were to constitute a perpetual fund, the principal of which should remain forever undiminished. The interest from this fund was to be used for the support of at least one technological college whose objective must be, without excluding other scientific and classical studies and including military tactics, to teach branches of learning pertaining to agriculture and mechanic arts in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life. The Legislature of Texas accepted the provisions of the congressional legislation in 1866, and $174,000 was realized from the sale of lands set aside under the Act. Before the College opened, this fund had grown to $209,000 through the addition of accrued interest.

In April, 1871, the Legislature provided for the establishment of the Agricultural and Mechanical College. A commission created for the purpose of locating the College accepted the offer made by the citizens of Brazos County and located the institution on a tract of 2,416 acres of land in that county. The College was formally opened, and instruction began on October 4, 1876. Its educational activities have been enlarged as the need for such expansion became evident. At the present time both undergraduate and graduate instruction are offered not only in the fields of agriculture and engineering but also in liberal arts, science, education, business administration, and veterinary medicine.

The purchase from time to time of additional land adjacent to the original tract has increased the land owned by the College in Brazos County to approximately 5,200 acres. In 1944 the College acquired a plantation of 3,192 acres in Burleson County for experimental purposes, while in 1950 the College acquired 411 acres in Kimble County for the Junction Adjunct of the Agricultural and Mechanical College of Texas. The value of the physical plant has grown to approximately $34,000,000 and a good foundation has been laid at the College for instruction, for investigation, and for extension by means of financial aid secured from both the Congress and the State Legislature.

SCHOOLS AND DEPARTMENTS

The Agricultural and Mechanical College of Texas is composed of the Basic Division; the Schools of Agriculture, Arts and Sciences, Engineering, Military Sciences, and Veterinary Medicine; and the Graduate School. The Basic Division, which is a non-degree granting school, was established to aid first-year students in their adjustment to college. After completing a year in the Basic Division, a student satisfying the entrance requirements to one of the degree-granting schools may be admitted to the School of Agriculture, the School of Arts and Sciences, or the School of Engineering. The

School of Veterinary Medicine is another degree-granting school, admission to which is obtained only after completion of the program in pre-veterinary medicine and selection within the quota to be admitted for the session under consideration. The ROTC program is under the supervision of the School of Military Sciences. The Graduate School assists graduate students in developing and pursuing individual educational programs. More detailed information concerning its administration and the degrees which may be earned will be found in the Bulletin of the Graduate School.

For administrative purposes the 48 departments and divisions of instruction are assigned to the several schools as follows:

School of Agriculture

Agricultural Economics and Sociology
Agricultural Education
Agricultural Engineering
Agronomy
Animal Husbandry
Biochemistry and Nutrition
Dairy Science
Entomology
Floriculture and Landscape Architecture
Genetics
Horticulture
Plant Physiology and Pathology
Poultry Science
Range and Forestry
Wildlife Management

School of Arts and Sciences

Biology
Business Administration
Chemistry
Economics
Education and Psychology
English
Geography
History and Government
Journalism
Mathematics
Modern Languages
Oceanography and Meteorology
Physical Education
Physics

School of Engineering

Aeronautical Engineering
Architecture
Chemical Engineering
Civil Engineering
Electrical Engineering
Engineering Drawing
Geology and Geophysics
Industrial Education
Industrial Engineering
Mechanical Engineering
Petroleum Engineering

School of Military Sciences

Air Science
Military Science and Tactics

School of Veterinary Medicine

Veterinary Anatomy
Veterinary Medicine and Surgery
Veterinary Microbiology
Veterinary Parasitology
Veterinary Pathology
Veterinary Physiology and Pharmacology

LIBRARY FACILITIES

Library resources available to students and faculty of the College total over 300,000 volumes. A large staff of professionally trained librarians provides library service of the highest type. The book collection is housed primarily in the main library building (Cushing Memorial Library), but certain collections, due to their highly specialized nature, are to be found in branch libraries on the campus.

Cushing Memorial Library: Located conveniently near the center of the campus is the air-conditioned Cushing Memorial Library, which houses the main collection now numbering over 260,000 volumes, including bound periodicals and files of federal and state documents. This library is also a designated depository for federal documents on a selective basis. The collection of foreign documents and periodicals has been supplemented greatly within the past few years. The library receives currently over 2,800 periodicals and serials. Bound files of the majority of the periodicals are kept for reference and research. Over fifty state and national newspapers are received by the library.

The library has been developed chiefly along reference and technical lines, and a good general reading collection has been accumulated. Funds from the Exchange Store and generous contributions from the A. and M. Mothers' Clubs throughout the State have been used to increase substantially the collection of fiction and non-technical popular material. The careful selection of new books keeps the collection abreast of modern thought. With the exception of periodicals, government documents, and certain books temporarily reserved by departments for reference or required reading, all books are loaned for home use for a period of two weeks with the privilege of renewal unless the book is requested meanwhile. The important reference works, such as encyclopedias, dictionaries, indexing services and the like are kept in the general reference room on the second floor. Specialized reference materials used in science and agricultural research are shelved in the science and agricultural reference room on this same floor. The Asbury Browsing and Study Room is located on the third floor and is furnished with comfortable tables and chairs for pleasure reading. Graduate study carrells are provided throughout the stacks.

The Cushing Memorial Library is also the research library of the Texas Agricultural Experiment Station, which has made notable contributions to the Agricultural Collection.

It also serves the agricultural extension agents throughout the State by mail.

During the regular session the library is open for the following hours: Weekdays, 8 a.m. to 10 p.m., Saturdays, 8 a.m. to 1:00 p.m.; Sundays, 2 p.m. to 10 p.m. Between terms and on holidays the library is open on weekdays from 8 a.m. to 5 p.m. and on Saturdays from 8 a.m. to 12 noon. It is closed on Sundays.

Branch Libraries: The College Library administers three branch libraries on the campus. The largest of these is the **Veterinary Library,** located on the first floor of the new Veterinary Science Building. It contains over 6,000 volumes of books and periodicals in veterinary and allied fields.

The Division of Architecture Library, located on the fourth floor of the Academic Building, has a specialized collection of over 3,500 volumes of books and journals; and the **Division of Business Administration Library,** located on the first floor of Francis Hall, provides a special reference collection of some 2,000 volumes for students of business and accounting.

All three branch libraries are open daily from 8:00 a.m. to 5:00 p.m., Mondays through Fridays, and 8:00 a.m. to 12:00 noon on Saturdays. The Veterinary Library is open each week night from 7:30 to 9:00 except Tuesday night.

The Texas Engineers' Library: By an act of the State Legislature in 1941, the Texas State Board of Registration for Professional Engineers was given authority to establish a library for the professional engineers of Texas. It was voted by the members of the State Board of Registration for Professional Engineers that this library be established at the Agricultural and Mechanical College of Texas.

The Texas Engineers' Library, centrally located on the campus, in the new Gibb Gilchrist Engineering Library Building, now has a collection of approximately 40,000 volumes. It is being developed and assembled primarily for the professional engineers of the State as a specialized technical library; however, some general reference books as well as those in some of the fields allied to engineering are included in the collection. This library now receives over 1,000 technical periodicals and maintains bound files of most of them. The library indexing services make any article readily available.

BUILDINGS AND FACILITIES

The physical plant of the College includes buildings with a total valuation of approximately $22,290,000 while equipment and lands of the College represent an additional valuation of $13,710,000. Included among these buildings are the Memorial Student Center, the Cushing Memorial Library, the Gibb Gilchrist Engineering Library, the College Administration Building, the G. Rollie White Coliseum, the chapel, the auditorium, hospital, Y.M.C.A., supply store, office buildings, and laboratories for the Texas Agricultural Experiment Station, numerous classroom buildings with laboratory and shop facilities for the various departments, and many barns providing facilities for handling the various classes of livestock used in demonstration and laboratory work in the Schools of Agriculture and Veterinary Medicine. Athletic facilities consist of a stadium, field house and natatorium, baseball diamond and bleachers, golf course, and numerous tennis courts and practice fields. Twenty-six dormitories are located conveniently on the campus, and two dining halls are in operation.

ACADEMIC REGULATIONS

Certain academic regulations have been set up by the faculty for the purpose of assisting the student to secure the maximum benefit from his studies. These regulations, contained in the copy of **College Regulations** given to each student when he enters the College, serve as a guide in such important matters as choice of course and subjects, methods of study, attendance, examinations, promotion, and graduation.

By means of reports at regular intervals, frequent conferences with the deans, the Registrar, Office of Student Personnel Services, and members of the teaching staff, the authorities of the College keep in close touch with the student's progress; and such advice and counsel are offered from time to time as seem justified in each case. For failure to keep up with his studies, the student may at any time be dropped from the rolls of the College.

The College reserves the right to modify the curricula or withdraw any course when it appears wise to do so.

DEGREES OFFERED

The following degrees are offered for the satisfactory completion of resident study in the appropriate curriculum:

Bachelor of Arts (B.A.)
Bachelor of Business Administration (B.B.A.)
Bachelor of Science (B.S.)
Bachelor of Architecture (B.Arch.)
Bachelor of Petroleum Engineering (B.P.E.)
Doctor of Veterinary Medicine (D.V.M.)
Master of Agriculture (M.Agr.)
Master of Architecture (M.Arch.)
Master of Business Administration (M.B.A)

Master of Education (M.Ed.)
Master of Engineering (M.Eng.)
Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)

On the basis of acceptable professional experience the following professional degrees in engineering are offered to graduates of the College:

Aeronautical Engineering (Aero.E.)
Agricultural Engineer (A.E.)
Architectural Engineer (Arch.E.)
Chemical Engineer (Ch.E.)
Civil Engineer (C.E.)
Electrical Engineer (E.E.)
Geological Engineer (Geol.E.)
Industrial Engineer (Ind.E.)
Mechanical Engineer (M.E.)
Petroleum Engineer (P.E.)

REQUIREMENTS FOR A BACCALAUREATE DEGREE

The appropriate degree and the diploma of the College will be conferred upon the student who has made formal application for the undergraduate degree and has satisfied the following requirements:

1. He must complete one of the regular courses of study leading to a degree.

2. The total number of grade points earned at this institution in courses applied to this degree must equal at least the number of hours which he carried in courses at this institution which are applied to this degree. Grades of F or WF shall be included, except such grades and grades of D made in the freshman year or summer session preceding that year which are subsequently repeated in this college during the student's first four semesters in college. Grades of WP shall be excluded.

3. The total number of grade points earned at this institution in courses in his major department applicable to this degree must equal at least the number of hours which he carried at this institution in his major department which are applied to this degree. Grades of F and WF shall be included, but grades of WP shall be excluded.

4. Grades made in courses elected in excess of a student's degree requirements shall be counted, but if failed such courses need not be repeated.

5. He must have settled all financial obligations to the College.

6. He must be formally recommended for graduation by the Academic Council after consideration of his complete record.

7. Unless registered in absentia or excused by his dean, he must be present in person at the graduation exercises.

These requirements must be completed and all grades on record in the Registrar's Office not later than 5 p.m. on Thursday preceding Commencement Day.

Requirements for an advanced degree are outlined in the Graduate Bulletin.

APPLICATION FOR A DEGREE

During the semester or summer session preceding the conferring of the

degree, a student must be officially registered in the College. Formal application for degrees must be submitted to the Registrar, on forms provided for that purpose, not later than 90 days prior to the end of the semester, or 30 days prior to the end of the summer term, in which the student expects to complete his requirements for graduation.

In order to be a candidate for a degree at the end of a semester or summer term, a student at the beginning of that semester or term must fulfill the following two conditions:

1. He must be registered for the courses necessary to complete the requirements of his curriculum.

2. He must need a grade point ratio of no more than 1.50 in the courses for which he is registered in that semester or term to satisfy the minimum requirements of a 1.0 grade point ratio in his major field and in his entire college program.

RESIDENCE REQUIREMENT

A candidate for a Bachelor's degree must complete the requirements of the final year's work of his curriculum in residence at this institution with the exception of six semester hours, which may be accepted in transfer. However, in every case the student must complete at least 36 semester hours of the last two years of his curriculum at this institution.

A candidate for a Bachelor's degree in the School of Agriculture will be expected to complete approximately the last two years in residence at this institution. Acceptance of transfer credit for courses in agriculture generally will be limited to those courses taught in the freshman and sophomore years at this institution.

TWO DEGREES

A candidate for a second Bachelor's degree must have been in residence at least two academic years and must have completed all the essential work of the second curriculum not covered in the first; in all such cases the total amount required must be at least 30 semester hours additional to the greater number required for either degree.

CHANGE OF CURRICULUM

Applications for change of curriculum shall be passed upon by the deans of the schools concerned. A student under 21 years of age must have the written consent of his parent or guardian.

At the time of the change, the dean of the school to which the transfer is being made will indicate any courses on the student's record which are to be excluded from requirements for his new curriculum and will so advise the Registrar.

TRANSFER OF CREDITS

As a general policy credit will be given in transfer for work completed with a grade of C or better at another properly accredited institution. Work completed with the grade of D must be validated before it can be transferred. Validation may be by examination or by completion with a grade of C or better of more advanced work in the same subject area. Any student desiring to validate work done elsewhere should discuss with the Registrar the conditions necessary for validation of his particular work and secure from him authorization for such action. Credits given by transfer are provisional and may be cancelled at any time if the student's work in the College is unsatisfactory.

Work done in an institution not properly accredited must be validated by one of the two methods of validation already mentioned before it can be transferred.

CORRESPONDENCE COURSES

The Agricultural and Mechanical College of Texas offers no correspondence courses. A student in residence at this institution will be permitted to receive credit for correspondence courses taken elsewhere only when written permission has been granted in advance by the dean of of his school.

Credit earned in a course completed by correspondence will be accepted only after a validating examination has been passed unless the final examination is taken under the supervision of the Registrar at this college. An exception will be made in the case of courses taken in the United States Armed Forces Institute.

Not more than twelve semester hours of credit taken in correspondence work may be applied toward the requirements for a degree.

REQUIREMENT IN GOVERNMENT AND HISTORY

In order to meet the legal requirements for a baccalaureate degree, all students must have credit for six semester hours of American history or three semester hours of American history and three semester hours of Texas history, in addition to the long-standing government requirement of Government 306 and credit for three semester hours of military or air science. For those students who do not take military or air science, six hours of government must be completed. Such students must complete Government 306 and 307.

In satisfying the government requirement for a teacher's certificate, Government 306 and 307 may be used. Government 305 will fulfill this requirement. Credit for basic military science cannot be used in satisfying this requirement.

REQUIREMENT IN PHYSICAL EDUCATION

All students under 21 years of age at the time of entrance are required to complete Physical Education 101, 102, 201, 202.

Transfer students will be given exemption from one semester of required physical education for each semester of course work completed at the other institution.

Students who have completed as much as one year of service in the Armed Forces of the United States on active duty will be exempt from the requirement in physical education.

CREDIT IN MILITARY TRAINING FOR EX-SERVICEMEN

Students who have completed one year of service in the Armed Forces of the United States on active duty are exempt from further military training and may be given academic credit of four semester hours for basic ROTC.

Students who have served for at least one year in the Armed Forces of the United States on active duty and who hold a commission are exempt from further military training and may be given academic credit of sixteen semester hours for basic and advanced ROTC.

A student wishing to receive such credit should file a photostatic or certified copy of his discharge with the Registrar's Office so that appropriate credit may be allowed.

ELIGIBILITY FOR AN ADVANCED ROTC CONTRACT

To be considered for an advanced course ROTC contract a student must: (1) be morally and physically qualified, (2) attain junior classification, (3) have satisfactorily completed the ROTC basic course or have served at least one year of active military service.

Students are reminded that acceptance of an advanced course ROTC contract requires completion of the advanced course ROTC curriculum, completion of the ROTC summer camp, and acceptance of a reserve commission if one is tendered. The foregoing become integral parts of the degree requirements of advance course ROTC students. Therefore, for those students under an advanced course ROTC contract, the College will not grant a degree prior to acceptance of a reserve commission. Likewise, the reserve commission will be withheld from advanced course ROTC students who have completed requirements for a reserve commission until they have completed work for their academic degree.

ENGLISH CONFERENCES

Students enrolled in courses in English composition are required to attend conferences with their instructors.

ASSEMBLIES

In most of the teaching divisions of the College, students are required to attend assemblies at intervals during the session. Prominent speakers are presented at the assemblies for the discussion of topics of general and special interest.

THE GRADING SYSTEM

Since one comes to college for an education, his grades are usually taken as an indication of the proficiency of his endeavors. The student's semester grade in a course is based upon recitation, written exercises and tests, laboratory work, and the final examination. The final examination has a weight of one-fourth of the final grade, and the proportionate weight assigned to each of the other factors is determined by the head of the department administering the course.

There are four passing grades signifying various degrees of achievement, and grade points are awarded on the basis of these grades.

Grade	Description	Range (Inclusive)	Grade Points per Semester Hour
A	Excellent	92-100	3
B	Good	84- 91	2
C	Fair	76- 83	1
D	Passing	70- 75	0

The lowest passing grade is 70. There is one failing grade, F, below 70, indicating work of unsatisfactory quality. Credit for a course failed may be obtained only by satisfactorily repeating the course in class, except that in a course including both theory and practice, the head of a department may excuse a student from repeating the practice if his grade in the practice is B or better, and if in the judgment of the head of the department the repetition is not necessary. The student must register for both theory and practice, however.

The temporary grade "Inc." (Incomplete) indicates that the student has satisfactorily completed the course with the exception of a major quiz, final examination, or other work. This grade is given only when the deficiency is

due to authorized absence or other cause beyond the control of the student and when the work already done has been of a quality acceptable for the satisfactory completion of the course. The privilege of completing such work is limited to the end of the first month of his succeeding semester in college; otherwise the student must repeat the course in order to receive credit, unless for good reason his dean grants an extension of time.

Permission to remove a semester grade of "Inc." received because of absence from a quiz or examination may be granted by the head of the department only on receipt of official notice that the absence was authorized or evidence that the cause for the absence prevented making normal preparation to take the quiz or examination before the close of the semester.

When a student resigns or is dropped from the College after the first two weeks of a semester, the Registrar calls for his grades and enters on his permanent record the symbol WP after each course in which he is passing and WF after each course in which he is not making a passing grade. All WF's and F's will be taken into account in determining his grade point ratio thereafter unless for cause the Executive Committee directs otherwise.

The semester grade in a subject which a student is required to drop on account of failure to keep up with the work is F.

GRADE POINT RATIO

A student's grade point ratio for any period is computed by dividing the total number of semester hours for which he received grades into the total number of grade points earned in that period. Grades of WF and F are included, but grades of WP are excluded.

Only the record made in course work for which the student was registered in this institution is used in determining his grade point ratio.

GRADE REPORTS

Preliminary Report: A preliminary report of the student's progress is sent to the parent or guardian about eight weeks after the beginning of each semester.

Semester Reports: At the close of each semester, a report of the student's work during the semester is sent directly to the parent or guardian.

Unsatisfactory Work: During the session the deans receive reports from the members of the teaching staff on students doing unsatisfactory work. These reports form the basis for personal conferences with the students concerned and for special notices to parents and guardians.

Reports to High Schools: At the close of the first semester, a report is sent to each accredited high school showing the grades made by the freshmen entering the College from that school.

DISTINGUISHED STUDENTS

A student who completes a semester schedule of at least 15 hours with no grade lower than C and with a grade point ratio of not less than 2.25 for the semester shall be designated as a "Distinguished Student." In official acknowledgment of the designation, he is issued a Distinguished Student card by the dean of his school.

As a recognition of his scholastic achievement, the College allows a Distinguished Student to present his card to the instructor during the next succeeding semester after he distinguishes and, without requirement or privilege of making up the work missed, absent himself from any theory class except for announced quizzes provided, however, that any student who

without permission of the instructor leaves a class to which he has reported shall be given a grade of zero for the day's work. This privilege may be revoked for cause at any time by the dean of the student's school.

HONORARY SCHOLASTIC SOCIETIES

Students ranking near the top of their class scholastically will be considered for admission to one or more of the national honorary societies described below. The honor societies are intended to reward the student of character and ability, and membership in them is a well-recognized mark of distinction which becomes a part of one's permanent record.

Alpha Zeta. This is the oldest national agricultural honor fraternity in the country. Election to membership is limited to junior and senior students in agriculture who have achieved outstanding records of scholarship, character, and leadership in their chosen fields.

Phi Kappa Phi. Open to all academic fields in the undergraduate school, this honor society elects its membership from those students who are within a year of graduation in a four-year course and are within the top one-eighth of their class scholastically. The student must have been registered one year in the College to be eligible. Graduate students with outstanding records who have satisfied the residence requirement are also eligible for membership.

Phi Eta Sigma. Election to this freshman honor society is automatic upon attainment of a grade point ratio of 2.50 or better in all freshman work for one semester or more. The individual must have carried an academic load of at least 13 semester hours and must not have transferred more than 20 hours from another college.

Phi Zeta. Students in the School of Veterinary Medicine who rank in the upper ten per cent of the junior class or upper twenty-five per cent of the senior class and who have a grade point average of at least 2.25 in their entire veterinary curriculum through the preceding semester are eligible for election to this honor society.

Sigma Xi. The object of this society is to encourage original investigation in science, pure and applied. It is open to graduate students and to staff members of the A. and M. College System who have shown a marked excellence in one or more departments of pure or applied science and given evidence of an aptitude for scientific research.

Tau Beta Pi. Students in the School of Engineering who rank in the top one-eighth of the junior class or top one-tenth of the senior class are eligible for election to this society. This is the oldest national engineering society founded for the purpose of recognizing scholarship. Members are given keys and certificates.

SCHOLASTIC PROBATION

Whenever a student's cumulative record indicates that he is failing to make satisfactory progress, he is considered as scholastically deficient. The cause of the deficiency will be investigated by the dean of his school, and the student may be placed on scholastic probation of such terms as the dean shall designate, or he may be required to withdraw from the College if the deficiency warrants.

Scholastic probation is a conditional permission for a student to continue in school after he has become scholastically deficient or after he has incurred an excessive number of unauthorized absences. This permission is granted by the dean of the student's school when an analysis of the deficiency indicates that a continuation is in the best interests of the student and the College.

CLASSIFICATION

Sophomore, junior, and senior classification will be granted on completion of 30, 60, and 95 semester hours respectively.

EXCESS HOURS

A student may register for the regular semester program in his curriculum if he is in good standing. With the Dean's approval, necessary adjustments for minor irregularities may be authorized up to 20 hours. Registration for 21 hours or more may be approved under the following conditions:

Hours	Grade Point Ratio Last Semester or Overall
21	1.50
22	2.00
23	2.25
24	2.50

The normal amount of work a student may carry in a six-weeks summer term is 6 credit hours (or 7, if one hour is practice), except that with the approval of the dean concerned, 7 credit hours (8 if one hour is practice) may be taken by a student who has earned at least 27 grade points in the preceding semester.

ADMISSION

APPLICATION FOR ADMISSION

Any person who wishes to enter the College should write to the Director of Admissions, Agricultural and Mechanical College of Texas, College Station, Texas, for a formal application blank. The applicant should complete the form according to the directions printed thereon and return it to the Admissions Office. If the applicant has attended any other institution, he must submit with his application a complete and official transcript from each institution previously attended in lieu of the high school transcript required of those with only high school attendance.

When admission requirements have been satisfied, the Director of Admissions will then send the applicant a letter of acceptance and a physical examination form to be filled out by his personal physician. The physical examination form must be completed and returned to the College Physician. It is of the highest importance that credentials be submitted in advance of registration. If this cannot be done, the applicant should bring them at the opening of the session. Without the credentials the student cannot be admitted, and valuable time will be lost if he has to send for them after arriving at the College.

All applicants for admission to the College must be of good moral character, at least sixteen years old, and free from contagious or infectious diseases. Since the Agricultural and Mechanical College of Texas is not a coeducational institution, only men are admitted to the regular session.

A high school student who is eligible for admission to college and who wishes to enter during the summer may well consider the opportunities of combining study and recreation at the Junction Adjunct of the Agricultural and Mechanical College of Texas. Excellent studying, living, and recreational facilities are available at this beautiful Kimble County campsite in the heart of the Texas hill country. Application blanks for admission to the Adjunct may be obtained from the Director of Admissions, Agricultural and Mechanical College of Texas, College Station, Texas.

BASIC DIVISION

The Basic Division was established to provide for the special needs of entering students and to administer their work during the first year in the College or until they are admitted into one of the degree granting schools. The following groups of students are enrolled in the Basic Division: (1) All acceptable high school graduates entering for the first time upon their college program of studies; (2) All students transferring from other colleges and universities who are not admitted directly to one of the degree granting schools of the College; and (3) All other students who do not meet the requirements for admission to the degree granting school of their choice. These requirements are stated on page 56 of this catalogue.

METHODS OF ADMISSION

Of High School Graduates: Graduation from a properly accredited secondary school with a minimum of fifteen acceptable units is required for admission to the Agricultural and Mechanical College of Texas. These shall include three units in English, one unit in algebra, one unit in plane geometry, two units in the social sciences, one unit in a natural science, and seven acceptable elective units. It is recommended that the elective units include additional courses from the following subject areas: English and speech, mathematics, social sciences, foreign languages, and natural sciences. If necessary, as many as four of the elective units may be chosen from the following:

ELECTIVE UNITS

Advanced Arithmetic	½	Drawing	1 to 4
Agriculture	1 to 4	Home and Family Life	½ to 1
Art	1	Home Making	½ to 1
Business Arithmetic	½	Journalism	1
Bible	½ to 1	Junior Business Training	1
Bookkeeping	1	Music	1
Commercial Geography	½	Typing	½ to 1
Commercial Law	½	Shopwork	1 to 4
Distributive Education	2	Vocational Agriculture	1 to 4
Diversified Occupations	2		

No credit will be granted for work taken in an accredited high school unless the applicant is a graduate of such a school.

A student whose ultimate degree objective is in one of the fields of engineering, including agricultural engineering, is strongly advised to present for admission two units in algebra, one unit in physics, and one-half unit in solid geometry. Trigonometry and an additional year of algebra will be added to the present mathematics entrance requirements for new students entering the fall semester of 1958 and thereafter.

Any student who does not present two units in algebra may be required to complete Mathematics 101, Algebra, before taking Mathematics 102, the beginning algebra course required in many of the curricula. In such cases, Mathematics 101 will not count for credit toward a degree.

An applicant whose pattern of courses does not meet the above requirements will be considered for admission on the basis of a superior scholastic high school record or satisfactory performance on tests administered at this college or by a combination of both.

By Examination: Any or all of the scholarship requirements for admission may be met by passing the entrance examinations. These will be held at the beginning of each semester under the supervision of the College authorities and will cover all the subjects required or accepted for admission as outlined above. Candidates desiring to take examinations at the College should notify the Director of Admissions well in advance of registration.

By Individual Approval: An applicant over twenty-one years of age who has not recently attended school and who cannot satisfy the entrance requirements in full may be admitted without examination, subject to the following requirements:

1. He must make application on the official entrance blanks.

2. He must furnish evidence that his preparation is substantially equivalent to that required of other applicants and that he possesses the ability and seriousness of purpose necessary to pursue his studies with profit to himself and to the satisfaction of the College.

3. He must show by a test in composition that he has an adequate command of the English language.

4. The candidate should forward his credentials to the Director of Admissions in advance of his coming, but in no case will he be admitted without a personal interview.

A student admitted by individual approval will not be considered a candidate for a degree until he has satisfied the entrance requirements in full.

Of Superior Students: Any superior student, as indicated by his entrance tests and his high school record, who presents evidence of outstanding preparation in any subject matter field may be relieved of the introductory course in that field and permitted to substitute another course with the approval of the dean of his school provided he passes a validating examination in the course with a grade of C or better.

Of College Transfer Students: Admission to advanced standing may be granted to an applicant who has satisfied the requirements as outlined below:

An applicant who has attended another college or university must be eligible to return to that institution and also must have for each of the last two semesters, or for the total record if less than two semesters of attendance a grade point ratio of 1.00 (C-average) or better on all courses undertaken.

An official transcript of the record at each college or university previously attended must be submitted.

An applicant is not at liberty to disregard the record of any previous training and gain admission by individual approval or on the basis of a high school record.

On the basis of these credentials, credit will be given for work completed with a grade of C or better, so far as the work is equivalent in character and extent to similar work at A. and M. College. Credits given by transfer are provisional and may be cancelled at any time if the student's work in the College is unsatisfactory. Work completed with a grade of D must be validated before it can be transferred. Validation may be by examination or by completion with a grade of C or better of more advanced work in the subject area.

An applicant whose record does not meet the minimum admission requirements may be considered upon merit after the student has shown satisfactory performance on tests administered at this college.

It is essential that all credentials be forwarded to the Director of Admissions well in advance of registration day.

College credit for work done in secondary schools will be given only on the basis of examination at the College and shall not include work presented in satisfaction of the entrance requirements.

Candidates for a baccalaureate degree in the School of Agriculture will be expected to complete approximately the last two years in residence at this

institution. Acceptance of transfer credit for courses in agriculture will generally be limited to those courses normally taught in the freshman and sophomore years at this institution.

Of Special Students: A limited number of young men over twenty-one years of age may be admitted to the College as special students, not candidates for a degree, subject to the following regulations:

1. The applicant must show good reason for not taking a regular course and must submit satisfactory evidence that he is prepared to profit by the special studies he wishes to pursue.

2. Record of his previous scholastic work must be submitted on the official entrance blanks and must be accompanied by a statement showing (1) his experience; (2) a plan of study, enumerating the courses he desires to pursue; and (3) the purpose or end expected to be accomplished by his study.

3. In order to be admitted to the work of any department, a special student must secure the consent of the head of the department; and his course of study as a whole must be approved by the dean concerned.

Special students are subject to the rules and regulations governing regular students.

A special student who may desire to become a candidate for a degree must satisfy the entrance requirements and obtain the consent of the dean concerned.

To One of the Degree Granting Schools: A student may be transferred from the Basic Division to one of the degree granting schools (or into the pre-veterinary medicine curriculum administered by the School of Veterinary Medicine) whenever in the judgment of the Dean of the Basic Division and the Dean of the degree granting school such transfer is in the student's best interest.

Ordinarily, no student will be considered for transfer whose cumulative record shows less than 30 semester hours of credit and 30 grade points earned in two regular semesters, or less than 45 semester hours and 45 grade points in three regular semesters, or (if he is permitted to remain for a fourth semester) less than 60 semester hours with a grade point deficiency in excess of 10 on all hours undertaken in four semesters.

Students who wish to transfer from the Basic Division to the School of Engineering must have earned at least a number of grade points equivalent to the number of credits undertaken and must have at least a C-average in mathematics. In addition, the student may not be transferred while he has an F grade in a course unless he is currently enrolled in the course for the removal of the deficiency.

Of Nonresident Students: 1. A limited number of nonresident students who have attended another college or university may be accepted so long as facilities are available. Such students must have maintained a grade point ratio of 1.00 (C-average) or better on all courses undertaken in addition to a grade point ratio of 1.00 (C-average) or better for each of the last two semesters.

2. A limited number of out-of-state high school graduates may be accepted so long as facilities are available. Such students, in addition to satisfying all other admission requirements, should have made superior records in high school.

3. Students who are admitted to the College in one curriculum may not be permitted to change to another which is restricted except under the same conditions as apply to new students.

4. The status of the residence of a student is determined at the time of his first registration in the College, and his residence is not changed by his sojourn at A. and M. as a student. His residence may not thereafter be changed by him, but, in the case of a minor, it may be changed by his parents, should they move to and become legal residents of the State and maintain such residence for at least one calendar year.

REGISTRATION

Every student is required to register when he first enters the College and thereafter at the beginning of each semester. Dates of registration for the session of 1957-58 are shown on pages 2-3 of this catalogue.

Registration is not complete until the student pays his fees for the ensuing semester; reports to ROTC headquarters for assignment to an organization; reports to the Chief of Housing for assignment to a room or to report his place of residence if not living in a dormitory; and returns his assignment card, properly approved, to the Registrar's Office, where his receipt showing payment of fees will be stamped "Registered in the Registrar's Office."

EXPENSES

The expenses for a regular session of nine months will vary with the individual concerned and with the course of study pursued. In the case of new students the total cost should range between $800.00 and $1000.00. In general these amounts include four types of expenses as follows: fees payable to the College Fiscal Department (matriculation fee, medical fee, student activities fee, Student Center fee, board, room rent, laundry, and room key deposit); textbooks and supplies; clothing, and military uniform to supplement that furnished by the government; and incidental expenses, estimated to range between $100.00 and $200.00 depending upon the individual concerned.

The total expenses for returning students during a regular session should be somewhat less than those amounts indicated for new students.

The fees for board, room, and laundry listed for the session of 1957-1958 may be changed during the year if economic conditions make it absolutely necessary.

Fees payable to the Fiscal Department:

	First Semester to Begin Sept. 13, 1957	Second Semester to Begin Jan. 31, 1958
Matriculation Fee (See Note 4)	$ 50.00*	$ 50.00*
Medical Service Fee (See page 63)	10.00	10.00
Student Activities Fee (See page 63)	21.90	†
Student Center Fee (See page 63)	2.00	2.00
Board	157.95	156.60
Room Rent	56.25	50.40
Laundry	12.85	12.95
Room Key Deposit, returnable	1.00	
Total payable to Fiscal Dept.	311.95	281.95
Textbooks and supplies are variable with classes and courses—about	40.00	30.00
Total general expenses—about	$351.95	$311.95

*The matriculation fee for nonresident students is $200.00 per semester.
†For those students who did not pay optional fee during the first semester, the fee is $11.55.

All fees except room rent, board, and laundry are payable in full at the beginning of the semester; these fees may be paid in installments as shown below. The last three installments for each semester are due on the dates shown below; the fees for delayed payments shall be $1.00 per day extra for each day of delayed payment of fees for board, room rent, and laundry or for any one of these fees. Students who are delinquent five days will be dropped from the rolls.

All members of the cadet corps living in the dormitories are required to pay the fees for board and laundry in addition to the fees for room rent. Students living in the dormitories who are not members of the cadet corps are required to pay the fees for room rent and laundry in addition to the other required fees. Changes from dormitory student to day student will be made only on the last day of installment payments for room, board, and laundry.

INSTALLMENT PAYING: The general expenses listed above may be paid in installments as follows:

FIRST SEMESTER

1. First installment, payable on entrance, September 13-14
To Fiscal Department:

Matriculation Fee (See Note 4)	$ 50.00*
Medical Service Fee (See page 63)	10.00
Student Activities Fee (See page 63)	21.90
Student Center Fee (See page 63)	2.00
Board to October 22	54.00
Room Rent to October 22	16.65
Laundry to October 22	4.30
Room Key Deposit, returnable	1.00
Total payable to Fiscal Department	$159.85
Textbooks and supplies, variable with classes and courses—about	40.00
General expenses, first installment—about	$199.85

2. Second installment, payable October 1-22
To Fiscal Department:

Board to November 21	40.50
Room Rent to November 21	12.50
Laundry to November 21	3.20
Total payable to Fiscal Department	$ 56.20

3. Third installment, payable November 1-21
To Fiscal Department:

Board to December 20 (Thanksgiving recess excluded)	$ 35.10
Room Rent to December 20	12.10
Laundry to December 20	3.10
Total payable to Fiscal Department	$ 50.30

4. Fourth installment, payable December 1-20
To Fiscal Department:

Board to January 25 (Christmas recess excluded)	$ 28.35
Room Rent to January 25	15.00
Laundry to January 25 (Christmas recess excluded)	2.25
Total payable to Fiscal Department	45.60
Total general expenses, first semester	$351.95

*The matriculation fee for nonresident students is $200.00 per semester.

SECOND SEMESTER

1. First installment, payable on entrance
January 31-February 1, 1958
To Fiscal Department:

Matriculation Fee (See Note 4)	$ 50.00*
Medical Service Fee (See page 63)	10.00
Student Activities Fee (See page 63)	†
Student Center Fee (See page 63)	2.00
Board to February 21	29.70
Room Rent to February 21	9.15
Laundry to February 21	2.35
Total payable to Fiscal Department	$103.20
Textbooks and supplies, variable with classes and courses—about	30.00
General expenses, first installment—about	$133.20

2. Second installment, payable February 1-21
To Fiscal Department:

Board to March 21	$ 37.80
Room Rent to March 21	11.65
Laundry to March 21	3.00
Total payable to Fiscal Department	$ 52.45

3. Third installment, payable March 1-21
To Fiscal Department:

Board to April 23 (Spring recess excluded)	$ 37.80
Room Rent to April 23	13.75
Laundry to April 23	3.55
Total payable to Fiscal Department	$ 55.10

4. Fourth installment, payable April 1-23
To Fiscal Department:

Board to May 31	$ 51.30
Room Rent to May 31	15.85
Laundry to May 31	4.05
Total payable to Fiscal Department	$ 71.20
Total general expenses, second semester	$311.95

ADDITIONAL EXPENSES FOR NEW STUDENTS

In addition to the general expenses shown above, new students will have the following expenses when registering for the first time:

Uniform (See Note 1.)—about	$ 80.00
Slide rule and drawing instruments for engineering students (See Note 3.)	$38.00 to 53.00
Room key deposit, returnable	1.00
For new students registering the second semester, January 31, 1958, extra for books and supplies—about	10.00
For new students who report for the first semester on September 6 for New Student Week, add:	
Board	9.45
Room Rent	2.90
Laundry	.75

*The matriculation fee for nonresident students is $200.00 per semester.
†For those students who did not pay the optional fee during the first semester the fee is $11.55.

NOTES: 1. Members of the ROTC will be furnished most of their uniform equipment. Cadets will find it necessary to supplement the uniform issued by purchasing the following articles, the approximate cost of which at the College Exchange Store is as follows: one pair of wool elastique O. D. dark trousers ($19.95); two pairs of cotton khaki trousers ($5.95 each); collar ornaments ($2.00); two cotton khaki officer style shirts ($4.50 each); one wool elastique garrison cap ($2.25); one cotton khaki garrison cap ($1.00); and four pairs of tan cotton socks ($0.55 per pair). Cadets will pay a handling charge of $8.00 per year to cover the cost of issuing, receiving, and record keeping of Government uniforms issued. Since only approved articles of uniform may be worn, new students should purchase uniforms after arrival at the College.

To defray the cost of additional billing and delayed handling, a charge of ten per cent of the value of uniform articles turned in subsequent to five days following the close of school, with a minimum charge of $1.00, will be made.

The College operates a store for the purpose of supplying necessary articles to students. The store carries in stock textbooks, stationery, drawing instruments, toilet articles, and other supplies. All merchandise is sold at the usual retail prices prevailing in the area. Upon recommendation of the Exchange Store Advisory Board, any profit created from the operation of the Exchange Store may be used for student welfare and other purposes of benefit to the entire student body.

2. The College will furnish the necessary physical education uniform, except shoes, to all students taking required physical education and to others who wish to use facilities of the Physical Education Department. All such students will be required to pay a handling charge of $8.00 per semester for this service. The handling charge includes the cost of laundering the physical education uniform after each use. Each student will be required to furnish his own shoes (1 pair, canvas, rubber sole). These may be purchased at the College Exchange Store for $5.95.

3. The slide rule is one of the most important time saving instruments of engineers. For use throughout the college course the LL Decitrig Duplex is suggested. Such a rule costs about $22.50. The cost of the drawing instruments needed by engineering students will range from $15.00 to $30.00 depending on quality.

4. For matriculation fee of nonresident students, see paragraph below. Former students who in either semester do not register on the days set apart for that purpose pay an additional matriculation fee of $2.00.

5. New students, or former students not in school during the preceding semester, may file room reservation applications beginning June 16 for the first semester; October 16 for the second semester. Each application for a dormitory room reservation must be accompanied by a deposit of $6.00, which will apply on the room rent payable on entrance and for the key deposit. Deposits on room rent for the first semester are not refundable after August 15; for the second semester, after January 15. Application blanks for room reservations will be furnished by the Director of Admissions.

DAY STUDENTS

Day students pay all specified fees and charges except board, laundry, room rent, and room key deposit.

GRADUATE STUDENTS

A graduate student, except a full-time staff member, is required to pay the matriculation fee and Student Center fee. In the event of registration for the thesis only, he is charged a matriculation fee of $7.50. He also pays the

regular charges for laundry and room rent if he resides in a College dormitory. Full-time staff members pay matriculation fee only.

PART-TIME STUDENTS

A student registering for less than twelve credit hours is required to pay a matriculation fee of $4.00 per credit hour with a minimum fee of $15.00.

NONRESIDENT STUDENTS

The residence status of a student is determined at the time of his first registration in the College, and his residence is not changed by his sojourn at A. and M. College as a student except as provided by law. This policy shall apply to both graduate and undergraduate students regardless of any scholarships, student assistantships, or graduate assistantships that may be granted to any student.

In compliance with the State law, the matriculation fee for nonresident students is $200.00 per semester. A nonresident student is hereby defined to be a student of less than twenty-one years of age, living away from his family and whose family resides in another state, or whose family has not resided in Texas for the twelve months immediately preceding the date of registration; or a student of twenty-one years of age or over who resides out of the State or who has not been a resident of the State twelve months subsequent to his twenty-first birthday or for the twelve months immediately preceding the date of registration. The matriculation fee for nonresident students registering for less than 12 credit hours will be reduced by $16.00 for each credit hour less than 12.

The term "residence" means "legal residence" or "domicile"; and the term "resided in" means "domiciled in."

The legal residence of one who is under twenty-one years of age is that of the father. Upon death of the father, the legal residence of the minor is that of the mother. Upon divorce of the parents, the residence of the minor is determined by the legal residence of the person to whom custody is granted by the court. In the absence of any grant of custody, the residence of the father continues to control. Upon death of both parents, the legal residence of the minor continues to be that of the last surviving parent until he becomes twenty-one unless he makes his home with his grandparents, whereupon their residence is controlling.

A student under twenty-one years of age shall not be classified as a resident student until his parents shall have maintained legal residence ("domicile") in this state for at least twelve months. A student under twenty-one years of age whose parents leave the State and establish legal residence in another state shall be classified immediately as a nonresident student. It shall be the responsibility and duty of the student to submit legal evidence of any change of residence.

All individuals who have come from without the state of Texas and who are within the State primarily for educational purposes are classified as nonresidents. Registration in an educational institution in the State is evidence that residence is primarily for educational purposes even though such individuals may have become qualified voters, have become legal wards or residents of Texas, have been adopted by residents of Texas, or have otherwise attempted to establish legal residence with in the State.

A student twenty-one years of age or older who comes from without the State and desires to establish a status as a resident student must have resided in the State as a legal resident for a period of at least twelve months and must have the intention of establishing a permanent residence within the State during that entire period.

All aliens shall be classified as nonresident students except that an alien who has applied for naturalization in the United States and has received his first citizenship papers shall have the same privilege of qualifying as a resident student as a citizen of the United States. The twelve months' residence required to establish the status of a resident student shall not begin until after such first citizenship papers have been received by the alien.

Officers, enlisted men, selectees or draftees of Army, Army Reserve, National Guard, Air Force, Air Force Reserve, Navy, Naval Reserve, or the Marine Corps of the United States who are stationed in Texas by assignment to duty within the borders of this state, shall be permitted to enroll themselves and their children by paying the tuition fees and other fees or charges provided for regular residents of the State of Texas, without regard to the length of time such officers, enlisted men, selectees, or draftees have been stationed on active duty within the State. This provision shall extend only during active military service in Texas; and upon such member of the Armed Service being transferred outside the state of Texas, he and his children shall be classified as to residence under the second paragraph of these regulations. Any student claiming the privilege of this section shall submit at each registration a statement by the commanding officer of the post or station at which his parent is on active duty verifying the fact of his parent's military status.

Appointment as a member of the teaching or research staffs or the holding of a fellowship, scholarship, or assistantship shall not affect a student's residence status or the tuition fee to be paid.

It shall be the responsibility of the student to pay the correct fee at the beginning of each semester or term for which he may register, and a penalty of $5.00 shall be assessed for failure to pay the proper fee.

The responsibility of registering under the proper residence is placed upon the student, and it is his duty, at or before registration, if there is any possible question of his right to legal residence in Texas under the State law and these regulations, to raise the question with the proper admissions officer and have such question settled prior to registration. Change in residence classification shall be only by the proper admissions officer.

PAYMENTS

Payments to the Fiscal Department should be made by cashier's check or money order, payable to the Agricultural and Mechanical College of Texas. All checks, money orders, and drafts are accepted subject to final payment. Personal checks will not be accepted.

REFUNDS

Any student withdrawing officially (a) during the first week of class work in a semester will receive a refund of four-fifths of the matriculation fee and medical fee; (b) during the second week of class work, three-fifths; (c) during the third week of class work, two-fifths; (d) during the fourth week of class work, one-fifth; (e) after the fourth week of class work, nothing. No refunds will be made until ten days have elapsed from the time the fees were paid.

A refund of board and laundry payment will not be made unless there is a consecutive absence of not less than ten days due to illness of the student or a member of his family, or for some other unavoidable cause.

Students withdrawing or requesting refund during the first week of the Fall Semester will receive a 100% refund of the Student Activities fee. Students withdrawing or requesting refund after the first week of the Fall Semester and before the end of the first week of the Spring Semester, will receive a refund of $6.55 and will be entitled to receive a copy of the student

annual. Students withdrawing after the first week of the Spring Semester will receive no refund.

Students not enrolled in the first semester and withdrawing or requesting refund during the first week of the Spring Semester will receive a 100% refund of the Student Activities fee. No refund will be made to students withdrawing or requesting refund after the first week, but the student will be entitled to receive a copy of the student annual.

DEDUCTIONS

No deductions will be made from charges for board, laundry, and room rent in case of entrance within ten days after the opening of a semester, nor will a refund be made in case of withdrawal during the last ten days of a semester or the last ten days for which payment is made.

UNPAID CHECKS

If a check or draft accepted by the Fiscal Department is returned unpaid by the bank on which it is drawn, the person presenting it will be required to pay a penalty of $1.00.

DUPLICATE RECEIPTS

Duplicate receipts covering fees paid by students will be issued on payment of twenty-five cents.

MATRICULATION FEE

The matriculation fee, fixed by the State law, includes the cost of necessary classroom and laboratory supplies and entitles the student to the usual college privileges, including the use of the library.

MEDICAL SERVICE FEE

The medical service fee is required of all students living in College housing and covers the professional services of the college physician and the hospital staff. Surgical operations and charges for consultations with outside physicians requested by parents are not included in the medical fee.

ROOM RENT FEE

Rooms are furnished with single bedsteads, mattresses, tables and chairs, and running water. The charge for room rent also includes heat, light, and cleaning the corridors but not the rooms.

STUDENT ACTIVITIES FEE

The optional student activities fee includes subscription to the Battalion newspaper, the College annual, and the magazine of the student's particular school as well as admission to the Town Hall program, the Great Issues and Recital Series, and to all athletic events held at College Station under the auspices of the Athletic Department.

STUDENT CENTER FEE

Based on authority of the State Legislature, the student body voted in the fall of 1955 to require a fee of $2.00 a semester for the partial support of the Memorial Student Center. This fee is used primarily in support of the student program activities of the Memorial Student Center.

VOCATIONAL REHABILITATION AID

The Texas Education Agency, through the Vocational Rehabilitation Program, offers assistance for tuition and fees to students in Texas colleges who have certain physical disabilities, provided the vocational objective selected by the student has been approved by a representative of the Division.

Assistance for this phase of the program of vocational rehabilitation is based on physical disabilities resulting in a vocational handicap and on the financial need of the individual concerned.

Application for Vocational Rehabilitation should be made to the Division of Vocational Rehabilitation, Room 407, Varisco Building, Bryan, Texas, or to Mr. J. J. Brown, Director, Division of Vocational Rehabilitation, Land Office Building, Austin, Texas.

STUDENT LIFE

LEADERSHIP AND GUIDANCE

Leadership and guidance in the area of student life are the responsibilities of the Dean of the Basic Division and Student Personnel Services. While appeals may be made to the Dean, direct responsibility for the enforcement of College regulations lies with the Commandant of the School of Military Sciences for military students, and with the Head of the Department of Student Affairs for civilian students.

The student government of the College is carried out through the Student Senate, composed of 43 Senators elected by the student body. The office of the President of the Student Senate is located on the second floor of the YMCA Building.

The Civilian Council serves as the official governing body for civilian students, with responsibility in those areas affecting civilian students only.

Governing the activities of the Memorial Student Center is the Memorial Student Center Council, composed of students, staff personnel, and former students.

BASIC POLICY

The rules of conduct by which every student is expected to live while attending the A. and M. College are contained in the Basic Policy, a copy of which follows:

The Board of Directors finds it necessary to assert the basic principles to govern student life and staff-student relationship at the A. and M. College of Texas.

The College accepts responsibility for the curricular work of the student and for his conduct and development. The term "College" as used here embraces the Board of Directors, the President, the faculty, all personnel of the A. and M. system, the student body, former students, and all the worthy traditions of the institution.

Every student is expected at all times to recognize constituted authority, to conform to the ordinary rules of good conduct, to be truthful, to respect the rights of others, to protect private and public property, and to make the best use of his time toward an education.

Every student has rights which are to be respected. They include the right of respect for personal feelings, the right of freedom from indignity of any type, the right of freedom from control by any person except as may be in accord with published rules and regulations of the College, and the right

to make the best use of his time and his talents toward the objective which brought him to this institution. No officer or student, regardless of position or rank shall violate those rights. No custom or regulation in conflict will be allowed to prevail.

It shall be the duty of every person employed by this institution to conform to this policy; to cooperate with all agencies of the College and with the student body, individually and collectively, in carrying out its provisions. Personal responsibility in this respect will be primary.

THE OFFICE OF THE DEAN OF THE BASIC DIVISION AND STUDENT PERSONNEL SERVICES

Responsibility for the development and welfare of the student in areas other than the academic is placed with the Office of the Dean of the Basic Division and Student Personnel Services. Activities are provided which help to meet the physical, emotional, social, and spiritual needs of students.

Student Personnel departments and offices include those of the Department of Student Affairs, Department of Student Activities, the Memorial Student Center (activities program), the Office of Student Publications, the College Hospital, and the Office of the Placement Services. Related services include the specialized counseling, testing, and remedial services of the Basic Division and certain non-classroom Corps activities.

STUDENT AFFAIRS

The Department of Student Affairs includes the activities and functions of the Veterans Advisor's Office, the Housing Office, Civilian Dormitory Counselors, the Foreign Student Advisor's Office, and the Campus Security Office.

VETERANS ADVISORY SERVICE

The A. and M. College of Texas provides a Veterans Advisor to assist ex-servicemen with their problems. This office is located on the ground floor of the YMCA Building.

HOUSING AND MEALS

Single Students: Unless they are living with their families, all students are required to live in College-owned dormitories on the campus. Dormitories are designed especially to meet the student's needs of living and study.

Reservations are filed in the order in which they are received and will be held only until 3 p.m. of the regular registration day. Reservations made by students who do not complete their registration on the regular registration day by 5 p.m. may be cancelled, and the space will be assigned to another applicant.

New students may file room reservation applications beginning March 1 for the summer session, June 16 for the fall semester, and October 15 for the spring semester. As soon as a new student has been accepted for admission, he will be mailed a room reservation request card, which should be filled out as directed and returned to the Fiscal Office with a check or money order for $6.00 for room reservation fee and key deposit. As soon as the reservation has been made, the student will be notified of his assignment to dormitory space. The room reservation fee will be credited to the student as part of his first installment of room rent upon his registration in June, September, or February. Should a student decide that it will be impossible for him to register, he may have his reservaton cancelled not later than May 15 for the summer session, August 15 for the fall semester, and January 15 for the spring semester, and the fees will be returned. Can-

cellations made after these dates will result in a forfeit of the reservation fee. The room assignment card and room reservation fee receipt will be secured at the Housing Office, Ground Floor, YMCA Building, when the student reports for registration.

All cadets residing on the campus are required to take their meals in one of the two dining halls on the campus, operated by the Subsistence Department of the Business Office. Each has a seating capacity of 4,000 and furnishes the students at cost well-balanced meals prepared under the direction of experienced supervisors.

Those students who are not members of the Cadet Corps may also eat their meals in the College dining hall. They, however, may take their meals elsewhere if they so desire.

Married Students: The College operates 526 apartments for married students, with first priority given to ex-servicemen. More complete information about these apartments and application forms for them may be obtained from the Chief of Housing, Ground Floor, YMCA Building.

FOREIGN STUDENT ADVISOR

The Office of the Foreign Student Advisor is located on the Ground Floor of the YMCA Building. Information relative to immigration regulations and answers to problems peculiar to students from other lands may be obtained from this staff member.

REGISTRATION OF MOTOR VEHICLES

All students and employees who drive motor vehicles on the campus must have them registered in the Office of Campus Security, Ground Floor, YMCA Building, within 48 hours of the time that they are brought on the campus.

STUDENT ACTIVITIES

The Department of Student Activities is charged with the counsel and fiscal operation of many student activities. It is concerned with such activities as the religious life of the campus (including the YMCA); recreation and entertainment; the campus movie program; music and drama activities; social activities, clubs, student government; the College golf course; and intramural athletics. Profits realized through management of these operations are returned to the student body in the form of recreational facilities, entertainment, and grants to recognized student groups and organizations for approved projects, such as judging teams, convention activities, payment of speakers, and other activities considered to be in the interests of the student body.

The Department of Student Activities is located on the second floor of the YMCA Building.

RELIGIOUS ACTIVITIES

Young Men's Christian Association: For the many services rendered to students, the YMCA holds a coveted spot in the hearts of Aggies. The YMCA Building, erected in 1912 from funds given by former students and friends of the College, is a 4-story structure in the center of the campus. It provides space for religious services; lounges for meeting friends and visitors; office space; and meeting rooms.

The YMCA carries on a varied and vigorous program of religious group meetings, Bible study, and dormitory discussion groups to maintain and to stimulate the moral and spiritual lives of students.

Chapel: Through the generosity of the Association of Former Students a chapel has been completed recently in a central location on the campus.

It is not used for regular meetings of established local church groups, but is available at any time to students of all faiths for prayer and meditation.

Religious Services: In addition to the college Y.M.C.A staff, there are nine churches near the campus whose primary purpose is to serve the spiritual needs of the students. The campus religious leadership is deeply conscious that the students are in perhaps the most formative period of their lives and feel keenly the responsibility for their spiritual development.

The programs of the respective churches are aimed primarily to meet the student needs. Many of the churches have distinct student departments with specialized leadership whose sole responsibility is that of ministering to the students. The pastors of the churches also give as much time as is necessary to the students for personal counseling.

The churches serving the campus have a program similar to that of the home church with an expanded young people's department and dominant emphasis upon student interests. In addition to the special student emphasis, they have the customary Sunday worship periods, church schools, and young people's organizations promoted to stimulate clear and constructive thinking in the important field of religion. The student departments are expanded to offer wholesome recreation and social life and social service.

One week during each year is designated officially by the College administration as Religious Emphasis Week, in which the entire College cooperates, making it possible to have an outstanding religious leader to address voluntary convocations of the students. The administration of the College, knowing the value of developing the spiritual aspects of the personality of the student, authorizes an adjustment of the College program so as to permit all students to attend.

Courses in Religious Education: The Baptist General Convention of Texas; the Church of Christ; the Board of Missions of the Episcopal Church, Diocese of Texas; the B'nai B'rith Hillel Foundation; the Division of Student Service, the National Lutheran Council; the Texas Methodist Student Movement; the Presbyterian Church, U. S. and U.S.A.; and the Roman Catholic Church, Diocese of Austin, upon approval of their respective boards, have been authorized to offer courses in religious education open to students of junior and senior classification.

The courses offered according to this plan are as follows:

305. Old Testament Character Studies. (1-0). Credit 1.
Through a chronological study of many characters in the Old Testament, the student becomes acquainted with experiences in the lives of these characters, through which is revealed the righteous and omnipotent God of the Old Testament.

306. New Testament Character Studies. (1-0). Credit 1.
After a brief introduction to the New Testament giving the political, social, moral and religious situation at Jesus' birth, the course will pursue a character study of key personalities in the New Testament and their contribution to the Christian system of thought.

309. Early Old Testament History. (1-0). Credit 1.
Story of Bible history as recorded in first five books; study divided into five periods between the Creation and the Wilderness wanderings.

310. Later Old Testament History. (2-0). Credit 2.
Periods of Bible history studied include: conquest of Canaan, the Judges, the united Kingdom, the divided Kingdom, Judah alone, the exile, and return from exile.

311. The Synoptic Gospels. (2-0). Credit 2.
A study of the first three Gospels, Matthew, Mark and Luke, with emphasis upon the contribution of each to our knowledge of the life and teachings of Jesus.

312. The Gospel of John. (1-0). Credit 1.
This course is a detailed study of the life and teachings of Jesus as reported in the fourth Gospel. Special attention is given to interpretation of Jewish customs and institutions for the non-Jewish (Greek) readers.

313. Survey of the New Testament. (2-0). Credit 2.
Each book of the New Testament is studied with reference to its content, author, purpose, unique characteristics, and the historical background which provided the occasion for its writing.

314. Survey of the Old Testament. (3-0). Credit 3.
Each book of the Old Testament is studied in light of the historical background of the Hebrew people and the development of their relationship with God.

318. The Book of Acts. (1-0). Credit 1.
Chapter by chapter study of Acts; founding and spread of church in Jerusalem, Judea, Samaria; Paul's travels; church among the Gentiles.

319. The Epistles of Paul. (2-0). Credit 2.
A study of the life and thought of Paul as found in the Book of Acts and Pauline correspondence. A history of the primitive church as reflected in these writings.

320. The Book of Revelation. (1-0). Credit 1.
This book is studied in the light of the persecution of Christians in the Roman Empire, and as an apocalyptic writing to serve in strengthening their faith and loyalty to Christ who sent them the message.

321. The General Epistles. (1-0). Credit 1.
A study of the "open letters" written by James, John, Peter, and Jude to the early Christian Churches, comparing their messages to the recorded words of Jesus relative to the situation and problems of their day and ours.

323. The Life of Jesus. (3-0). Credit 3.
In this course on the life of Christ, the four Gospels are studied with the passages in the four books arranged in chronological sequence so as to give a connected account of the life of Christ and to reveal similarities and differences in the four books.

324. The Prophetic Movement in the Old Testament. (3-0). Credit 3.
A history of the prophetic movement from the 8th century B. C. to the time of the Maccabees. An interesting study of the contribution of the prophets to the religious thinking of the day, and the permanent value of their teachings.

325. The Book of Job. (2-0). Credit 2.
The book of Job is one of the great books of all time. It offers in interesting form a thorough study of the problem of suffering.

326. The Psalms. (2-0). Credit 2.
This study of the book of Psalms includes a glance at Hebrew poetry; the source and background of certain of the Psalms—interpretation and beauty of structure and composition.

327. An Introduction to the Bible. (2-0). Credit 2.
A course to acquaint the student with the Bible showing its unity and the continuity existing between the two Testaments by the study of representative sections of both the Old and New Testaments together with their historical settings and their relationship to each other.

329. Proverbs. (1-0). Credit 1.
This study of the book of Proverbs includes authorship, date of writing, and a close study of the practical wisdom contained in the proverbs, of which the book is full.

330. Ecclesiastes and the Song of Solomon. (1-0). Credit 1.
A study of two neglected books of the Bible—their contents, interpretation, and significance.

335. Comparative Religions. (2-0). Credit 2.
A study of the most popular contemporary religions of the world as channels through which men have tried to find the meaning of life and to relate themselves to its values. It includes Buddhism, Confucianism, Mohammedanism, Judaism, and Christianity.

A maximum of six semester hours in religious education courses may be credited toward a degree.

ENTERTAINMENT

Guion Hall Theater: The Guion Hall Theater is operated to provide economical and convenient movie entertainment for the student body and College staff. Good pictures are shown, though they are usually second run shows in order to keep costs as low as possible. Continuous filmings are shown while school is in session.

Town Hall: The Town Hall program includes the best obtainable artists in the fields of music and entertainment. Since its inception, its popularity has grown each year. Activity fees and the sale of season and individual tickets make it possible to bring outstanding programs to the student body at low prices.

MUSICAL ORGANIZATIONS AND ACTIVITIES

The Texas Aggie Band: The Texas Aggie Band is the official band of the A. and M. College. It is often referred to as the "pulse of the Spirit of Aggieland" and furnishes music for military ceremonies, yell practices, and athletic events.

Interested new students should indicate on the advanced room reservation card their desire to participate. Although a large number of College-owned and government-owned instruments are available for issue, it is advised that students having their own instruments bring them.

Singing Cadets: This widely known singing unit consists of more than 60 students. The group has appeared in many Texas cities, on numerous broadcasts, and on other entertainment programs. Membership is selected from the entire student body after try-outs held early in the regular year.

Aggieland Orchestra: The Aggieland Orchestra is a dance band sponsored by the Department of Student Activities. This orchestra plays for many of the college dances during the social season.

Music Hall: For students interested in music, a building with practice rooms and pianos is provided. Also, there is a library of piano, vocal, and other instrumental literature which can be checked out by students. It is open for use from 8 a.m. until 5 p.m., but may be used by special permission at night for instrumental or vocal groups.

DRAMA AND SPEECH ACTIVITIES

The Aggie Players: Any student who has an interest in the theater is encouraged to participate as a member of The Aggie Players. Four major dramatic productions are given annually by this group.

Debate Activities: An active program of intercollegiate debate activities is provided for those interested.

ORGANIZATIONAL ACTIVITIES

Clubs: Many opportunities exist for students interested in co-curricular club activities. There are more than 150 organizations on the campus, ranging in interest from home town clubs to technical societies. Their activities include discussion meetings, movies, smokers, barbecues, dances, and inspection trips.

Dances and Social Affairs: Social life at Texas A. and M. is highlighted by numerous dances and social functions. The various classes, military units, and civilian organizations sponsor dances. In addition, certain all-school social functions are held for which outstanding name bands provide music. The most elaborate function is the traditional Senior Ring Dance and Banquet, when graduating seniors and their guests dance to an outstanding orchestra of the year.

All parties and other social functions, whether held on or off the campus, must be approved by the College. Military functions must be approved by the Commandant. Civilian dormitory parties or dances must be approved by the Head of the Department of Student Affairs. Class and club social functions must be approved by the Head of the Department of Student Activities.

INTRAMURAL ATHLETICS

Intramural athletics feature contests between military units and between civilian organizations. The intramural program, which is one of the most outstanding in the country, includes flag football, softball, volleyball, handball, basketball, track, swimming and diving, wrestling, bowling, horseshoes, rifle shooting, weight lifting, golf, cross country, tennis, and table tennis. Ample physical facilities are available to accommodate these comprehensive intramural activities.

GOLF COURSE

An 18-hole golf course is available to students and staff members. This 6,715-yard course, located on the campus, is considered one of the finest golf courses in the area.

OTHER RECREATIONAL FACILITIES

The Grove: The Grove is an outdoor concrete recreational area with a stage, and it is utilized by the Department of Student Activities for movies, intramural athletics, concerts, dances, picnics, games, and festivals.

Hensel Park: Located close to the campus and supervised by the Department of Student Activities, is Hensel Park, where many organization steak fries and picnics are held.

Cashion Cabin: Named in honor of the former General Secretary of the Texas A. and M. YMCA, Cashion Cabin may be reserved through the YMCA for parties and other social functions.

MEMORIAL STUDENT CENTER

The Texas A. and M. College Memorial Student Center is dedicated to the memory of the men of Texas A. and M. who gave their lives during World Wars I and II. It was erected to foster the social, cultural, and spiritual phases of student life.

The Memorial Student Center is governed by a council of eight students, five faculty members, and two former students, with a student as President of the Council. The Directorate, which is composed of the chairmen of the various committees, plans and directs the program of the Memorial Student Center. Many positions of leadership are open in this student program for those who join the committee activities at an early date.

Facilities: Facilities of the Memorial Student Center include a dining room, snack bar, gift shop, barber shop, and 66 guest rooms.

Recreation Facilities: Recreation facilities include bowling alleys, table tennis, a game room (bridge, canasta, chess, checkers), a browsing library (periodicals, books, magazines), and record playing rooms.

Activities: Included in the activities program of the Memorial Student Center are the following: Dance Group; Music Group (Recital Series); Games Group (Bowling and Bridge); Hobby Group (Amateur Radio Committee, Audio Committee, Camera Club, Crafts Committee); Forum Group (Great Issues Series, Student Conference on National Affairs, Film Society, Junto Committee, Browsing Library Committee); the Art Gallery Committee; House Committee; and Public Relations Committee. All of these activities are separate organizations; and all make requests to and receive funds from the Memorial Student Center Council's money for the activities of the Center.

In addition to the above activities, the Center houses a large number of meetings, receptions, exhibits, and dances of the many clubs and activities of the A. and M. College of Texas .

STUDENT PUBLICATIONS

The College provides unusual opportunity for students to participate in student publications. An Office of Student Publications, headed by the Director, works within the framework of policy established by the student-faculty Board of Student Publications.

The Office of Student Publications, together with editorial offices, is located on the Ground Floor of the YMCA Building.

The following seven journals and papers are published:

The Battalion: The Battalion is the student newspaper edited and produced by Texas A. and M. students. It is the official paper of the A. and M. College of Texas and of the City of College Station. Students who begin work as freshmen or sophomores may become paid employees in editorial capacities during their senior year.

The Aggieland: The yearbook of the student body is known as **The Aggieland.** Many opportunities for participation are available, because of the amount of work necessary to produce a complete record of the school year.

Official Directory: Each year the Office of Student Publications publishes an official directory of offices, staff personnel, and students.

The Engineer: Published monthly by students in the School of Engineering, this journal is designed to promote talent for technical writing. Students who have ability in research, in reporting scientific data, or in creative writing, are welcome as members of the staff.

The Agriculturist: Students of the School of Agriculture produce **The Agriculturist,** a quarterly publication printing research, scientific, and technical articles relating to the field of agriculture.

The Southwestern Veterinarian: The leading college veterinary magazine in the country, as well as in foreign countries, this publication is produced quarterly by the students of the School of Veterinary Medicine.

The Commentator: Students of the School of Arts and Sciences publish **The Commentator**, a literary magazine, four times each year.

COLLEGE HEALTH SERVICES

The College Hospital, located in the north central area of the campus, has recently been remodeled to give more efficient service. Besides infirmary space for over 100 patients, the facilities include physiotheraphy (diathermy, ultra-violet, infra-red, and whirlpool baths), laboratory, and X-ray departments. The medical staff includes specialists in the fields of medicine; surgery; ear, nose, and throat; urology; and mental hygiene. The facilities are equivalent to those found in better clinics and hospitals.

Students who have paid the medical fee may come to the College Hospital Clinic as often as necessary during clinic hours for consultation, diagnosis, and treatment of illnesses and injuries. Students needing hospital care may be admitted to the infirmary at any hour, as there is a staff of Registered Nurses on duty at all times. Routine medications, X-rays, laboratory tests, and ambulance service are furnished the patient without charge.

The water of the College is supplied through a College-owned water supply system and comes from four deep wells located nine miles northwest of the College campus. As a part of the sanitary work carried on throughout the entire year, the College laboratories make bacteriological checks of this water supply and of the milk supply at regular intervals.

The College is particularly concerned with the maintenance of the health and physical development of its students. It provides one of the finest indoor swimming pools in the State, as well as tennis courts, a golf course, athletic fields, and physical training.

OFFICE OF PLACEMENT AND SPECIAL SERVICES

Employment for Graduates

The College feels a definite responsibility for the proper professional placement of its graduates. Assistance in fulfilling this responsibility is shared jointly by the faculty and the Office of Placement and Special Services. The function of this office is to maintain active contact with prospective employers of the graduating students and alumni in such manner that well qualified men may be directed to suitable job opportunities.

Supplementing assistance in securing professional employment, this office cooperates with other College departments in an educational program designed to acquaint undergraduates with opportunities in the fields of work in which they are interested, and to advise on problems which will be met in entering professional employment. Assistance is given students in preparing credentials for submission to employers as well as advice on the proper approach in seeking a job. Assistance is also given undergraduates in securing employment during the summer vacation.

Seniors and graduate students who wish to make use of these services are requested to file a record of their qualifications with the Placement and Special Services Office early in the year in which their college work will be completed. There is no charge for this service other than for personal leaflets, which are prepared at cost on request.

The Office of Placement and Special Services is located on the top floor of the Y.M.C.A. Building.

Employment for Students

Part-time employment of resident students is coordinated by the Office of Student Labor and Loans, a part of the services of the Office of Placement and Special Services. Every effort is made to develop new employment opportunities outside of the College. To become eligible for employment, a student must have been admitted to the College by the Director of Admissions and have an accepted application on file with the Office of Student Labor and Loans. Continued eligibility for employment is contingent on satisfactory performance of work and on the ability of the student to maintain good scholastic standing.

Ordinarily only those students whose financial resources are limited may be considered for employment. Assignments are made primarily on the basis of need and sincerity of purpose.

Loan Funds

The Head of the Office of Student Labor and Loans coordinates the program of student loans. Provided directly by the Office of Labor and Loans are a sizeable number of short-term, small loan funds which are made available to students in need of such assistance.

The Association of Former Students administers a series of loan funds which are available to any student who has been in the College at least three semesters, and whose record in conduct and scholarship is satisfactory. The amount of the loan in each case depends on the student's actual needs.

Various other loan funds are available. Information about such may be secured from the Head of the Office of Student Labor and Loans. Included in such funds are the Lucy Jane Breazeale Loan Fund, the Ernestine Gaber Loan Fund, the Davis Buck Fund, the Allsup-Ramsey Loan Fund, the George Long Memorial Fund, the James Leftwich Shepherd Fund, the Sonora A. and M. Mothers' Club Fund, and the A. and M. College Loan Fund.

Special Services

Special services of the Office of Placement and Special Services include the recruitment and orientation of secretarial personnel, the operation of the Speakers' Bureau, and administration of the Short Courses program.

COUNSELING, TESTING, AND REMEDIAL SERVICES

The Basic Division performs certain specialized guidance services for all students enrolled at the College. When a student enrolls, he is given certain tests which are used in counseling with him.

For those who are in need of special attention in the fields of reading, study habits, and speech, certain remedial services are provided.

Various group activities are also provided for those with problems in the areas of personality development, social study and vocational choice.

Specialized guidance services of the Basic Division are carefully coordinated with other student services on the campus in an effort to make for a rich and meaningful experience for all Texas A. and M. students.

CORPS ACTIVITIES

Although all phases of the Corps experience are, administratively, a part of the School of Military Sciences headed by the Commandant, who in turn is responsible to the Dean of the College, the Office of the Dean of the Basic

Division and Student Personnel Services works closely with the Commandant and his staff in the interests of the welfare of all cadets. Particularly in the areas of counseling and group activity is there a close working relationship.

The Ross Volunteer Company: This unit was organized in 1887 by Colonel T. M. Scott, business manager of the College, for the purpose of banding together the most proficient military men in A. and M. into a crack drill team. They were first called the Scott Volunteers. The name was changed to Ross Volunteers in 1891 to honor Governor Lawrence Sullivan Ross, who in that year became President of the College. It was originally the plan of the organization to change its name in honor of each succeeding president of the College, but in 1902, at President Harrington's request, the idea was dropped and the name Ross Volunteers made permanent.

INTERCOLLEGIATE ATHLETICS

The A. and M. College of Texas is a member of the Southwest Athletic Conference, which embraces eight leading major colleges and universities—The University of Texas, the Agricultural and Mechanical College of Texas, Baylor University, the Rice Institute, Texas Christian University, Southern Methodist University, the University of Arkansas, and Texas Technological College. The latter college, although a member of the Conference, will not participate in Conference play until 1960. The intercollegiate program includes football, baseball, basketball, track, cross country, swimming, tennis, golf, pistol and rifle shooting, and fencing. Varsity teams in each sport are known as the Texas Aggies, and the uniforms used by the players are in the school's colors, maroon and white. The A. and M. College of Texas has won more than its share of conference championships, especially in football.

Center of athletics is Kyle Field, which contains the football stadium seating 33,000 in the old stands, 2,460 in the new addition to the west stands, and with temporary bleachers and cinder path boxes giving a total capacity of 41,594. A quartermile cinder track with a 220-yard straight-away and a baseball diamond with 4,000 seats afford excellent facilities for these sports. The P. L. Downs, Jr., Natatorium with swimming pool 100 by 60 feet, has lockers and showers, and seats for 600 spectators. DeWare Field House has been converted from a 3,500-seat basketball gymnasium into a Physical Education Plant, while the new G. Rollie White Coliseum seating 8,500 is available for basketball and other indoor College events. In addition there is an auxiliary gymnasium with handball courts and large rooms for physical education classes. An 18-hole golf course is available to students on the campus.

SCHOLARSHIPS, FELLOWSHIPS, AND AWARDS

The scholarship program is administered by a permanent committee known as the Faculty Committee on Scholarships. As authorized by the Board of Directors, this committee is composed of the Dean of the College, who serves as chairman; the Dean of the Basic Division and Student Personnel Services; Secreary of the Former Students Association; and representatives, appointed by the President, as follows; one from the Basic Division and one from each of the undergraduate schools of the College.

In general there are three types of scholarships available: (1) Valedictory Scholarships and Opportunity Awards, representing those limited to entering freshmen; (2) scholarships designed for the more advanced undergraduate students; and (3) fellowships and grants-in-aid for graduate students.

The over-all program is designed to encourage and reward scholastic effort on the part of all students; to enable outstanding students to do the best work of which they are capable by removing financial handicaps; and to enable capable and ambitious young men who might be denied a college education for financial reasons only to secure that education at the Agricultural and Mechanical College of Texas.

Valedictory Scholarships

The College offers a scholarship to the valedictorian or honor graduate, if a boy, of an accredited secondary school of Texas that holds at least fifteen units accredited by the Texas Education Agency. The successful applicant must make the highest record among all students, boys and girls, graduating that calendar year including winter, spring, and summer graduating classes, and must be certified through the Texas Education Agency. The scholarship is valid during the first long session after the holder's graduation from high school. The financial benefit is exemption from the matriculation fee of $25.00 for each of the two semesters, or a total of $50.00. The scholarship is not valid for the second semester unless the student has passed at least ten semester hours for the first semester with an average grade of C or better.

The Opportunity Award Program

This program annually provides 75 or more four-year scholarships to high school graduates of Texas who are capable of outstanding scholastic achievement and who need financial assistance to attend college. The awards are made possible by the A. and M. College Development Fund and by interested citizens and organizations of the State. Financial benefits range in value from $800 to $1600 with recipients receiving from $200 to $400 each year for four years plus an opportunity for additional earnings from student employment if necessary. Most of the awards are unrestricted as to course of study or degree objective in college.

Graduates of accredited high schools of Texas who have not attended another college or university, who are legal residents of this state, and who need financial assistance to attend college are eligible to make application for an Opportunity Award Scholarship. To be considered for such a scholarship, an applicant must satisfy the admission requirements of the College; must make formal application for an award on forms provided by the College; and must enter the State-wide competition which is held each spring. Selections are made by the Faculty Committee on Scholarships on the basis of the applicant's academic record in high school; his scores on competitive examinations; evidence of initiative, leadership, and other traits of good character; and his need for financial assistance. In order for the award to be continued from semester to semester, the recipient must maintain a standard of scholastic achievement and personal conduct satisfactory to the Scholarships Committee.

This program is usually announced officially between February 20 and March 10 each year. Official announcements and application blanks are distributed over the State between these dates and are also made available to those interested upon request. Requests for additional information and application forms should be addressed to the Secretary, Faculty Committee on Scholarships, Office of the Registrar, A. and M. College of Texas, College Station, Texas.

Scholarships for Advanced Undergraduate Students

One-year scholarships ranging in value from $100 to $750 are available to outstanding students already enrolled in the College. Some of these are limited to certain fields of study and to individuals who have attained a necessary academic classification, while others are unrestricted in this regard. Recipients are usually chosen by the Faculty Committee on Scholarships in April or May each year with the basis of selection determined by the nature and intent of the award.

Some of these scholarships are given as "rewards for a job well done" and are intended to recognize outstanding scholastic achievement or other meritorious accomplishments. As such, they not only benefit financially the student concerned but also encourage and promote scholastic attainment and leadership on the part of other individuals. In addition to the reward type

of scholarship, others are made available to outstanding students who must have financial assistance in order to remain in school or to do a high quality of work while enrolled. It is the general objective of this type of reward to encourage every scholar to go as far as his abilities and ambition will carry him.

Information regarding scholarships for advanced undergraduate students may be obtained from the Secretary, Faculty Committee on Scholarships, Office of the Registrar.

TRAINING FOR GOVERNMENT SERVICE

Government Employment

The United States Government employs many college graduates trained in specialized fields of engineering, agriculture, and the natural and social sciences, for assignment either at home or abroad. In some instances, experience is a desirable or necessary qualification for federal employment. Within fixed limits, graduate study is normally accepted as the equivalent of experience. Except for positions of high rank, employment is on the basis of competitive examinations. Information concerning these opportunities and Civil Service examinations to qualify for them is readily obtainable from any United States Post Office or from the Civil Service Commission, Washington 25, D. C.

Agricultural Foreign Service

Recently, many specialists in agriculture have been appointed to administer technical programs of the United States in foreign countries. In addition to their own field of specialization, such technically trained candidates will often find some knowledge of foreign language (French, German, Portuguese, Russian, or Spanish) useful. They should likewise command a good knowledge of our own language, government and history, and economics. Students who are interested in such a program should at the earliest possible date confer with the Dean of Agriculture and the head of the subject matter department of major interest in order to work out a satisfactory degree program.

The Foreign Service of the United States

Superior students who plan to take the examinations for career officers in the Foreign Service of the United States are urged to consult the Head of the Department of History and Government or the Dean of Arts and Sciences. In general, they should follow a broad program of study with emphasis on English, foreign languages, history and government, economics, mathematics and statistics, literature, geography, anthropology, and similar courses. Those primarily interested in Latin American might refer to the paragraph on Latin American studies in the School of Arts and Sciences for some specific suggestions. Besides the general examinations on the reading of English and on vocabulary, on statistics and mathematics, on general knowledge, and on written English, candidates take special examinations on world or United States history and government, economics, and modern languages.

THE BASIC DIVISION

The Basic Division is a non-degree granting school which was established to aid entering students in their adjustment to college. The Associate Dean of the Basic Division, acting for the Dean of Basic Division and Student Personnel Services, administers the work of all entering students until they are admitted into one of the degree granting schools.

SPECIFIC AIMS

The aims of the Basic Division may be summarized as follows:

1. To give the first year college student sufficient supervision to aid him in the transition from high school to college study and to help him adjust to college life.

2. To afford every student assigned to the Basic Division the benefits of a planned program of educational and vocational guidance so that he may make an intelligent choice of a course of study and related school activities.

3. To furnish the student who has not decided upon a course of study an opportunity to gain some insight into the educational requirements of the various curricula.

4. To furnish the necessary aid to the student who is in need of assistance in the development of general study skills or in specific subject areas.

5. To supply the various schools of the College with a selected group of students qualified to pursue the training necessary for professional competency and mature citizenship.

GUIDANCE FUNCTIONS

The student enrolled in the Basic Division is offered many opportunities for both individual and group guidance. Opportunity for individual guidance and counseling by professionally trained personnel is provided throughout the school year. Members of the Basic Division Staff administer a battery of aptitude and achievement tests before the beginning of the school year. The results of these tests are employed for placement purposes with the objective of more fully assisting each new student to adjust to the academic requirements of the College. These tests are often supplemented by other psychological measures and are also utilized for other counseling purposes.

NEW STUDENT WEEK

The Basic Division coordinates and administers the annual New Student Week program. This program is held during the week prior to the beginning of the fall semester. Each new student admitted to the Basic Division is required to participate in this program. Early in the week a series of tests is given, the results of which are used for counseling and guidance purposes. Any student whose high school entrance units and grades or whose scores on these tests indicate that he may have difficulty in pursuing the course he has chosen, may be advised to register in special sections designed to fit his particular needs. The main objectives of New Student Week are to provide the beginning student the opportunity for group and individual consultation with counselors, to give him the opportunity to get acquainted with various school officials, and to acquaint him with College rules and regulations.

TESTING SERVICE

Should a student desire to learn more about himself than the basic group of tests reveals, the Basic Division has available many additional aptitude, personality, and interest tests which he may take. Usually the student and

his counselor decide which of the many tests available would be suitable and advisable.

GROUP GUIDANCE

Each new student may enroll in special group guidance courses during his first year at the Agricultural and Mechanical College of Texas. The group guidance program should assist the beginning college student to anticipate and to master problems which are common to most beginning freshmen. A description of each of these courses is given in this catalogue. Basic 101, 102, 103, 104, and 105 are recommended for students who want special assistance or who are undecided about the course of study to pursue. Basic 106 and 107 are recommended for students who have their vocational goals more clearly in mind. The General Curriculum outlined on page 79 of this catalogue includes Basic 105 for vocational guidance reasons, since students following this curriculum are those who are not yet ready to designate their course of study. Any student having interest in, or feeling the need for, a Basic course may enroll during the Fall or Spring semester of his freshman year. Certain students demonstrating the need for assistance in the area of a Basic course may be required to register for that course which can most nearly resolve that need.

BASIC DIVISION ASSEMBLY

During his first semester, one hour each week will be set aside in the student's schedule for the purpose of a special assembly to be supervised by the Associate Dean of the Basic Division. Attendance at this assembly is required of all first semester Basic Division students.

REMEDIAL AID

Many opportunities for assistance are available to the student enrolled in the Basic Division. A Remedial Reading Laboratory and a Study Habits Program have been established to assist students needing special help in these areas. In addition, special assistance in specific subject matter areas has been provided with the cooperation of the various academic departments of the degree granting schools.

CURRICULA FOR FRESHMAN STUDY

In general the Basic Division provides two types of curricula from which the entering student may select the one which best fits his own particular needs. These may be summarized as follows:

1. General Curriculum. The general curriculum is designed to meet the needs of the new student who has not decided upon a major field of study. It is arranged to assist the student in evaluating himself and in evaluating the several possible degree objectives, and at the same time to afford general courses that have application in almost all curricula. A student who decides upon his major field of interest by the beginning of the second semester may declare his degree objective and register for the courses outlined in that curriculum. If a student has not decided upon his degree objective by this time, he is advised to continue with the General Curriculum for the second semester.

GENERAL CURRICULUM

First Semester		Credit
Basic 105	(0-2)	1
The World of Work		
English 103	(3-0)	3
Composition and Rhetoric		
History 105	(3-0)	3
History of the United States		
Mathematics		3
Military or Air Science	(0-3)	1
Elective		7
Physical Education 101	(0-2)	R
		18

Second Semester		Credit
Basic 106	(0-2)	1
Survey of Man's Knowledge		
English 104	(3-0)	3
Composition and Rhetoric		
History 106	(3-0)	3
History of the United States		
Military or Air Science	(0-3)	1
Elective		10
Physical Education 102	(0-2)	R
		18

Assignments to the specific courses listed above will be made in conference with a Basic Division staff member and in accord with the student's achievement. The courses designated as mathematics and elective will be assigned in line with the requirements of the curriculum in which the student expresses greatest interest.

As a part of the elective hours, a student may take either Biology 101, 107, 108, or Chemistry 101, 102 in the first and second semesters. Chemistry is required or is acceptable in more curricula than biology. A student evidencing a deficiency in mathematics may be required to delay chemistry a semester.

2. Degree Curricula. These plans of study are designed for the student who has decided upon the field in which he wishes to major as provided by one of the degree granting schools of the College. The specific courses required in the chosen curriculum may be determined by counsulting the index of this catalogue for the page number where the desired curriculum is listed.

With approval of the Dean of the Basic Division, a student may register for any of the courses listed as "Basic" courses in the course description section of this catalogue, or for any other elective course for which he may have prerequisites. A student need not take an elective course that carries the exact hours of credit prescribed in his curriculum.

A student whose high school record and entrance tests indicate inadequate preparation may be required to register for either a reduced load or special courses designed to meet his need.

INDIVIDUALIZED CURRICULA

A student who is deficient in English may take English 100, Fundamentals of Writing, as a means of achieving greater proficiency in this area before progressing with English 103. A student who is deficient in arithmetic skills may take Mathematics 100, General Mathematics, before enrolling in Mathematics 101. Hours of credit toward a degree will not be granted for the satisfactory completion of either English 100 or Mathematics 100. These courses may be taken either in a regular semester or during the summer at the Junction Adjunct. A student whose high school record and entrance tests indicate adequate preparation for Mathematics 102, Algebra, may enroll for it regardless of the mathematics requirement of his degree objective. The completion of this course will permit the student to transfer into any curriculum of the College without taking an additional course in algebra. Mathematics 102 will substitute automatically for Mathematics 101 when the latter is required in the curriculum. Similarly, a student whose record indicates superior preparation in such fields as chemistry and English may register for such advanced courses in these departments as are approved after personal consultation with the Dean of the Basic Division.

CURRICULUM FOR SECOND YEAR IN BASIC DIVISION

A student who is permitted to remain in the Basic Division a second year will first schedule courses to make up any deficiencies in his first year's work. He will complete his schedule with courses required in the curriculum of his degree objective.

REQUIREMENTS FOR TRANSFER TO A DEGREE GRANTING SCHOOL

The requirements for transfer from the Basic Division to one of the degree granting schools of the College are stated on page 56 of this catalogue.

JUNCTION ADJUNCT

Many of the counseling and guidance functions of the Basic Division are carried on during the summer at the Junction Adjunct. During a six-weeks term there a student is able to discover more fully his aptitudes and interests and is helped in relating these to the demands and opportunities of various college curricula. Results of aptitude, achievement, interest, and personality tests are used to help the student know much more about himself than is otherwise possible. By knowing himself better, a student is able more intelligently to decide upon his course of study in college. Further, he is able to know the areas of his strength and his weakness, thus being able to capitalize upon the one and improve upon the other. Among the students who are especially urged to attend the Junction Adjunct are those whose high school average grade is under 80, and those who have not fully decided upon a course of study in college.

A student who is found to be prepared for regular college courses may enroll in the first course of college English and the first course in college mathematics in addition to a Basic Division course and the first course in physical education. A student who is found not to be prepared fully to progress with regular college courses is offered special help in the area of his weakness. Thus, a student having a weakness in mathematics may take a preparatory course in general mathematics (Mathematics 100); one having a weakness in English may take a preparatory course in English (English 100); and a student having a weakness in reading may participate in a program of remedial reading.

THE SCHOOL OF AGRICULTURE

The various curricula in the School of Agriculture have as their main objectives the preparation of young men for farming, ranching, and other businesses associated with agriculture; for harvesting, processing, and marketing of food and fiber products; for the pursuit of scientific investigation in the broad field of agriculture, including soils, water and plant and animal products, both native and cultivated; for careers in teaching or extension work in agriculture; for work with various governmental and private agricultural agencies; or for the teaching of conservation and management of our natural and cultivated resources. Systematic training is given in the sciences of chemistry, physics, mathematics, and biology, all of which are fundamental to the study of scientific agriculture. The curricula offered give the student a wide range of choice in the selection of a major, and elective courses provide excellent opportunity for enlarging his field of learning in keeping with his individual interest and needs.

FOUR-YEAR PROGRAMS

The following departments offer four-year programs:

Agricultural Economics and Sociology
Agricultural Education
Agricultural Engineering
Agronomy
Animal Husbandry
Dairy Science
Entomology
Floriculture and Landscape Architecture
Horticulture
Poultry Science
Range and Forestry
Wildlife Management

COMBINED TECHNICAL CURRICULA

Appropriate committees administer technical curricula in:

Animal Science
Food Technology
Plant and Soil Science

AGRICULTURAL JOURNALISM

This curriculum is administered by the Department of Journalism in the School of Arts and Sciences.

DEPARTMENTS NOT HAVING FOUR-YEAR PROGRAMS

Biochemistry and Nutrition
Genetics
Plant Physiology and Pathology

These departments do not have four-year programs but do offer courses which are basic to many of the major fields in agriculture. A student interested in a career in any of these subject matter fields should consult with a member of the staff of the appropriate department and ask that professional opportunities in the field of his interest be described to him. The equivalent of a major in these subjects may be developed through the curriculum in animal science or in plant and soil science.

TWO-YEAR PROGRAM IN FORESTRY

The present curriculum includes the first two years of forestry.

AGRICULTURAL ECONOMICS AND SOCIOLOGY

Trained personnel are needed in the fields of marketing, farm and ranch management, agricultural policy and finance, agricultural statistics and outlook, land economics, and rural sociology.

AGRICULTURAL ECONOMICS

Agricultural Administration Option

The program in agricultural administration prepares students for employment with governmental and private agencies; in such positions as research workers, marketing specialists, agricultural agents of banks and business firms; as extension workers; and as salesmen and teachers. Electives in business administration prepare students for work in businesses related to agriculture. Electives in technical agriculture prepare a student who wishes to become a specialist in the marketing of a particular farm product.

Farm Management Option

The program in farm management is intended to prepare students for the operation of farms and ranches and for professional and commercial work dealing with agriculture. Electives in technical agriculture permit students to emphasize the study of particular agricultural enterprises.

RURAL SOCIOLOGY

Rural Sociology Option

The program in rural sociology affords professional training in the field of human relations with special emphasis on rural social problems and organization. Graduates are qualified to do social case work, to enter county agricultural extension service, and to serve as Boy Scout executives or as Chamber of Commerce directors.

Pre-Seminary Option

The program for pre-seminary training of rural ministers and agricultural missionaries is designed to give a student interested in such work the necessary general education to enter theological seminary and a knowledge of technical agriculture that will enable him to better understand farm people and their problems.

AGRICULTURAL EDUCATION

This curriculum, which includes a minimum of 57 semester hours of credit in technical agriculture, is designed to give the teacher of vocational agriculture the preparation and training in both technical agriculture and professional education, including student teaching, required to qualify under the Texas Plan for Vocational Education.

In addition to being qualified to teach vocational agriculture, graduates of this curriculum find employment with the Agricultural Extension Service and the Soil Conservation Service, in agricultural public relations work with banks, with Chambers of Commerce and news gathering and reporting agencies, and with industries related to agriculture.

AGRICULTURAL ENGINEERING

The curriculum in agricultural engineering is under the joint supervision of the School of Agriculture and the School of Engineering. Agricultural engineering deals with the application of the fundamental branches of engineering to the peculiar conditions and requirements of agriculture as an industry and as a field of applied science. The term "agricultural engineer" denotes an engineer who has been trained in both engineering and

agriculture, with experience in combining the two, and who is qualified to develop, design, organize, and direct engineering work in agricultural and closely allied industries.

In general, agricultural engineering may be broken down into four major phases of activity: farm power and machinery; farm buildings and structures; farm electrification; and soil and water control and conservation, which includes drainage, flood control, irrigation, land clearing, and soil erosion control.

Graduates of this curriculum are prepared for service with the colleges and the government in teaching, extension, and research work; with government soil erosion control projects; with manufacturers of farm machinery; in advertising, sales, and design work; with engineering and contracting firms doing soil erosion control, irrigation, and drainage work; and as rural electrification specialists.

AGRICULTURAL JOURNALISM

The curriculum in agricultural journalism is designed to prepare students for professional careers as agricultural writers and editors, including work on bulletins and magazines as well as on rural and metropolitan newspapers, and in radio broadcasting.

The first two years are planned to give students the fundamental studies. The program affords opportunities for students to prepare themselves as specialists in certain phases of agricultural writing, but with an adequate background for general journalistic work.

AGRONOMY

The program in agronomy prepares students for work in the broad fields of soil management and crop production. Agronomic training gives the student a thorough understanding of the basic sciences and, in addition, teaches him how to apply this knowledge in the improvement of crops and soils. The first phase of training includes such subjects as mathematics, chemistry, botany, entomology, bacteriology, genetics, and plant physiology. Specialized courses in plant and soil science, which emphasize efficient crop production practices and the conservation and improvement of our soils, are provided in the last two years of the curriculum.

The agronomy graduate is well trained in those subjects dealing with crops and soils and is qualified for the numerous activities related to his field of training. Professional opportunities include those in farming, farm management, and land appraisal; in fertilizer manufacture and sales, seed companies, grain marketing and milling, and agricultural equipment and supply businesses; in extension and education as county agents, extension specialists, college instructors, agricultural public relation specialists and agricultural editors and directors; and in technical fields with the Agricultural Experiment Stations, United States Department of Agriculture and Soil Conservation Service.

ANIMAL HUSBANDRY

The preeminent position of Texas in livestock production affords ample opportunities for young men who wish to take advantage of the many vocational opportunities offered in the industry. Successful livestock production has become increasingly dependent upon technical knowledge and good husbandry, and the many supplies and services required by livestock producers have fostered a substantial number of allied industries.

The commercial option of the animal husbandry program is designed primarily to qualify graduates for careers in allied industries, such as the

feed and the meat industries. The production option is designed primarily for students interested in livestock production and related problems, extension service, livestock marketing, and management activities.

DAIRY SCIENCE

Trained personnel are much in demand to aid, service, manage, and direct the production, manufacture, and distribution of milk and dairy foods so important in the human diet.

Dairy Production

This major is designed to prepare students for careers as dairy farm operators or managers; as dairy herd owners and breeders of dairy cattle; as teachers and research workers in dairy nutrition, breeding, or management; as extension dairy specialists and organization leaders and as workers in allied fields.

Dairy Manufacturing

This major is designed to prepare students for dairy plant operation and management; plant field work and dairy product quality control; teaching and research work in milk and dairy food processing; merchandising and sales. Fundamental technical and business courses give a well rounded preparation for careers in the dairy industry and allied fields.

ENTOMOLOGY

The program in entomology is intended to prepare students for careers in research, extension, teaching, business, or industry. The curriculum includes basic studies in insect taxonomy, morphology, physiology, toxicology, and economic entomology. It also includes fundamental subjects in various fields of agriculture as well as in the biological sciences.

FLORICULTURE AND LANDSCAPE ARCHITECTURE

Floriculture

Floriculture is that branch of agriculture concerned with the production, distribution, and marketing of ornamental plants and plant products.

The program in floriculture includes sound preparation in such sciences as botany, soils, entomology, and genetics to enable a graduate to breed, propagate, and distribute improved varieties of ornamental plants.

Floriculture is a business as well as a science and the curriculum is designed to provide preparation for the highly technical and specialized growing operations of florist or nursery crop production, as well as specialized training for associated industries requiring sales people, floral designers, managers, executives, and experts in the packing, shipping, and storage operations connected with flowers and nursery stock. Opportunities for employment also exist in the fields of teaching, research, and extension.

Landscape Architecture

The curriculum in landscape architecture is arranged to help students attain proficiency in the arrangement of ground and water forms for the purpose of securing the greatest returns in human use and enjoyment.

A successful landscape architect must possess or develop an artistic sense, engineering ability, and the fundamentals of architectural design, in addition to a knowledge of the basic elements of land, water, vegetation, and the forces of nature.

Graduates are employed in private practice; by city, state, and regional planning boards; as managers of city park systems, university campuses, cemeteries, arboretums, and in various phases of activity with the National

Park Service. Splendid opportunities also exist in teaching, extension, and research in this field.

HORTICULTURE

This program includes fundamental courses and specialized training in fruit growing, vegetable growing, plant propagation, and the processing of horticultural crops. Graduates are prepared for work as operators and owners of fruit orchards, vegetable farms, nurseries, and commercial processing plants. The training is also valuable for careers in teaching, extension, and research work in horticulture and related fields.

POULTRY SCIENCE

The growth of the poultry industry and the need for a rapid expansion of scientific and technical knowledge in the various fields of science basic to successful poultry production have supplied the motivation for the development of courses in this phase of agriculture. In no field of agriculture is an understanding of the science and practice of feeding, breeding, physiology, pathology, heating, ventilation, processing, and marketing more necessary or more rewarded than in the modern intensive methods of producing poultry meat and eggs. Undergraduate students are trained to operate commercial poultry farms, hatcheries, feed mills, and poultry processing plants. They also find employment with such allied industries as feed manufacturers, equipment distributors, and manufacturers of vaccines and biologics, with poultry publications, and with the extension service. Many graduates in poultry science choose to take graduate work in this and allied fields.

RANGE MANAGEMENT

This curriculum is designed to give students a thorough understanding of the great variety of problems met in the multiple use and conservation of non-cultivated lands. The first phase of training includes work in the physical, biological, and social courses. Specialized courses in range management, range ecology, agrostology, forestry, and conservation of natural resources are included in the last two years.

Graduates are prepared to enter the ranch business as owners or managers, for work as county agricultural agents, for work with Experiment Stations, and as college teachers in this field. A Bachelor's degree in range management gives the student the background for study toward advanced degrees. Men meeting Civil Service requirements are eligible for appointments with several United States Government agencies.

WILDLIFE MANAGEMENT

This curriculum includes work in fisheries and wildlife. At the beginning of the sophomore year, the student should elect one of the two options, fisheries or wildlife, because of difference in the basic sciences required. The junior and senior years are largely years of specialization.

This curriculum is designed (1) to train young men in the arts of managing wildlife on the land and of maintaining populations at levels consistent with good land use practices and the desirability of the wildlife species involved and (2) to train men for research in taxonomy, distribution, and ecology of fishes, reptiles and amphibians, birds, and mammals. Opportunities are also provided, in cooperation with the Department of Journalism, for training in the field of wildlife journalism, and, in cooperation with the Department of Education and Psychology, for preparation in the field of conservation education.

Upon completion of the wildlife management curriculum, graduates are prepared to enter occupations in the fisheries or wildlife fields, including

management, research, and teaching. Men meeting Civil Service requirements are eligible for appointments with the United States Fish and Wildlife Service, the United States Soil Conservation Service, and other federal agencies. Also, graduates are eligible for employment by the various state game and fish commissions. A few positions are open from time to time as wildlife managers on private ranches.

TECHNICAL CURRICULA

The curricula in animal science, food technology, and plant and soil science are designed for students who are interested in the more technical and scientific problems in agriculture. There is an increasing demand from industry and from the field of agricultural research for trained men in each of these curricula. They have no separate department, but a student interested in a given curriculum should select his electives in the department in which he is most interested.

Animal Science

Those who complete the curriculum in animal science will be qualified for graduate work in the fields of nutrition, animal breeding, genetics, physiology of reproduction, zoology, bio-statistics, and related fields. At the same time they are qualified for many of the positions available to graduates with a major in one of the animal curricula in the School of Agriculture.

Food Technology

The curriculum in food technology is designed to train students in the technical and scientific problems of food processing and manufacturing. This course of study includes a number of elective hours, enabling the student to take major work in production, processing, inspection, and grading of dairy products, fruit and vegetable products, and miscellaneous foods and beverages. Students majoring in this curriculum are under the supervision of a committee on food technology, appointed from the agricultural teaching staff by the Dean of Agriculture.

Plant and Soil Science

The curriculum in plant and soil science is designed to give students a technical background for the fields of plant breeding, plant pathology, plant physiology, turf management, soil fertility, soil physics and mineralogy. At the same time students are qualified for many other positions available to graduates with a major in one of the other plant curricula in the School of Agriculture.

The curriculum emphasizes the sciences of zoology, botany, and chemistry, but also gives a firm foundation in mathematics, English, and other liberal arts and agricultural courses.

FORESTRY

The two-year curriculum in forestry provides the student with fundamental courses necessary for him to enter a southern accredited school of forestry with junior standing. In addition to the arts and sciences, the curriculum includes the basic courses of plane surveying, agronomy, ecology, and forestry. The curriculum also emphasizes the propagation, protection, and management of commercial timbers, the processing and manufacture of wood products, and the conservation of all products derived from forests. All accredited southern forestry schools have approved the curriculum as adequate to permit the student to obtain his Bachelor of Science degree in forestry upon the completion of two additional years of study. The Texas Legislature has provided funds which are available to defray certain out-of-state expenses for Texas students who attend accredited southern forestry schools for the junior and senior years.

During the junior and senior years, the forestry student has the opportunity to specialize in forest production, forest utilization, wood technology,

pulp and paper technology, wood products merchandising, or extension and public relations forestry.

A degree from an accredited school of forestry prepares the graduate for work in the fields of forest administration, management, research, and education.

Curricula in AGRICULTURE

(For Majors in Agronomy, Animal Husbandry, Dairy Production, Dairy Manufacturing, Entomology, Horticulture, Poultry Science)

FRESHMAN YEAR

First Semester		Credit
Agronomy 105	(2-2)	3
Fundamentals of Crop Production		
Biology 107	(2-3)	3
Vertebrate Zoology		
Chemistry 101	(3-3)	4
General Chemistry		
English 103	(3-0)	3
Composition and Rhetoric		
Mathematics 101	(3-0)	3
Algebra		
Military or Air Science	(0-3)	1
Physical Education 101	(0-2)	R
		17

Second Semester		Credit
Animal Husbandry 107	(2-3)	3
General Animal Husbandry		
Biology 101	(2-3)	3
General Botany of Seed Plants		
Chemistry 102	(3-3)	4
General Chemistry		
English 104	(3-0)	3
Composition and Rhetoric		
Military or Air Science	(0-3)	1
Poultry Science 201	(2-2)	3
Poultry Production		
Elective		1
Physical Education 102	(0-2)	R
		18

NOTES: 1. Electives shall be selected and substitutions made with the advice of the head of the student's major department.

2. At least 16 but not more than 24 credit hours of advanced courses in the student's major department shall be permitted toward requirements for graduation.

For a Major in AGRONOMY

FRESHMAN YEAR
(See above)

SOPHOMORE YEAR

Chemistry 231	(3-0)	3
Elementary Organic Chemistry		
Dairy Science 202	(2-2)	3
Dairying		
Economics 205	(3-0)	3
Principles of Economics		
English 203	(2-0)	2
Composition and Literature		
Entomology 201	(2-2)	3
General Entomology		
Military or Air Science	(0-3)	1
Physics 213	(2-2)	3
Physics for Students of Agriculture		
Physical Education 201	(0-2)	R
		18

Agricultural Engineering 201	(2-2)	3
Farm Power and Machinery		
Biology 206	(2-4)	3
Introductory Microbiology		
Chemistry 223	(2-3)	3
Elementary Quantitative Analysis		
English 210	(2-0)	2
Writing and Discussion		
Horticulture 201	(2-2)	3
General Horticulture		
Military or Air Science	(0-3)	1
Elective		3
Physical Education 202	(0-2)	R
		18

JUNIOR YEAR

Agronomy 301	(3-2)	4
Introductory Soils		
Genetics 301	(3-2)	4
Genetics		
Government 306	(3-0)	3
American National Government		
Liberal Arts 311	(0-2)	1
Use of Library Resources		
Plant Physiology and Pathology 313	(2-3)	3
Introduction to Plant Physiology		
Elective		3
		18

Agricultural Economics 314	(3-0)	
Marketing Farm Products		
Or		
Agricultural Economics 421	(2-2)	3
Principles of Farm and Ranch Management		
Agricultural Engineering 305	(3-3)	4
Terracing and Drainage		
Animal Husbandry 303	(3-0)	3
Animal Nutrition		
Elective		8
		18

SENIOR YEAR

First Semester		Credit
English 301	(3-0)	
Writing for Professional Men		
Or		
Journalism 415	(2-2)	3
Agricultural Journalism		
History 325	(3-0)	3
Trends in American History		
Plant Physiology and Pathology 301	(2-3)	3
Plant Pathology		
Elective		9
		18

Second Semester		Credit
English 403	(1-2)	2
Speaking for Professional Men		
History 326	(3-0)	3
History of Texas		
Rural Sociology 407	(3-0)	3
Rural Social Problems		
Elective		10
		18

For a Major in ANIMAL HUSBANDRY

Commercial Option

(For students primarily interested in the meat, feed, or other related livestock industries)

FRESHMAN YEAR

(See page 88)

SOPHOMORE YEAR

Business Administration 209	(2-3)	3
Principles of Accounting		
Chemistry 231	(3-0)	3
Elementary Organic Chemistry		
Dairy Science 202	(2-2)	3
Dairying		
English 203	(2-0)	2
Composition and Literature		
Entomology 201	(2-2)	3
General Entomology		
Military or Air Science	(0-3)	1
Physics 213	(2-2)	3
Physics for Students of Agriculture		
Physical Education 201	(0-2)	R
		18

Agricultural Engineering 201	(2-2)	
Farm Power and Machinery		
Or		
Agricultural Engineering 213	(2-3)	3
Food Plant Engineering		
Biology 206	(2-4)	3
Introductory Microbiology		
Business Administration 210	(2-3)	3
Principles of Accounting		
Chemistry 223	(2-3)	3
Elementary Quantitative Analysis		
English 210	(2-0)	2
Writing and Discussion		
Military or Air Science	(0-3)	1
Elective		3
Physical Education 202	(0-2)	R
		18

JUNIOR YEAR

Animal Husbandry 303	(3-0)	
Animal Nutrition		
Or		
Biochemistry and Nutrition 401	(3-0)	3
Human Nutrition		
Economics 205	(3-0)	3
Principles of Economics		
English 301	(3-0)	
Writing for Professional Men		
Or		
Journalism 415	(2-2)	3
Agricultural Journalism		
Veterinary Physiology and Pharmacology 323	(2-2)	3
Physiology of Farm Animals		
Elective		6
		18

Agricultural Economics 314	(3-0)	3
Marketing Farm Products		
Agronomy 301	(3-2)	4
Introductory Soils		
Genetics 301	(3-2)	4
Genetics		
Government 306	(3-0)	3
American National Government		
Elective		4
		18

SENIOR YEAR

First Semester		Credit
Animal Husbandry 437 Marketing and Grading of Livestock and Meats	(2-2)	3
Business Administration 435 Salesmanship	(3-0)	3
History 325 Trends in American History	(3-0)	3
Veterinary Microbiology 491 Animal Hygiene	(2-2)	3
Elective		6
		18

Second Semester		Credit
Animal Husbandry 427 Seminar	(1-0)	1
Business Administration 422 Personnel Problems of Industry	(3-0)	3
English 403 Speaking for Professional Men	(1-2)	2
History 326 History of Texas	(3-0)	3
Psychology 303 Psychology for Technical Students	(3-0)	3
Elective		6
		18

For a Major in ANIMAL HUSBANDRY

Production Option

(For students primarily interested in livestock production and related problems)

FRESHMAN YEAR

(See page 88)

SOPHOMORE YEAR

Chemistry 231 Elementary Organic Chemistry	(3-0)	3
Dairy Science 202 Dairying	(2-2)	3
Economics 205 Principles of Economics	(3-0)	3
English 203 Composition and Literature	(2-0)	2
Military or Air Science	(0-3)	1
Physics 213 Physics for Students of Agriculture	(2-2)	3
Elective		3
Physical Education 201	(0-2)	R
		18

Agricultural Engineering 201 Farm Power and Machinery	(2-2)	3
Biology 206 Introductory Microbiology	(2-4)	3
Chemistry 223 Elementary Quantitative Analysis	(2-3)	3
English 210 Writing and Discussion	(2-0)	2
Entomology 201 General Entomology	(2-2)	3
Military or Air Science	(0-3)	1
Elective		3
Physical Education 202	(0-2)	R
		18

JUNIOR YEAR

Agronomy 301 Introductory Soils	(3-2)	4
Animal Husbandry 303 Animal Nutrition	(3-0)	3
Genetics 301 Genetics	(3-2)	4
Veterinary Physiology and Pharmacology 323 Physiology of Farm Animals	(2-2)	3
Elective		4
		18

Agricultural Economics 314 Marketing Farm Products	(3-0)	3
Agronomy 308 Forage Crops	(2-2)	
Or		
Range and Forestry 401 Range Improvement and Maintenance	(2-3)	3
Animal Husbandry 409 Feeds and Feeding	(2-2)	3
Genetics 306 Animal Breeding	(2-2)	3
Government 306 American National Government	(3-0)	3
Elective		3
		18

SENIOR YEAR

First Semester		Credit
Agronomy 417 Pasture Management	(2-2)	
Or		
Range and Forestry 412 Range Management Practices	(2-3)	3
Animal Husbandry 437 Marketing and Grading of Livestock and Meats	(2-2)	3
English 301 Writing for Professional Men	(3-0)	
Or		
Journalism 415 Agricultural Journalism	(2-2)	3
History 325 Trends in American History	(3-0)	3
Veterinary Microbiology 491 Animal Hygiene	(2-2)	3
Elective		3
		18

Second Semester		Credit
Agricultural Engineering 333 Surveying and Water Utilization	(2-3)	3
Animal Husbandry 427 Seminar	(1-0)	1
English 403 Speaking for Professional Men	(1-2)	2
History 326 History of Texas	(3-0)	3
Rural Sociology 407 Rural Social Problems	(3-0)	3
Elective		6
		18

For a Major in DAIRY MANUFACTURING

FRESHMAN YEAR

(See page 88 with the addition of the following note: Students who expect to major in dairy manufacturing may substitute Mathematics 103 or 110 for Poultry Science 201 or Entomology 201.)

SOPHOMORE YEAR

Business Administration 209 Principles of Accounting	(2-3)	3
Chemistry 223 Elementary Quantitative Analysis	(2-3)	3
Dairy Science 202 Dairying	(2-2)	3
English 203 Composition and Literature	(2-0)	2
Entomology 201 General Entomology	(2-2)	3
Military or Air Science	(0-3)	1
Physics 213 Physics for Students of Agriculture	(2-2)	3
Physical Education 201	(0-2)	R
		18

Biology 206 Introductory Microbiology	(2-4)	3
Business Administration 210 Principles of Accounting	(2-3)	3
Chemistry 231 Elementary Organic Chemistry	(3-0)	3
Economics 205 Principles of Economics	(3-0)	3
English 210 Writing and Discussion	(2-0)	2
Government 306 American National Government	(3-0)	3
Military or Air Science	(0-3)	1
Physical Education 202	(0-2)	R
		18

JUNIOR YEAR

Agricultural Economics 314 Marketing Farm Products	(3-0)	3
Business Administration 430 Cost Accounting Survey	(3-0)	3
Dairy Science 301 Market Milk	(3-2)	4
Dairy Science 320 Bacteriology of Dairy Products	(3-3)	4
Elective		4
		18

Agricultural Engineering 213 Food Plant Engineering	(2-3)	3
Dairy Science 311 Technical Control of Dairy Products	(2-6)	4
Dairy Science 316 Butter and Cheese Manufacture	(3-4)	4
English 403 Speaking for Professional Men	(1-2)	2
Elective		5
		18

SENIOR YEAR

First Semester		Credit
Biochemistry and Nutrition 401 Human Nutrition	(3-0)	3
Business Administration 305 Business Law	(3-0)	3
Dairy Science 407 Ice Cream Manufacturing	(2-3)	3
Dairy Science 415 Condensed and Powdered Milk	(2-2)	3
History 325 Trends in American History	(3-0)	3
Elective		3
		18

Second Semester		Credit
Business Administration 422 Personnel Problems of Industry	(3-0)	3
Dairy Science 410 Dairy Plant Management	(1-2)	2
Dairy Science 421 Seminar	(1-0)	1
English 301 Writing for Profesisonal Men	(3-0)	
Or		
Journalism 415 Agricultural Journalism	(2-2)	3
History 326 History of Texas	(3-0)	3
Psychology 303 Psychology for Technical Students	(3-0)	3
Elective		3
		18

For a Major in DAIRY PRODUCTION

FRESHMAN YEAR

(See page 88)

SOPHOMORE YEAR

Chemistry 231 Elementary Organic Chemistry	(3-0)	3
Dairy Science 202 Dairying	(2-2)	3
Economics 205 Principles of Economics	(3-0)	3
English 203 Composition and Literature	(2-0)	2
Entomology 201 General Entomology	(2-2)	3
Military or Air Science	(0-3)	1
Physics 213 Physics for Students of Agriculture	(2-2)	3
Physical Education 201	(0-2)	R
		18

Agricultural Engineering 201 Farm Power and Machinery	(2-2)	3
Biology 206 Introductory Microbiology	(2-4)	3
Chemistry 223 Elementary Quantitative Analysis	(2-3)	3
English 210 Writing and Discussion	(2-0)	2
Horticulture 201 General Horticulture	(2-2)	3
Military or Air Science	(0-3)	1
Elective		3
Physical Education 202	(0-2)	R
		18

JUNIOR YEAR

Dairy Science 301 Market Milk	(3-2)	4
Dairy Science 303 Dairy Cattle Judging	(0-3)	1
Dairy Science 320 Bacteriology of Dairy Products	(3-3)	4
Genetics 301 Genetics	(3-2)	4
Veterinary Physiology and Pharmacology 323 Physiology of Farm Animals	(2-2)	3
Elective		2
		18

Agronomy 301 Introductory Soils	(3-2)	4
Animal Husbandry 303 Animal Nutrition	(3-0)	3
English 403 Speaking for Professional Men	(1-2)	2
Genetics 306 Animal Breeding	(2-2)	3
Government 306 American National Government	(3-0)	3
Elective		3
		18

SENIOR YEAR

First Semester		Credit
Agricultural Economics 314	(3-0)	3
Marketing Farm Products		
Agricultural Engineering 333	(2-3)	3
Surveying and Water Utilization		
Dairy Science 417	(2-2)	3
History and Development of Dairy Cattle		
English 301	(3-0)	
Writing for Professional Men		
Or		
Journalism 415	(2-2)	3
Agricultural Journalism		
History 325	(3-0)	3
Trends in American History		
Elective		3
		18

Second Semester		Credit
Dairy Science 324	(3-0)	3
Commercial Dairy Products		
Dairy Science 418	(3-2)	4
Feeding and Management of Dairy Cattle		
Dairy Science 421	(1-0)	1
Seminar		
History 326	(3-0)	3
History of Texas		
Rural Sociology 407	(3-0)	3
Rural Social Problems		
Elective		4
		18

For a Major in ENTOMOLOGY

FRESHMAN YEAR
(See page 88)

SOPHOMORE YEAR

Chemistry 231	(3-0)	3
Elementary Organic Chemistry		
Dairy Science 202	(2-2)	3
Dairying		
Economics 205	(3-0)	3
Principles of Economics		
English 203	(2-0)	2
Composition and Literature		
Entomology 201	(2-2)	3
General Entomology		
Military or Air Science	(0-3)	1
Physics 213	(2-2)	3
Physics for Students of Agriculture		
Physical Education 201	(0-2)	R
		18

Agricultural Engineering 201	(2-2)	3
Farm Power and Machinery		
Biology 206	(2-4)	3
Introductory Microbiology		
Chemistry 223	(2-3)	3
Elementary Quantitative Analysis		
English 210	(2-0)	2
Writing and Discussion		
Horticulture 201	(2-2)	3
General Horticulture		
Military or Air Science	(0-3)	1
Elective		3
Physical Education 202	(0-2)	R
		18

JUNIOR YEAR

Agronomy 301	(3-2)	4
Introductory Soils		
English 403	(1-2)	2
Speaking for Professional Men		
Entomology 301	(2-3)	3
Systematic Entomology		
Entomology 305	(2-3)	3
Insect Morphology		
Government 306	(3-0)	3
American National Government		
Elective		3
		18

Entomology 302	(2-3)	3
Systematic Entomology		
Entomology 306	(2-3)	3
Insect Physiology		
Genetics 301	(3-2)	4
Genetics		
Horticulture 319	(2-2)	3
Orchard Management		
Elective		5
		18

SENIOR YEAR

Entomology 401	(2-3)	3
Principles of Insect Control		
Entomology 423	(2-3)	3
Comparative Anatomy of Arthropods		
History 325	(3-0)	3
Trends in American History		
Plant Physiology and Pathology 301	(2-3)	3
Plant Pathology		
Elective		6
		18

English 301	(3-0)	3
Writing for Professional Men		
Entomology 402	(2-3)	3
Agricultural Pests		
Entomology 424	(2-3)	3
Insect Ecology		
History 326	(3-0)	3
History of Texas		
Rural Sociology 407	(3-0)	3
Rural Social Problems		
Elective		3
		18

For a Major in FLORICULTURE

Option in Commercial Floriculture or Nursery Management

FRESHMAN YEAR

First Semester		Credit
Agronomy 105 Fundamentals of Crop Production	(2-2)	3
Biology 101 General Botany of Seed Plants	(2-3)	3
Chemistry 101 General Chemistry	(3-3)	4
English 103 Composition and Rhetoric	(3-0)	3
Mathematics 101 Algebra	(3-0)	3
Military or Air Science	(0-3)	1
Physical Education 101	(0-2)	R
		17

Second Semester		Credit
Biology 102 Taxonomy of Flowering Plants	(2-3)	3
Chemistry 102 General Chemistry	(3-3)	4
English 104 Composition and Rhetoric	(3-0)	3
Entomology 201 General Entomology	(2-2)	3
Horticulture 201 General Horticulture	(2-2)	3
Military or Air Science	(0-3)	1
Elective		1
Physical Education 102	(0-2)	R
		18

SOPHOMORE YEAR

Chemistry 223 Elementary Quantitative Analysis	(2-3)	3
Economics 205 Principles of Economics	(3-0)	3
English 203 Composition and Literature	(2-0)	2
Floriculture 120 Ornamental Plant Production	(2-2)	3
Floriculture 206 Ornamental Plants	(2-2)	3
Government 306 American National Government	(3-0)	3
Military or Air Science	(0-3)	1
Physical Education 201	(0-2)	R
		18

Biology 206 Introductory Microbiology	(2-4)	3
Chemistry 231 Elementary Organic Chemistry	(3-0)	3
English 210 Writing and Discussion	(2-0)	2
Floriculture 222 Greenhouse Construction and Management	(2-2)	3
Military or Air Science	(0-3)	1
Physics 213 Physics for Students of Agriculture	(2-2)	3
Elective		3
Physical Education 202	(0-2)	R
		18

JUNIOR YEAR

Agronomy 301 Introductory Soils	(3-2)	4
Floriculture 220 Propagation of Ornamental Plants	(2-2)	3
History 325 Trends in American History	(3-0)	3
Plant Physiology and Pathology 313 Introduction to Plant Physiology	(2-3)	3
Elective		5
		18

English 403 Speaking for Professional Men	(1-2)	2
Floriculture 320 Garden Management	(2-2)	3
Genetics 301 Genetics	(3-2)	4
History 326 History of Texas	(3-0)	3
Elective		6
		18

SENIOR YEAR

English 301 Writing for Professional Men	(3-0)	3
Floriculture 421 Marketing of Ornamental Plants	(3-3)	4
Plant Physiology and Pathology 301 Plant Pathology	(2-3)	3
Elective		8
		18

Floriculture 422 Outdoor Production Methods	(3-3)	4
Floriculture 427 Seminar	(1-0)	1
Landscape Architecture 308 Park and Recreational Development	(2-0)	2
Elective		11
		18

NOTE: Electives should be chosen according to the following policy:

1. COMMERCIAL FLORICULTURE: Students majoring in commercial floriculture should elect Floriculture 321 and 426 in their junior or senior year.

2. NURSERY MANAGEMENT: Students majoring in nursery management should elect Floriculture 207 and 323 in their junior or senior years.

For a Major in HORTICULTURE

FRESHMAN YEAR

(See page 88)

SOPHOMORE YEAR

First Semester	Credit	Second Semester	Credit
Chemistry 231 (3-0)	3	**Agricultural Engineering 201** (2-2)	3
Elementary Organic Chemistry		Farm Power and Machinery	
Dairy Science 202 (2-2)	3	**Biology 206** (2-4)	3
Dairying		Introductory Microbiology	
Economics 205 (3-0)	3	**Chemistry 223** (2-3)	3
Principles of Economics		Elementary Quantitative Analysis	
English 203 (2-0)	2	**English 210** (2-0)	2
Composition and Literature		Writing and Discussion	
Entomology 201 (2-2)	3	**Horticulture 201** (2-2)	3
General Entomology		General Horticulture	
Military or Air Science (0-3)	1	**Military or Air Science** (0-3)	1
Physics 213 (2-2)	3	**Elective**	3
Physics for Students of Agriculture		**Physical Education 202** (0-2)	R
Physical Education 201 (0-2)	R		18
	18		

JUNIOR YEAR

Agronomy 301 (3-2)	4	**Agricultural Economics 314** (3-0)	3
Introductory Soils		Marketing Farm Products	
Horticulture 311 (2-3)	3	**English 403** (1-2)	2
Processing Horticultural Crops		Speaking for Professional Men	
Plant Physiology and Pathology 301 (2-3)	3	**Genetics 301** (3-2)	4
Plant Pathology		Genetics	
Plant Physiology and Pathology 313 (2-3)	3	**Horticulture 319** (2-2)	3
Introduction to Plant Physiology		Orchard Management	
Elective	5	**Horticulture 322** (2-3)	3
	18	Vegetable Crops Management	
		Elective	3
			18

SENIOR YEAR

Agricultural Engineering 305 (3-3)	4	**Entomology 405** (2-2)	3
Terracing and Drainage		Fruit and Vegetable Insects	
English 301 (3-0)		**Government 306** (3-0)	3
Writing for Professional Men		American National Government	
Or		**History 326** (3-0)	3
Journalism 415 (2-2)	3	History of Texas	
Agricultural Journalism		**Rural Sociology 407** (3-0)	3
History 325 (3-0)	3	Rural Social Problems	
Trends in American History		**Elective**	6
Horticulture 427 (1-0)	1		18
Seminar			
Elective	7		
	18		

For a Major in POULTRY SCIENCE

FRESHMAN YEAR

(See page 88)

SOPHOMORE YEAR

First Semester		Credit	Second Semester		Credit
Chemistry 231 Elementary Organic Chemistry	(3-0)	3	**Agricultural Engineering 201** Farm Power and Machinery	(2-2)	3
Dairy Science 202 Dairying	(2-2)	3	**Biology 206** Introductory Microbiology	(2-4)	3
Economics 205 Principles of Economics	(3-0)	3	**Chemistry 223** Elementary Quantitative Analysis	(2-3)	3
English 203 Composition and Literature	(2-0)	2	**English 210** Writing and Discussion	(2-0)	2
Entomology 201 General Entomology	(2-2)	3	**Horticulture 201** General Horticulture	(2-2)	3
Military or Air Science	(0-3)	1	**Military or Air Science**	(0-3)	1
Physics 213 Physics for Students of Agriculture	(2-2)	3	**Elective**		3
Physical Education 201	(0-2)	R	**Physical Education 202**	(0-2)	R
		18			18

JUNIOR YEAR

Agricultural Economics 314 Marketing Farm Products	(3-0)	3	**Agronomy 301** Introductory Soils	(3-2)	4
Genetics 301 Genetics	(3-2)	4	**Government 306** American National Government	(3-0)	3
Poultry Science 411 Poultry Feeding	(3-2)	4	**Poultry Science 303** Turkey Production	(2-0)	2
Veterinary Physiology and Pharmacology 323 Physiology of Farm Animals	(2-2)	3	**Poultry Science 308** Hatchery Management	(2-3)	3
Elective		4	**Veterinary Microbiology 334** Poultry Pathology	(2-2)	3
		18	**Elective**		3
					18

SENIOR YEAR

English 301 Writing for Professional Men	(3-0)		**English 403** Speaking for Professional Men	(1-2)	2
Or			**History 326** History of Texas	(3-0)	3
Journalism 415 Agricultural Journalism	(2-2)	3	**Poultry Science 450** Poultry Seminar	(1-0)	1
History 325 Trends in American History	(3-0)	3	**Rural Sociology 407** Rural Social Problems	(3-0)	3
Poultry Science 407 Technology and Marketing of Poultry and Poultry Products	(2-2)	3	**Elective**		9
Poultry Science 414 Poultry Breeding	(2-2)	3			18
Poultry Science 449 Poultry Seminar	(1-0)	1			
Elective		5			
		18			

Curricula in AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY

FRESHMAN YEAR

Agricultural Economics 105 Introduction to Rural Economy	(3-0)	3	**Agronomy 105** Fundamentals of Crop Production	(2-2)	3
Biology 107 Vertebrate Zoology	(2-3)	3	**Animal Husbandry 107** General Animal Husbandry	(2-3)	3
Chemistry 101 General Chemistry	(3-3)	4	**Biology 101** General Botany of Seed Plants	(2-3)	3
English 103 Composition and Rhetoric	(3-0)	3	**Chemistry 102** General Chemistry	(3-3)	4
Mathematics 101 Algebra	(3-0)	3	**English 104** Composition and Rhetoric	(3-0)	3
Military or Air Science	(0-3)	1	**Military or Air Science**	(0-3)	1
Physical Education 101	(0-2)	R	**Elective**		1
		17	**Physical Education 102**	(0-2)	R
					18

Curriculum in AGRICULTURAL ECONOMICS AGRICULTURAL ADMINISTRATION OPTION

FRESHMAN YEAR

(See page 96)

SOPHOMORE YEAR

First Semester		Credit
Business Administration 209 Principles of Accounting	(2-3)	3
Dairy Science 202 Dairying	(2-2)	3
Economics 203 Principles of Economics	(3-0)	3
English 203 Composition and Literature	(2-0)	2
Horticulture 201 General Horticulture	(2-2)	3
Military or Air Science	(0-3)	1
Poultry Science 201 Poultry Production	(2-2)	3
Physical Education 201	(0-2)	R
		18

Second Semester		Credit
Agricultural Economics 314 Marketing Farm Products	(3-0)	3
Business Administration 210 Principles of Accounting	(2-3)	3
Economics 204 Principles of Economics	(3-0)	3
English 210 Writing and Discussion	(2-0)	2
Government 306 American National Government	(3-0)	3
Military or Air Science	(0-3)	1
Elective		3
Physical Education 202	(0-2)	R
		18

JUNIOR YEAR

Agricultural Economics 413 Cooperation in Agriculture	(3-0)	3
Agricultural Economics 422 Land Economics	(3-0)	3
Agronomy 301 Introductory Soils	(3-2)	4
Business Administration 303 Statistical Method	(3-3)	4
Elective		4
		18

Agricultural Economics 315 Economic History of Agriculture	(3-0)	3
Economics 311 Money and Banking	(3-0)	3
History 325 Trends in American History	(3-0)	3
Rural Sociology 407 Rural Social Problems	(3-0)	3
Elective		6
		18

SENIOR YEAR

Agricultural Economics 324 Agricultural Prices	(3-0)	3
Agricultural Economics 430 Agricultural Finance	(3-0)	3
Agricultural Economics 481 Seminar	(1-0)	1
English 301 Writing for Professional Men	(3-0)	3
History 326 History of Texas	(3-0)	3
Elective		5
		18

Agricultural Economics 429 Public Policies Affecting Agriculture	(3-0)	3
English 403 Speaking for Professional Men	(1-2)	2
Elective		13
		18

NOTE: Electives shall be chosen and approved according to the following policy:

1. AGRICULTURAL BUSINESS ADMINISTRATION: Students preparing for work with business concerns allied with agriculture should elect from 9 to 18 credit hours of work in business administration and economics.

2. AGRICULTURAL MARKETING: Students preparing for work in agricultural marketing should elect from 9 to 18 hours in courses dealing with the production, grading, and marketing of commodities in which they are interested.

3. AGRICULTURAL ECONOMICS: Students preparing for professional work in agricultural economics and expecting to take graduate training should elect courses in the various social sciences, including courses in advanced economic theory.

4. Not more than 6 elective hours of advanced courses in agricultural economics will be permitted toward requirements for graduation.

FARM MANAGEMENT OPTION

FRESHMAN YEAR

(See page 96)

SOPHOMORE YEAR

First Semester		Credit
Chemistry 231 Elementary Organic Chemistry	(3-0)	3
Dairy Science 202 Dairying	(2-2)	3
Economics 203 Principles of Economics	(3-0)	3
English 203 Composition and Literature	(2-0)	2
Entomology 201 General Entomology	(2-2)	3
Military or Air Science	(0-3)	1
Physics 213 Physics for Students of Agriculture	(2-2)	3
Physical Education 201	(0-2)	R
		18

Second Semester		Credit
Agricultural Engineering 201 Farm Power and Machinery	(2-2)	3
Biology 206 Introductory Microbiology	(2-4)	3
Economics 204 Principles of Economics	(3-0)	3
English 210 Writing and Discussion	(2-0)	2
Horticulture 201 General Horticulture	(2-2)	3
Military or Air Science	(0-3)	1
Poultry Science 201 Poultry Production	(2-2)	3
Physical Education 202	(0-2)	R
		18

JUNIOR YEAR

Agricultural Economics 321 Farm and Ranch Records and Accounts	(1-2)	2
Agronomy 301 Introductory Soils	(3-2)	4
Genetics 301 Genetics	(3-2)	4
Government 306 American National Government	(3-0)	3
History 325 Trends in American History	(3-0)	3
Elective		2
		18

Agricultural Economics 314 Marketing Farm Products	(3-0)	3
Animal Husbandry 303 Animal Nutrition	(3-0)	3
Business Administration 303 Statistical Method	(3-3)	4
Rural Sociology 407 Rural Social Problems	(3-0)	3
Elective		5
		18

SENIOR YEAR

Agricultural Economics 324 Agricultural Prices	(3-0)	3
Agricultural Economics 421 Principles of Farm and Ranch Management	(2-2)	3
Agricultural Economics 481 Seminar	(1-0)	1
History 326 History of Texas	(3-0)	3
Journalism 415 Agricultural Journalism	(2-2)	3
Elective		5
		18

Agricultural Economics 429 Public Policies Affecting Agriculture	(3-0)	3
Agricultural Economics 432 Farm and Ranch Organization and Operation	(1-3)	2
English 403 Speaking for Professional Men	(1-2)	2
Elective		11
		18

NOTE: Electives shall be chosen and approved according to the following policy:

1. Not more than 9 elective hours of advanced courses in agricultural economics will be permitted toward requirements for graduation.
2. Other electives shall be selected with view to strengthening the student's preparation for farm operation.

Curriculum in

RURAL SOCIOLOGY
RURAL SOCIOLOGY OPTION

FRESHMAN YEAR

(See page 96)

SOPHOMORE YEAR

First Semester		Credit
English 203 Composition and Literature	(2-0)	2
Government 306 American National Government	(3-0)	3
Military or Air Science	(0-3)	1
Poultry Science 201 Poultry Production	(2-2)	3
Psychology 207 General Psychology	(3-0)	
Or		
Psychology 301 Educational Psychology	(3-0)	3
Rural Sociology 205 Principles of Sociology	(3-0)	3
Elective		3
Physical Education 201	(0-2)	R
		18

Second Semester		Credit
Dairy Science 202 Dairying	(2-2)	3
Economics 205 Principles of Economics	(3-0)	3
English 210 Writing and Discussion	(2-0)	2
Horticulture 201 General Horticulture	(2-2)	3
Military or Air Science	(0-3)	1
Rural Sociology 206 Social Processes	(2-0)	2
Elective		4
Physical Education 202	(0-2)	R
		18

JUNIOR YEAR

Business Administration 303 Statistical Method	(3-3)	4
Education 321 Secondary School Methods	(3-0)	
Or		
Psychology 323 Psychology of Adolescence	(3-0)	3
Rural Sociology 314 Social Problems	(3-0)	3
Elective		8
		18

Agricultural Economics 314 Marketing Farm Products	(3-0)	3
Agronomy 301 Introductory Soils	(3-2)	4
Journalism 415 Agricultural Journalism	(2-2)	3
Rural Sociology 407 Rural Social Problems	(3-0)	3
Elective		5
		18

SENIOR YEAR

Agricultural Economics 481 Seminar	(1-0)	1
Civil Engineering 406 Sanitation and Public Health	(3-0)	3
English 403 Speaking for Professional Men	(1-2)	2
History 325 Trends in American History	(3-0)	3
Rural Sociology 404 Rural Community Development	(3-0)	3
Elective		6
		18

Agricultural Economics 429 Public Policies Affecting Agriculture	(3-0)	3
History 326 History of Texas	(3-0)	3
Rural Sociology 306 Principles of Social Work	(3-0)	3
Elective		9
		18

NOTE: All electives must be approved by the Head of the Department. Not more than 9 elective credit hours of advanced courses in rural sociology may be applied toward requirements for graduation.

PRE-SEMINARY TRAINING OPTION*

FRESHMAN YEAR

(See page 96)

SOPHOMORE YEAR

First Semester		Credit
Dairy Science 202	(2-2)	3
Dairying		
English 203	(2-0)	2
Composition and Literature		
Entomology 201	(2-2)	3
General Entomology		
Horticulture 201	(2-2)	3
General Horticulture		
Military or Air Science	(0-3)	1
Physics 213	(2-2)	3
Physics for Students of Agriculture		
Rural Sociology 205	(3-0)	3
Principles of Sociology		
Physical Education 201	(0-2)	R
		18

Second Semester		Credit
Agricultural Engineering 201	(2-2)	3
Farm Power and Machinery		
Biology 206	(2-4)	3
Introductory Microbiology		
Chemistry 231	(3-0)	3
Elementary Organic Chemistry		
English 210	(2-0)	2
Writing and Discussion		
Military or Air Science	(0-3)	1
Psychology 207	(3-0)	3
General Psychology		
Elective		3
Physical Education 202	(0-2)	R
		18

JUNIOR YEAR

Agronomy 301	(3-2)	4
Introductory Soils		
Economics 205	(3-0)	3
Principles of Economics		
Government 306	(3-0)	3
American National Government		
Journalism 415	(2-2)	3
Agricultural Journalism		
Rural Sociology 320	(3-0)	3
Social Anthropology		
Elective		2
		18

Agricultural Economics 314	(3-0)	3
Marketing Farm Products		
Genetics 301	(3-2)	4
Genetics		
Range and Forestry 401	(2-3)	3
Range Improvement and Maintenance		
Rural Sociology 206	(2-0)	2
Social Processes		
Rural Sociology 306	(3-0)	3
Principles of Social Work		
Elective		3
		18

SENIOR YEAR

Agricultural Economics 413	(3-0)	
Cooperation in Agriculture		
Or		
Agricultural Economics 422	(3-0)	3
Land Economics		
Agricultural Economics 481	(1-0)	1
Seminar		
Animal Husbandry 303	(3-0)	3
Animal Nutrition		
History 325	(3-0)	3
Trends in American History		
Rural Sociology 311	(3-0)	3
Social Psychology		
Rural Sociology 404	(3-0)	3
Rural Community Development		
Elective		2
		18

Agricultural Economics 429	(3-0)	3
Public Policies Affecting Agriculture		
English 403	(1-2)	2
Speaking for Professional Men		
History 326	(3-0)	3
History of Texas		
Rural Sociology 315	(3-0)	3
The Family		
Elective		7
		18

NOTE: Not more than 9 elective hours of advanced courses in rural sociology may apply toward graduation.

*For students preparing to become rural ministers and agricultural missionaries.

Curriculum in AGRICULTURAL EDUCATION

FRESHMAN YEAR

(Same as for Agriculture, page 88)

SOPHOMORE YEAR

First Semester		Credit
Chemistry 231	(3-0)	3
Elementary Organic Chemistry		
Economics 205	(3-0)	3
Principles of Economics		
English 203	(2-0)	2
Composition and Literature		
Entomology 201	(2-2)	3
General Entomology		
History 325	(3-0)	3
Trends in American History		
Military or Air Science	(0-3)	1
Physics 213	(2-2)	3
Physics for Students of Agriculture		
Physical Education 201	(0-2)	R
		18

Second Semester		Credit
Agricultural Engineering 325	(2-2)	3
Farm Electricity		
Biology 206	(2-4)	3
Introductory Microbiology		
Dairy Science 202	(2-2)	3
Dairying		
English 210	(2-0)	2
Writing and Discussion		
***Government 305**	(3-0)	3
Government of the United States and Texas		
Horticulture 201	(2-2)	3
General Horticulture		
Military or Air Science	(0-3)	1
Physical Education 202	(0-2)	R
		18

JUNIOR YEAR

Agricultural Education 301	(3-0)	3
Principles of Agricultural Education		
Agricultural Engineering 221	(1-3)	2
Farm Shop		
Agricultural Engineering 333	(2-3)	3
Surveying and Water Utilization		
Agronomy 301	(3-2)	4
Introductory Soils		
Animal Husbandry 303	(3-0)	3
Animal Nutrition		
Elective		3
		18

Agricultural Economics 314	(3-0)	3
Marketing Farm Products		
Agricultural Education 425	(2-0)	2
Course Building		
Agricultural Engineering 222	(1-3)	2
Farm Shop		
Agronomy 308	(2-2)	3
Forage Crops		
Genetics 301	(3-2)	4
Genetics		
History 326	(3-0)	3
History of Texas		
Elective		3
		20

SENIOR YEAR

Agricultural Economics 421	(2-2)	3
Principles of Farm and Ranch Management		
Agricultural Education 427	(1-2)	2
Methods of Developing Farming Programs		
Agricultural Education 431	(2-2)	3
Student Teaching in Vocational Agriculture		
Animal Husbandry 416	(2-2)	3
Livestock Management		
Dairy Science 420	(2-2)	3
Dairy Management		
Journalism 415	(2-2)	3
Agricultural Journalism		
Elective		3
		20

Agricultural Education 426	(2-0)	2
Methods in Adult Agricultural Education		
Agricultural Education 432	(2-2)	3
Student Teaching in Vocational Agriculture		
Agronomy 318	(3-3)	4
Soil Conservation		
English 403	(1-2)	2
Speaking for Professional Men		
Poultry Science 401	(2-2)	3
Management and Selection		
Psychology 301	(3-0)	3
Educational Psychology		
Elective		3
		20

*Students who do not have credit for Basic ROTC must take Government 306 and 307 in place of Government 305.

Curriculum in AGRICULTURAL ENGINEERING

FRESHMAN YEAR

First Semester		Credit
Chemistry 101 General Chemistry	(3-3)	4
Engineering Drawing 105 Engineering Drawing	(0-6)	2
English 103 Composition and Rhetoric	(3-0)	3
History 105 History of the United States	(3-0)	3
Mathematics 102 Algebra	(3-0)	3
Mathematics 103 Plane Trigonometry	(3-0)	3
Military or Air Science	(0-3)	1
Physical Education 101	(0-2)	R
		19

Second Semester		Credit
Chemistry 102 General Chemistry	(3-3)	4
Engineering Drawing 106 Descriptive Geometry	(0-6)	2
English 104 Composition and Rhetoric	(3-0)	3
History 106 History of the United States	(3-0)	3
Mathematics 104 Analytics	(3-0)	3
Mechanical Engineering 108 Engineering Problems	(2-3)	3
Military or Air Science	(0-3)	1
Physical Education 102	(0-2)	R
		19

SOPHOMORE YEAR

Agricultural Engineering 205 Materials in Farm Structures	(2-3)	3
Agronomy 105 Fundamentals of Crop Production	(2-2)	3
English 203 Composition and Literature	(2-0)	2
Mathematics 209 Calculus	(3-0)	3
Military or Air Science	(0-3)	1
Physics 203 General Physics	(4-3)	5
Physical Education 201	(0-2)	R
		17

Agricultural Engineering 208 Farm Machinery	(3-3)	4
Animal Husbandry 107 General Animal Husbandry	(2-3)	3
Economics 205 Principles of Economics	(3-0)	3
Mathematics 210 Calculus	(3-0)	3
Military or Air Science	(0-3)	1
Physics 204 General Physics	(4-3)	5
Physical Education 202	(0-2)	R
		19

JUNIOR YEAR

Civil Engineering 201 Plane Surveying	(3-3)	4
Government 306 American National Government	(3-0)	3
Mechanical Engineering 212 Engineering Mechanics	(3-0)	3
Mechanical Engineering 323 Thermodynamics	(4-0)	4
Psychology 303 Psychology for Technical Students	(3-0)	3
Elective		3
		20

Agricultural Engineering 324 Automotive Machinery	(3-3)	4
Agronomy 301 Introductory Soils	(3-2)	4
Civil Engineering 305 Mechanics of Materials	(3-0)	3
Civil Engineering 311 Hydraulics	(3-0)	3
Civil Engineering 336 Hydraulics Laboratory	(0-2)	1
Elective		3
		18

SENIOR YEAR

Agricultural Engineering 418 Agricultural Process Engineering	(2-3)	3
Agricultural Engineering 425 Seminar	(1-0)	1
Agricultural Engineering 428 Soil and Water Conservation Engineering	(2-3)	3
Agronomy 445 Soil Physics	(2-3)	3
Business Administration 305 Business Law	(3-0)	3
English 403 Speaking for Professional Men	(1-2)	2
Elective		4
		19

Agricultural Engineering 410 Irrigation and Drainage Engineering	(2-3)	3
Agricultural Engineering 413 Farm Structures Design	(2-3)	3
Agricultural Engineering 426 Seminar	(1-0)	1
Agricultural Engineering 430 Farm Electrification Engineering	(2-3)	3
English 301 Writing for Professional Men	(3-0)	3
Elective		6
		19

Curriculum in AGRICULTURAL JOURNALISM

FRESHMAN YEAR

(Same as for Agriculture, page 88)

SOPHOMORE YEAR

First Semester		Credit	Second Semester		Credit
Chemistry 231 Elementary Organic Chemistry	(3-0)	3	**Agricultural Engineering 201** Farm Power and Machinery	(2-2)	3
Dairy Science 202 Dairying	(2-2)	3	**Biology 206** Introductory Microbiology	(2-4)	3
English 203 Composition and Literature	(2-0)	2	**Economics 205** Principles of Economics	(3-0)	3
Entomology 201 General Entomology	(2-2)	3	**English 210** Writing and Discussion	(2-0)	2
Journalism 201 News Writing	(2-3)	3	**Horticulture 201** General Horticulture	(2-2)	3
Military or Air Science	(0-3)	1	**Journalism 202** Beginning News Reporting	(2-3)	3
Physics 213 Physics for Students of Agriculture	(2-2)	3	**Military or Air Science**	(0-3)	1
Physical Education 201	(0-2)	R	**Physical Education 202**	(0-2)	R
		18			18

JUNIOR YEAR

Agronomy 301 Introductory Soils	(3-2)	4	**Agricultural Economics 314** Marketing Farm Products	(3-0)	3
Genetics 301 Genetics	(3-2)	4	**Animal Husbandry 303** Animal Nutrition	(3-0)	3
Journalism 205 Principles of Typography	(2-3)	3	**Journalism 307** News Editing	(2-3)	3
Journalism 315 Photography	(1-3)	2	**Journalism 311** Radio News Writing	(2-2)	3
Elective		5	**Elective**		6
		18			18

SENIOR YEAR

English 403 Speaking for Professional Men	(1-2)	2	**Agricultural Economics 429** Public Policies Affecting Agriculture	(3-0)	3
Government 306 American National Government	(3-0)	3	**History 326** History of Texas	(3-0)	3
History 325 Trends in American History	(3-0)	3	**Journalism 306** Newspaper Production and Management	(2-2)	3
Journalism 304 Feature Story Writing	(2-2)	3	**Rural Sociology 407** Rural Social Problems	(3-0)	3
Journalism 308 Newspaper Advertising	(2-3)	3	**Elective**		6
Elective		4			18
		18			

NOTE: Electives shall include at least 10 hours of advanced courses in agriculture.

Curriculum in ANIMAL SCIENCE

FRESHMAN YEAR

Animal Husbandry 107 General Animal Husbandry	(2-3)	3	**Biology 101** General Botany of Seed Plants	(2-3)	3
Biology 107 Vertebrate Zoology	(2-3)	3	**Biology 108** Invertebrate Zoology	(2-3)	3
Chemistry 101 General Chemistry	(3-3)	4	**Chemistry 102** General Chemistry	(3-3)	4
English 103 Composition and Rhetoric	(3-0)	3	**English 104** Composition and Rhetoric	(3-0)	3
Mathematics 101 Algebra	(3-0)	3	**Mathematics 103** Plane Trigonometry	(3-0)	3
Military or Air Science	(0-3)	1	**Military or Air Science**	(0-3)	1
Physical Education 101	(0-2)	R	**Elective**		1
		17	**Physical Education 102**	(0-2)	R
					18

SOPHOMORE YEAR

First Semester		Credit
Biology 206 Introductory Microbiology	(2-4)	3
English 203 Composition and Literature	(2-0)	2
Mathematics 104 Analytics	(3-0)	3
Military or Air Science	(0-3)	1
Physics 201 College Physics	(3-3)	4
Elective		5
Physical Education 201	(0-2)	R
		18

Second Semester		Credit
Chemistry 216 Quantitative Analysis	(2-6)	4
English 210 Writing and Discussion	(2-0)	2
Mathematics 209 Calculus	(3-0)	3
Military or Air Science	(0-3)	1
Physics 202 College Physics	(3-3)	4
Elective		4
Physical Education 202	(0-2)	R
		18

JUNIOR YEAR

Biology 335 Gross and Microscopic Vertebrate Anatomy	(2-3)	3
Chemistry 301 Organic Chemistry	(3-3)	4
Genetics 301 Genetics	(3-2)	4
History 325 Trends in American History	(3-0)	3
Elective		4
		18

Animal Husbandry 303 Animal Nutrition	(3-0)	3
Biology 344 Embryology	(2-3)	3
Chemistry 302 Organic Chemistry	(3-3)	4
Economics 205 Principles of Economics	(3-0)	3
Elective		5
		18

SENIOR YEAR

Agronomy 301 Introductory Soils	(3-2)	4
Biology 433 General Physiology	(3-3)	4
English 301 Writing for Professional Men	(3-0)	3
Genetics 406 Biometry—Experimental Technique	(2-3)	3
Elective		4
		18

English 403 Speaking for Professional Men	(1-2)	2
Government 306 American National Government	(3-0)	3
History 326 History of Texas	(3-0)	3
Elective		10
		18

Curriculum in FOOD TECHNOLOGY

FRESHMAN YEAR

Biology 101 General Botany of Seed Plants	(2-3)	3
Chemistry 101 General Chemistry	(3-3)	4
Engineering Drawing 105 Engineering Drawing	(0-6)	2
English 103 Composition and Rhetoric	(3-0)	3
Mathematics 102 Algebra	(3-0)	3
Military or Air Science	(0-3)	1
Physical Education 101	(0-2)	R
		16

Biology 107 Vertebrate Zoology	(2-3)	3
Chemistry 102 General Chemistry	(3-3)	4
English 104 Composition and Rhetoric	(3-0)	3
Mathematics 116 Plane Trigonometry and Analytics	(4-0)	4
Mechanical Engineering 101 Engineering Problems	(0-3)	1
Military or Air Science	(0-3)	1
Elective		1
Physical Education 102	(0-2)	R
		17

SOPHOMORE YEAR

First Semester		Credit	Second Semester		Credit
Business Administration 227 Principles of Accounting	(3-3)	4	**Chemistry 216** Quantitative Analysis	(2-6)	4
Chemistry 205 Qualitative Analysis	(2-6)	4	**Economics 205** Principles of Economics	(3-0)	3
English 203 Composition and Literature	(2-0)	2	**English 210** Writing and Discussion	(2-0)	2
Government 306 American National Government	(3-0)	3	**Military or Air Science**	(0-3)	1
Military or Air Science	(0-3)	1	**Physics 202** College Physics	(3-3)	4
Physics 201 College Physics	(3-3)	4	**Elective**		4
Physical Education 201	(0-2)	R	**Physical Education 202**	(0-2)	R
		18			18

JUNIOR YEAR

Agricultural Economics 314 Marketing Farm Products	(3-0)	3	**Agricultural Engineering 213** Food Plant Engineering	(2-3)	3
Biology 206 Introductory Microbiology	(2-4)	3	**Chemistry 302** Organic Chemistry	(3-3)	4
Chemistry 301 Organic Chemistry	(3-3)	4	**Dairy Science 326** Food Preservation and Decomposition	(3-3)	4
Elective		8	**Elective**		7
		18			18

SENIOR YEAR

Business Administration 303 Statistical Method	(3-3)	4	**Biochemistry and Nutrition 401** Human Nutrition	(3-0)	3
English 403 Speaking for Professional Men	(1-2)	2	**Business Administration 305** Business Law	(3-0)	3
History 325 Trends in American History	(3-0)	3	**Chemistry 342** Physical Chemistry	(3-3)	4
Psychology 207 General Psychology	(3-0)	3	**English 301** Writing for Professional Men	(3-0)	3
Elective		7	**History 326** History of Texas	(3-0)	3
		19	**Elective**		3
					19

NOTE: Students enrolled in advanced military or air science will elect 14 hours in one food field. Students not enrolled in advanced military or air science will elect 24 hours in two food fields but not less than 15 in one of them; they will elect 5 hours outside the School of Agriculture.

Two-Year Curriculum in FORESTRY

FRESHMAN YEAR

Biology 101 General Botany of Seed Plants	(2-3)	3	**Biology 102** Taxonomy of Flowering Plants	(2-3)	3
Chemistry 101 General Chemistry	(3-3)	4	**Biology 108** Invertebrate Zoology	(2-3)	3
Engineering Drawing 105 Engineering Drawing	(0-6)	2	**Chemistry 102** General Chemistry	(3-3)	4
English 103 Composition and Rhetoric	(3-0)	3	**English 104** Composition and Rhetoric	(3-0)	3
Mathematics 101 Algebra	(3-0)	3	**Mathematics 103** Plane Trigonometry	(3-0)	3
Military or Air Science	(0-3)	1	**Military or Air Science**	(0-3)	1
Physical Education 101	(0-2)	R	**Range and Forestry 102** Introduction to Range and Forestry	(1-0)	1
		16	**Physical Education 102**	(0-2)	R
					18

SOPHOMORE YEAR

First Semester		Credit	Second Semester		Credit
Civil Engineering 201 Plane Surveying	(3-3)	4	**Agronomy 301** Introductory Soils	(3-2)	4
Economics 205 Principles of Economics	(3-0)	3	**Geography 203** Physical Geography	(3-3)	4
English 210 Writing and Discussion	(2-0)	2	**Government 306** American National Government	(3-0)	3
Military or Air Science	(0-3)	1	**Military or Air Science**	(0-3)	1
Physics 213 Physics for Students of Agriculture	(2-2)	3	**Range and Forestry 204** Dendrology	(1-3)	2
Range and Forestry 202 Range Plants	(2-3)	3	**Range and Forestry 301** Plant and Range Ecology	(2-3)	3
Range and Forestry 203 Dendrology	(1-3)	2	**Elective**		1
Physical Education 201	(0-2)	R	**Physical Education 202**	(0-2)	R
		18			18

NOTE: Students who complete this two-year curriculum may continue their work for a degree in forestry in any accredited Southern forestry school. Funds have been appropriated by the Texas Legislature to help defray certain out-of-state expenses for Texas students attending such schools for their junior and senior years.

Curriculum in LANDSCAPE ARCHITECTURE

FRESHMAN YEAR

Architecture 101 Design I	(0-6)	2	**Architecture 102** Design I	(0-6)	2
Architecture 115 Architectural Graphics	(0-6)	2	**Architecture 116** Architectural Graphics	(0-6)	2
Biology 101 General Botany of Seed Plants	(2-3)	3	**Biology 102** Taxonomy of Flowering Plants	(2-3)	3
English 103 Composition and Rhetoric	(3-0)	3	**English 104** Composition and Rhetoric	(3-0)	3
History 105 History of the United States	(3-0)	3	**History 106** History of the United States	(3-0)	3
Mathematics 101 Algebra	(3-0)	3	**Mathematics 103** Plane Trigonometry	(3-0)	3
Military or Air Science	(0-3)	1	**Mechanical Engineering 101** Engineering Problems	(0-3)	1
Physical Education 101	(0-2)	R	**Military or Air Science**	(0-3)	1
		17	**Physical Education 102**	(0-2)	R
					18

SOPHOMORE YEAR

Architecture 201 Design II	(0-12)	4	**Architecture 202** Design II	(0-12)	4
Architecture 205 Freehand Drawing	(0-6)	2	**Architecture 206** Freehand Drawing	(0-6)	2
Civil Engineering 201 Plane Surveying	(3-3)	4	**Civil Engineering 202** Advanced Surveying	(2-3)	3
English 203 Composition and Literature	(2-0)	2	**English 210** Writing and Discussion	(2-0)	2
Floriculture 120 Ornamental Plant Production	(2-2)	3	**Floriculture 207** Ornamental Plants	(2-2)	3
Floriculture 206 Ornamental Plants	(2-2)	3	**Government 306** American National Government	(3-0)	3
Military or Air Science	(0-3)	1	**Military or Air Science**	(0-3)	1
Physical Education 201	(0-2)	R	**Physical Education 202**	(0-2)	R
		19			18

SUMMER WORK

Landscape Architecture 300, Summer Practice, 10 weeks.

JUNIOR YEAR

First Semester		Credit
Architecture 305 Freehand Drawing	(0-6)	2
Economics 205 Principles of Economics	(3-0)	3
Landscape Architecture 301 Intermediate Landscape Design	(1-15)	6
Landscape Architecture 310 History of Landscape Architecture	(3-0)	3
Elective		3
		17

Second Semester		Credit
Architecture 306 Freehand Drawing	(0-6)	2
English 301 Writing for Professional Men	(3-0)	3
Landscape Architecture 311 Intermediate Landscape Design	(1-15)	6
Landscape Architecture 312 Landscape Construction	(2-3)	3
Elective		3
		17

SENIOR YEAR

Business Administration 305 Business Law	(3-0)	3
Landscape Architecture 401 Advanced Landscape Design	(1-15)	6
Landscape Architecture 406 Planting Design	(2-3)	3
Elective		6
		18

Architecture 330 Art and Civilization	(2-0)	2
Architecture 556 City Planning	(2-3)	3
English 403 Speaking for Professional Men	(1-2)	2
Landscape Architecture 308 Park and Recreational Development	(2-0)	2
Landscape Architecture 402 Advanced Landscape Design	(1-15)	6
Elective		3
		18

Curriculum in PLANT AND SOIL SCIENCE

FRESHMAN YEAR

Agronomy 105 Fundamentals of Crop Production	(2-2)	3
Biology 101 General Botany of Seed Plants	(2-3)	3
Chemistry 101 General Chemistry	(3-3)	4
English 103 Composition and Rhetoric	(3-0)	3
Mathematics 101 Algebra	(3-0)	3
Military or Air Science	(0-3)	1
Physical Education 101	(0-2)	R
		17

Biology 107 Vertebrate Zoology	(2-3)	3
Chemistry 102 General Chemistry	(3-3)	4
English 104 Composition and Rhetoric	(3-0)	3
Mathematics 103 Plane Trigonometry	(3-0)	3
Military or Air Science	(0-3)	1
Elective		4
Physical Education 102	(0-2)	R
		18

NOTE: Students must select all electives with the advice of the head of the department in which they expect to take their major work.

SOPHOMORE YEAR

Biology 206 Introductory Microbiology	(2-4)	3
Chemistry 205 Qualitative Analysis	(2-6)	4
English 203 Composition and Literature	(2-0)	2
Mathematics 104 Analytics	(3-0)	3
Military or Air Science	(0-3)	1
Physics 201 College Physics	(3-3)	4
Physical Education 201	(0-2)	R
		17

Chemistry 216 Quantitative Analysis	(2-6)	4
Economics 205 Principles of Economics	(3-0)	3
English 210 Writing and Discussion	(2-0)	2
Government 306 American National Government	(3-0)	3
Military or Air Science	(0-3)	1
Physics 202 College Physics	(3-3)	4
Elective		2
Physical Education 202	(0-2)	R
		19

JUNIOR YEAR

First Semester		Credit	Second Semester		Credit
Biology 327 Fundamental Plant Morphology	(2-3)	3	**Agronomy 301** Introductory Soils	(3-2)	4
Chemistry 301 Organic Chemistry	(3-3)	4	**Chemistry 302** Organic Chemistry	(3-3)	4
Genetics 301 Genetics	(3-2)	4	**English 403** Speaking for Professional Men	(1-2)	2
Plant Physiology and Pathology 313 Introduction to Plant Physiology	(2-3)	3	**Plant Physiology and Pathology 314** Principles of Plant Physiology	(3-3)	4
Elective		4	**Elective**		4
		18			18

SENIOR YEAR

Biology 453 Plant Anatomy	(2-3)	3	**Genetics 406** Biometry—Experimental Technique	(2-3)	3
English 301 Writing for Professional Men	(3-0)	3	**History 326** History of Texas	(3-0)	3
History 325 Trends in American History	(3-0)	3	**Elective**		12
Elective		9			18
		18			

Curriculum in RANGE MANAGEMENT

FRESHMAN YEAR

Biology 101 General Botany of Seed Plants	(2-3)	3	**Animal Husbandry 107** General Animal Husbandry	(2-3)	3
Chemistry 101 General Chemistry	(3-3)	4	**Biology 102** Taxonomy of Flowering Plants	(2-3)	3
English 103 Composition and Rhetoric	(3-0)	3	**Chemistry 102** General Chemistry	(3-3)	4
History 105 History of the United States	(3-0)	3	**English 104** Composition and Rhetoric	(3-0)	3
Mathematics 101 Algebra	(3-0)	3	**History 106** History of the United States	(3-0)	3
Military or Air Science	(0-3)	1	**Military or Air Science**	(0-3)	1
Physical Education 101	(0-2)	R	**Range and Forestry 102** Introduction to Range and Forestry	(1-0)	1
		17	**Physical Education 102**	(0-2)	R
					18

SOPHOMORE YEAR

Biology 107 Vertebrate Zoology	(2-3)	3	**Agronomy 105** Fundamentals of Crop Production	(2-2)	3
Chemistry 223 Elementary Quantitative Analysis	(2-3)	3	**Chemistry 231** Elementary Organic Chemistry	(3-0)	3
English 203 Composition and Literature	(2-0)	2	**Civil Engineering 208** Topographic Surveying	(1-3)	2
Mathematics 103 Plane Trigonometry	(3-0)	3	**Economics 205** Principles of Economics	(3-0)	3
Military or Air Science	(0-3)	1	**Geology 309** Agricultural Geology	(3-3)	4
Range and Forestry 202 Range Plants	(2-3)	3	**Military or Air Science**	(0-3)	1
Wildlife Management 201 Wildlife Conservation and Management	(3-0)	3	**Elective**		2
Physical Education 201	(0-2)	R	**Physical Education 202**	(0-2)	R
		18			18

JUNIOR YEAR

First Semester		Credit
Agronomy 301 Introductory Soils	(3-2)	4
Animal Husbandry 303 Animal Nutrition	(3-0)	3
English 210 Writing and Discussion	(2-0)	2
Plant Physiology and Pathology 313 Introduction to Plant Physiology	(2-3)	3
Range and Forestry 303 Agrostology	(2-3)	3
Elective		3
		18

Second Semester		Credit
English 403 Speaking for Professional Men	(1-2)	2
Genetics 301 Genetics	(3-2)	4
Government 306 American National Government	(3-0)	3
Range and Forestry 301 Plant and Range Ecology	(2-3)	3
Range and Forestry 308 Farm Forestry	(2-3)	3
Elective		3
		18

SENIOR YEAR

Animal Husbandry 416 Livestock Management	(2-2)	3
Range and Forestry 304 Range Management	(2-3)	3
Range and Forestry 309 Silvics and Silviculture	(2-3)	3
Wildlife Management 403 Animal Ecology	(2-3)	3
Elective		6
		18

Agricultural Economics 422 Land Economics	(3-0)	3
Agronomy 310 Soil Morphology	(1-3)	2
English 301 Writing for Professional Men	(3-0)	
Or		
Journalism 415 Agricultural Journalism	(2-2)	3
Range and Forestry 409 Advanced Range Management	(2-3)	3
Elective		7
		18

Curriculum in WILDLIFE MANAGEMENT

FRESHMAN YEAR

Biology 101 General Botany of Seed Plants	(2-3)	3
Chemistry 101 General Chemistry	(3-3)	4
English 103 Composition and Rhetoric	(3-0)	3
History 105 History of the United States	(3-0)	3
Mathematics 101 Algebra	(3-0)	3
Military or Air Science	(0-3)	1
Physical Education 101	(0-2)	R
		17

Agronomy 105 Fundamentals of Crop Production	(2-2)	3
Biology 102 Taxonomy of Flowering Plants	(2-3)	3
Chemistry 102 General Chemistry	(3-3)	4
English 104 Composition and Rhetoric	(3-0)	3
History 106 History of the United States	(3-0)	3
Military or Air Science	(0-3)	1
Elective		1
Physical Education 102	(0-2)	R
		18

SOPHOMORE YEAR

Biology 107 Vertebrate Zoology	(2-3)	3
English 203 Composition and Literature	(2-0)	2
Government 306 American National Government	(3-0)	3
Mathematics 103 Plane Trigonometry	(3-0)	3
Military or Air Science	(0-3)	1
Physics 213 Physics for Students of Agriculture	(2-2)	3
Wildlife Management 201 Wildlife Conservation and Management	(3-0)	3
Physical Education 201	(0-2)	R
		18

Biology 108 Invertebrate Zoology	(2-3)	3
Chemistry 231 Elementary Organic Chemistry	(3-0)	3
Civil Engineering 208 Topographic Surveying	(1-3)	2
English 210 Writing and Discussion	(2-0)	2
Geology 205 Elementary Geology	(3-3)	4
Military or Air Science	(0-3)	1
Elective		3
Physical Education 202	(0-2)	R
		18

JUNIOR YEAR

First Semester		Credit
Economics 205 Principles of Economics	(3-0)	3
Entomology 313 Biology of Insects	(2-3)	3
Genetics 301 Genetics	(3-2)	4
Range and Forestry 307 Elementary Forestry	(2-3)	3
Wildlife Management 402 General Ornithology	(2-2)	3
Elective		3
		19

Second Semester		Credit
Agronomy 301 Introductory Soils	(3-2)	4
Range and Forestry 301 Plant and Range Ecology	(2-3)	3
Rural Sociology 407 Rural Social Problems	(3-0)	3
Wildlife Management 315 Herpetology	(2-2)	3
Elective		6
		19

SENIOR YEAR

English 403 Speaking for Professional Men	(1-2)	2
Genetics 406 Biometry—Experimental Technique	(2-3)	3
Wildlife Management 311 Ichthyology (Fresh Water)	(2-3)	3
Wildlife Management 401 General Mammalogy	(2-2)	3
Wildlife Management 403 Animal Ecology	(2-3)	3
Elective		3
		17

Agricultural Economics 422 Land Economics	(3-0)	3
English 301 Writing for Professional Men	(3-0)	3
Journalism 415 Agricultural Journalism	(2-2)	3
Wildlife Management 408 Techniques of Wildlife Management	(2-3)	3
Elective		6
		18

FISHERIES OPTION

FRESHMAN YEAR

(See page 109)

SOPHOMORE YEAR

Biology 107 Vertebrate Zoology	(2-3)	3
Chemistry 223 Elementary Quantitative Analysis	(2-3)	3
English 203 Composition and Literature	(2-0)	2
Mathematics 103 Plane Trigonometry	(3-0)	3
Military or Air Science	(0-3)	1
Rural Sociology 205 Principles of Sociology	(3-0)	3
Wildlife Management 201 Wildlife Conservation and Management	(3-0)	3
Elective		1
Physical Education 201	(0-2)	R
		19

Biology 108 Invertebrate Zoology	(2-3)	3
Chemistry 231 Elementary Organic Chemistry	(3-0)	3
Economics 205 Principles of Economics	(3-0)	3
English 210 Writing and Discussion	(2-0)	2
Geology 205 Elementary Geology	(3-3)	4
Military or Air Science	(0-3)	1
Elective		3
Physical Education 202	(0-2)	R
		19

JUNIOR YEAR

Biology 217 Comparative Anatomy of Vertebrates	(2-4)	3
Entomology 313 Biology of Insects	(2-3)	3
Genetics 301 Genetics	(3-2)	4
Wildlife Management 311 Ichthyology (Fresh Water)	(2-3)	3
Elective		5
		18

Agronomy 301 Introductory Soils	(3-2)	4
Biology 344 Embryology	(2-3)	3
English 403 Speaking for Professional Men	(1-2)	2
Government 306 American National Government	(3-0)	3
Wildlife Management 312 Ichthyology (Marine)	(2-3)	3
Elective		3
		18

SENIOR YEAR

First Semester		Credit
Biology 435 Advanced Invertebrate Zoology	(3-3)	4
English 301 Writing for Professional Men	(3-0)	3
Physics 213 Physics for Students of Agriculture	(2-2)	3
Wildlife Management 417 Biology of Fishes	(2-2)	3
Elective		5
		18

Second Semester		Credit
Genetics 406 Biometry—Experimental Technique	(2-3)	3
Journalism 415 Agricultural Journalism	(2-2)	3
Wildlife Management 410 Conservation and Management of Fishes	(3-0)	3
Elective		9
		18

NOTES: 1. Majors in the Wildlife Management Option must participate in the summer field course, Wildlife Management 300, or submit evidence of satisfactory summer employment as biologists' aid with a state game and fish commission, the U. S. Fish and Wildlife Service, or other agency.

2. Majors in the Fisheries Option must participate in the summer field course, Wildlife Management 400, or submit evidence of satisfactory summer employment as biologists' aid with a state game and fish commission, the U. S. Fish and Wildlife Service, or other agency.

THE SCHOOL OF ARTS AND SCIENCES

CURRICULA

LIBERAL ARTS

Economics
English (Language and Literature)
History and Government
Journalism
Mathematics
Modern Languages
Studies Preparatory to Law

BUSINESS ADMINISTRATION

Accounting
Building Products Marketing
Finance
General Business
Insurance
Marketing
Personnel Administration

PREPARATION FOR TEACHING

Education
Physical Education

SCIENCE

Botany
Chemistry
Entomology
Meteorology
Microbiology
Physics
Studies Preparatory to Medicine and Dentistry
Zoology

COMBINED DEGREE PLAN

Students may also pursue a five-year program combining full professional training with a broad general education to qualify for two degrees—the Bachelor of Science degree in engineering, in the sciences, or in teacher training, or the Bachelor of Business Administration degree and the Bachelor of Arts degree in one of the liberal arts curricula. The student contemplating such a program is advised to consult the heads of both departments concerned in formulating a combined degree plan. (See page 48, "Two Degrees.")

REQUIREMENT OF PROFICIENCY IN WRITTEN ENGLISH

In order to qualify for candidacy for a degree in the School of Arts and Sciences, all students majoring in departments of this school (Division of Business Administration, Departments of Biology, Chemistry, Economics, Education and Psychology, English, History and Government, Journalism, Mathematics, Modern Languages, Oceanography and Meteorology, Physical Education, and Physics) must first demonstrate their ability to express themselves in acceptable English by passing a written examination in English composition. Each student who fails to make a passing grade on a qualifying examination will be required to report to the Department of English for assignment for remedial work, which the student must complete satisfactorily without degree credit. Only if the Department of English has certified satisfactory completion of such remedial work and the student has passed his examination will the student be granted regular status as a candidate for a degree. The qualifying program will apply immediately to all majors in business administration, the arts, and the sciences graduating after January 30, 1958.

ELECTIVES

In all curricula, elective hours are shown distributed over several semesters (one, two, or more a semester). The student is not expected to schedule his elective courses only in the units listed. He is free to schedule electives in whatever units he chooses up to and beyond the total number of elective hours in his curriculum. He may also exceed the hour requirement in any semester provided only that his record entitles him to carry the desired number of hours.

It is recommended that most of the elective courses be in fields other than the major, and that the student take at least one course outside his major field during each semester of his junior and senior years. For example, where possible, the major in science should elect courses in the humanities and social sciences, and students in economics or history should elect courses in the natural sciences and humanities.

LATIN AMERICAN STUDIES

A number of departments offer courses relating to Latin America, so that it is possible for many students (including some who are registered in the other schools of the College) to combine some concentration in Latin American studies with their regular departmental major. The program of offerings on Latin America is designed to meet the needs of four classes of students: (1) those who expect to enter into business in Latin America or into trade with Latin America; (2) those who contemplate a career in the foreign service of the United States Government or in any of the several government agencies in Washington which employ specialists on Latin America, with assignments both in the United States and in the foreign field; (3) those who expect to enter into teaching or research with emphasis upon Latin America; and (4) those who wish to broaden their education and acquire a better understanding of the people and the problems of Latin America. Any student who elects to coordinate some study of Latin America with a regular major in one of the College departments should consult the head of his major department for guidance in working out his program of study.

Those courses which bear directly on Latin America include the following:

Economics 440 ..... (3-0) 3
Latin-American Trade
Geography 201 ..... (3-0) 3
Principles of Geography
Geography 303 ..... (3-0) 3
Geography of South America
History 313 ..... (3-0) 3
The Latin-American Nations to 1820
History 314 ..... (3-0) 3
The Latin-American Republics, 1820 to the Present
History 422 ..... (3-0) 3
International Rivalry in the Gulf-Caribbean Area, 1840 to the Present
Modern Language 305 ..... (3-0) 3
Modern Spanish-American Drama
Modern Language 306 ..... (3-0) 3
Modern Spanish-American Drama
Modern Language 325 ..... (1-2) 2
Public Speaking in Spanish
Modern Language 326 ..... (1-2) 2
Public Speaking in Spanish
Modern Language 335 ..... (3-0) 3
Spanish-American Novel
Modern Language 336 ..... (3-0) 3
Spanish-American Novel

LIBERAL ARTS

The curricula in liberal arts leading to the degree of Bachelor of Arts offer carefully planned programs of study in selected areas of the humanities and social sciences. They are intended for students whose interests, abilities, and aims are better served by a broad general education than by more specialized technological and scientific studies.

After completing one of these curricula, many students enter directly upon their lifework. Others make their liberal arts course the foundation for additional education in a professional or graduate school. Special provision is

made for those who wish to begin the study of law before they have completed the program for the Bachelor's degree.

In all of the programs the first two years are given over to introductory work in fundamental subjects. The purpose is to enable the student to attain experience and breadth of view so that he may take a more intelligent part in his own further education. During the last two years the student selects a major and a minor field of study and appropriate electives, under the advice and direction of the Dean of the School of Arts and Sciences.

MAJOR AND MINOR STUDIES

By April 15 of his sophomore year the student selects a major and a minor field of study, according to the following directions:

1. One of the following subjects must be chosen as the field of major study: Economics, English, History, Journalism, Mathematics, or Modern Languages.

2. For his minor study the student may select one of the above subjects other than that of his major study, or one of the following: Biology, Business Administration, Chemistry, Education, Entomology, Geography, Geology and Geophysics, Meteorology, Physical Education, Physics, Psychology, or Rural Sociology.

3. The remainder of the elective work may be taken in any of the areas of study indicated above, or in other departments of the College, subject to the approval of the Dean of the School of Arts and Sciences.

4. To satisfy the requirements for graduation a student must complete not less than thirty semester hours in his major study, of which at least twelve hours are in advanced courses (above the sophomore level), and not less than eighteen semester hours in his minor study, of which at least six hours are in advanced courses. Upon recommendation of the head of the student's major department, the Dean may authorize the substitution of courses in closely related departments for a limited number of hours in the major or minor study.

FOREIGN LANGUAGE REQUIREMENT

The student will satisfy the foreign language requirement by completing four semesters of study in one language. If he can demonstrate by examination an adequate ability to read and speak a foreign language and a knowledge of its literature, he will be granted exemption from the language requirement. In no case does the exemption substitute for credit hours towards graduation.

With the approval of the Dean of the School of Arts and Sciences, a student who presents two units of a foreign language for admission may be allowed to take the beginning course in that language for credit.

THE SOPHOMORE SCIENCE REQUIREMENT

A student whose curriculum includes a sophomore science requirement may satisfy this requirement in one of three ways.

1. Normally, he will schedule any two (one each semester) of the following survey courses: Chemistry 106, Geography 203, Geology 205, Physics 211.

2. Alternatively, he may substitute for the two survey courses any two-semester course in chemistry, geology, or physics.

3. By special permission of the Dean, he may be allowed to substitute the first semester of the usual two-semester introductory course in chemistry,

geology, or physics for the survey course in that science. This last provision is intended to prevent unnecessary duplication in the program of students changing from one curriculum to another or transferring from another institution with science credit equivalent to an introductory rather than a survey course.

Curricula in LIBERAL ARTS

FRESHMAN YEAR

(For Majors in Economics, English, History, and Modern Languages)

First Semester		Credit	Second Semester		Credit
Biology 101[1]	(2-3)	3	Biology 107[1]	(2-3)	3
General Botany of Seed Plants			Vertebrate Zoology		
English 103	(3-0)	3	English 104	(3-0)	3
Composition and Rhetoric			Composition and Rhetoric		
History 105	(3-0)	3	History 106	(3-0)	3
History of the United States			History of the United States		
Mathematics 101 or 102	(3-0)	3	Mathematics 103	(3-0)	3
Algebra			Plane Trigonometry		
Military or Air Science	(0-3)	1	Military or Air Science	(0-3)	1
Modern Language[2]	(3-0)	3	Modern Language[2]	(3-0)	3
French, German, or Spanish			French, German, or Spanish		
Physical Education 101	(0-2)	R	Elective		2
		16	Physical Education 102	(0-2)	R
					18

NOTES: 1. Transfers who have credit for any 6 hours of college biology may substitute such credit for Biology 101, 107.

2. See "The Foreign Language Requirement," page 115.

For a Major in ECONOMICS

Most students who major in economics enter upon a business career following their graduation. These students obtain a broad foundation for such a career by combining a judicious selection of courses in business administration with those prescribed in their major program. Other students find it desirable to obtain an undergraduate degree with a major in economics before entering law school. Still others pursue the four-year course in preparation for graduate school study leading to careers in teaching, research, or government service.

FRESHMAN YEAR

(See above)

SOPHOMORE YEAR

Business Administration 209	(2-3)	3	Business Administration 210	(2-3)	3
Principles of Accounting			Principles of Accounting		
Economics 203	(3-0)	3	Economics 204	(3-0)	3
Principles of Economics			Principles of Economics		
English 212	(3-0)	3	English 231 or 232	(3-0)	3
Shakespeare			Survey of English Literature		
Military or Air Science	(0-3)	1	Military or Air Science	(0-3)	1
Modern Language[1]	(3-0)	3	Modern Language[1]	(3-0)	3
French, German, or Spanish			French, German, or Spanish		
Science[2]	(3-3)	4	Science[2]	(3-3)	4
Elective		1	Elective		1
Physical Education 201	(0-2)	R	Physical Education 202	(0-2)	R
		18			18

NOTES: 1. See "The Foreign Language Requirement," page 115.

2. See "The Sophomore Science Requirement," page 115.

JUNIOR YEAR

First Semester		Credit
Business Administration 303 Statistical Method	(3-3)	4
Economics 323 Economic Analysis	(3-0)	3
Psychology 207 General Psychology	(3-0)	
Or		
Psychology 303 Psychology for Technical Students	(3-0)	3
Elective		7
		17

Second Semester		Credit
Economic History*	(3-0)	3
Economics 311 Money and Banking	(3-0)	3
Economics (elective)	(3-0)	3
Government 306 American National Government	(3-0)	3
Elective		5
		17

SENIOR YEAR

Economics (elective)	(3-0)	3
Economics (elective)	(3-0)	3
English 403 Speaking for Professional Men	(1-2)	2
Elective		9
		17

Economics 412 Public Finance	(3-0)	3
Economics (elective)	(3-0)	3
Economics (elective)	(3-0)	3
Elective		7
		16

NOTES: 1. The Department of Economics has prepared a pamphlet containing suggested electives and minor fields of study for those who are interested in a specific objective. The student planning his advanced course of study should refer to this pamphlet and consult with the Head of the Department sometime during the second semester of his sophomore year to make out his degree plan. There is also available a suggested program of work for those who wish to combine a major in economics with Latin American studies.

2. Business Administration 304 or 418 can substitute for three semester hours of economics electives.

3. Junior and senior electives are to be selected after consultation with the student's major advisor.

For a Major in ENGLISH

The curriculum for a major in English is designed for breadth in education. In the Department of English, the English major studies writing skills, the language, and literature. Outside of the Department of English, he is required to study both physical and biological sciences, social sciences, foreign language, history, and philosophy. A large part of the program, however, especially in the junior and senior years, is left to the choice of the student. Through electives the student may extend his knowledge in the humanities, sciences, social sciences, or even technological skills. The curriculum for the English major, then, is suitable not only for the student who expects to continue his studies of the humanities in graduate school but also for the student who expects to go into business or to become a student of law or medicine or religion.

The student desiring both a full professional training and a broad general education may in five years complete the requirements for two degrees—Bachelor of Arts in English and Bachelor of Science in any one of the professional fields. For specific degree plans, which are made out for each individual entering this program, the student should consult the Dean of the School of Arts and Sciences and the dean of any other school in which he seeks a professional degree. (For degrees in English and in Engineering, see page 152; in English and in other fields in Arts and Sciences, page 113.)

*Credit for Economics 319 (Economic Development of the United States), or Economics 320 (Economic Development of Europe) will satisfy this requirement.

FRESHMAN YEAR
(See page 117)

SOPHOMORE YEAR

First Semester		Credit	Second Semester		Credit
Economics 203 Principles of Economics	(3-0)	3	**Economics 204** Principles of Economics	(3-0)	3
English 231 Survey of English Literature	(3-0)	3	**English 212** Shakespeare	(3-0)	3
History 213 History of England	(3-0)	3	**History 214** History of England	(3-0)	3
Military or Air Science	(0-3)	1	**Military or Air Science**	(0-3)	1
Modern Language[1] French, German, or Spanish	(3-0)	3	**Modern Language**[1] French, German, or Spanish	(3-0)	3
Science[2]	(3-3)	4	**Science**[2]	(3-3)	4
Physical Education 201	(0-2)	R	**Physical Education 202**	(0-2)	R
		17			17

NOTES: 1. See "The Foreign Language Requirement," page 115.

2. See "The Sophomore Science Requirement," page 115.

JUNIOR YEAR

English 309 The English Language Or	(3-0)		**English (elective)**	(3-0)	3
English 310 Phonetics and Pronunciation	(3-0)	3	**English 322** Nineteenth Century Literature	(3-0)	3
English 321 Nineteenth Century Literature	(3-0)	3	**Elective**		12
Government 306 American National Government	(3-0)	3			18
Elective		8			
		17			

SENIOR YEAR

English 407 Speaking and Oral Interpretation	(1-2)	2	**English (elective)**	(3-0)	3
English (elective)	(3-0)	3	**Elective**		14
Elective		12			17
		17			

For a Major in HISTORY

FRESHMAN YEAR
(See page 117)

SOPHOMORE YEAR

Economics 203 Principles of Economics	(3-0)	3	**Economics 204** Principles of Economics	(3-0)	3
English 212 Shakespeare	(3-0)	3	**English 231 or 232** Survey of English Literature	(3-0)	3
History 217 Development of Europe	(3-0)	3	**History 218** Development of Europe	(3-0)	3
Military or Air Science	(0-3)	1	**Military or Air Science**	(0-3)	1
Modern Language[1] French, German, or Spanish	(3-0)	3	**Modern Language**[1] French, German, or Spanish	(3-0)	3
Science[2]	(3-3)	4	**Science**[2]	(3-3)	4
Physical Education 201	(0-2)	R	**Physical Education 202**	(0-2)	R
		17			17

NOTES: 1. See "The Foreign Language Requirement," page 115.

2. See "The Sophomore Science Requirement," page 115.

JUNIOR YEAR

First Semester		Credit	Second Semester		Credit
Government 306 American National Government	(3-0)	3	**Government 307** State and Local Government	(3-0)	3
History (elective)		6	**History (elective)**		6
Elective		8	**Elective**		9
		17			18

SENIOR YEAR

English 403 Speaking for Professional Men	(1-2)	2	**History (elective)**		3
History (elective)		6	**Elective**		14
Elective		9			17
		17			

For a Major in JOURNALISM

Programs for students majoring in journalism are designed to prepare them for futures in the communications field. By the beginning of the junior year, each student determines, with the advice of members of the Department, what special phase of journalism he wishes to emphasize in his own program—community newspapers, urban newspapers, news-editorial work, advertising, business management, industrial writing and editing, radio journalism. A major in agricultural journalism is available for students interested primarily in the field of technical journalism, serving agriculture.

Upon completing the curriculum, most students enter either the news or advertising departments of newspapers or magazines. Other students find opportunities in the radio field and in public relations.

Students may also pursue a five-year program combining full professional training with a broad general education to qualify for two degrees—the Bachelor of Science degree in a technical field such as Industrial Technology or the Bachelor of Business Administration in Personnel Administration concurrently with the Bachelor of Arts degree in Journalism. See page 113.

FRESHMAN YEAR

Biology 115 Survey of Biology	(3-3)	4	**English 104** Composition and Rhetoric	(3-0)	3
English 103 Composition and Rhetoric	(3-0)	3	**History 106** History of the United States	(3-0)	3
History 105 History of the United States	(3-0)	3	**Mathematics 110** Survey Course in Mathematics	(3-0)	3
Mathematics 101 Algebra	(3-0)	3	**Military or Air Science**	(0-3)	1
Military or Air Science	(0-3)	1	**Modern Language**[1] Spanish Recommended	(3-0)	3
Modern Language[1] Spanish Recommended	(3-0)	3	**Science**[2]	(3-3)	4
Physical Education 101	(0-2)	R	**Elective**		1
		17	**Physical Education 102**	(0-2)	R
					18

SOPHOMORE YEAR

Economics 203 Principles of Economics	(3-0)	3	**Economics 204** Principles of Economics	(3-0)	3
English 212 Shakespeare	(3-0)	3	**English 232** Survey of English Literature	(3-0)	3
Journalism 201 News Writing	(2-3)	3	**Journalism 202** Beginning News Reporting	(2-3)	3
Military or Air Science	(0-3)	1	**Journalism 205** Principles of Typography	(2-3)	3
Modern Language Spanish Recommended	(3-0)	3	**Military or Air Science**	(0-3)	1
Rural Sociology 205 Principles of Sociology	(3-0)	3	**Modern Language** Spanish Recommended	(3-0)	3
Elective		1	**Elective**		1
Physical Education 201	(0-2)	R	**Physical Education 202**	(0-2)	R
		17			17

JUNIOR YEAR

First Semester		Credit
Government 306	(3-0)	3
American National Government		
Journalism 304	(2-2)	3
Feature Story Writing		
Journalism 307	(2-3)	3
News Editing		
Journalism 308	(2-3)	3
Newspaper Advertising		
Elective		5
		17

Second Semester		Credit
Business Administration 205	(3-0)	3
Marketing		
English (elective)[3]		3
Journalism 306	(2-2)	3
Newspaper Production and Management		
Elective		8
		17

SENIOR YEAR

English (elective)[3]		2
Government 307	(3-0)	3
State and Local Government		
Journalism 409	(3-0)	3
History and Principles of Journalism		
Journalism 315	(1-3)	2
Photography		
Elective		7
		17

English 403	(1-2)	2
Speaking for Professional Men		
Journalism 412	(3-0)	3
Editorial Writing		
Journalism (elective)		3
Elective		9
		17

NOTES: 1. See "The Foreign Language Requirement," page 115.

2. The student may select any one of the following: Chemistry 106, Geography 203, Geology 205, Physics 211.

3. The student may select any one of the following: English 325, 328, 340, 350, 371, 375.

4. The Journalism Department has assembled information on the various areas of emphasis which will prove a valuable guide to a student planning his advanced course of study and choosing his electives at the beginning of the junior year.

5. The Journalism Department, in cooperation with the Texas Daily Newspaper Association, offers a 10-weeks professional internship program for selected students who have demonstrated superior ability. These internships are available only during the summer following the junior year.

6. For further information on agricultural journalism, see pages 83 and 103.

For a Major in MATHEMATICS

FRESHMAN YEAR

Biology 101	(2-3)	3
General Botany of Seed Plants		
English 103	(3-0)	3
Composition and Rhetoric		
History 105	(3-0)	3
History of the United States		
Mathematics 102	(3-0)	3
Algebra		
Mathematics 103	(3-0)	3
Plane Trigonometry		
Military or Air Science	(0-3)	1
Physical Education 101	(0-2)	R
		16

Biology 107	(2-3)	3
Vertebrate Zoology		
English 104	(3-0)	3
Composition and Rhetoric		
History 106	(3-0)	3
History of the United States		
Mathematics 104	(3-0)	3
Analytics		
Mechanical Engineering 101	(0-3)	1
Engineering Problems		
Military or Air Science	(0-3)	1
Elective		3
Physical Education 102	(0-2)	R
		17

SOPHOMORE YEAR

First Semester		Credit	Second Semester		Credit
English 212 Shakespeare	(3-0)	3	English 231 or 232 Survey of English Literature	(3-0)	3
Mathematics 209 Calculus	(3-0)	3	Mathematics 210 Calculus	(3-0)	3
Military or Air Science	(0-3)	1	Military or Air Science	(0-3)	1
Modern Language French, German, or Spanish	(3-0)	3	Modern Language French, German, or Spanish	(3-0)	3
Physics 203 General Physics	(4-3)	5	Physics 204 General Physics	(4-3)	5
Elective		2	Elective		3
Physical Education 201	(0-2)	R	Physical Education 202	(0-2)	R
		17			18

JUNIOR YEAR

Economics 203 Principles of Economics	(3-0)	3	Economics 204 Principles of Economics	(3-0)	3
Government 306 American National Government	(3-0)	3	Mathematics 308 Differential Equations	(3-0)	3
Mathematics 307 Calculus	(3-0)	3	Mathematics (elective)		3
Modern Language French, German, or Spanish	(3-0)	3	Modern Language French, German, or Spanish	(3-0)	3
Elective		5	Elective		6
		17			18

SENIOR YEAR

English 403 Speaking for Professional Men	(1-2)	2	Mathematics (elective)		3
Mathematics (elective)		3	Elective		14
Elective		12			17
		17			

NOTE: The minor field of study should be chosen only after consultation with the Head of the Department of Mathematics, who will help the student arrange a program appropriate to his plans following graduation.

For a Major in MODERN LANGUAGES

FRESHMAN YEAR

(See page 117 with Spanish required as the modern language.)

SOPHOMORE YEAR

Economics 203 Principles of Economics	(3-0)	3	Economics 204 Principles of Economics	(3-0)	3
English 212 Shakespeare	(3-0)	3	English 231 or 232 Survey of English Literature	(3-0)	3
Military or Air Science	(0-3)	1	Military or Air Science	(0-3)	1
Modern Language[1] Spanish	(3-0)	3	Modern Language[1] Spanish	(3-0)	3
Science[2]	(3-3)	4	Science[2]	(3-3)	4
Elective		3	Elective		3
Physical Education 201	(0-2)	R	Physical Education 202	(0-2)	R
		17			17

JUNIOR YEAR

First Semester		Credit	Second Semester		Credit
English 309[3]	(3-0)	3	**English 310**[3]	(3-0)	3
The English Language			Phonetics and Pronunciation		
Government 306	(3-0)	3	**Modern Language**	(3-0)	3
American National Government			Spanish		
Modern Language	(3-0)	3	**Modern Language**	(3-0)	3
Spanish			French or German		
Modern Language	(3-0)	3	**Elective**		9
French or German					18
Elective		5			
		17			

SENIOR YEAR

English 403	(1-2)	2	**History 314**[4]	(3-0)	3
Speaking for Professional Men			The Latin-American Republics, 1820 to the Present		
History 313[4]	(3-0)	3	**Modern Language**	(3-0)	3
The Latin-American Nations to 1820			French or German		
Modern Language	(3-0)	3	**Modern Language**		2
French or German			Spanish		
Modern Language		2	**Elective**		9
Spanish					17
Elective		7			
		17			

NOTES: 1. See "The Foreign Language Requirement," page 115. Students who take beginning Spanish in their freshman year must elect 6 hours of advanced Spanish in their senior year.

2. See "The Sophomore Science Requirement," page 115.

3. For those who do not expect to teach, a substitution in economics or history will be allowed upon approval by the Head of the Department of Modern Languages.

4. In case of unavoidable conflict with another required course, a substitution in the fields of history or economics will be allowed upon approval by the Head of the Department and the Dean of the School of Arts and Sciences.

5. Recommended electives: English 405, or advanced courses in economics, geography, or history.

6. For most students majoring in modern languages, economics, English, and history are logical minors.

Studies Preparatory to LAW

Students who plan to obtain an undergraduate degree before undertaking the study of law will normally register for one of the regular degree programs. Particularly appropriate are the programs in business administration, economics, English, and history. Students who plan to complete no more than three years of undergraduate work before entering law school will matriculate in the three-year preparatory program listed below. Any student who completes this program may still earn a Bachelor of Arts degree with a major in history and a minor in economics by completing one additional year of course work as follows: History 318 and 423 (first semester), 424 and a 3-hour history elective (second semester), Economics 321 (first semester) and 324 (second semester), English 403, and sixteen hours of electives, including if possible Business Administration 303.

FRESHMAN YEAR

First Semester		Credit	Second Semester		Credit
Biology 101 General Botany of Seed Plants	(2-3)	3	**Biology 107** Vertebrate Zoology	(2-3)	3
English 103 Composition and Rhetoric	(3-0)	3	**English 104** Composition and Rhetoric	(3-0)	3
History 105 History of the United States	(3-0)	3	**History 106** History of the United States	(3-0)	3
Mathematics 102 Algebra	(3-0)	3	**Mathematics 103** Plane Trigonometry	(3-0)	3
Military or Air Science	(0-3)	1	**Military or Air Science**	(0-3)	1
Modern Language[1] French, German, or Spanish	(3-0)	3	**Modern Language**[1] French, German, or Spanish	(3-0)	3
Physical Education 101	(0-2)	R	**Elective**		1
		16	**Physical Education 102**	(0-2)	R
					17

SOPHOMORE YEAR

Business Administration 209 Principles of Accounting	(2-3)	3	**Business Administration 210** Principles of Accounting	(2-3)	3
Economics 205 Principles of Economics	(3-0)	3	**Economics 319** Economic Development of the United States	(3-0)	3
English 212 Shakespeare	(3-0)	3	**English 231 or 232** Survey of English Literature	(3-0)	3
Military or Air Science	(0-3)	1	**Military or Air Science**	(0-3)	1
Modern Language[1] French, German, or Spanish	(3-0)	3	**Modern Language**[1] French, German, or Spanish	(3-0)	3
Science[2]	(3-3)	4	**Science**[2]	(3-3)	4
Physical Education 201	(0-2)	R	**Physical Education 202**	(0-2)	R
		17			17

JUNIOR YEAR

Economics 311 Money and Banking	(3-0)	3	**Economics 412** Public Finance	(3-0)	3
Government 306 American National Government	(3-0)	3	**Government 307** State and Local Government	(3-0)	3
History 213 History of England	(3-0)	3	**Government 308** United States Constitutional Development	(3-0)	3
Liberal Arts 301 Introduction to Philosophy	(3-0)	3	**History 214** History of England	(3-0)	3
Psychology 303 Psychology for Technical Students	(3-0)	3	**Liberal Arts 304** Philosophies of Life	(3-0)	3
Elective		3	**Elective**		3
		18			18

NOTES: 1. See "The Foreign Language Requirement," page 115.

2. To satisfy the requirement in physical science, the student may choose one of the following: Chemistry 101, 102 or Physics 201, 202.

3. The American Bar Association minimum requirement for admission to an accredited law school is three years of acceptable college work. Students who plan to seek admission to a law school after completing the three-year program listed above are strongly advised to check the program with the registrar of the school of their choice before beginning the third year. If necessary to meet specific requirements, substitutions may be approved by the Dean of the School of Arts and Sciences.

   Students planning to attend Law School of the University of Texas must use the 6 semester hours of elective in the junior year for advanced courses (300-400 level) in economics, government, history, or sociology.

4. A student may qualify for the Bachelor of Arts degree from the Agricultural and Mechanical College of Texas by completing the three-year pre-law curriculum here and at least one year at an accredited law school, with a minimum of 137 acceptable semester hours, subject to the usual grade point requirement.

BUSINESS ADMINISTRATION

The several curricula in business administration provide training for business careers. The freshman year is the same in all curricula with the exception of building products marketing. A student who plans to major in building products marketing follows a separate course of study beginning with his freshman year. Other students elect a major field at the beginning of the sophomore year choosing one of the following: accounting, finance, general business, insurance, marketing, personnel administration.

Each curriculum contains courses essential to a general education and permits the study of fundamental business theory and procedure with limited specialization in one of the major fields. Upon the completion of his chosen curriculum, the student receives the degree of Bachelor of Business Administration.

Curricula in BUSINESS ADMINISTRATION

(For Majors in Accounting, Finance, General Business, Insurance, Marketing, Personnel Administration)

FRESHMAN YEAR

First Semester		Credit
Biology 115 Survey of Biology	(3-3)	4
Business Administration 105 Introduction to Business	(3-0)	3
English 103 Composition and Rhetoric	(3-0)	3
History 105 History of the United States	(3-0)	3
Mathematics 101 Algebra	(3-0)	3
Military or Air Science	(0-3)	1
Physical Education 101	(0-2)	R
		17

Second Semester		Credit
English 104 Composition and Rhetoric	(3-0)	3
History 106 History of the United States	(3-0)	3
Mathematics 110 Survey Course in Mathematics	(3-0)	3
Military or Air Science	(0-3)	1
*Science	(3-3)	4
Elective		3
Physical Education 102	(0-2)	R
		17

For a Major in ACCOUNTING

The curriculum in accounting offers a professional course of training for employment in commercial and industrial accounting, public accounting, and governmental accounting. Positions in these fields are generally designated as accountant, public accountant, certified public accountant, tax accountant, auditor, cost accountant, internal auditor, and controller. The basic business training obtained in this curriculum also qualifies graduates for employment eventually leading to executive positions in industry.

FRESHMAN YEAR

(See above)

*Students may select any one of the following: Chemistry 106, Geography 203, Geology 205, Physics 211.

SOPHOMORE YEAR

First Semester		Credit
Business Administration 205 Marketing	(3-0)	3
Business Administration 227 Principles of Accounting	(3-3)	4
Economics 203 Principles of Economics	(3-0)	3
English 203 Composition and Literature	(2-0)	2
Government 306 American National Government	(3-0)	3
Military or Air Science	(0-3)	1
Physical Education 201	(0-2)	R
		16

Second Semester		Credit
Business Administration 228 Principles of Accounting	(3-3)	4
Business Administration 303 Statistical Method	(3-3)	4
Economics 204 Principles of Economics	(3-0)	3
English 210 Writing and Discussion	(2-0)	2
Military or Air Science	(0-3)	1
Elective		3
Physical Education 202	(0-2)	R
		17

JUNIOR YEAR

Business Administration 304 Business Cycles and Business Measurements	(3-0)	3
Business Administration 327 Intermediate Accounting	(3-3)	4
Business Administration 329 Cost Accounting	(3-0)	3
Economics 311 Money and Banking	(3-0)	3
Elective		4
		17

Business Administration 305 Business Law	(3-0)	3
Business Administration 328 Intermediate Accounting	(3-3)	4
Business Administration 330 Advanced Accounting	(3-0)	3
English 301 Writing for Professional Men	(3-0)	3
Elective		4
		17

SENIOR YEAR

Business Administration 306 Business Law	(3-0)	3
Business Administration 403 Income Tax	(3-0)	3
Business Administration 407 Auditing	(3-0)	3
Business Administration 418 Corporation Finance	(3-0)	3
English 403 Speaking for Professional Men	(1-2)	2
Elective		4
		18

Business Administration 402 Accounting Systems	(3-0)	3
Business Administration 404 Managerial Accounting	(3-0)	
Or		
Business Administration 408 Auditing	(3-0)	3
Elective		12
		18

NOTE: The following electives are suggested:

Business Administration 206 Purchasing and Control of Materials	(2-0)	2
Business Administration 308 Law of Private Corporations	(3-0)	3
Business Administration 310 Credits and Collections	(2-0)	2
Business Administration 315 Insurance	(3-0)	3
Business Administration 317 Punch Card Methods	(1-2)	2
Business Administration 322 Property Insurance	(3-0)	3
Business Administration 333 Business Machines	(0-2)	1

Business Administration 420 Principles of Investment	(3-0)	3
Business Administration 428 Real Estate Titles and Conveyances	(3-0)	3
Business Administration 433 Business Management	(3-0)	3
Economics 323 Economic Analysis	(3-0)	3
Economics 412 Public Finance	(3-0)	3
Economics 424 Economics of Transportation	(3-0)	3

For a Major in
BUILDING PRODUCTS MARKETING

The curriculum in building products marketing was developed in cooperation with the retail building materials industry, the Lumberman's Association of Texas, and the National Retail Lumber Dealers Association. It is designed to train persons who plan to seek employment in the retail building materials industry. Students who complete this program will have an educational foundation for responsible positions in this industry.

FRESHMAN YEAR

First Semester		Credit	Second Semester		Credit
Business Administration 105 Introduction to Business	(3-0)	3	**Chemistry 106** General Chemistry	(3-3)	4
English 103 Composition and Rhetoric	(3-0)	3	**Engineering Drawing 105** Engineering Drawing	(0-6)	2
History 105 History of the United States	(3-0)	3	**English 104** Composition and Rhetoric	(3-0)	3
Mathematics 101 Algebra	(3-0)	3	**History 106** History of the United States	(3-0)	3
Mechanical Engineering 105 Carpentry and Mill Work	(1-6)	3	**Mathematics 103** Plane Trigonometry	(3-0)	3
Military or Air Science	(0-3)	1	**Military or Air Science**	(0-3)	1
Physical Education 101	(0-2)	R	**Physical Education 102**	(0-2)	R
		16			16

SOPHOMORE YEAR

Agricultural Engineering 205 Materials and Farm Structures	(2-3)	3	**Business Administration 206** Purchasing and Control of Materials	(2-0)	2
Business Administration 205 Marketing	(3-0)	3	**Business Administration 208** Advertising	(3-0)	3
Business Administration 227 Principles of Accounting	(3-3)	4	**Business Administration 216** Building Products	(0-2)	1
Economics 205 Principles of Economics	(3-0)	3	**Business Administration 228** Principles of Accounting	(3-3)	4
Engineering Drawing 221 Building Construction Drawing	(1-3)	2	**English 210** Writing and Discussion	(2-0)	2
English 203 Composition and Literature	(2-0)	2	**Physics 211** A Brief Survey of Physics	(3-3)	4
Military or Air Science	(0-3)	1	**Military or Air Science**	(0-3)	1
Physical Education 201	(0-2)	R	**Physical Education 202**	(0-2)	R
		18			17

JUNIOR YEAR

Business Administration 305 Business Law	(3-0)	3	**Business Administration 303** Statistical Method	(3-3)	4
Business Administration 325 Retailing	(3-0)	3	**Business Administration 306** Business Law	(3-0)	3
Business Administration 329 Cost Accounting	(3-0)	3	**Economics 311** Money and Banking	(3-0)	3
Civil Engineering 206 Plane Surveying	(0-3)	1	**Government 306** American National Government	(3-0)	3
English 301 Writing for Professional Men	(3-0)	3	**Elective**		4
Elective		4			17
		17			

SENIOR YEAR

Business Administration 315 Insurance	(3-0)	3	**Business Administration 418** Corporation Finance	(3-0)	3
Business Administration 435 Salesmanship	(3-0)	3	**Business Administration 422** Personnel Problems of Industry	(3-0)	3
Business Administration 461 Retailing Building Products	(2-0)	2	**Business Administration 428** Real Estate Titles and Conveyances	(3-0)	3
Civil Engineering 473 Cost Estimating	(3-0)	3	**English 403** Speaking for Professional Men	(1-2)	2
Psychology 303 Psychology for Technical Students	(3-0)	3	**Elective**		7
Elective		4			18
		18			

NOTE: A minimum of 12 weeks of practice in the industry is required. This practice is to be approved in advance, and suitable reports are to be submitted on each assignment.

For a Major in FINANCE

The curriculum in finance provides instruction in the principles, methods, instruments, and institutions of finance with specalized training in the techniques and practices of financial management. The student receives training in accounting, economics, business law, and elective fields, which provides a balanced background for specialization in finance.

The principal objective of the program is to prepare students for managerial positions in such fields of business finance as commercial banking, investment banking, securities brokerage, trust management, and property management. The program also provides training for employment with governmental agencies engaged in lending operations and regulation of securities markets.

FRESHMAN YEAR

(See page 125)

SOPHOMORE YEAR

First Semester		Credit	Second Semester		Credit
Business Administration 205 Marketing	(3-0)	3	**Business Administration 228** Principles of Accounting	(3-3)	4
Business Administration 227 Principles of Accounting	(3-3)	4	**Business Administration 306** Business Law	(3-0)	3
Business Administration 305 Business Law	(3-0)	3	**Business Administration 315** Insurance	(3-0)	3
Economics 203 Principles of Economics	(3-0)	3	**Economics 204** Principles of Economics	(3-0)	3
English 203 Composition and Literature	(2-0)	2	**English 210** Writing and Discussion	(2-0)	2
Military or Air Science	(0-3)	1	**Military or Air Science**	(0-3)	1
Elective		1	**Elective**		1
Physical Education 201	(0-2)	R	**Physical Education 202**	(0-2)	R
		17			17

JUNIOR YEAR

Business Administration 303 Statistical Method	(3-3)	4	**Business Administration 304** Business Cycles and Business Measurements	(3-0)	3
Business Administration 327 Intermediate Accounting	(3-3)	4	**Business Administration 310** Credits and Collections	(2-0)	2
Economics 311 Money and Banking	(3-0)	3	**Business Administration 418** Corporation Finance	(3-0)	3
English 301 Writing for Professional Men	(3-0)	3	**Government 306** American National Government	(3-0)	3
Elective		3	**Elective**		6
		17			17

SENIOR YEAR

Business Administration 308 Law of Private Corporations	(3-0)	3	**Business Administration 432** Security Analysis	(3-0)	3
Business Administration 420 Principles of Investment	(3-0)	3	**Business Administration 434** Problems of Finance	(3-0)	3
Business Administration 440 Real Estate Fundamentals	(3-0)	3	**Economics 412** Public Finance	(3-0)	3
English 403 Speaking for Professional Men	(1-2)	2	**Elective**		9
Elective		6			18
		17			

NOTE: The following courses are suggested electives:

Agricultural Economics 430 Agricultural Finance	(3-0)	3
Business Administration 320 Life Insurance	(3-0)	3
Business Administration 322 Property Insurance	(3-0)	3
Business Administration 324 Casualty Insurance and Suretyship	(3-0)	3
Business Administration 330 Advanced Accounting	(3-0)	3
Business Administration 352 Personal Finance	(2-0)	2
Business Administration 403 Income Tax	(3-0)	3
Business Administration 422 Personnel Problems of Industry	(3-0)	3
Business Administration 428 Real Estate Titles and Conveyances	(3-0)	3
Business Administration 435 Salesmanship	(3-0)	3
Business Administration 438 Commercial Bank Management	(3-0)	3
Business Administration 442 Real Estate Practice	(3-0)	3

For a Major in GENERAL BUSINESS

Students who do not wish to major in one of the several special fields in business administration should follow the curriculum in general business. This curriculum includes one or more courses in each of the fields of business administration and thereby provides a broad training for business careers. It is designed for those planning to establish their own business or preparing for employment eventually leading to responsible positions in industry.

FRESHMAN YEAR

(See page 125)

SOPHOMORE YEAR

First Semester		Credit
Business Administration 205 Marketing	(3-0)	3
Business Administration 227 Principles of Accounting	(3-3)	4
Economics 203 Principles of Economics	(3-0)	3
English 203 Composition and Literature	(2-0)	2
Military or Air Science	(0-3)	1
Psychology 303 Psychology for Technical Students	(3-0)	3
Elective		1
Physical Education 201	(0-2)	R
		17

Second Semester		Credit
Business Administration 206 Purchasing and Control of Materials	(2-0)	2
Business Administration 208 Advertising	(3-0)	3
Business Administration 228 Principles of Accounting	(3-3)	4
Economics 204 Principles of Economics	(3-0)	3
English 210 Writing and Discussion	(2-0)	2
Military or Air Science	(0-3)	1
Elective		2
Physical Education 202	(0-2)	R
		17

JUNIOR YEAR

Business Administration 303 Statistical Method	(3-3)	4
Business Administration 305 Business Law	(3-0)	3
Economics 311 Money and Banking	(3-0)	3
English 301 Writing for Professional Men	(3-0)	3
Elective		4
		17

Business Administration 304 Business Cycles and Business Measurements	(3-0)	3
Business Administration 306 Business Law	(3-0)	3
Business Administration 310 Credits and Collections	(2-0)	2
Government 306 American National Government	(3-0)	3
Elective		6
		17

SENIOR YEAR

Business Administration 315 Insurance	(3-0)	3
Business Administration 325 Retailing	(3-0)	3
Business Administration 418 Corporation Finance	(3-0)	3
English 403 Speaking for Professional Men	(1-2)	2
Elective		6
		17

Business Administration 420 Principles of Investment	(3-0)	3
Business Administration 422 Personnel Problems of Industry	(3-0)	3
Business Administration 435 Salesmanship	(3-0)	3
Elective		9
		18

NOTE: The following courses are suggested electives:

Business Administration 308 Law of Private Corporations	(3-0)	3
Business Administration 316 Office Management	(2-0)	2
Business Administration 320 Life Insurance	(3-0)	3
Business Administration 322 Property Insurance	(3-0)	3
Business Administration 327 Intermediate Accounting	(3-3)	4
Business Administration 328 Intermediate Accounting	(3-3)	4
Business Administration 329 Cost Accounting	(3-0)	3
Business Administration 344 Marketing Problems	(3-0)	3
Business Administration 427 Insurance Law	(3-0)	3
Business Administration 428 Real Estate Titles and Conveyances	(3-0)	3
Business Administration 433 Business Management	(3-0)	3
Business Administration 436 Sales Management	(3-0)	3
Economics 318 Economics of Labor	(3-0)	3
Economics 412 Public Finance	(3-0)	3
Economics 424 Economics of Transportation	(3-0)	3
English 371 Great Books	(3-0)	3
Geography 204 Economic Geography	(3-0)	3

For a Major in INSURANCE

The insurance industry is seeking an increasing number of college graduates for positions as agents, agency managers, underwriters, claim adjusters, payroll auditors, safety engineers, and executives. The insurance field includes life, property, and casualty insurance, and corporate suretyship. The curriculum in insurance is designed to provide the specialized training for students who plan to enter this field, whether on their own account, with insurance companies, or with business or industrial concerns.

FRESHMAN YEAR

(See page 125)

SOPHOMORE YEAR

First Semester		Credit
Business Administration 205 Marketing	(3-0)	3
Business Administration 227 Principles of Accounting	(3-3)	4
Economics 203 Principles of Economics	(3-0)	3
English 203 Composition and Literature	(2-0)	2
Military or Air Science	(0-3)	1
Psychology 303 Psychology for Technical Students	(3-0)	3
Elective		1
Physical Education 201	(0-2)	R
		17

Second Semester		Credit
Business Administration 228 Principles of Accounting	(3-3)	4
Business Administration 315 Insurance	(3-0)	3
Economics 204 Principles of Economics	(3-0)	3
English 210 Writing and Discussion	(2-0)	2
Military or Air Science	(0-3)	1
Elective		4
Physical Education 202	(0-2)	R
		17

JUNIOR YEAR

Business Administration 303 Statistical Method	(3-3)	4
Business Administration 305 Business Law	(3-0)	3
Business Administration 322 Property Insurance	(3-0)	3
Economics 311 Money and Banking	(3-0)	3
Elective		3
		16

Business Administration 304 Business Cycles and Business Measurements	(3-0)	3
Business Administration 306 Business Law	(3-0)	3
Business Administration 320 Life Insurance	(3-0)	3
English 301 Writing for Professional Men	(3-0)	3
Elective		6
		18

SENIOR YEAR

First Semester		Credit
Business Administration 324 Casualty Insurance and Suretyship	(3-0)	
Or		
Business Administration 437 Applied Life Insurance	(3-0)	3
Business Administration 418 Corporation Finance	(3-0)	3
Business Administration 435 Salesmanship	(3-0)	3
Business Administration 440 Real Estate Fundamentals	(3-0)	3
English 403 Speaking for Professional Men	(1-2)	2
Elective		3
		17

Second Semester		Credit
Business Administration 420 Principles of Investment	(3-0)	3
Business Administration 422 Personnel Problems of Industry	(3-0)	3
Business Administration 427 Insurance Law	(3-0)	3
Government 306 American National Government	(3-0)	3
Elective		6
		18

NOTE: The following courses are suggested electives:

Business Administration 208 Advertising	(3-0)	3
Business Administration 308 Law of Private Corporations	(3-0)	3
Business Administration 310 Credits and Collections	(2-0)	2
Business Administration 312 Statistical Charts and Graphs	(2-0)	2
Business Administration 316 Office Management	(2-0)	2
Business Administration 327 Intermediate Accounting	(3-3)	4
Business Administration 329 Cost Accounting	(3-0)	3
Business Administration 403 Income Tax	(3-0)	3
Business Administration 428 Read Estate Titles and Conveyances	(3-0)	3
Business Administration 436 Sales Management	(3-0)	3
Business Administration 442 Read Estate Practice	(3-0)	3
Industrial Engineering 401 Survey of Industrial Engineering	(3-0)	3

For a Major in MARKETING

The field of marketing is diversified in the scope of its opportunities. Typical of the fields in which expansion is taking place is retail merchandising. Its major departments include store management, buying, publicity, merchandise planning, research, and personnel work. Market research will make increased demands upon those able to furnish management with the data necessary to keep abreast of marketing changes, to eliminate wasteful marketing methods, and to develop new products. The field of sales administration requires an ever-increasing number of individuals qualified to recruit, select, and train selling personnel. Also in this area lie the important functions of establishing sales territories, setting sales quotas, and sale costing. Personal selling is a field offering many opportunities for employment. In the field of advertising there is a need for copywriters, space buyers, research workers, media analysts, account executives, and advertising production managers.

By careful selection of electives, a student can specialize in one of the different fields of marketing or gain general knowledge in anticipation of starting his own business.

FRESHMAN YEAR

(See page 125)

SOPHOMORE YEAR

First Semester		Credit	Second Semester		Credit
Business Administration 205 Marketing	(3-0)	3	**Business Administration 208** Advertising	(3-0)	3
Business Administration 227 Principles of Accounting	(3-3)	4	**Business Administration 228** Principles of Accounting	(3-3)	4
Economics 203 Principles of Economics	(3-0)	3	**Business Administration 303** Statistical Method	(3-3)	4
English 203 Composition and Literature	(2-0)	2	**Economics 204** Principles of Economics	(3-0)	3
Geography 204 Economic Geography	(3-0)	3	**English 210** Writing and Discussion	(2-0)	2
Military or Air Science	(0-3)	1	**Military or Air Science**	(0-3)	1
Physical Education 201	(0-2)	R	**Physical Education 202**	(0-2)	R
		16			17

JUNIOR YEAR

Business Administration 206 Purchasing and Control of Materials	(2-0)	2	**Business Administration 304** Business Cycles and Business Measurements	(3-0)	3
Business Administration 305 Business Law	(3-0)	3	**Business Administration 306** Business Law	(3-0)	3
Business Administration 325 Retailing	(3-0)	3	**Business Administration 315** Insurance	(3-0)	3
Economics 311 Money and Banking	(3-0)	3	**Psychology 303** Psychology for Technical Students	(3-0)	3
English 301 Writing for Professional Men	(3-0)	3	**Elective**		6
Elective		4			18
		18			

SENIOR YEAR

Business Administration 418 Corporation Finance	(3-0)	3	**Business Administration 344** Marketing Problems	(3-0)	3
Business Administration 435 Salesmanship	(3-0)	3	**Business Administration 436** Sales Management	(3-0)	3
English 403 Speaking for Professional Men	(1-2)	2	**Business Administration 422** Personnel Problems of Industry	(3-0)	3
Government 306 American National Government	(3-0)	3	**Business Administration 446** Marketing Industrial Products	(2-0)	2
Elective		6	**Elective**		6
		17			17

NOTE: Six hours of electives are to be selected from the following:

Business Administration 310 Credits and Collections	(2-0)	2	**Business Administration 456** Applied Salesmanship	(0-2)	1
Business Administration 318 Wholesale Merchandising	(3-0)	3	**Journalism 205** Principles of Typography	(2-3)	3
Business Administration 447 Advertising Procedures	(3-0)	3			

For a Major in PERSONNEL ADMINISTRATION

The curriculum in personnel administration provides training for employment in the personnel departments of industrial concerns, public institutions, and governmental agencies, especially those agencies concerned with employer-employee relations. In recent years employer-employee relations have become a major problem of business and society, with the result that there is an increasing demand for qualified college graduates to work in this important field.

FRESHMAN YEAR

(See page 125)

SOPHOMORE YEAR

First Semester		Credit
Business Administration 205 Marketing	(3-0)	3
Business Administration 227 Principles of Accounting	(3-3)	4
Business Administration 316 Office Management	(2-0)	2
Economics 203 Principles of Economics	(3-0)	3
English 203 Composition and Literature	(2-0)	2
Military or Air Science	(0-3)	1
Psychology 303 Psychology for Technical Students	(3-0)	3
Physical Education 201	(0-2)	R
		18

Second Semester		Credit
Business Administration 228 Principles of Accounting	(3-3)	4
Business Administration 305 Business Law	(3-0)	3
Business Administration 315 Insurance	(3-0)	3
Economics 204 Principles of Economics	(3-0)	3
English 210 Writing and Discussion	(2-0)	2
Military or Air Science	(0-3)	1
Physical Education 202	(0-2)	R
		16

JUNIOR YEAR

Business Administration 303 Statistical Method	(3-3)	4
Business Administration 306 Business Law	(3-0)	3
English 301 Writing for Professional Men	(3-0)	3
Government 306 American National Government	(3-0)	3
Elective		4
		17

Business Administration 304 Business Cycles and Business Measurements	(3-0)	3
Business Administration 418 Corporation Finance	(3-0)	3
Business Administration 422 Personnel Problems of Industry	(3-0)	3
Economics 318 Economics of Labor	(3-0)	3
Elective		6
		18

SENIOR YEAR

Business Administration 423 Personnel Policies and Techniques	(3-0)	3
Business Administration 435 Salesmanship	(3-0)	3
Economics 435 Collective Bargaining and Labor Disputes	(3-0)	3
English 403 Speaking for Professional Men	(1-2)	2
Journalism 321 Industrial Journalism	(2-2)	3
Elective		3
		17

Economics 437 Government and Labor Relations	(2-0)	2
Industrial Education 328 Industrial Accident Prevention	(3-0)	3
Psychology 401 Industrial Psychology	(3-0)	3
Elective		9
		17

NOTE: The following courses are suggested electives:

Business Administration 208 Advertising	(3-0)	3
Business Administration 320 Life Insurance	(3-0)	3
Business Administration 322 Property Insurance	(3-0)	3
Business Administration 420 Principles of Investment	(3-0)	3
Business Administration 433 Business Management	(3-0)	3
Business Administration 436 Sales Management	(3-0)	3
Business Administration 463 Employee Supervision	(2-0)	2
Economics 319 Economic Development of the United States	(3-0)	3
English 405 Radio Speaking and Studio Practice	(2-0)	2
Industrial Education 406 Vocational Guidance	(2-0)	2
Industrial Engineering 401 Survey of Industrial Engineering	(3-0)	3

PREPARATION FOR TEACHING

Two departments in the School of Arts and Sciences provide programs of study which prepare students for certification as teachers in secondary schools. In the Department of Education and Psychology a student may prepare himself for teaching one of the usual secondary school subject matter fields. In the Department of Physical Education a student may prepare himself for coaching athletics and teaching physical education in the secondary school. Normally the student will follow a program leading to the Bachelor of Science degree, but an alternative program is available to the student who desires to obtain a Bachelor of Arts degree. The Department of Education and Psychology also offers teachers, principals, supervisors, and administrators an opportunity to add to their professional preparation in advanced undergraduate and graduate courses.

The Placement Office of the College, with the special cooperation of the School of Arts and Sciences, endeavors to assist graduates and students of the College in securing suitable teaching positions and to assist boards of education and other officials in securing teachers. While no one is assured of a position, every reasonable effort will be made to place all worthy candidates registered for this service. Information obtained from professors and others is confidential. No charge is made for this service.

EDUCATION

The Department of Education and Psychology offers teacher education programs for teaching in secondary schools leading to the degree of Bachelor of Arts or Bachelor of Science. The degree of Bachelor of Arts will require 12 hours of modern language. Students desiring to teach in the public schools may choose to major either in the Department of Education and Psychology or in a subject-matter area such as biology or mathematics.

Candidates preparing for work in the teacher education fields should select their courses under the guidance of the departmental advisor. Students beginning their teacher education program after September 1, 1955, will be eligible to receive the provisional certificate upon completing the requirements for the Bachelor's degree and being recommended by the Department to the Texas Education Agency. The Department of Education and Psychology also offers advanced undergraduate and graduate courses in partial preparation for certification at the professional level as master teachers, visiting teachers, counselors, supervisors, principals, and superintendents.

Students majoring in the Department of Education and Psychology or working toward the provisional or the professional certificate will be assigned an advisor who will counsel with the student during his teacher education program. The minimum requirements for the provisional certificate include (1) 6 semester hours of pre-professional work in education and psychology, (2) 12 semester hours of professional work in education and psychology, (3) 6 semester hours in supervised teaching, (4) 36 to 42 semester hours in a teaching area or field of specialization, (5) not less than 45 semester hours of general education, and (6) the completion of requirements for the Bachelor's degree. To meet the requirements for the professional certificate, the student must have at least three years teaching experience and must have completed an approved program of at least 30 semester hours of graduate work beyond the Bachelor's degree requirements.

PREPARATION FOR TEACHING WITH A MAJOR IN EDUCATION

I. General Education ..... 57 hours

Biological Science	6 hours
Economics	3 hours
English	13 hours
General Psychology	3 hours
Government	6 hours
History	6 hours
Mathematics	6 hours
Physical Education	6 hours
Physical Science	8 hours

II. Plans of Specialization

Plan 1. The student must complete at least 24 hours of concentration in a subject-matter area identified with a field of teaching in the secondary schools and a minimum of 18 semester hours in a second subject-matter area.

Plan 2. The student may complete at least 36 hours of concentration in a subject-matter field.

The student must complete one of the plans of specialization from the following fields: Biology, Chemistry, Business Administration, Economics, English, Geography, Government, History, Journalism, Mathematics, Modern Language, Physics. The exact courses involved will be chosen with the guidance of the student's advisor and the approval of the head of the department concerned.

III. Pre-Professional Education ..... 6 hours

Introductory Education	3 hours
Educational Psychology	3 hours

IV. Professional Education ..... 12 hours

Secondary School Methods	3 hours
Adolescent Psychology	3 hours
History and Philosophy of Secondary Education	3 hours
Secondary School Curriculum	3 hours

V. Professional Laboratory Experiences ..... 6 hours

Professional laboratory experiences consist of actual and direct contacts with youth in school, home, and community. They include observations made in connection with courses in psychology, instructional methods, and curriculum and testing. They also include participation in teaching activities during which the student accepts the direct responsibility for the success of a group of youth in a school situation. This experience will be given during the student's senior year upon the completion of the pre-professional and professional requirements in the teacher education program and satisfactory progress in the plan of specialization. Application for enrollment in supervised teaching must be made upon the recommendation of the student's advisor.

VI. Professional Electives ..... 6 hours

The student will be required to take 6 hours of professional work in the field of education or psychology or the equivalent upon the recommendation and approval of the student's advisor. These experiences will be directed toward meeting the need of students preparing for special areas of work.

VII. Electives

Electives to satisfy the requirements of a teacher education program to make a total of 137 semester hours. These hours will be chosen with the consent of the advisor.

Curriculum in EDUCATION

FRESHMAN YEAR

First Semester		Credit
Biology 101	(2-3)	3
General Botany of Seed Plants		
Chemistry 101	(3-3)	4
General Chemistry		
English 103	(3-0)	3
Composition and Rhetoric		
History 105	(3-0)	3
History of the United States		
Mathematics 101 or 102	(3-0)	3
Algebra		
Military or Air Science	(0-3)	1
Physical Education 101	(0-2)	R
		17

Second Semester		Credit
Biology 107	(2-3)	3
Vertebrate Zoology		
Chemistry 102	(3-3)	4
General Chemistry		
English 104	(3-0)	3
Composition and Rhetoric		
History 106	(3-0)	3
History of the United States		
Mathematics 103	(3-0)	
Plane Trigonometry		
Or		
Mathematics 110	(3-0)	3
Survey Course in Mathematics		
Military or Air Science	(0-3)	1
Elective		1
Physical Education 102	(0-2)	R
		18

SOPHOMORE YEAR

Education 121	(3-0)	3
An Introduction to Education		
English 203	(2-0)	
Composition and Literature		
Or		
English 210	(2-0)	2
Writing and Discussion		
Military or Air Science	(0-3)	1
Psychology 207	(3-0)	3
General Psychology		
Elective		8
Physical Education 201	(0-2)	R
		17

Economics 205	(3-0)	3
Principles of Economics		
English (elective)	(3-0)	3
Military or Air Science	(0-3)	1
Psychology 301	(3-0)	3
Educational Psychology		
Elective		7
Physical Education 202	(0-2)	R
		17

JUNIOR YEAR

Education 321	(3-0)	3
Secondary School Methods		
Government 306	(3-0)	3
American National Government		
Physical Education 213	(3-0)	3
Introduction to Health and Physical Education		
Elective		9
		18

Government 307	(3-0)	3
State and Local Government		
Psychology 323	(3-0)	3
Psychology of Adolescence		
Elective		12
		18

SENIOR YEAR

Education 421	(3-0)	3
History and Philosophy of Education		
Education 444	(3-0)	3
Secondary School Curriculum		
Physical Education 415	(3-0)	3
Secondary School Health Education		
Elective		9
		18

Education 425	(2-12)	6
Supervised Student Teaching		
English 403	(1-2)	2
Speaking for Professional Men		
Elective		6
		14

NOTES: 1. In choosing electives, the student should keep in mind the requirements of his subject-matter area of teaching specialization.

2. With the consent of the student's advisor, the following substitutions may be made in the program outlined above:

(1) Biological Sciences. A minimum of 6 hours of biological science is required. For Biology 101 and 107, students may substitute Biology 115 (3-3) and Biology 330 (2-0) or Biology 337 (2-0).

(2) Physical Sciences. A minimum of 8 hours of physical science is required. For Chemistry 101 and 102, students may substitute Physics 201 (3-3) and 202 (3-3), or select 8 hours from these courses: Chemistry 106 (3-3), Physics 211 (3-3), Geology 205 (3-3), and Geography 203 (3-3).

3. The English elective in the sophomore year should be chosen from literature courses. Students planning to teach English in the secondary schools may substitute for English 203 or 210 a 3-hour English course chosen with the consent of the advisor. If a student writes unsatisfactorily, he may be required to take an additional course in writing, such as English 301.

PHYSICAL EDUCATION

The Bachelor's degree is granted students majoring in the Department of Physical Education who complete the prescribed program of studies in professional education, physical education, and general education, and establish a teaching minor in one of the usual secondary school subject matter fields (See above). The choice of a teaching minor may be made only with the aproval of the Head of the Department of Physical Education.

Upon completion of the prescribed curriculum and recommendation to the Texas Education Agency, the student will be eligible for (1) the All-Grade Level Certificate in Health and Physical Education and (2) Secondary School Certificate in Health and Physical Education and the selected teaching minor.

Curriculum in PHYSICAL EDUCATION

FRESHMAN YEAR

First Semester		Credit
Biology 101	(2-3)	3
General Botany of Seed Plants		
English 103	(3-0)	3
Composition and Rhetoric		
History 105	(3-0)	3
History of the United States		
Mathematics 101	(3-0)	3
Algebra		
Military or Air Science	(0-3)	1
Rural Sociology 205	(3-0)	3
Principles of Sociology		
Physical Education 101	(0-2)	R
		16

Second Semester		Credit
Biology 107	(2-3)	3
Vertebrate Zoology		
Chemistry 106	(3-3)	4
General Chemistry		
Education 121	(3-0)	3
An Introduction to Education		
English 104	(3-0)	3
Composition and Rhetoric		
History 106	(3-0)	3
History of the United States		
Military or Air Science	(0-3)	1
Elective		1
Physical Education 102	(0-2)	R
		18

SOPHOMORE YEAR

Biology 219	(2-3)	3
Anatomy and Physiology		
Biology 225	(2-0)	2
Personal and Public Health		
English 203	(2-0)	2
Composition and Literature		
Government 306	(3-0)	3
American National Government		
Military or Air Science	(0-3)	1
Physical Education 211	(1-3)	2
Physical Education Activities		
Physical Education 213	(3-0)	3
Introduction to Health and Physical Education		
Physical Education 221	(2-0)	2
Safety Education		
Physical Education 201	(0-2)	R
		18

Biology 220	(2-3)	3
Physiology and Hygiene		
Economics 205	(3-0)	3
Principles of Economics		
English 210	(2-0)	2
Writing and Discussion		
Government 307	(3-0)	3
State and Local Government		
Military or Air Science	(0-3)	1
Physical Education 216	(0-3)	1
First Aid		
Physical Education 317	(1-3)	2
Coaching of Football		
Physical Education 325	(2-0)	2
Outdoor Activities		
Physical Education 202	(0-2)	R
		17

JUNIOR YEAR

First Semester		Credit	Second Semester		Credit
Physical Education 316 Secondary School Physical Education	(3-0)	3	**Physical Education 218** Athletic Injuries	(1-3)	2
Physical Education 415 Secondary School Health Education	(3-0)	3	**Physical Education 315** Elementary School Physical Education	(3-0)	3
Physical Education 427 Remedial Exercises	(3-0)	3	**Physical Education 421** Elementary School Health Education	(3-0)	3
Psychology 301 Educational Psychology	(3-0)	3	**Psychology 307** Child Growth and Development	(3-0)	3
Elective		6	**Elective**		6
		18			17

SENIOR YEAR

Education (elective[2])	(3-0)	3	**Physical Education 423** Administration of Health and Physical Education	(3-0)	3
English 403 Speaking for Professional Men	(1-2)	2	**Physical Education 450** Directed Teaching	(2-12)	6
Physical Education 425 Tests and Measurements	(3-0)	3	**Elective**		6
Psychology 323 Psychology of Adolescence	(3-0)	3			15
Elective		7			
		18			

NOTES: 1. History 325, 326 may be substituted for History 105, 106.

2. Electives in Education may be chosen from any one of the following: Education 421, 427, 437.

3. Students who desire a secondary school certificate only may, with the approval of the Head of the Department of Physical Education and the Dean of the School of Arts and Sciences, substitute approved electives for the following courses: Biology 101; Physical Education 221, 315, 325, 421; and Psychology 307.

SCIENCE

Science programs in the School of Arts and Sciences are administered by the following departments: Biology, Chemistry, Oceanography and Meteorology, and Physics.

The several curricula in science are planned for those students whose interests and abilities lie in the direction of seeking scientific truths and relations previously unknown or not understood in the world about us and of bringing these truths to bear on problems affecting the well-being of mankind. Because many students do not discover the nature of their interests or abilities until they have followed a curriculum in agriculture or engineering for a year or more, the curricula in science are so arranged that a student may change to science with a minimum of loss in semester hour credit.

The curricula are designed to serve the following purposes:

1. To prepare students for research in basic science, usually after further study at the graduate level.
2. To prepare teachers of science in secondary schools and other institutions of learning.
3. To provide the necessary undergraduate foundation for students planning to study medicine or kindred fields.
4. To afford a broad scientific training for students who desire it before entering some field of applied science in industry or government service.

Curricula in BIOLOGICAL SCIENCES

(For Majors in Botany, Entomology, Microbiology, and Zoology)

FRESHMAN YEAR

First Semester		Credit	Second Semester		Credit
Biology 107 Vertebrate Zoology	(2-3)	3	**Biology 108** Invertebrate Zoology	(2-3)	3
Chemistry 101 General Chemistry	(3-3)	4	**Chemistry 102** General Chemistry	(3-3)	4
English 103 Composition and Rhetoric	(3-0)	3	**English 104** Composition and Rhetoric	(3-0)	3
History 105 History of the United States	(3-0)	3	**History 106** History of the United States	(3-0)	3
Mathematics 101 or 102 Algebra	(3-0)	3	**Mathematics 103** Plane Trigonometry	(3-0)	3
Military or Air Science	(0-3)	1	**Military or Air Science**	(0-3)	1
Physical Education 101	(0-2)	R	**Elective**		1
		17	**Physical Education 102**	(0-2)	R
					18

For a Major in BOTANY

FRESHMAN YEAR

(See above)

SOPHOMORE YEAR

Biology 101 General Botany of Seed Plants	(2-3)	3	**Biology 102** Taxonomy of Flowering Plants	(2-3)	3
Chemistry 205 Qualitative Analysis	(2-6)	4	**Biology 327** Fundamental Plant Morphology	(2-3)	3
English 203 Composition and Literature	(2-0)	2	**Chemistry 216** Quantitative Analysis	(2-6)	4
Mathematics 104 Analytics	(3-0)	3	**English 210** Writing and Discussion	(2-0)	2
Military or Air Science	(0-3)	1	**Military or Air Science**	(0-3)	1
Physics 201 College Physics	(3-3)	4	**Physics 202** College Physics	(3-3)	4
Physical Education 201	(0-2)	R	**Physical Education 202**	(0-2)	R
		17			17

JUNIOR YEAR

Biology 206 Introductory Microbiology	(2-4)	3	**Chemistry 302** Organic Chemistry	(3-3)	4
Chemistry 301 Organic Chemistry	(3-3)	4	**Genetics 301** Genetics	(3-2)	4
Geography 203 Physical Geography	(3-3)	4	**Modern Language** French or German	(3-0)	3
Modern Language French or German	(3-0)	3	**Plant Physiology and Pathology 313** Introduction to Plant Physiology	(2-3)	3
Elective		3	**Elective**		3
		17			17

SENIOR YEAR

Biology 419 Seminar in Biology	(1-0)	1	**Biology 420** Seminar in Biology	(1-0)	1
Biology 453 Plant Anatomy	(2-3)	3	**Biology (Botany elective)**		3
Economics 205 Principles of Economics	(3-0)	3	**English 403** Speaking for Professional Men	(1-2)	2
Government 306 American National Government	(3-0)	3	**Genetics 406** Biometry—Experimental Technique	(2-3)	3
Modern Language French or German	(3-0)	3	**Modern Language** French or German	(3-0)	3
Elective		4	**Elective**		5
		17			17

For a Major in ENTOMOLOGY

FRESHMAN YEAR

(See page 139)

SOPHOMORE YEAR

First Semester		Credit	Second Semester		Credit
Biology 101 General Botany of Seed Plants	(2-3)	3	**Biology 206** Introductory Microbiology	(2-4)	3
English 212 Shakespeare	(3-0)	3	**Economics 205** Principles of Economics	(3-0)	3
Entomology 201 General Entomology	(2-2)	3	**English 231 or 232** Survey of English Literature	(3-0)	3
Military or Air Science	(0-3)	1	**Military or Air Science**	(0-3)	1
Modern Language	(3-0)	3	**Modern Language**	(3-0)	3
Physics 201 College Physics	(3-3)	4	**Physics 202** College Physics	(3-3)	4
Physical Education 201	(0-2)	R	**Physical Education 202**	(0-2)	R
		17			17

JUNIOR YEAR

Chemistry 301 Organic Chemistry	(3-3)	4	**Chemistry 302** Organic Chemistry	(3-3)	4
Entomology 301 Systematic Entomology	(2-3)	3	**English 301** Writing for Professional Men	(3-0)	3
Entomology 305 Insect Morphology	(2-3)	3	**Entomology 302** Systematic Entomology	(2-3)	3
Modern Language	(3-0)	3	**Entomology 306** Insect Physiology	(2-3)	3
Elective		3	**Modern Language**	(3-0)	3
		16	**Elective**		2
					18

SENIOR YEAR

English 403 Speaking for Professional Men	(1-2)	2	**Entomology 402** Agricultural Pests	(2-3)	3
Entomology 401 Principles of Insect Control	(2-3)	3	**Entomology 424** Insect Ecology	(2-3)	3
Entomology 423 Comparative Anatomy of Arthropods	(2-3)	3	**Genetics 301** Genetics	(3-2)	4
Plant Physiology and Pathology 301 Plant Pathology	(2-3)	3	**Government 306** American National Government	(3-0)	3
Elective		6	**Elective**		4
		17			17

NOTES: 1. See "The Foreign Language Requirement," page 115.

2. Science electives should usually be selected from the following courses:

Biology 102 Taxonomy of Flowering Plants	(2-3)	3	**Biology 436** Animal Parasitology	(3-3)	4
Biology 217 Comparative Anatomy of Vertebrates	(2-4)	3	**Entomology 427** Arthropods of Veterinary and Medical Importance	(2-3)	3
Biology 218 Comparative Anatomy of Vertebrates	(2-4)	3	**Genetics 406** Biometry—Experimental Technique	(2-3)	3
Biology 433 General Physiology	(3-3)	4	**Plant Physiology and Pathology 313** Introduction to Plant Physiology	(2-3)	3
Biology 435 Advanced Invertebrate Zoology	(3-3)	4	**Wildlife Management 401** General Mammalogy	(2-2)	3

For a Major in MICROBIOLOGY

FRESHMAN YEAR

(See page 139)

SOPHOMORE YEAR

First Semester		Credit	Second Semester		Credit
Biology 101	(2-3)	3	Biology 206	(2-4)	3
General Botany of Seed Plants			Introductory Microbiology		
Chemistry 205	(2-6)	4	Chemistry 216	(2-6)	4
Qualitative Analysis			Quantitative Analysis		
English 210	(2-0)	2	Economics 205	(3-0)	3
Writing and Discussion			Principles of Economics		
Mathematics 104	(3-0)	3	English 231 or 232	(3-0)	3
Analytics			Survey of English Literature		
Military or Air Science	(0-3)	1	Military or Air Science	(0-3)	1
Physics 201	(3-3)	4	Physics 202	(3-3)	4
College Physics			College Physics		
Physical Education 201	(0-2)	R	Physical Education 202	(0-2)	R
		17			18

JUNIOR YEAR

Biology (Microbiology elective)[1]		4	Biology (Microbiology elective)[1]		4
Chemistry 301	(3-3)	4	Chemistry 302	(3-3)	4
Organic Chemistry			Organic Chemistry		
Government 306	(3-0)	3	Liberal Arts[2]		3
American National Government			Modern Language	(3-0)	3
Modern Language	(3-0)	3	French, German, or Russian		
French, German, or Russian			Elective		3
Elective		3			17
		17			

SENIOR YEAR

Biochemistry and Nutrition 312	(3-6)	5	Biology 420	(1-0)	1
Veterinary Physiological Chemistry			Seminar in Biology		
Biology 419	(1-0)	1	Biology (Microbiology elective)[1]		4
Seminar in Biology			English 403	(1-2)	2
Biology (Microbiology elective)[1]		4	Speaking for Professional Men		
Modern Language	(3-0)	3	Genetics 301	(3-2)	4
French, German, or Russian			Genetics		
Elective		3	Modern Language	(3-0)	3
		16	French, German, or Russian		
			Elective		3
					17

NOTES: 1. Microbiology electives may be satisfied by Agronomy 443; Biology 327, 353, 358, 433, 437, 455, 457, 630, 647; Dairy Science 320, 326; Plant Physiology and Pathology 314, 401, 403 or 405. Selections should be made with the aid of the student's advisor.

2. Liberal Arts elective may be satisfied by Liberal Arts 301, 304, or 201 and 311.

For a Major in ZOOLOGY

FRESHMAN YEAR

(See page 139)

SOPHOMORE YEAR

First Semester		Credit	Second Semester		Credit
Biology 101 General Botany of Seed Plants	(2-3)	3	**Biology 206** Introductory Microbiology	(2-4)	3
Biology 217 Comparative Anatomy of Vertebrates	(2-4)	3	**Biology 218** Comparative Anatomy of Vertebrates	(2-4)	3
English 212 Shakespeare	(3-0)	3	**English 231 or 232** Survey of English Literature	(3-0)	3
Military or Air Science	(0-3)	1	**Military or Air Science**	(0-3)	1
Modern Language	(3-0)	3	**Modern Language**	(3-0)	3
Physics 201 College Physics	(3-3)	4	**Physics 202** College Physics	(3-3)	4
Physical Education 201	(0-2)	R	**Physical Education 202**	(0-2)	R
		17			17

JUNIOR YEAR

Biology (Zoology elective)		3	**Biology (Zoology elective)**		3
Chemistry 301 Organic Chemistry	(3-3)	4	**Chemistry 302** Organic Chemistry	(3-3)	4
Genetics 301 Genetics	(3-2)	4	**Government 306** American National Government	(3-0)	3
Modern Language	(3-0)	3	**Modern Language**	(3-0)	3
Elective		3	**Elective**		4
		17			17

SENIOR YEAR

Biology 419 Seminar in Biology	(1-0)	1	**Biology 420** Seminar in Biology	(1-0)	1
Biology (Zoology elective)		4	**Biology (Zoology elective)**		4
Economics 205 Principles of Economics	(3-0)	3	**Elective**		12
English 403 Speaking for Professional Men	(1-2)	2			17
Elective		7			
		17			

NOTES: 1. See "The Foreign Language Requirement," page 115.

2. The elective hours in Zoology must include 12 hours chosen from the following courses: Biology 343, 344, 422, 433, 434, 435, 436.

3. Elective hours and the remaining hours required for the major should be selected from the following:

***Architecture 205** Freehand Drawing	(0-6)	2	**Entomology 306** Insect Physiology	(2-3)	3
Architecture 206 Freehand Drawing	(0-6)	2	**Genetics 304** Plant Breeding	(3-2)	4
***Chemistry 216** Quantitative Analysis	(2-6)	4	**Genetics 306** Animal Breeding	(2-2)	3
Chemistry 342 Physical Chemistry	(3-3)	4	**Genetics 406** Biometry—Experimental Technique	(2-3)	3
Civil Engineering 406 Sanitation and Public Health	(3-0)	3	**Geology 205** Elementary Geology	(3-3)	4
Entomology 201 General Entomology	(2-2)	3	**Wildlife Management 201** Wildlife Conservation and Management	(3-0)	3
Entomology 208 Veterinary Entomology	(2-3)	3	**Wildlife Management 401** General Mammalogy	(2-2)	3
Entomology 301 Systematic Entomology	(2-3)	3	**Wildlife Management 402** General Ornithology	(2-2)	3
Entomology 302 Systematic Entomology	(2-3)	3	**Wildlife Management 403** Animal Ecology	(2-3)	3
Entomology 305 Insect Morphology	(2-3)	3			

*Strongly recommended for all zoology majors.

Studies Preparatory to MEDICINE, DENTISTRY, AND RELATED FIELDS

Premedical and Predental Program

Students planning to enter a school of medicine or dentistry without first taking a college degree should matriculate in the curriculum in science and take the following program:

FRESHMAN YEAR

First Semester		Credit	Second Semester		Credit
Biology 107 Vertebrate Zoology	(2-3)	3	**Biology 108** Invertebrate Zoology	(2-3)	3
Chemistry 101 General Chemistry	(3-3)	4	**Chemistry 102** General Chemistry	(3-3)	4
English 103 Composition and Rhetoric	(3-0)	3	**English 104** Composition and Rhetoric	(3-0)	3
History 105 History of the United States	(3-0)	3	**History 106** History of the United States	(3-0)	3
Mathematics 102 Algebra	(3-0)	3	**Mathematics 103** Plane Trigonometry	(3-0)	3
Military or Air Science	(0-3)	1	**Military or Air Science**	(0-3)	1
Physical Education 101	(0-2)	R	**Physical Education 102**	(0-2)	R
			Elective		1
		17			18

SOPHOMORE YEAR

Biology 217 Comparative Anatomy of Vertebrates	(2-4)	3	**Biology 218** Comparative Anatomy of Vertebrates	(2-4)	3
Chemistry 216 Quantitative Analysis	(2-6)	4	**Chemistry 301** Organic Chemistry	(3-3)	4
English 212 Shakespeare	(3-0)	3	**English 231 or 232** Survey of English Literature	(3-0)	3
Military or Air Science	(0-3)	1	**Military or Air Science**	(0-3)	1
Modern Language	(3-0)	3	**Modern Language**	(3-0)	3
Physics 201 College Physics	(3-3)	4	**Physics 202** College Physics	(3-3)	4
Physical Education 201	(0-2)	R	**Physical Education 202**	(0-2)	R
		18			18

JUNIOR YEAR

Biology (elective)		3	**Biology (elective)**		3
Chemistry 302 Organic Chemistry	(3-3)	4	**Chemistry 342** Physical Chemistry	(3-3)	4
Economics 205 Principles of Economics	(3-0)	3	**English 403** Speaking for Professional Men	(1-2)	2
Government 306 American National Government	(3-0)	3	**Government 307** State and Local Government	(3-0)	3
Modern Language	(3-0)	3	**Modern Language**	(3-0)	3
Psychology 207 General Psychology	(3-0)	3	**Elective**		4
		19			19

NOTES: 1. Under the regulations imposed by the American Medical Association, a medical school may admit students who have as little as two years of premedical training. But ninety per cent of the students admitted to medical and dental schools in the United States have three or more years of premedical training. A large proportion hold college degrees in science or liberal arts. It is therefore recommended that students preparing to enter medical or dental school plan at the outset to complete at least the foregoing three-year program. (The Medical Branch of the University of Texas, the Baylor University College of Medicine, and the Southwestern College of Medicine require a minimum of three years of college work for admission. At present Baylor University College of Dentistry and the School of Dentistry of the University of Texas are likewise requiring three years of college work for admission.)

2. A student may qualify for the Bachelor of Science degree from the Agricultural and Mechanical College of Texas by completing the three-year premedical curriculum here and at least one year at a Class A medical school or dental school, with a minimum of 137 acceptable semester hours, subject to the usual grade point requirement.

3. Since courses in literature, language, history, and social sciences are not offered in medical or dental schools, leaders in medical education urge prospective medical and dental students to include much of such work in their preprofessional education. Some electives for the junior and senior years in line with this recommendation are:

Business Administration 227 Principles of Accounting	(3-3)	4
Business Administration 228 Principles of Accounting	(3-3)	4
English 203 Composition and Literature	(2-0)	2
English 210 Writing and Discussion	(2-0)	2
Rural Sociology 205 Principles of Sociology	(3-0)	3
Rural Sociology 206 Social Processes	(2-0)	2
Rural Sociology 311 Social Psychology	(3-0)	3

Electives available in the sciences related to medicine are:

Biology 206 Introductory Microbiology	(2-4)	3
Biology 343 Histology	(2-3)	3
Biology 344 Embryology	(2-3)	3
Biology 419 Seminar in Biology	(1-0)	1
Biology 420 Seminar in Biology	(1-0)	1
Biology 422 Microtechnique	(1-6)	3
Biology 433 General Physiology	(3-3)	4
Biology 434 General Mammalian Physiology	(2-3)	3
Biology 435 Advanced Invertebrate Zoology	(3-3)	4
Biology 436 Animal Parasitology	(3-3)	4
Biology 457 Bacterial Ecology	(2-6)	4
Chemistry 205 Qualitative Analysis	(2-6)	4
Civil Engineering 406 Sanitation and Public Health	(3-0)	3
Genetics 301 Genetics	(3-2)	4

Curricula in PHYSICAL SCIENCES

(For Majors in Chemistry, Meteorology, and Physics)

FRESHMAN YEAR

First Semester		Credit
Biology 101 General Botany of Seed Plants	(2-3)	3
Chemistry 101 General Chemistry	(3-3)	4
English 103 Composition and Rhetoric	(3-0)	3
Mathematics 102 Algebra	(3-0)	3
Mathematics 103 Plane Trigonometry	(3-0)	3
Military or Air Science	(0-3)	1
Physical Education 101	(0-2)	R
		17

Second Semester		Credit
Biology 107 Vertebrate Zoology	(2-3)	3
Chemistry 102 General Chemistry	(3-3)	4
English 104 Composition and Rhetoric	(3-0)	3
Mathematics 104 Analytics	(3-0)	3
Mechanical Engineering 101 Engineering Problems	(0-3)	1
Military or Air Science	(0-3)	1
Elective		2
Physical Education 102	(0-2)	R
		17

For a Major in CHEMISTRY

FRESHMAN YEAR

(See page 144)

SOPHOMORE YEAR

First Semester		Credit	Second Semester		Credit
Chemistry 205 Qualitative Analysis	(2-6)	4	**Chemistry 216** Quantitative Analysis	(2-6)	4
English 203 Composition and Literature	(2-0)	2	**History 106** History of the United States	(3-0)	3
History 105 History of the United States	(3-0)	3	**Mathematics 210** Calculus	(3-0)	3
Mathematics 209 Calculus	(3-0)	3	**Military or Air Science**	(0-3)	1
Military or Air Science	(0-3)	1	**Physics 204** General Physics	(4-3)	5
Physics 203 General Physics	(4-3)	5	**Physical Education 202**	(0-2)	R
Physical Education 201	(0-2)	R			16
		18			

JUNIOR YEAR

Chemistry 301 Organic Chemistry	(3-3)	4	**Chemistry 302** Organic Chemistry	(3-3)	4
Chemistry 323 Physical Chemistry	(3-3)	4	**Chemistry 324** Physical Chemistry	(3-3)	4
Government 306 American National Government	(3-0)	3	**Chemistry 447** Qualitative Organic Analysis	(1-6)	3
Modern Language[1] French or German	(3-0)	3	**English 210** Writing and Discussion	(2-0)	2
Elective		3	**Modern Language**[1] French or German	(3-0)	3
		17	**Elective**		2
					18

SENIOR YEAR

Chemistry 400 Industrial Analysis	(1-6)	3	**Chemistry 448** Electrochemistry	(2-3)	3
Chemistry 454 Seminar	(1-0)	1	**Chemistry (elective)**		4
Chemistry (elective)		4	**Economics 205** Principles of Economics	(3-0)	3
English 301 Writing for Professional Men	(3-0)	3	**English 401** Public Speaking	(0-2)	1
Modern Language[1] French or German	(3-0)	3	**Modern Language**[1] French or German	(3-0)	3
Elective		3	**Elective**		3
		17			17

NOTES: 1. See "The Foreign Language Requirement," page 115.

2. Chemistry electives in the senior year must be selected from the following courses:

Chemistry 449 Energetics	(4-0)	4	**Chemistry 452** Inorganic Chemistry	(3-3)	4
Chemistry 450 Colloidal Chemistry	(3-3)	4	**Chemistry 455** Paints and Coatings	(4-0)	4

For a Major in METEOROLOGY

Meteorology is the science of the atmosphere and all its phenomena. One of the broad fields of geophysics, it is concerned with physical states and processes within the atmosphere and at the earth's surface. The objective of meteorology is to determine the natural and physical controls of the atmosphere and to apply this knowledge in various ways benefitting life and human endeavor.

Weather and climate through the ages have shaped the physical and biological features of the earth and have guided the course of human activities. However, it is only through quite recent developments in technology, communications, and transportation that sufficient information has been obtained about the atmosphere to enable meteorology to emerge as a separate college study. While satisfying public interest in the weather has been the major object in meteorology, the last few years have witnessed rapidly expanding applications in agriculture, engineering, industry, business, commerce, and national defense.

FRESHMAN YEAR

(See page 144)

SOPHOMORE YEAR

First Semester		Credit	Second Semester		Credit
English 203 Composition and Literature	(2-0)	2	English 210 Writing and Discussion	(2-0)	2
Mathematics 209 Calculus	(3-0)	3	Geography 203 Physical Geography	(3-3)	4
Military or Air Science	(0-3)	1	Mathematics 210 Calculus	(3-0)	3
Modern Language	(3-0)	3	Military or Air Science	(0-3)	1
Physics 203 General Physics	(4-3)	5	Modern Language	(3-0)	3
Elective		3	Physics 204 General Physics	(4-3)	5
Physical Education 201	(0-2)	R	Physical Education 202	(0-2)	R
		17			18

JUNIOR YEAR

History 325 Trends in American History	(3-0)	3	Economics 205 Principles of Economics	(3-0)	3
Mathematics 307 Calculus	(3-0)	3	History 326 History of Texas	(3-0)	3
Meteorology 317 Meteorological Instruments, Observations, and Communications	(2-3)	3	Meteorology 318 Meteorological Instruments, Observations, and Communications	(1-3)	2
Meteorology 325 Physical Climatology	(3-0)	3	Meteorology 326 Regional Climatology	(2-0)	2
Meteorology 335 Atmospheric Statics and Thermodynamics	(3-0)	3	Meteorology 336 Atmospheric Motions	(3-3)	4
Elective		2	Elective		3
		17			17

SENIOR YEAR

English 301 Writing for Professional Men	(3-0)	3	English 403 Speaking for Professional Men	(1-2)	2
Meteorology 445 Atmospheric Physical Processes	(3-0)	3	Government 306 American National Government	(3-0)	3
Meteorology 457 Fundamentals of Weather Analysis	(1-12)	5	Meteorology 458 Weather Analysis	(1-12)	5
Oceanography 401 Introduction to Oceanography	(3-0)	3	Elective		7
Elective		3			17
		17			

NOTES: 1. The choice of Modern Language (German, Russian, French, or Spanish) should be determined in conference with the student's department advisor and will be based on the student's own plans for the future.

2. Elective courses should be planned in consultation with and on approval of the Head of the Department, and in order to provide a maximum of cultural, scientific, or technical broadening. Students considering graduate work in meteorology are urged to elect a second year of modern language and to strengthen their scientific backgrounds by additional mathematics and physics. Those students who plan to apply meteorology in, or in combination with, one of the several subject fields where meteorologists are presently in demand should consider a concentration of electives in that field or even a double degree. Some of these fields are agriculture (plant or soil phases); aeronautical, civil, or electrical engineering; certain phases of business; and the chemistry and physics of the atmosphere.

OCEANOGRAPHY

Oceanography is the study of the oceans and their boundaries. It is based upon the unity of the sciences of the sea. Effective study of the subject requires thorough previous training in one of the pertinent basic sciences such as biology, chemistry, geology, mathematics, meteorology, and physics, or in engineering. Therefore, much of the work in oceanography is conducted at the graduate level, and the undergraduate program of students who wish to study oceanography must be planned to satisfy certain prerequisite requirements. It is suggested that such students consult regularly during their undergraduate years with the oceanography staff.

Five options, the biological, chemical, geological, physical, and meteorological with their corresponding engineering phases, are offered. The options require different undergraduate programs. These programs are taken in other departments except in the case of meteorological oceanography, where a complete undergraduate program in meteorology is offered in the Oceanography and Meteorology Department.

In the graduate program there are curricula leading to the Master of Science and Doctor of Philosophy degrees in each of the five options in oceanography. Specific prerequisite requirements are set up for each curriculum. In general, these consist of the courses normally required for the degree of Bachelor of Science in one of the basic fields listed above and some course work in each of the other fields.

Oceanography may be utilized in solving certain problems arising in fisheries work, offshore oil and gas operations, navigation, prevention of beach erosion, weather forecasting, recreation, extraction of raw materials from the sea, marine construction, coastal sanitation, military operations, fresh water supply, and many other activities. It requires broad interests, numerous skills, a real liking for the sea, and an adaptability to shipboard life.

For a Major in PHYSICS

Physics is the science of energy and the interaction of energy and matter. Some physicists are primarily concerned with the discovery and investigation of effects and relations in the physical universe previously unknown or not understood. Others, known as applied physicists, are interested in bringing to the solution of industrial and technical problems, physical effects not previously so applied. When new and better ways are required to obtain and transmit energy or to alter the configuration or constitution of matter, physicists are of service.

Many branches of industry are seeking applied physicists with all levels of professional training from the Bachelor's to the Doctor's degree. Industrial and government-operated research laboratories and colleges and universities are seeking investigators of new physical truths and relations with professional training beyond the Bachelor's degree. College graduates in physics are far short of the number needed.

The undergraduate curriculum in physics offers a thorough coverage of the phenomena of classical, atomic, and nuclear physics, while developing the student's mathematical tools to the point where he can deal resourcefully and constructively with these phenomena. It also provides a grounding in related sciences, linguistic techniques, and general education. Elective time permits further broadening of the student's education or a degree of concentration in some phases of engineering.

FRESHMAN YEAR

(See page 144)

SOPHOMORE YEAR

First Semester		Credit	Second Semester		Credit
English 203 Composition and Literature	(2-0)	2	English 210 Writing and Discussion	(2-0)	2
History 105 History of the United States	(3-0)	3	History 106 History of the United States	(3-0)	3
Mathematics 209 Calculus	(3-0)	3	Mathematics 210 Calculus	(3-0)	3
Military or Air Science	(0-3)	1	Military or Air Science	(0-3)	1
Modern Language[1]	(3-0)	3	Modern Language[1]	(3-0)	3
Physics 203 General Physics	(4-3)	5	Physics 204 General Physics	(4-3)	5
Physical Education 201	(0-2)	R	Physical Education 202	(0-2)	R
		17			17

JUNIOR YEAR

Mathematics 307 Calculus	(3-0)	3	Mathematics 308 Differential Equations	(3-0)	3
Modern Language[1]	(3-0)	3	Modern Language[1]	(3-0)	3
Physics 301 Heat	(3-3)	4	Physics 302 Mechanical Properties of Matter	(2-3)	3
Physics 311 Atomic and Nuclear Physics	(3-0)	3	Physics 312 Atomic and Nuclear Physics	(2-0)	2
Elective		3	Physics 401 Optics	(3-3)	4
		16	Elective		3
					18

SENIOR YEAR

Economics 205 Principles of Economics	(3-0)	3	English 403 Speaking for Professional Men	(1-2)	2
English 301 Writing for Professional Men	(3-0)	3	Government 306 American National Government	(3-0)	3
Mathematics 405 Vector Analysis	(3-0)	3	Physics 411 Experimental Modern Physics	(0-6)	2
Physics 405 Physical Mechanics	(3-0)	3	Physics 414 Electricity and Magnetism	(1-3)	2
Physics 413 Electricity and Magnetism	(2-3)	3	Physics 416 Electromagnetic Fields	(3-0)	3
Elective		3	Elective		5
		18			17

NOTES: 1. See "The Foreign Language Requirement," page 115. German is recommended normally.

2. Electives should be selected in consultation with, and on approval of, the Head of the Department with two objectives in view: (1) to strengthen the broad foundation expected of students who specialize in physics; (2) to intensify the student's program in the direction of a specific competence. For objective (1) are recommended electives in other sciences, especially chemistry; electives in basic engineering courss, such as DC and AC machinery, circuit theory, electronics, engineering mechanics, mechanics of materials, thermodynamics, engineering drawing (Engineering Drawing 105), and machine shop (Mechanical Engineering 309); and electives in mathematics, languages, the humanities, and social sciences.

Objective (2) is determined by the student's interests and plans for the future. He may aspire to a career of advancing knowledge of fundamental physics through basic research on physical phenomena or through college teaching. In this case the student must plan on postgraduate study and should choose his electives to increase his intellectual equipment in mathematics and to widen his range of acquaintance with subjects in physics and other sciences and fields important for an educated man. If the student is interested in research in physics bearing on a field of some other science, such as chemistry, geology, meteorology, oceanography, or biology, a heavy concentration of electives should be made in that science. The student preparing for a career in high school teaching should elect the requisite courses in education. A student planning to go directly into industry upon graduation should concentrate a large portion of his electives in a sequence of courses proceeding to an advanced stage in, for instance, aeronautical engineering, communications and electronics in electrical engineering, or vibrations and the mechanics of materials, or thermodynamics and heat transfer in mechanical engineering.

THE SCHOOL OF ENGINEERING

GENERAL STATEMENT

The School of Engineering, through its several curricula, offers broad programs of education in the engineering sciences that are designed to develop the student's abilities and qualities to enable him to enter into and advance with the profession of engineering, and to lead a useful and happy life in the community in which he lives. Quite naturally, these programs include as their main core the fundamentals of engineering science and the basic materials related thereto, but in addition they include subjects from the social and humanistic sciences. It is expected that a student who conscientiously applies himself to and successfully completes one of these broad engineering programs not only will be technically trained but also humanly and socially educated.

It is important for a student who is contemplating a curriculum in engineering to realize that engineering is highly technical in character, requiring a minimum of four years of comprehensive study in mathematics and science. In addition to theory, practice work and problem courses are provided so that the student may learn more readily the application of the fundamental principles to the solution of problems encountered in the practice of engineering. It should be pointed out that these courses are professional engineering courses and are not training courses for any of the mechanical or manipulative skills. With the exception of industrial education, all curricula are planned to provide preparation for research, design, operation, management, testing, or maintenance of engineering projects. The particular place of industrial education, including the industrial technology option, will be explained in the subsequent description of the Industrial Education Department.

For the high school graduate, the minimum requirements for college entrance are listed in the earlier pages of this bulletin. On the other hand, for students who are still in high school and who are in a position to plan their high school program in preparation for engineering, the importance of mathematics and science cannot be overemphasized. The best high school background in mathematics would include two years of algebra, one year of plane geometry, one-half year of solid geometry, and one-half year of trigonometry. For new students entering a program of engineering in 1958 and thereafter, an additional year of algebra and trigonometry will be added to the present mathematics entrance requirements.

Also, a student should take as much natural science as possible in high school. Of the natural sciences, chemistry and physics are of particular importance in the preparation for the study of engineering.

CURRICULA

Four-Year Curricula

Each of the following curricula leads to the Bachelor of Science degree and requires a normal period of four years for completion:

Aeronautical Engineering
*Agricultural Engineering
Chemical Engineering
Civil Engineering
Electrical Engineering
Geological Engineering
Geology
Geophysics
Industrial Education
Industrial Engineering
Mechanical Engineering
Petroleum Engineering

*Administered jointly by Schools of Agriculture and Engineering.

Five-Year Curricula

The following five-year programs lead to the Bachelor of Architecture and Bachelor of Petroleum Engineering degrees respectively:

Architecture (Design Option)
Petroleum Engineering

The five-year curriculum in Architecture (Construction Option) leads to the degree of Bachelor of Science in Architectural Construction.

Five-Year Combined Degree Plans

Students who are interested in two areas of engineering or a business foundation to complement their engineering curriculum may pursue programs which lead to two Bachelor's degrees in five years. The following curricula are examples; students interested in other possible combinations should consult with the Dean of Engineering:

Chemical Engineering-General Business
Civil Engineering-General Business
Geology-Petroleum Engineering
*Industrial Engineering
Petroleum Engineering-General Business
Petroleum Engineering-Chemical Engineering
Petroleum Engineering-Geological Engineering
Petroleum Engineering-Mechanical Engineering

Students may also pursue a five-year program combining full professional training with a broad general education to qualify for two degrees, the Bachelor of Science degree in a professional field and the Bachelor of Arts degree in one of the liberal arts curricula such as English (See page 48, "Two Degrees"). Other combinations are available such as a five-year combined program in industrial technology and journalism, which prepares the student to become an industrial journalist.

ADVANCED STUDY

As the knowledge required for advanced engineering design in industry increases, more and more students are finding it desirable to go beyond the usual four-year course in college. Much of the design in industry today follows the research mode of procedure, the procedure predominantly used in graduate study. Consequently, there has been a growth in graduate study to satisfy the demands of industry for engineers with greater scientific knowledge and research ability. In the future, industry, colleges, and governmental agencies will carry on more and more research, and, therefore, there will continue to be a great demand for engineers with graduate training through the doctorate degree. It should be pointed out, however, that graduate study is available only to those with more than average ability. Prospective graduate students should write to the Director of Admissions for a Graduate School Catalogue.

AERONAUTICAL ENGINEERING

Aeronautical engineering is described as the technical activities associated with aircraft design. These include research, analysis and design in several technical specialties such as aerodynamics, dynamics of aircraft, structures, properties of materials, propulsion and operation analysis of weapons systems.

*A degree of Bachelor of Science in Industrial Engineering may be awarded on the basis of the student's completing the requirements for the degree of Bachelor of Science in Aeronautical, Chemical, Civil, Electrical, Mechanical or Petroleum Engineering and additional required courses.

Aeronautical engineering graduates are employed in air-frame manufacturing companies, government research laboratories, and equipment manufacturing companies in Texas and elsewhere. A considerable number enter the military services as engineering officers. Aeronautical engineering graduates are also well qualified for positions in other fields of engineering, since men trained in aerodynamics and the design of high strength, light weight structures are in demand in many industries.

The Aeronautical Engineering Department has excellent facilities in the new Engineering Building on the campus and at the College-owned Easterwood Airport. Facilities on the campus include a supersonic wind tunnel, two small low-speed wind tunnels, a structures laboratory, a materials and process laboratory, an instrument laboratory, and complete shop facilities. The Aircraft Research Center, the large wind tunnel, and the Guiberson Engine Laboratory are located at Easterwood Airport. The airport is one of the best in the Southwest and offers unequaled facilities for flight research.

The four-year undergraduate curriculum in aeronautical engineering leading to the degree of Bachelor of Science includes sound preparation in mathematics, physics, chemistry, English, and mechanics. The junior and senior years are devoted largely to the professional courses in aerodynamics, aircraft structures, aircraft power plants, and aircraft design. The opportunity to elect courses in a desired specialty is provided in the senior year.

AGRICULTURAL ENGINEERING

See page 82 for a discussion of this curriculum.

ARCHITECTURE

The program in architecture is designed primarily to prepare young men for professional careers in the design and construction of buildings.

The method of teaching is that of individual criticism, accompanied by careful direction in the use of the library and in materials of construction. The work of the first two years is designed to give the student fundamental training in the techniques of drafting and an appreciation and understanding of the elementary principles of design and construction. The work of the upper years is built around the larger problems of architecture which, in many instances, become individual student projects.

Two options are offered: the Design Option and the Construction Option. The program is the same during the first year. This makes it possible for the student to defer his decision until the beginning of his sophomore year, when he can more intelligently select his course of study for his upper years. Both options are five-year courses. The Design Option leads to the degree of Bachelor of Architecture; the Construction Option, to the degree of Bachelor of Science in Architectural Construction.

While the programs are designed primarily to prepare young men for professional careers in architecture and building construction, the training forms a good foundation for those who may wish to enter other fields. Graduates find their way into the profession as draftsmen, designers, estimators, superintendents of construction, and develop careers as architects, contractors, and city and regional planners.

The Division is a member of the Association of Collegiate Schools of Architecture, is on the approved list of schools accepted by the Texas Board of Architectural Examiners, and is accredited by the National Architectural Accrediting Board.

CHEMICAL ENGINEERING

Chemical engineering is that branch of engineering concerned with the development and application of manufacturing processes in which chemical or certain physical changes of materials are involved. These processes may

usually be resolved into a coordinated series of unit physical operations and unit chemical processes. The work of the chemical engineer is concerned primarily with the design, construction, and operation of equipment and plants in which series of these unit operations and processes are applied. Chemistry, physics, and mathematics are the underlying sciences of chemical engineering, and economics is its guide in practice.

Chemical engineering became a separate division of engineering with the growth of strictly chemical industries, and it is now recognized as one of the important divisions of engineering, dealing with combustion of fuels, heat treatment of metals and alloys, the preparation of water for potable and industrial use, the refining of petroleum, processing of vegetable oils, the development of electric furnace products, portland cement, lime gypsum, plaster, heavy chemicals, soaps, rubber, corn products, textiles, paper, artificial leather and silks, food products, and other products.

The work of the chemical engineer is the changing of raw materials into finished products with the greatest efficiency and economy. He substitutes a rigid control of processes for guess work and uncertainty and increases the productivity of labor by supplying more efficient processes where the standard and quality of the finished product are revised and the amount of seconds and rejections is reduced. The chemical engineer must also be able to modify a process in order to adapt it to commercial conditions and to select his material for construction with special reference to its use. His work is distinct from that of the chemist on the one hand and the mechanical engineer on the other, though he must have a thorough training in both chemistry and engineering.

The curriculum in chemical engineering is planned to prepare students for the design, construction, and operation of industries in which materials undergo chemical and physical change. The unit operations, such as fluid flow, heat flow, evaporation, drying, distillation, gas absorption, filtration, crushing and grinding, and size separation are basic studies that may be applied to any industry. General chemical processes are also included in the laboratory and classroom work. Research in both of these divisions is fostered by cooperative projects with the Texas Engineering Experiment Station and industrial organizations of the State.

As chemical engineering treats of the processes whereby materials undergo a chemical and physical change, it is apparent that a large number of diversified industries have use for the chemical engineer, not only in the operation and control of processes but in the design of special equipment. Many chemical engineers enter the research laboratory, investigating processes in the laboratory and supervising their operation in the plants, considering carefully the controlling interest of cost as a factor in all industrial operations.

CIVIL ENGINEERING

The curriculum in civil engineering has for its object the thorough grounding of young men in the underlying principles of the basic sciences and engineering. Training or practice in the art of applying these principles to problems encountered in practice is given in the drafting room, laboratories, and in the field so as to enable the graduate to give satisfactory service in an engineering organization immediately upon graduation.

During the first three years the subject matter of the courses is common to all phases of civil engineering, such as surveying, highway engineering, mechanics, strength of materials, hydraulics, and stress analysis. In the fourth year the student is given an opportunity to specialize moderately in structural engineering, highway engineering, hydraulic engineering, or municipal and sanitary engineering. In addition, courses in cost estimating and engineering economy are required of all the students to give them an understanding of the importance of these matters in the practice of civil engineer-

ing. Students who are interested in construction engineering should consider the possibility of obtaining a Bachelor of Science degree in Civil Engineering and a Bachelor of Business Administration degree. Copies of a degree plan to satisfy the requirements for both degrees may be obtained from the Civil Engineering Department.

The moderate specialization indicated above does not restrict the student to securing employment in a special field. The curriculum is so planned as to make it possible for him to undertake professional practice embracing the following: surveying; water supply; sewerage; the planning, design, and construction of buildings, bridges, earthen dams, reservoirs, canals, and the conventional types of foundations required for all of the structures; planning, design, construction, and maintenance of roads and highways; traffic engineering; planning and execution of sanitary measures for rural and urban communities; administration of city business as city manager; industrial, academic, and governmental research of civil engineering matters; and technical service of various kinds for industries leading to executive positions.

ELECTRICAL ENGINEERING

The curriculum in electrical engineering is designed to give the student thorough training in the principles of direct and alternating current phenomena and of electronics. It provides training in the subjects fundamental to the general practice of engineering, in the theory of electricity, and in the application of the theory to practical problems in engineering.

The work of the first three years includes courses in mathematics, chemistry, physics, drawing, and mechanics which are common to all branches of engineering. Electrical engineering subjects begin in the sophomore year and continue in increasing amount through the junior and senior years. Much emphasis is put on the fundamental principles of electricity, but the fundamentals are vitalized with illustrations of their application in engineering practice. Opportunity for specialization beyond work offered in the foundation courses is offered in the senior year with electives in radio and communication engineering, power machinery, industrial electronics, television, radar, and servo-mechanisms. These courses tend to impress more firmly on the student's mind the principles already covered and give the student specific information about one or more of the specialized branches of electrical engineering.

Electrical engineering offers broad opportunities for young men with proper training. Graduates in this course find employment in the following fields: construction, operation, and design of generating stations and electric power systems; installation and operation of electrical equipment in industrial plants; design, manufacture, and sale of electrical equipment; geophysical exploration in the petroleum industry; rural electrification and the application of electricity to agriculture; radio communications; television; telephone and telegraph systems; illumination; urban and trunk line transportation systems; development of electrical equipment and controls for aircraft and computers; teaching; and research.

Recently the application of electron tubes to the control of all sorts of processes in industry, as well as in communications and television, has resulted in what is known as the field of electronics. While this field is especially promising and new developments in it are constantly being made, it should be pointed out that it is not something distinct and apart from electrical engineering, but it is merely the newest of the many technics in which electrical engineers work. The course in electrical engineering prepares its graduates for work in electronics, including television, radar, computers, and other recent war developments.

Student branches of the American Institute of Electrical Engineers and of the Institute of Radio Engineers have been organized at the College. These

branches offer the student a means of keeping in touch with the latest developments in the field of engineering.

GEOLOGY

Training in geology is designed to prepare the student in the fundamentals of the earth sciences. These include the study of rocks, minerals, fossils, earth structures, the physical features of the earth's surface, and the economic application of this knowledge.

This curriculum is designed for the student who approaches geology as a science, with the inherent obligation of exploring, observing, analyzing, inquiring, classifying, describing, and finally interpreting the record and the content of the rocks. It is based upon the related sciences of chemistry, physics, mathematics, and biology. It prepares a man either for general geological investigations or for graduate study in geology in a normal period of four years.

GEOLOGICAL ENGINEERING

The curriculum in geological engineering provides training in the fundamental principles of engineering as well as specialized training in geology in a normal period of four years. Although this course is designed primarily for the student who expects to be employed as a petroleum geologist, the curriculum is such that the graduate is also qualified for work with railroads, public utilities, construction, ceramics, and other industries in which a knowledge of both geology and engineering is desirable.

GEOPHYSICS

This curriculum is designed to prepare students to investigate geologic features with physical measurements. The objective is to gain skill in geologic interpretations of data obtained with such measurements. It is concerned primarily with a fundamental understanding of geology, secondly with mathematics, and thirdly with physics and electrical engineering. The curriculum prepares a student either for general geological or geophysical investigations, or for graduate study in either of these subjects in a normal period of four years.

INDUSTRIAL EDUCATION

The industrial arts teacher education option in the industrial education curriculum aims to prepare young men to teach industrial arts subjects in junior or senior high schools or in technical schools and to sponsor guidance, safety, and personnel programs in public schools. (Industrial arts in these schools includes such areas as general shop, electrical work, metal work, woodwork, technical drawing, plastics, ceramics, leather, and other craft courses.)

The vocational industrial teacher education option in the industrial education curriculum is intended for teachers, supervisors, and directors for the vocational industrial schools and classes of Texas. Since the men completing this course are to qualify as teachers under the State Plan for Vocational Education, a candidate for a degree must satisfy the requirements for one of the classes of vocational teachers as specified in the State Plan.

In general the industrial technology option prepares young men for the following types of occupations:

Employees in industrial relations departments of industries, which includes such work as employee training, personnel, production, and accident prevention.

Students interested in this option also have the opportunity to prepare themselves for industrial technical sales (industrial distribution). The demand for graduates with sales potential is increasing annually and employment opportunities are plentiful at this time. Those pursuing this pattern should take such courses as are indicated on page 173.

INDUSTRIAL ENGINEERING

Industrial engineering is the science of production. Just as the other branches of engineering use the laws of the physical sciences in the design and operation of a product, so does industrial engineering apply these same laws to the design, selection, and operation of the plant in which this product is produced. A major distinction between industrial engineering and other branches is that the industrial engineer must consider not only the behavior of inanimate objects as they are governed by physical laws, but also must include in his plan the behavior of people as they operate together in organizations, whether these organizations be simple or complex.

Although usually the industrial engineer is concerned with the production of a manufactured article, the same principles of scientific analysis, planning, and control which are effective in this field have been found to be quite useful in any activity where a large number of people work together. Thus, industrial engineers find employment in wholesale trade, in transportation, even in banks and insurance companies. Because of the increasing technical complexity of today's manufacturing operations, there is a rapidly increasing demand for men with engineering background to enter the field of factory design and operation.

Four-Year Curriculum

The four-year curriculum leading to the Bachelor of Science degree in industrial engineering fills the above need by providing training in the basic engineering subjects of mathematics, physics, drawing, chemistry, and mechanics which are common to most engineering curricula. Beyond this, it gives students training in manufacturing processes, setting time standards, production control, quality control, tool engineering, cost analysis, and personnel administration. This combination well equips the graduate who plans to make his career that of production control and supervision.

Five-Year Curriculum

Since there is an insistent and growing demand for men versed in the fundamentals of other branches of engineering and also in the fundamentals of executive control, there are offered five-year curricula designed for students who wish training in industrial and in aeronautical, chemical, civil, electrical, mechanical, or petroleum engineering. Thus, in five years the student may complete the requirements for two Bachelor of Science degrees, one in his preferred specialty of engineering and the other in the field of industrial engineering. The completion of the requirements for these two degrees should admirably prepare the engineering graduate for rapid advancement.

Students desiring to work toward the two degrees should consult with the Registrar or the Head of the Industrial Engineering Department for the course requirements. The industrial engineering courses may be taken either concurrently with courses in any of the above branches, which will enable the students to get both degrees at the same time, or may be taken after the first degree is granted. Ordinarily two semesters of additional work is sufficient to complete the requirements for the second degree in industrial engineering.

MECHANICAL ENGINEERING

The breadth of the field of mechanical engineering is such that extensive specialization in undergraduate work is impossible and undesirable. In-

dustry needs mechanical engineers for such a variety of work that it is deemed wise to make the curriculum broad and fundamental.

Training in habits of accurate analysis and logical thinking, the prerequisites of a good engineer, is emphasized.

Fundamental theory courses are supplemented by practice work in pattern shop, foundry, machine shop, welding, and testing. Practice courses are designed to instruct in methods rather than to develop extensive skills.

Some specialization is possible in that during the senior year the student may elect courses in such fields as refrigeration, air conditioning, automotive engineering, and internal combustion engines.

The work of practicing mechanical engineers varies from general engineering to highly specialized fields. The work logically falls under **design, construction and erection, operation and maintenance, research,** and **administration.**

Design engineers may find their work to be that of original design of machines and associated equipment; design of operating assemblies of machines and equipment commercially available for desired manufacturing or process jobs; redesign of existing equipment to make possible changes, improvements, economics, safety, and better appearance.

Construction and erection engineers may be responsible for assembling and fabricating entire plants and putting them into operation. They must be able to use engineering drawings, plans, and specifications, and to do supplementary design work.

Operation and maintenance engineers are in charge of plant performance and upkeep. They must be capable of securing profitable operation and of the supervision of plant personnel.

Research engineers are called on for an endless variety of investigations. They must have inquiring minds, initiative, patience, thorough knowledge of the fields in which they work, and the ability to analyze and correlate the results obtained. For the research man, graduate study is usually desirable.

Many engineers who have the leadership ability, personality, tact, and initiative become **administrators and executives.**

Among the industries that employ a large number of mechanical engineers are: air conditioning, aircraft, automotive, chemical, power, petroleum, refrigeration, and general manufacturing.

Sales engineers are probably as much in demand as any other group.

PETROLEUM ENGINEERING

The curricula in petroleum engineering are intended to prepare students for the petroleum industry and particularly for those branches which have to do with drilling, production, and transportation of petroleum as well as with the natural gas industry.

Four courses in petroleum engineering are available to the students in this department: (1) A regular four-year curriculum in petroleum engineering, which leads to a degree of Bachelor of Science; (2) A five-year curriculum in petroleum engineering, which leads to a degree of Bachelor of Petroleum Engineering; (3) A five-year curriculum in petroleum engineering—geological engineering, which leads to a Bachelor of Science degree in both Petroleum Engineering and Geological Engineering; (4) A five-year curriculum in petroleum engineering — mechanical engineering, which leads to Bachelor of Science degrees in both Petroleum Engineering and Mechanical Engineering.

The four-year curriculum in petroleum engineering includes sufficient training in civil, mechanical, and electrical engineering to prepare the graduate for the applicaton of engineering principles to the petroleum industry. Courses in geology give an understanding of the geological structures and conditions favorable for petroleum deposits. To the basic subjects are added courses in petroleum engineering which illustrate the application of engineering principles to the type of problems met in the petroleum industry and which also give some understanding of the technique of the industry. Emphasis is placed on thorough grounding in the fundamentals rather than on application to particular problems.

The five-year curriculum in petroleum engineering is designed to provide a broader educational background. This curriculum contains all the courses included in the four-year curriculum and courses in psychology, accounting, English, economics, business, geography, and advanced mathematics.

PETROLEUM ENGINEERING—GEOLOGICAL ENGINEERING

The five-year petroleum engineering—geological engineering course includes all of the subjects given in the four-year petroleum engineering course and all of the subjects in the four-year geological engineering course. This course is intended to give a student interested in geology a background in engineering and the application of geology and engineering to the petroleum industry.

PETROLEUM ENGINEERING—MECHANICAL ENGINEERING

The five-year curriculum in petroleum engineering—mechanical engineering leads to Bachelor of Science degrees in both Petroleum Engineering and Mechanical Engineering. The scope of the work in the petroleum industry is so broad and so varied that it is desirable for the man whe expects to enter this field to have a very comprehensive training. This course is designed to give such breadth of training by including the essential courses in both the petroleum and mechanical curricula. The production, transportation, and refining of oil involves the generation and utilization of power, the design and operation of mechanical equipment, the principles of heat transfer, and the handling of men and finances. Thus, a five-year curriculum combining the two courses was deemed desirable.

Curricula in ARCHITECTURE AND ARCHITECTURAL CONSTRUCTION

FRESHMAN YEAR

First Semester		Credit	Second Semester		Credit
Architecture 101 Design I	(0-6)	2	**Architecture 102** Design I	(0-6)	2
Architecture 115 Architectural Graphics	(0-6)	2	**Architecture 116** Architectural Graphics	(0-6)	2
English 103 Composition and Rhetoric	(3-0)	3	**Basic 106** Survey of Man's Knowledge	(0-2)	1
History 105 History of the United States	(3-0)	3	**English 104** Composition and Rhetoric	(3-0)	3
Mathematics 102 College Algebra	(3-0)	3	**History 106** History of the United States	(3-0)	3
Mechanical Engineering 105 Carpentry and Mill Work	(1-6)	3	**Mathematics 116** Plane Trigonometry and Analytics	(4-0)	4
Military or Air Science	(0-3)	1	**Mechanical Engineering 101** Engineering Problems	(0-3)	1
Physical Education 101	(0-2)	R	**Military or Air Science**	(0-3)	1
		17	**Physical Education 102**	(0-2)	R
					17

DESIGN OPTION
SOPHOMORE YEAR

First Semester		Credit
Architecture 201 Design II	(0-12)	4
Architecture 205 Freehand Drawing	(0-6)	2
Architecture 227 Structural Principles	(3-0)	3
Architecture 253 Technology of Materials	(2-0)	2
English 210 Writing and Discussion	(2-0)	2
Military or Air Science	(0-3)	1
Physics 201 College Physics	(3-3)	4
Physical Education 201	(0-2)	R
		18

Second Semester		Credit
Architecture 202 Design II	(0-12)	4
Architecture 206 Freehand Drawing	(0-6)	2
Architecture 228 Elements of Mechanics	(3-0)	3
Architecture 254 Technology of Materials	(2-0)	2
Civil Engineering 206 Plane Surveying	(0-3)	1
Military or Air Science	(0-3)	1
Physics 202 College Physics	(3-3)	4
Physical Education 202	(0-2)	R
		17

JUNIOR YEAR

Architecture 301 Design III	(0-15)	5
Architecture 305 Freehand Drawing	(0-6)	2
Architecture 327 Basic Structures	(3-0)	3
Architecture 329 Art and Civilization	(2-0)	2
Government 306 American National Government	(3-0)	3
Elective		3
		18

Architecture 302 Design III	(0-15)	5
Architecture 306 Freehand Drawing	(0-6)	2
Architecture 328 Steel Structures	(3-0)	3
Architecture 330 Art and Civilization	(2-0)	2
Elective		6
		18

SENIOR YEAR

Architecture 401 Design IV	(0-15)	5
Architecture 427 Concrete Structures	(2-2)	3
Architecture 429 History of Architecture	(3-0)	3
Mechanical Engineering 335 Mechanical Equipment of Buildings	(2-0)	2
Elective		3
		16

Architecture 402 Design IV	(0-15)	5
Architecture 428 Roof Structures	(2-2)	3
Architecture 430 History of Architecture	(3-0)	3
English 403 Speaking for Professional Men	(1-2)	2
Mechanical Engineering 336 Mechanical Equipment of Buildings	(2-0)	2
Elective		3
		18

SUMMER WORK

Architecture 500; Summer Practice, twelve weeks, required.

FIFTH YEAR

Architecture 501 Design V	(0-15)	5
Architecture 527 Structural Systems	(2-3)	3
Architecture 556 City Planning	(2-3)	3
Electrical Engineering 436 Electrical Equipment for Buildings	(3-0)	3
Landscape Architecture 411 Landscape Design for the Architect and Engineer	(2-2)	3
		17

Architecture 454 Specifications and Working Drawings	(1-6)	3
Architecture 502 Design V	(0-15)	5
Architecture 528 Structural Systems	(2-3)	3
Architecture 550 Seminar	(1-0)	1
Architecture 554 Professional Practice	(2-0)	2
English 371 Great Books	(3-0)	3
		17

CONSTRUCTION OPTION

SOPHOMORE YEAR

First Semester		Credit
Architecture 201 Design II	(0-12)	4
Architecture 205 Freehand Drawing	(0-6)	2
English 210 Writing and Discussion	(2-0)	2
Mathematics 223 Differential and Integral Calculus	(4-0)	4
Military or Air Science	(0-3)	1
Physics 201 College Physics	(3-3)	4
Physical Education 201	(0-2)	R
		17

Second Semester		Credit
Architecture 202 Design II	(0-12)	5
Architecture 206 Freehand Drawing	(0-6)	2
Architecture 228 Elements of Mechanics	(3-0)	3
Civil Engineering 206 Plane Surveying	(0-3)	1
Government 306 American National Government	(3-0)	3
Military or Air Science	(0-3)	1
Physics 202 College Physics	(3-3)	4
Physical Education 202	(0-2)	R
		18

JUNIOR YEAR

Architecture 253 Technology of Materials	(2-0)	2
Architecture 327 Basic Structures	(3-0)	3
Architecture 329 Art and Civilization	(2-0)	2
Business Administration 305 Business Law	(3-0)	3
Economics 205 Principles of Economics	(3-0)	3
Elective		5
		18

Architecture 254 Technology of Materials	(2-0)	2
Architecture 328 Steel Structures	(3-0)	3
Architecture 330 Art and Civilization	(2-0)	2
Business Administration 409 Survey of Accounting Principles	(3-0)	3
Civil Engineering 315 Strength of Materials Laboratory	(0-2)	1
Geology 422 Natural Structural Materials	(2-3)	3
Elective		3
		17

SENIOR YEAR

Architecture 427 Concrete Structures	(2-2)	3
Architecture 429 History of Architecture	(3-0)	3
Architecture 454 Specifications and Working Drawings	(1-6)	3
Business Administration 428 Real Estate Titles and Conveyances	(3-0)	3
Civil Engineering 473 Cost Estimating	(3-0)	3
Elective		3
		18

Architecture 428 Roof Structures	(2-2)	3
Architecture 430 History of Architecture	(3-0)	3
Business Administration 433 Business Management	(3-0)	3
Civil Engineering 478 Construction Plant and Methods	(3-0)	3
English 371 Great Books	(3-0)	3
Elective		3
		18

SUMMER WORK

Architecture 500; Summer Practice, twelve weeks, required.

FIFTH YEAR

Architecture 527 Structural Systems	(2-3)	3
Architecture 554 Professional Practice	(2-0)	2
Civil Engineering 408 Municipal Administration	(3-0)	3
Industrial Engineering 412 Labor and Industry	(3-0)	3
Mechanical Engineering 335 Mechanical Equipment of Buildings	(2-0)	2
Elective		4
		17

Architecture 528 Structural Systems	(2-3)	3
Architecture 550 Seminar	(1-0)	1
Civil Engineering 465 Soil Mechanics and Foundations	(2-2)	3
Electrical Engineering 436 Electrical Equipment for Buildings	(3-0)	3
English 403 Speaking for Professional Men	(1-2)	2
Mechanical Engineering 336 Mechanical Equipment of Buildings	(2-0)	2
Elective		4
		18

Curricula in ENGINEERING

(With the exception of architecture and industrial education, the curricula for all engineering programs are identical in the freshman year.)

FRESHMAN YEAR

First Semester		Credit	Second Semester		Credit
Chemistry 101 General Chemistry	(3-3)	4	**Chemistry 102** General Chemistry	(3-3)	4
Engineering Drawing 105 Engineering Drawing	(0-6)	2	**Engineering Drawing 106** Descriptive Geometry	(0-6)	2
English 103 Composition and Rhetoric	(3-0)	3	**English 104** Composition and Rhetoric	(3-0)	3
History 105 History of the United States	(3-0)	3	**History 106** History of the United States	(3-0)	3
Mathematics 102 Algebra	(3-0)	3	**Mathematics 104** Analytics	(3-0)	3
Mathematics 103 Plane Trigonometry	(3-0)	3	**Mechanical Engineering 108** Engineering Problems	(2-3)	3
Military or Air Science	(0-3)	1	**Military or Air Science**	(0-3)	1
Physical Education 101	(0-2)	R	**Physical Education 102**	(0-2)	R
		19			19

Curriculum in AERONAUTICAL ENGINEERING

FRESHMAN YEAR
(See above)

SOPHOMORE YEAR

Economics 205 Principles of Economics	(3-0)	3	**Aeronautical Engineering 201** Elementary Aerodynamics	(3-3)	4
English 203 Composition and Literature	(2-0)	2	**English 207** Report Writing and Correspondence	(2-0)	2
Government 306 American National Government	(3-0)	3	**Mathematics 210** Calculus	(3-0)	3
Mathematics 209 Calculus	(3-0)	3	**Mechanical Engineering 212** Engineering Mechanics	(3-0)	3
Mechanical Engineering 201 Welding and Foundry	(0-3)	1	**Mechanical Engineering 309** Machine Shop	(0-3)	1
Military or Air Science	(0-3)	1	**Military or Air Science**	(0-3)	1
Physics 203 General Physics	(4-3)	5	**Physics 204** General Physics	(4-3)	5
Physical Education 201	(0-2)	R	**Physical Education 202**	(0-2)	R
		18			19

JUNIOR YEAR

Aeronautical Engineering 301 Theoretical Aerodynamics	(3-0)	3	**Aeronautical Engineering 302** Experimental Aerodynamics	(1-3)	2
Aeronautical Engineering 304 Elementary Aircraft Structures	(3-0)	3	**Aeronautical Engineering 303** High Speed Aerodynamics	(3-0)	3
Civil Engineering 305 Mechanics of Materials	(3-0)	3	**Aeronautical Engineering 306** Strength of Aircraft Materials	(2-3)	3
Mathematics 307 Calculus	(3-0)	3	**Mechanical Engineering 323** Thermodynamics	(4-0)	4
Mechanical Engineering 313 Engineering Mechanics	(3-0)	3	**Mechanical Engineering 338** Kinematics and Machine Design	(2-3)	3
Elective		3	**Elective**		3
		18			18

SENIOR YEAR

Aeronautical Engineering 401 Aircraft Design	(2-6)	4	**Aeronautical Engineering 402** Aircraft Design	(2-6)	4
Aeronautical Engineering 403 Aircraft Materials and Processes	(1-3)	2	**Aeronautical Engineering 406** Aircraft Power Plant Operation	(2-3)	3
Aeronautical Engineering 405 Aircraft Structures	(3-0)	3	**Aeronautical Engineering 408** Seminar	(1-0)	1
Electrical Engineering 307 Electrical Circuits	(3-3)	4	**English 401** Public Speaking	(0-2)	1
Mechanical Engineering 410 Internal Combustion Engines	(3-0)	3	**Technical Elective**		6
Elective		3	**Elective**		3
		19			18

Technical Electives for AERONAUTICAL ENGINEERING

Group A		
Aeronautical Engineering 410 Airplane Detail Design	(2-3)	3
Aeronautical Engineering 417 Aircraft Propulsion Systems	(3-0)	3
Aeronautical Engineering 418 Advanced Aerodynamics	(4-0)	4
Aeronautical Engineering 421 Dynamics of Airplanes	(3-0)	3

Group B		
Chemical Engineering 447 Nuclear Engineering	(3-0)	3
Electrical Engineering 501 Theory and Application of Electron Tubes	(3-3)	4
Mathematics 308 Differential Equations	(3-0)	3
Mathematics 405 Vector Analysis	(3-0)	3
Mechanical Engineering 440 Physical Metallurgy	(2-3)	3

NOTE: At least one of the technical electives in the senior year must be selected from Group A.

Curriculum in AGRICULTURAL ENGINEERING

(See page 102)

Curriculum in CHEMICAL ENGINEERING

FRESHMAN YEAR

(See page 162)

SOPHOMORE YEAR

First Semester		Credit
Chemistry 205 Qualitative Analysis	(2-6)	4
English 203 Composition and Literature	(2-0)	2
Government 306 American National Government	(3-0)	3
Mathematics 209 Calculus	(3-0)	3
Military or Air Science	(0-3)	1
Physics 203 General Physics	(4-3)	5
Physical Education 201	(0-2)	R
		18

Second Semester		Credit
Chemical Engineering 204 Elementary Chemical Engineering	(3-0)	3
Chemistry 216 Quantitative Analysis	(2-6)	4
English 210 Writing and Discussion	(2-0)	2
Mathematics 210 Calculus	(3-0)	3
Military or Air Science	(0-3)	1
Physics 204 General Physics	(4-3)	5
Physical Education 202	(0-2)	R
		18

JUNIOR YEAR

Chemical Engineering 304 Unit Operations	(3-0)	3
Chemistry 301 Organic Chemistry	(3-3)	4
Chemistry 323 Physical Chemistry	(3-3)	4
English 401 Public Speaking	(0-2)	1
Mechanical Engineering 212 Engineering Mechanics	(3-0)	3
***Elective**		3
		18

Chemical Engineering 314 Unit Operations Laboratory	(0-3)	1
Chemical Engineering 423 Unit Operations	(3-0)	3
Chemistry 302 Organic Chemistry	(3-3)	4
Chemistry 324 Physical Chemistry	(3-3)	4
Mechanical Engineering 327 Thermodynamics	(3-0)	3
****Elective**		3
		18

*Students not electing advanced ROTC will register for Economics 205.
**Students not electing advanced ROTC will register for Mathematics 307.

SENIOR YEAR

First Semester		Credit
Chemical Engineering 409 Oil and Gas Technology	(3-0)	3
Chemical Engineering 429 Oil and Gas Technology Laboratory	(0-3)	1
Chemical Engineering 433 Unit Operations Laboratory	(0-3)	1
Chemical Engineering 438 Seminar	(1-0)	1
Chemical Engineering 441 Chemical Engineering Unit Processes	(3-0)	3
Chemical Engineering 454 Chemical Engineering Thermodynamics	(3-0)	3
Chemical Engineering 461 Process Control and Instrumentation	(2-0)	2
Civil Engineering 305 Mechanics of Materials	(3-0)	3
Civil Engineering 315 Strength of Materials Laboratory	(0-2)	1
Elective		3
		21

Second Semester		Credit
Chemical Engineering 426 Plant Design	(2-6)	4
Chemical Engineering 428 Industrial Chemical Processes	(3-0)	3
Chemical Engineering 464 Chemical Engineering Kinetics	(3-0)	3
Electrical Engineering 305 Electrical Circuits and Machines	(3-3)	4
Mechanical Engineering 403 Engineering Laboratory	(1-3)	2
Elective		3
		19

Curriculum in CIVIL ENGINEERING

FRESHMAN YEAR

(See page 162)

SOPHOMORE YEAR

Civil Engineering 201 Plane Surveying	(3-3)	4
English 203 Composition and Literature	(2-0)	2
Government 306 American National Government	(3-0)	3
Mathematics 209 Calculus	(3-0)	3
Military or Air Science	(0-3)	1
Physics 203 General Physics	(4-3)	5
Physical Education 201	(0-2)	R
		18

Civil Engineering 202 Advanced Surveying	(2-3)	3
Economics 205 Principles of Economics	(3-0)	3
Mathematics 210 Calculus	(3-0)	3
Mechanical Engineering 212 Engineering Mechanics	(3-0)	3
Military or Air Science	(0-3)	1
Physics 204 General Physics	(4-3)	5
Physical Education 202	(0-2)	R
		18

SUMMER WORK

Civil Engineering 300s, Summer Surveying Practice, six weeks, credit 5.

JUNIOR YEAR

Civil Engineering 305 Mechanics of Materials	(3-0)	3
Civil Engineering 311 Hydraulics	(3-0)	3
Civil Engineering 315 Strength of Materials Laboratory	(0-2)	1
Civil Engineering 336 Hydraulics Laboratory	(0-2)	1
Civil Engineering 345 Analysis of Structures	(3-3)	4
Geology 320 Geology for Civil Engineers	(2-3)	3
Elective		3
		18

Civil Engineering 338 Design of Drainage Structures	(2-0)	2
Civil Engineering 344 Plain and Reinforced Concrete	(2-3)	3
Civil Engineering 346 Design of Members and Connections	(2-3)	3
Civil Engineering 401 Water and Sewage Treatment	(2-2)	3
Civil Engineering 465 Soil Mechanics and Foundations	(2-2)	3
English 210 Writing and Discussion	(2-0)	2
Elective		3
		19

SENIOR YEAR

First Semester		Credit
Civil Engineering 402 Water Supply and Sewerage Practice	(2-2)	3
Civil Engineering 407 Highway Engineering	(3-0)	3
Civil Engineering 473 Cost Estimating	(3-0)	3
Civil Engineering 483 Analysis and Design of Structures	(2-3)	3
Technical Elective		3
Elective		3
		18

Second Semester		Credit
Civil Engineering 443 Materials of Construction	(1-3)	2
Civil Engineering 448 Engineering Economy	(2-0)	2
Civil Engineering 474 Contracts and Specifications	(2-0)	2
Civil Engineering 476 Seminar	(1-0)	1
Electrical Engineering 305 Electrical Circuits and Machines	(3-3)	4
English 401 Public Speaking	(0-2)	1
Technical Elective		3
Elective		3
		18

TECHNICAL ELECTIVES

(Offered in Fall Semester only)

Civil Engineering 406 Sanitation and Public Health	(3-0)	3
Civil Engineering 408 Municipal Administration	(3-0)	3
Civil Engineering 409 Sanitary Laboratory	(2-3)	3
Civil Engineering 457 Traffic Engineering	(3-0)	3
Civil Engineering 463 Hydrology	(3-0)	3
Civil Engineering 468 Statically Indeterminate Structures	(2-3)	3
Civil Engineering 482 Aerial Photogrammetry	(2-3)	3
Geology 441 Advanced Engineering Geology	(3-3)	4

(Offered in Spring Semester only)

Civil Engineering 403 Sanitary Design	(2-3)	3
Civil Engineering 417 Bituminous Materials	(2-3)	3
Civil Engineering 458 Hydraulic Engineering	(3-0)	3
Civil Engineering 478 Construction Plant and Methods	(3-0)	3
Civil Engineering 484 Design of Bridges and Buildings	(2-3)	3

NOTE: By proper choice of technical electives, civil engineering students may specialize to some extent in highway, hydraulic, structural, construction, or sanitary engineering.

Curriculum in ELECTRICAL ENGINEERING

FRESHMAN YEAR

(See page 162)

SOPHOMORE YEAR

Civil Engineering 206 Plane Surveying	(0-3)	1
Electrical Engineering 201 Electricity and Magnetism	(3-4)	4
English 212 Shakespeare	(3-0)	3
Government 306 American National Government	(3-0)	3
Mathematics 209 Calculus	(3-0)	3
Military or Air Science	(0-3)	1
Physics 207 General Physics	(3-3)	4
Physical Education 201	(0-2)	R
		19

Economics 205 Principles of Economics	(3-0)	3
Electrical Engineering 208 Direct Current Machinery	(3-3)	4
Mathematics 210 Calculus	(3-0)	3
Mechanical Engineering 212 Engineering Mechanics	(3-0)	3
Military or Air Science	(0-3)	1
Physics 208 General Physics	(3-3)	4
Physical Education 202	(0-2)	R
		18

JUNIOR YEAR

First Semester		Credit
Civil Engineering 305 Mechanics of Materials	(3-0)	3
Electrical Engineering 315 Alternating Currents	(3-3)	4
Mathematics 307 Calculus	(3-0)	3
Mechanical Engineering 313 Engineering Mechanics	(3-0)	3
Mechanical Engineering 323 Thermodynamics	(4-0)	4
Elective		3
		20

Second Semester		Credit
Electrical Engineering 316 Electrical Circuit Theory	(3-0)	3
Electrical Engineering 318 Electrical Measurements	(1-3)	2
Electrical Engineering 320 Electronics	(3-3)	4
Electrical Engineering 322 Electric and Magnetic Fields	(2-0)	2
English 371 Great Books	(3-0)	3
Mathematics 308 Differential Equations	(3-0)	3
Elective		3
		20

SENIOR YEAR

Electrical Engineering 401 Alternating Current Machinery	(3-0)	3
Electrical Engineering 403 Alternating Current Laboratory	(0-6)	2
Electrical Engineering 415 Transmission Networks	(2-2)	3
Electrical Engineering 419 Radio Communication	(3-3)	4
Electrical Engineering 449 Seminar	(0-2)	1
English 401 Public Speaking	(0-2)	1
Technical Elective		3
Elective		3
		20

Business Administration 305 Business Law	(3-0)	3
Electrical Engineering 402 Alternating Current Machinery	(3-0)	3
Electrical Engineering 404 Alternating Current Laboratory	(0-6)	2
Electrical Engineering 432 Public Utility Problems	(3-0)	3
Electrical Engineering 450 Seminar	(0-2)	1
Mechanical Engineering 403 Engineering Laboratory	(1-3)	2
Technical Elective		3
Elective		3
		20

TECHNICAL ELECTIVES

Electrical Engineering 406 Electric Power Distribution and Transmission	(2-2)	3
Electrical Engineering 420 Servo-Mechanisms and Control Devices	(3-0)	3
Electrical Engineering 428 Communication Circuits	(2-3)	3
Electrical Engineering 441 Symmetrical Components of Polyphase Circuits	(3-0)	3
Electrical Engineering 446 Television	(2-3)	3
Electrical Engineering 451 Radiation and Propagation	(3-0)	3
Electrical Engineering 452 Ultra High Frequency Techniques	(2-3)	3
Electrical Engineering 457 Principles of Digital Computers	(3-2)	4
Geophysics 435 Survey of Geophysical Exploration	(3-3)	4
Mechanical Engineering 344 Fluid Mechanics	(3-0)	3
Mechanical Engineering 404 Engineering Laboratory	(1-3)	2
Mechanical Engineering 440 Physical Metallurgy	(2-3)	3
Physics 405 Physical Mechanics	(3-0)	3

Curriculum in GEOLOGY

FRESHMAN YEAR

(See page 162)

SOPHOMORE YEAR

English 203 Composition and Literature	(2-0)	2
Geology 201 General Geology	(3-0)	3
Geology 203 Crystallography and Mineralogy	(2-6)	4
Geology 209 Introduction to Field Work	(0-3)	1
Mathematics 209 Calculus	(3-0)	3
Military or Air Science	(0-3)	1
Physics 203 General Physics	(4-3)	5
Physical Education 201	(0-2)	R
		19

Chemistry 207 Elementary Quantitative Analysis	(2-3)	3
Civil Engineering 208 Topographic Surveying	(1-3)	2
Geology 204 Mineralogy and Rock Study	(1-3)	2
Geology 210 Historical Geology	(3-3)	4
Mathematics 210 Calculus	(3-0)	3
Military or Air Science	(0-3)	1
Physics 204 General Physics	(4-3)	5
Physical Education 202	(0-2)	R
		20

SUMMER CAMP
(Optional*)
Geology 299, Field Geology, credit 2.

JUNIOR YEAR

First Semester		Credit
Chemistry 344 Physical Chemistry	(3-0)	3
English 210 Writing and Discussion	(2-0)	2
Geology 303 Petrography and Petrology	(2-3)	3
Geology 305 Invertebrate Paleontology	(3-3)	4
Geology 315 Principles of Sedimentation	(2-3)	3
Elective		3
		18

Second Semester		Credit
Geology 306 Stratigraphy	(3-3)	4
Geology 312 Structural Geology	(2-3)	3
Geology (two of the following)		6
Geology 304 Sedimentary Petrography	(2-3) 3	
Geology 423 Micropaleontology	(1-6) 3	
Geology 443 Paleontology	(2-3) 3	
Government 306 American National Government	(3-0)	3
Elective		3
		19

SUMMER CAMP
Geology 300, Field Geology, credit 6.

SENIOR YEAR

English 319 Report Writing	(1-0)	1
Geology 449 Seminar	(1-0)	1
Geology (three of the following)		9
Geology 404 Geology of Petroleum	(2-3) 3	
Geology 406 Economic Geology	(3-0) 3	
Geology 431 Geomorphology	(2-3) 3	
Geology 437 Cenozoic Micropaleontology	(1-6) 3	
Geophysics 435 Survey of Geophysical Exploration	(3-3)	4
Elective		3
		18

Economics 205 Principles of Economics	(3-0)	3
English 401 Public Speaking	(0-2)	1
Geology 433 Field Geology	(0-6)	2
Geology 450 Seminar	(1-0)	1
Geology-Geophysics (any two)		6
Geology 304 Sedimentary Petrography	(2-3) 3	
Geology 409 Geology of Non-Metallics Other than Petroleum	(3-0) 3	
Geology 423 Micropaleontology	(1-6) 3	
Geology 425 Subsurface Geology	(2-3) 3	
Geophysics 436 Seismic Exploration	(2-3) 3	
Geophysics 446 Physics of the Earth	(3-0) 3	
Elective		6
		19

Curriculum in
GEOLOGICAL ENGINEERING

FRESHMAN YEAR
(See page 162)

SOPHOMORE YEAR
(Same as for curriculum in Geology, page 166)

SUMMER CAMP
(Optional*)
Geology 299, Field Geology, credit 2.

*May be used as elective.

JUNIOR YEAR

First Semester		Credit
English 319 Report Writing	(1-0)	1
Geology 305 Invertebrate Paleontology	(3-3)	4
Geology 315 Principles of Sedimentation	(2-3)	3
Mechanical Engineering 220 Engineering Mechanics	(4-0)	4
Petroleum Engineering 305 Petroleum Development	(3-0)	3
Petroleum Engineering 307 Petroleum Development Laboratory	(0-3)	1
Elective		3
		19

Second Semester		Credit
Chemistry 344 Physical Chemistry	(3-0)	3
English 401 Public Speaking	(0-2)	1
Geology 306 Stratigraphy	(3-3)	4
Geology 312 Structural Geology	(2-3)	3
Petroleum Engineering 306 Petroleum Production Methods	(3-0)	3
Petroleum Engineering 308 Petroleum Production Laboratory	(0-3)	1
Elective		3
		18

SUMMER CAMP

Geology 300, Field Geology, credit 6.

SENIOR YEAR

Economics 205 Principles of Economics	(3-0)	3
Electrical Engineering 305 Electrical Circuits and Machines	(3-3)	4
Geology 404 Geology of Petroleum	(2-3)	3
Geology 449 Seminar	(1-0)	1
Mechanical Engineering 323 Thermodynamics	(4-0)	4
Elective		3
		18

Civil Engineering 305 Mechanics of Materials	(3-0)	3
Geology 425 Subsurface Geology	(2-3)	3
Geology 433 Field Geology	(0-6)	2
Geology 450 Seminar	(1-0)	1
Government 306 American National Government	(3-0)	3
Mechanical Engineering 344 Fluid Mechanics	(3-0)	3
Elective		3
		18

Curriculum in GEOPHYSICS

FRESHMAN YEAR

(See page 162)

SOPHOMORE YEAR

English 203 Composition and Literature	(2-0)	2
Geology 201 General Geology	(3-0)	3
Geology 203 Crystallography and Mineralogy	(2-6)	4
Geology 209 Introduction to Field Work	(0-3)	1
Mathematics 209 Calculus	(3-0)	3
Military or Air Science	(0-3)	1
Physics 203 General Physics	(4-3)	5
Physical Education 201	(0-2)	R
		19

Chemistry 207 Elementary Quantitative Analysis	(2-3)	3
Geology 204 Mineralogy and Rock Study	(1-3)	2
Geology 210 Historical Geology	(3-3)	4
Mathematics 210 Calculus	(3-0)	3
Military or Air Science	(0-3)	1
Physics 204 General Physics	(4-3)	5
Physical Education 202	(0-2)	R
		18

SUMMER CAMP
(Optional*)
Geology 299, Field Geology, credit 2.

JUNIOR YEAR

First Semester		Credit
Electrical Engineering 307 Electrical Circuits	(3-3)	4
English 210 Writing and Discussion	(2-0)	2
Geology 305 Invertebrate Paleontology	(3-3)	4
Geology 315 Principles of Sedimentation	(2-3)	3
Mathematics 307 Calculus	(3-0)	3
Elective		3
		19

Second Semester		Credit
Civil Engineering 208 Topographic Surveying	(1-3)	2
English 301 Writing for Professional Men	(3-0)	3
Geology 306 Stratigraphy*	(3-3)	4
Geology 312 Structural Geology	(2-3)	3
Mathematics 308 Differential Equations	(3-0)	3
Elective		3
		18

SUMMER CAMP
Geology 300, Field Geology, credit 6.

SENIOR YEAR

Chemistry 344 Physical Chemistry	(3-0)	
Or		
Physics 311 Atomic and Nuclear Physics	(3-0)	3
Electrical Engineering 501 Theory and Application of Electron Tubes	(3-3)	4
Geology 449 Seminar	(1-0)	1
Geophysics 435 Survey of Geophysical Exploration	(3-3)	4
Government 306 American National Government	(3-0)	3
Elective		3
		18

Economics 205 Principles of Economics	(3-0)	3
English 401 Public Speaking	(0-2)	1
Geology 450 Seminar	(1-0)	1
Geophysics 436 Seismic Exploration	(2-3)	3
Geophysics 446 Physics of the Earth	(3-0)	3
Physics 302 Mechanical Properties of Matter	(2-3)	3
Elective		3
		17

Curriculum in
INDUSTRIAL EDUCATION
Industrial Arts Teacher Education Option

FRESHMAN YEAR

Engineering Drawing 105 Engineering Drawing	(0-6)	2
English 103 Composition and Rhetoric	(3-0)	3
History 105 History of the United States	(3-0)	3
Industrial Education 105 Wood Craft	(1-5)	3
Industrial Education 107 Industrial Materials and Manufacturing Processes	(2-3)	3
Mathematics 101 Algebra	(3-0)	3
Mechanical Engineering 201 Welding and Foundry	(0-3)	1
Military or Air Science	(0-3)	1
Physical Education 101	(0-2)	R
		19

Chemistry 106 General Chemistry	(3-3)	4
Engineering Drawing 106 Descriptive Geometry	(0-6)	2
Engineering Drawing 128 Methods of Industrial Reproduction	(0-2)	1
English 104 Composition and Rhetoric	(3-0)	3
History 106 History of the United States	(3-0)	3
Mathematics 103 Plane Trigonometry	(3-0)	3
Mechanical Engineering 202 Welding and Foundry	(0-3)	1
Military or Air Science	(0-3)	1
Physical Education 102	(0-2)	R
		18

*May be used as an elective.

SOPHOMORE YEAR

First Semester		Credit
Engineering Drawing 127	(1-3)	2
Industrial Freehand Sketching		
Engineering Drawing 221	(1-3)	2
Building Construction Drawing		
English 203	(2-0)	2
Composition and Literature		
Industrial Education 205	(1-5)	3
Ornamental Iron		
Mechanical Engineering 101	(0-3)	1
Engineering Problems		
Mechanical Engineering 309	(0-3)	1
Machine Shop		
Military or Air Science	(0-3)	1
Physics 201	(3-3)	4
College Physics		
Elective		2
Physical Education 201	(0-2)	R
		18

Second Semester		Credit
Education 121	(3-0)	3
An Introduction to Education		
Industrial Education 106	(1-5)	3
Sheet Metal		
Industrial Education 204	(3-0)	3
Development and Practice in Industrial Education		
Mechanical Engineering 106	(1-6)	3
Cabinet Making		
Mechanical Engineering 310	(0-3)	1
Machine Shop		
Military or Air Science	(0-3)	1
Physics 202	(3-3)	4
College Physics		
Physical Education 202	(0-2)	R
		18

JUNIOR YEAR

Economics 205	(3-0)	3
Principles of Economics		
English 210	(2-0)	2
Writing and Discussion		
Industrial Education 323	(1-3)	2
Methods of Teaching Mechanical Drawing		
Industrial Education 327	(1-5)	3
Industrial Arts Handcraft		
Industrial Education 334	(1-3)	2
Upholstery		
Psychology 301	(3-0)	3
Educational Psychology		
Elective		4
		19

English 301	(3-0)	3
Writing for Professional Men		
Industrial Education 304	(2-3)	3
Applied Industrial Electricity		
Industrial Education 310	(2-0)	2
Course Making		
Industrial Education 332	(1-3)	2
Plastics and Ceramics		
Industrial Education 336	(1-3)	2
Design in the Arts and Crafts		
Mechanical Engineering 329	(1-6)	3
Advanced Cabinet Making		
Elective		3
		18

SENIOR YEAR

English 403	(1-2)	2
Writing for Professional Men		
Industrial Education 301	(3-0)	3
Methods of Teaching and Class Management		
Industrial Education 326	(1-5)	3
General Metalwork		
Industrial Education 404	(1-2)	2
Visual Aids for Industrial Subjects		
Industrial Education 406	(2-0)	2
Vocational Guidance		
Industrial Education 447	(2-3)	3
Electricity and Electronics		
Elective		3
		18

***Government 305**	(3-0)	3
Government of the United States and Texas		
Industrial Education 419	(1-3)	2
Laboratory of Industries Methods		
Industrial Education 442	(2-12)	6
Supervised Teaching in Industrial Arts		
Industrial Education 449	(1-0)	1
Seminar in Industrial Education		
Elective		5
		17

Curriculum in INDUSTRIAL EDUCATION

Vocational Industrial Teacher Education Option

(Prerequisite: At least one full year of employed experience at some skilled trade or industrial technical occupation.)

A student who desires to graduate under this plan must submit a written request accompanied by a statement of his employed practical experience. Upon the approval of the request by the Head of the Department and the Dean

*Students who do not have credit for Basic ROTC must take Government 306 and 307 in place of Government 305.

of Engineering, the student will be permitted to plan a program within the limit of the courses listed below as approved by the Head of the Department.

Approved industrial experience will be evaluated in terms of college credits and, if acceptable to the Head of the Department and the Dean of the School of Engineering, may be used in the place of shop work on the basis of four credit hours for each year of experience up to a maximum of twenty credits. Approved teaching experience may be credited as practice teaching on the basis of two credit hours per year up to a maximum of six credits.

REQUIRED COURSES

GENERAL EDUCATION			Minimum Credits
Economics			6
Economics 205 Principles of Economics	(3-0)	3	
Economics (elective)		3	
English			10
English 103 Composition and Rhetoric	(3-0)	3	
English 104 Composition and Rhetoric	(3-0)	3	
English 203 Composition and Literature	(2-0)	2	
English 210 Writing and Discussion	(2-0)	2	
Government			3
*Government 305 Government of the United States and Texas	(3-0)	3	
History			6
History 105 History of the United States	(3-0)	3	
History 106 History of the United States	(3-0)	3	
Mathematics			6
Mathematics 101 Algebra	(3-0)	3	
Mathematics 103 Plane Trigonometry	(3-0)	3	
Public Speaking			1
English 401 Public Speaking	(0-2)	1	
Rural Sociology			3
Sociology (elective) (Rural Sociology 315 not acceptable)		3	
TECHNICAL			
Engineering Drawing			4
Engineering Drawing 105 Engineering Drawing	(0-6)	2	
Engineering Drawing 106 Descriptive Geometry	(0-6)	2	
Engineering Problems			1
Mechanical Engineering 101 Engineering Problems	(0-3)	1	
Shop Work Includes credit for industrial work experience			24
SCIENCE			
Chemistry			4
Chemistry 106 General Chemistry	(3-3)	4	
Industrial Supervision or Management			3
Industrial Education 429 Foremanship and Supervision	(3-0)	3	
Or			
Industrial Engineering 401 Survey of Industrial Engineering	(3-0)	3	

*Students who do not have credit for Basic ROTC must take Government 306 and 307 in place of Government 305.

Modern Industries			**3**
Industrial Education 308	(3-0)	3	
A Study of Modern Industries			
Physics			**8**
Physics 201	(3-3)	4	
College Physics			
Physics 202	(3-3)	4	
College Physics			

MILITARY TRAINING

Military or Air Science	**4**

PROFESSIONAL EDUCATION

The courses listed below are the basic ones required by the Vocational Division of the Texas Education Agency for a vocational certificate.

General Requirements			**8**
Industrial Education 204	(2-0)	2	
Development and Practice in Industrial Education			
Industrial Education 301	(2-0)	2	
Methods of Teaching and Class Management			
Industrial Education 310	(2-0)	2	
Course Making			
Industrial Education 424	(1-2)	2	
Organization of Instructional Material			
Additional courses and related fields are listed below depending upon the certificate desired.			
For Vocational Industrial Shop Teachers		6	
Visual Aids for Industrial Subjects			
Methods of Introducing Industrial Organization and Management into Industrial Schools			
Or			**6**
For Part-Time Cooperative Training Coordinators		6	
Follow-up, Visitation, and Coordination in Part-Time Schools			
Related Subjects in Part-Time Cooperative Programs			
Supervised Teaching			**6**
Other general education courses suited to the needs of the student			**8**

ELECTIVE

To be approved by the Head of the Department	**31**
TOTAL CREDITS	**145**

Curriculum in
INDUSTRIAL EDUCATION
Industrial Technology and Industrial Distribution Option

FRESHMAN YEAR

First Semester		Credit
Engineering Drawing 105	(0-6)	**2**
Engineering Drawing		
English 103	(3-0)	**3**
Composition and Rhetoric		
History 105	(3-0)	**3**
History of the United States		
Industrial Education 105	(1-5)	**3**
Wood Craft		
Industrial Education 107	(2-3)	**3**
Industrial Materials and Manufacturing Processes		
Mathematics 101	(3-0)	**3**
Algebra		
Mechanical Engineering 201	(0-3)	**1**
Welding and Foundry		
Military or Air Science	(0-3)	**1**
Physical Education 101	(0-2)	**R**
		19

Second Semester		Credit
Chemistry 106	(3-3)	**4**
General Chemistry		
Engineering Drawing 106	(0-6)	**2**
Descriptive Geometry		
English 104	(3-0)	**3**
Composition and Rhetoric		
History 106	(3-0)	**3**
History of the United States		
Mathematics 116	(4-0)	**4**
Plane Trigonometry and Analytics		
Mechanical Engineering 202	(0-3)	**1**
Welding and Foundry		
Military or Air Science	(0-3)	**1**
Physical Education 102	(0-2)	**R**
		18

SOPHOMORE YEAR

First Semester		Credit
Engineering Drawing 127	(1-3)	2
Industrial Freehand Sketching		
English 203	(2-0)	2
Composition and Literature		
Mathematics 223	(4-0)	4
Differential and Integral Calculus		
Mechanical Engineering 101	(0-3)	1
Engineering Problems		
Mechanical Engineering 309	(0-3)	1
Machine Shop		
Military or Air Science	(0-3)	1
Physics 201	(3-3)	4
College Physics		
Elective		3
Physical Education 201	(0-2)	R
		18

Second Semester		Credit
Economics 205	(3-0)	3
Principles of Economics		
Industrial Education 106	(1-5)	3
Sheet Metal		
Industrial Education 204	(3-0)	3
Development and Practice in Industrial Education		
Mechanical Engineering 106	(1-6)	3
Cabinet Making		
Mechanical Engineering 310	(0-3)	1
Machine Shop		
Military or Air Science	(0-3)	1
Physics 202	(3-3)	4
College Physics		
Physical Education 202	(0-2)	R
		18

JUNIOR YEAR

Architecture 331	(2-3)	3
Mechanics and Materials		
English 210	(2-0)	2
Writing and Discussion		
Industrial Education 308	(3-0)	3
A Study of Modern Industries		
Industrial Education 328	(3-0)	3
Industrial Accident Prevention		
Physical Education 216	(0-3)	1
First Aid		
Elective		7
		19

Business Administration 305	(3-0)	3
Business Law		
English 301	(3-0)	3
Writing for Professional Men		
Industrial Education 304	(2-3)	3
Applied Industrial Electricity		
Industrial Education 326	(1-5)	3
General Metalwork		
Industrial Engineering 302	(1-2)	2
Production Engineering		
Elective		4
		18

SENIOR YEAR

English 403	(1-2)	2
Speaking for Professional Men		
Industrial Education 429	(3-0)	3
Foremanship and Supervision		
Journalism 321	(2-2)	3
Industrial Journalism		
Psychology 401	(3-0)	3
Industrial Psychology		
Elective		7
		18

Government 306	(3-0)	3
American National Government		
Industrial Education 449	(1-0)	1
Seminar in Industrial Education		
Industrial Engineering 412	(3-0)	3
Labor and Industry		
Elective		11
		18

NOTE: INDUSTRIAL TECHNOLOGY: Students pursuing this option must include the following courses as part of the elective requirement:

Business Administration 409	(3-0)	3
Survey of Accounting Principles		
Industrial Education 423	(1-2)	2
Analysis Procedure		
Industrial Education 438	(2-3)	3
Industrial Safety		

Industrial Engineering 401	(3-0)	3
Survey of Industrial Engineering		
Industrial Engineering 404	(2-3)	3
Motion and Time Study		

INDUSTRIAL DISTRIBUTION: Students interested in Industrial Distribution must include the following courses as part of the elective requirement:

Business Administration 205	(3-0)	3
Marketing		
Business Administration 318	(3-0)	3
Wholesale Merchandising		
Business Administration 435	(3-0)	3
Salesmanship		

Business Administration 446	(2-0)	2
Marketing Industrial Products		
Industrial Education 444	(3-0)	3
Industrial Distribution		

ELECTIVES FOR INDUSTRIAL EDUCATION

Electives for all options in industrial education are to be selected from the general engineering electives shown on page 182; from the sophomore, junior, or senior courses offered by the Department of Engineering Drawing; or from the following:

Civil Engineering 201 Plane Surveying	(3-3)	4
Civil Engineering 202 Advanced Surveying	(2-3)	3
Civil Engineering 206 Plane Surveying	(0-3)	1
Civil Engineering 208 Topographic Surveying	(1-3)	2
Civil Engineering 300s Summer Surveying Practice		5
Chemistry 102 General Chemistry	(3-3)	4
Education 426 Tests and Measurements	(3-0)	3
Education 427 Principles of Guidance	(3-0)	3
Geology 205 Elementary Geology	(3-3)	4
Industrial Education 427 Driver Education	(1-6)	3
Journalism 205 Principles of Typography	(2-3)	3
Journalism 315 Photography	(1-3)	2
Mathematics 104 Analytics	(3-0)	3
Mathematics 209 Calculus	(3-0)	3
Mechanical Engineering 212 Engineering Mechanics	(3-0)	3
Psychology 207 General Psychology	(3-0)	3
Psychology 305 Personality Adjustments	(3-0)	3
Psychology 323 Psychology of Adolescence	(3-0)	3
Rural Sociology 304 Criminology and Juvenile Delinquency	(3-0)	3
Rural Sociology 315 The Family	(3-0)	3
Rural Sociology 408 Organization for Boy Scout Work	(2-0)	2

Additional electives for the teacher education options may be selected from required courses for the industrial technology option, from the junior or senior courses offered by the Department of Education and Psychology, or from the following courses:

Physical Education 253 Coaching of Baseball	(1-3)	2
Physical Education 315 Elementary School Physical Education	(3-0)	3
Physical Education 317 Coaching of Football	(3-0)	3

Additional electives for the industrial technology and industrial distribution option may be selected from required courses for the industrial arts teacher education option or from the following courses:

Business Administration 315 Insurance	(3-0)	3
Business Administration 324 Casualty Insurance and Suretyship	(3-0)	3
Industrial Engineering 414 Statistical Control of Quality	(2-3)	3
Industrial Engineering 415 Production Control	(1-3)	2
Industrial Engineering 416 Factory Layout	(1-6)	3
Journalism 308 Newspaper Advertising	(2-3)	3
Mechanical Engineering 440 Physical Metallurgy	(2-3)	3
Physical Education 221 Safety Education	(2-0)	2

Those desiring to elect courses not listed above must secure the written approval of the Head of the Department of Industrial Education and of the Dean of the School of Engineering.

Curriculum in INDUSTRIAL ENGINEERING

FRESHMAN YEAR

(See page 162)

SOPHOMORE YEAR

First Semester		Credit
Economics 205 Principles of Economics	(3-0)	3
English 203 Composition and Literature	(2-0)	2
Government 306 American National Government	(3-0)	3
Mathematics 209 Calculus	(3-0)	3
Mechanical Engineering 201 Welding and Foundry	(0-3)	1
Mechanical Engineering 309 Machine Shop	(0-3)	1
Military or Air Science	(0-3)	1
Physics 203 General Physics	(4-3)	5
Physical Education 201	(0-2)	R
		19

Second Semester		Credit
Business Administration 305 Business Law	(3-0)	3
Industrial Engineering 202 Introduction to Industrial Engineering	(2-0)	2
Mathematics 210 Calculus	(3-0)	3
Mechanical Engineering 202 Welding and Foundry	(0-3)	1
Mechanical Engineering 212 Engineering Mechanics	(3-0)	3
Mechanical Engineering 310 Machine Shop	(0-3)	1
Military or Air Science	(0-3)	1
Physics 204 General Physics	(4-3)	5
Physical Education 202	(0-2)	R
		19

JUNIOR YEAR

Business Administration 409 Survey of Accounting Principles	(3-0)	3
Civil Engineering 305 Mechanics of Materials	(3-0)	3
Electrical Engineering 307 Electrical Circuits	(3-3)	4
Industrial Engineering 302 Production Engineering	(1-2)	2
Mechanical Engineering 313 Engineering Mechanics	(3-0)	3
Elective		3
		18

Business Administration 430 Cost Accounting Survey	(3-0)	3
Civil Engineering 315 Strength of Materials Laboratory	(0-2)	1
Electrical Engineering 308 Electrical Machinery	(3-3)	4
Industrial Engineering 404 Motion and Time Study	(2-3)	3
Mechanical Engineering 323 Thermodynamics	(4-0)	4
Elective		3
		18

SENIOR YEAR

English 401 Public Speaking	(0-2)	1
Industrial Engineering 414 Statistical Control of Quality	(2-3)	3
Industrial Engineering 415 Production Control	(1-3)	2
Industrial Engineering 420 Manufacturing Costs	(3-0)	3
Industrial Engineering 451 Tool Engineering	(2-0)	2
Mechanical Engineering 337 Kinematic Drawing	(0-3)	1
Mechanical Engineering 440 Physical Metallurgy	(2-3)	3
Elective		3
		18

English 301 Writing for Professional Men	(3-0)	3
Industrial Engineering 408 Seminar	(0-2)	1
Industrial Engineering 412 Labor and Industry	(3-0)	3
Industrial Engineering 416 Factory Layout	(1-6)	3
Industrial Engineering 452 Tool Design Laboratory	(0-3)	1
Approved Elective		5
Elective		3
		19

Notes: 1. Students who have taken Industrial Engineering 411 prior to the fall of 1957 may substitute it for 420.

2. Students entering before January, 1956, may use 6 hours of history for approved elective.

Approved Electives for INDUSTRIAL ENGINEERING

The student should observe that these electives may be used for obtaining a better background in statistics, accounting, economics, or history. Some technical subjects are available for those so inclined.

Business Administration 303 Statistical Method	(3-3)	4
Business Administration 304 Business Cycles and Business Measurements	(3-0)	3
Business Administration 316 Office Management	(2-0)	2
Business Administration 418 Corporation Finance	(3-0)	3
Business Administration 420 Principles of Investment	(3-0)	3
Business Administration 435 Salesmanship	(3-0)	3
Business Administration 446 Marketing Industrial Products	(2-0)	2
Business Administration 604 Statistics	(3-2)	4
Civil Engineering 311 Hydraulics	(3-0)	3
Civil Engineering 406 Municipal Administration	(3-0)	3
Civil Engineering 473 Cost Estimating	(3-0)	3
Economics 311 Money and Banking	(3-0)	3
Economics 318 Economics of Labor	(3-0)	3
Economics 421 Government and Business	(3-0)	3
Electrical Engineering 320 Electronics	(3-3)	4
Electrical Engineering 420 Servo-Mechanisms and Control Devices	(3-0)	3
Electrical Engineering 436 Electrical Equipment for Buildings	(3-0)	3
History 318 International Developments Since 1918	(3-0)	3
Industrial Education 328 Industrial Accident Prevention	(3-0)	3
Industrial Engineering 406 Industrial Case Analysis	(1-0)	1
Industrial Engineering 411 Wage and Salary Control	(3-0)	3
Industrial Engineering 430 Special Problems in Industrial Engineering		1 to 3
Journalism 304 Feature Story Writing	(2-2)	3
Journalism 321 Industrial Journalism	(2-2)	3
Journalism 406 Publicity and Public Relations	(3-0)	3
Mathematics 307 Calculus	(3-0)	3
Mathematics 308 Differential Equations	(3-0)	3
Mathematics 411 Mathematical Probability	(3-0)	3
***Mechanical Engineering 338** Kinematics and Machine Design	(2-3)	3
Mechanical Engineering 344 Fluid Mechanics	(3-0)	3
Mechanical Engineering 436 Heating, Ventilating and Air Conditioning	(3-0)	3
Mechanical Engineering 445 Machine Design	(2-3)	3
Mechanical Engineering 446 Machine Design	(2-3)	3
Psychology 303 Psychology for Technical Students	(3-0)	3
Psychology 401 Industrial Psychology	(3-0)	3

Curriculum in MECHANICAL ENGINEERING

(Steam Power, Internal Combustion Engines, Automotive, Refrigerating, Heating, Ventilating, Air Conditioning, Physical Metallurgy, and Machine Design)

FRESHMAN YEAR

(See page 162)

SOPHOMORE YEAR

First Semester	Credit	
Civil Engineering 206 Plane Surveying	(0-3)	1
Economics 205 Principles of Economics	(3-0)	3
Government 306 American National Government	(3-0)	3
Mathematics 209 Calculus	(3-0)	3
Mechanical Engineering 201 Welding and Foundry	(0-3)	1
Mechanical Engineering 309 Machine Shop	(0-3)	1
Military or Air Science	(0-3)	1
Physics 203 General Physics	(4-3)	5
Physical Education 201	(0-2)	R
		18

Second Semester	Credit	
Business Administration 305 Business Law	(3-0)	3
English 203 Composition and Literature	(2-0)	2
Mathematics 210 Calculus	(3-0)	3
Mechanical Engineering 202 Welding and Foundry	(0-3)	1
Mechanical Engineering 212 Engineering Mechanics	(3-0)	3
Mechanical Engineering 310 Machine Shop	(0-3)	1
Military or Air Science	(0-3)	1
Physics 204 General Physics	(4-3)	5
Physical Education 202	(0-2)	R
		19

*May be substituted for Mechanical Engineering 337 and 2 hours approved elective.

JUNIOR YEAR

First Semester		Credit	Second Semester		Credit
Civil Engineering 305 Mechanics of Materials	(3-0)	3	**Electrical Engineering 308** Electrical Machinery	(3-3)	4
Electrical Engineering 307 Electrical Circuits	(3-3)	4	**Mechanical Engineering 328** Thermodynamics	(3-0)	3
Mathematics 307 Calculus	(3-0)	3	**Mechanical Engineering 338** Kinematics and Machine Design	(2-3)	3
Mechanical Engineering 313 Engineering Mechanics	(3-0)	3	**Mechanical Engineering 344** Fluid Mechanics	(3-0)	3
Mechanical Engineering 327 Thermodynamics	(3-0)	3	**Mechanical Engineering 440** Physical Metallurgy	(2-3)	3
Elective		3	**Elective**		3
		19			19

SENIOR YEAR

English 301 Writing for Professional Men	(3-0)	3	**Business Administration 409** Survey of Accounting Principles	(3-0)	3
English 401 Public Speaking	(0-2)	1	**Mechanical Engineering 404** Engineering Laboratory	(1-3)	2
Industrial Engineering 401 Survey of Industrial Engineering	(3-0)	3	**Mechanical Engineering 417** Power Engineering	(4-0)	4
Mechanical Engineering 403 Engineering Laboratory	(1-3)	2	**Mechanical Engineering 446** Machine Design	(2-3)	3
Mechanical Engineering 445 Machine Design	(2-3)	3	**Mechanical Engineering 450** Seminar	(0-2)	1
Mechanical Engineering 449 Seminar	(0-2)	1	**Technical Elective**		3
Technical Elective		3	**Elective**		3
Elective		3			19
		19			

Technical Electives in MECHANICAL ENGINEERING

Industrial Engineering 404 Motion and Time Study	(2-3)	3	**Mechanical Engineering 412** Advanced Problems in Mechanical Engineering		2 to 5
Mathematics 308 Differential Equations	(3-0)	3	**Mechanical Engineering 414** Steam and Gas Turbines	(2-3)	3
Mechanical Engineering 407 Mechanical Refrigeration	(3-0)	3	**Mechanical Engineering 432** Automotive Engineering	(3-0)	3
Mechanical Engineering 410 Internal Combustion Engines	(3-0)	3	**Mechanical Engineering 436** Heating, Ventilating, and Air Conditioning	(3-0)	3
Mechanical Engineering 457 Engineering Analysis	(3-0)	3			
Mechanical Engineering 459 Mechanical Vibration	(3-0)	3			

Four-Year Curriculum in PETROLEUM ENGINEERING

(A minimum of six weeks of approved experience in oil field operations or Petroleum Engineering 300 required for registration in senior Petroleum Engineering courses)

FRESHMAN YEAR

(See page 162)

For Students Entering in Fall of 1956 and 1957
SOPHOMORE YEAR

Chemistry 207 Elementary Quantitative Analysis	(2-3)	3	**Chemistry 225** Elementary Organic Chemistry	(2-0)	2
Geology 201 General Geology	(3-0)	3	**Civil Engineering 208** Topographic Surveying	(1-3)	2
Geology 207 Mineralogy and Rock Study	(2-6)	4	**Geology 210** Historical Geology	(3-3)	4
Mathematics 209 Calculus	(3-0)	3	**Mathematics 210** Calculus	(3-0)	3
Military or Air Science	(0-3)	1	**Mechanical Engineering 220** Engineering Mechanics	(4-0)	4
Physics 203 General Physics	(4-3)	5	**Military or Air Science**	(0-3)	1
Physical Education 201	(0-2)	R	**Physics 204** General Physics	(4-3)	5
		19	**Physical Education 202**	(0-2)	R
					21

For Students Entering Prior to Fall of 1956
JUNIOR YEAR

First Semester		Credit	Second Semester		Credit
Chemistry 225 Elementary Organic Chemistry	(2-0)	2	**Chemistry 344** Physical Chemistry	(3-0)	3
English 207 Report Writing and Correspondence	(2-0)	2	**Civil Engineering 305** Mechanics of Materials	(3-0)	3
Geology 311 Petroleum and Structural Geology	(3-3)	4	**Mechanical Engineering 313** Engineering Mechanics	(3-0)	3
Mechanical Engineering 323 Thermodynamics	(4-0)	4	**Mechanical Engineering 344** Fluid Mechanics	(3-0)	3
Petroleum Engineering 305 Petroleum Development	(3-0)	3	**Petroleum Engineering 306** Petroleum Production Methods	(3-0)	3
Petroleum Engineering 307 Petroleum Development Laboratory	(0-3)	1	**Petroleum Engineering 308** Petroleum Production Laboratory	(0-3)	1
Elective		4	***Elective**		3
		20			19

SENIOR YEAR

Electrical Engineering 305 Electrical Circuits and Machines	(3-3)	4	**English 401** Public Speaking	(0-2)	1
Petroleum Engineering 405 Equipment and Applications	(2-2)	3	**Government 306** American National Government	(3-0)	3
Petroleum Engineering 409 Subsurface Engineering	(1-3)	2	**Mechanical Engineering 403** Engineering Laboratory	(1-3)	2
Petroleum Engineering 413 Natural Gas Engineering	(2-2)	3	**Petroleum Engineering 402** Petroleum Production Economics	(3-0)	3
Petroleum Engineering 415 Gas Measurement Laboratory	(0-3)	1	**Petroleum Engineering 414** Oil Measurements and Transportation	(3-0)	3
Petroleum Engineering 428 Reservoir Engineering	(3-0)	3	**Petroleum Engineering 416** Oil Measurements and Transportation Laboratory	(0-3)	1
Elective		3	**Petroleum Engineering 438** Secondary Recovery Methods	(3-0)	3
		19	**Elective**		3
					19

Five-Year Curriculum in
PETROLEUM ENGINEERING

(A minimum of six weeks of approved experience in oil field operations or Petroleum Engineering 300 required for registration in senior Petroleum Engineering courses)

FRESHMAN YEAR
(See page 162)

SOPHOMORE YEAR
(See page 177)

For Students Entering Prior to Fall of 1956
JUNIOR YEAR

Chemistry 225 Elementary Organic Chemistry	(2-0)	2	**Chemistry 344** Physical Chemistry	(3-0)	3
English 203 Composition and Literature	(2-0)	2	**English 210** Writing and Discussion	(2-0)	2
Mathematics 307 Calculus	(3-0)	3	**Mathematics 308** Differential Equations	(3-0)	3
Mechanical Engineering 344 Fluid Mechanics	(3-0)	3	**Mechanical Engineering 323** Thermodynamics	(4-0)	4
Petroleum Engineering 305 Petroleum Development	(3-0)	3	**Petroleum Engineering 306** Petroleum Production Methods	(3-0)	3
Petroleum Engineering 307 Petroleum Development Laboratory	(0-3)	1	**Petroleum Engineering 308** Petroleum Production Laboratory	(0-3)	1
Elective		4	**Elective**		3
		18			19

*Students not electing advanced ROTC will register for Economics 205.

SENIOR YEAR

First Semester		Credit
Civil Engineering 305 Mechanics of Materials	(3-0)	3
Civil Engineering 315 Strength of Materials Laboratory	(0-2)	1
Geology 311 Petroleum and Structural Geology	(3-3)	4
Mechanical Engineering 313 Engineering Mechanics	(3-0)	3
Petroleum Engineering 413 Natural Gas Engineering	(2-2)	3
Petroleum Engineering 415 Gas Measurement Laboratory	(0-3)	1
Elective		3
		18

Second Semester		Credit
Business Administration 305 Business Law	(3-0)	3
English 403 Speaking for Professional Men	(1-2)	2
Government 306 American National Government	(3-0)	3
Petroleum Engineering 414 Oil Measurements and Transportation	(3-0)	3
Petroleum Engineering 416 Oil Measurements and Transportation Laboratory	(0-3)	1
Psychology 303 Psychology for Technical Students	(3-0)	3
Elective		3
		18

FIFTH YEAR

Economics 205 Principles of Economics	(3-0)	3
English 301 Writing for Professional Men	(3-0)	3
Geography 401 International Political Geography	(3-0)	3
Mechanical Engineering 403 Engineering Laboratory	(1-3)	2
Petroleum Engineering 405 Equipment and Applications	(2-2)	3
Petroleum Engineering 409 Subsurface Engineering	(1-3)	2
Petroleum Engineering 428 Reservor Engineering	(3-0)	3
		19

Business Administration 409 Survey of Accounting Principles	(3-0)	3
Economics 319 Economic Development of the United States	(3-0)	3
Electrical Engineering 305 Electrical Circuits and Machines	(3-3)	4
History 325 Trends in American History	(3-0)	3
Petroleum Engineering 402 Petroleum Production Economics	(3-0)	3
Petroleum Engineering 438 Secondary Recovery Methods	(3-0)	3
		19

NOTE: The following electives are particularly recommended:

Business Administration 306 Business Law	(3-0)	3
Geography 201 Principles of Geography	(3-0)	3

Five-Year Curriculum in PETROLEUM ENGINEERING— GEOLOGICAL ENGINEERING

(A minimum of six weeks of approved experience in oil field operations or Petroleum Engineering 300 required for registration in senior Petroleum Engineering courses)

FRESHMAN YEAR

(See page 162)

SOPHOMORE YEAR

English 203 Composition and Literature	(2-0)	2
Geology 201 General Geology	(3-0)	3
Geology 203 Crystallography and Mineralogy	(2-6)	4
Geology 209 Introduction to Field Work	(0-3)	1
Mathematics 209 Calculus	(3-0)	3
Military or Air Science	(0-3)	1
Physics 203 General Physics	(4-3)	5
Physical Education 201	(0-2)	R
		19

Chemistry 207 Elementary Quantitative Analysis	(2-3)	3
Civil Engineering 208 Topographic Surveying	(1-3)	2
Geology 204 Mineralogy and Rock Study	(1-3)	2
Geology 210 Historical Geology	(3-3)	4
Mathematics 210 Calculus	(3-0)	3
Military or Air Science	(0-3)	1
Physics 204 General Physics	(4-3)	5
Physical Education 202	(0-2)	R
		20

JUNIOR YEAR

First Semester		Credit
Chemistry 225 Elementary Organic Chemistry	(2-0)	2
Geology 305 Invertebrate Paleontology	(3-3)	4
Geology 315 Principles of Sedimentation	(2-3)	3
Mechanical Engineering 212 Engineering Mechanics	(3-0)	3
Elective		6
		18

Second Semester		Credit
Chemistry 344 Physical Chemistry	(3-0)	3
Civil Engineering 305 Mechanics of Materials	(3-0)	3
Economics 205 Principles of Economics	(3-0)	3
English 401 Public Speaking	(0-2)	1
Geology 306 Stratigraphy	(3-3)	4
Elective		3
		17

SENIOR YEAR

English 207 Report Writing and Correspondence	(2-0)	2
Government 306 American National Government	(3-0)	3
Mechanical Engineering 323 Thermodynamics	(4-0)	4
Mechanical Engineering 344 Fluid Mechanics	(3-0)	3
Petroleum Engineering 305 Petroleum Development	(3-0)	3
Petroleum Engineering 307 Petroleum Development Laboratory	(0-3)	1
Elective		3
		19

Electrical Engineering 305 Electrical Circuits and Machines	(3-3)	4
Geology 312 Structural Geology	(2-3)	3
Mechanical Engineering 313 Engineering Mechanics	(3-0)	3
Mechanical Engineering 403 Engineering Laboratory	(1-3)	2
Petroleum Engineering 306 Petroleum Production Methods	(3-0)	3
Petroleum Engineering 308 Petroleum Production Laboratory	(0-3)	1
Elective		3
		19

SUMMER CAMP

Geology 300, Field Geology, credit 6.

FIFTH YEAR

Geology 404 Geology of Petroleum	(2-3)	3
Geology 449 Seminar	(1-0)	1
Petroleum Engineering 405 Equipment and Applications	(2-2)	3
Petroleum Engineering 409 Subsurface Engineering	(1-3)	2
Petroleum Engineering 413 Natural Gas Engineering	(2-2)	3
Petroleum Engineering 415 Gas Measurement Laboratory	(0-3)	1
Petroleum Engineering 428 Reservoir Engineering	(3-0)	3
Elective		3
		19

Geology 425 Subsurface Geology	(2-3)	3
Geology 433 Field Geology	(0-6)	2
Geology 450 Seminar	(1-0)	1
Petroleum Engineering 402 Petroleum Production Economics	(3-0)	3
Petroleum Engineering 414 Oil Measurements and Transportation	(3-0)	3
Petroleum Engineering 416 Oil Measurements and Transportation Laboratory	(0-3)	1
Petroleum Engineering 438 Secondary Recovery Methods	(3-0)	3
Elective		3
		19

Five-Year Curriculum in PETROLEUM ENGINEERING— MECHANICAL ENGINEERING

(A minimum of six weeks of approved experience in oil field operations or Petroleum Engineering 300 required for registration in senior Petroleum Engineering courses)

FRESHMAN YEAR

(See page 162)

SOPHOMORE YEAR

First Semester		Credit
Chemistry 207 Elementary Quantitative Analysis	(2-3)	3
Civil Engineering 208 Topographic Surveying	(1-3)	2
English 203 Composition and Literature	(2-0)	2
Mathematics 209 Calculus	(3-0)	3
Mechanical Engineering 201 Welding and Foundry	(0-3)	1
Mechanical Engineering 309 Machine Shop	(0-3)	1
Military or Air Science	(0-3)	1
Physics 203 General Physics	(4-3)	5
Physical Education 201	(0-2)	R
		18

Second Semester		Credit
Economics 205 Principles of Economics	(3-0)	3
Government 306 American National Government	(3-0)	3
Mathematics 210 Calculus	(3-0)	3
Mechanical Engineering 202 Welding and Foundry	(0-3)	1
Mechanical Engineering 212 Engineering Mechanics	(3-0)	3
Mechanical Engineering 310 Machine Shop	(0-3)	1
Military or Air Science	(0-3)	1
Physics 204 General Physics	(4-3)	5
Physical Education 202	(0-2)	R
		20

JUNIOR YEAR

Chemistry 225 Elementary Organic Chemistry	(2-0)	2
Geology 201 General Geology	(3-0)	3
Geology 207 Mineralogy and Rock Study	(2-6)	4
Mathematics 307 Calculus	(3-0)	3
Mechanical Engineering 313 Engineering Mechanics	(3-0)	3
Elective		4
		19

Chemistry 344 Physical Chemistry	(3-0)	3
Civil Engineering 305 Mechanics of Materials	(3-0)	3
Geology 210 Historical Geology	(3-3)	4
Mechanical Engineering 327 Thermodynamics	(3-0)	3
Mechanical Engineering 440 Physical Metallurgy	(2-3)	3
Elective		3
		19

SENIOR YEAR

Electrical Engineering 307 Electrical Circuits	(3-3)	4
English 207 Report Writing and Correspondence	(2-0)	2
Geology 311 Petroleum and Structural Geology	(3-3)	4
Mechanical Engineering 344 Fluid Mechanics	(3-0)	3
Petroleum Engineering 305 Petroleum Development	(3-0)	3
Petroleum Engineering 307 Petroleum Development Laboratory	(0-3)	1
Elective		3
		20

Electrical Engineering 308 Electrical Machinery	(3-3)	4
Industrial Engineering 401 Survey of Industrial Engineering	(3-0)	3
Mechanical Engineering 328 Thermodynamics	(3-0)	3
Mechanical Engineering 338 Kinematics and Machine Design	(2-3)	3
Petroleum Engineering 306 Petroleum Production Methods	(3-0)	3
Petroleum Engineering 308 Petroleum Production Laboratory	(0-3)	1
Elective		3
		20

FIFTH YEAR

First Semester		Credit
Mechanical Engineering 403 Engineering Laboratory	(1-3)	2
Mechanical Engineering 417 Power Engineering	(4-0)	4
Mechanical Engineering 445 Machine Design	(2-3)	3
Petroleum Engineering 405 Equipment and Applications	(2-2)	3
Petroleum Engineering 409 Subsurface Engineering	(1-3)	2
Petroleum Engineering 413 Natural Gas Engineering	(2-2)	3
Petroleum Engineering 415 Gas Measurement Laboratory	(0-3)	1
Petroleum Engineering 428 Reservoir Engineering	(3-0)	3
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Second Semester		Credit
Business Administration 409 Survey of Accounting Principles	(3-0)	3
English 401 Public Speaking	(0-2)	1
Mechanical Engineering 404 Engineering Laboratory	(1-3)	2
Mechanical Engineering 446 Machine Design	(2-3)	3
Petroleum Engineering 402 Petroleum Production Economics	(3-0)	3
Petroleum Engineering 414 Oil Measurements and Transportation	(3-0)	3
Petroleum Engineering 416 Oil Measurements and Transportation Laboratory	(0-3)	1
Petroleum Engineering 438 Secondary Recovery Methods	(3-0)	3
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General Electives in ENGINEERING

Students with the proper prerequisites may choose their general electives from the list below. Those desiring to elect courses not listed must secure the written approval of the Dean of Engineering.

1. Aeronautical Engineering 201; Agricultural Engineering 324, 410, 418, 428, 430; Architecture 329, 330, 429, 430; English 212, 231, 232; Geology 201; Industrial Education 328; Industrial Engineering 401, 411, 412; Journalism 304, 321, 406; Landscape Architecture 308, 310, 411; Liberal Arts 201, 301, 304; Oceanography 401; Petroleum Engineering 204; Rural Sociology 205, 206, 311, 314.
2. Any junior or senior courses offered by the Departments of Air Science, Economics, English, History and Government, Mathematics, Military Science and Tactics, and Physics.
3. Any sophomore, junior, or senior courses offered by the Division of Business Administration, or by the Departments of Chemistry, Geography, and Psychology.
4. Biology: Any course, but not more than 7 hours of freshman courses.
5. Modern Languages: Any course, but credit in the beginning course in a modern language is allowed only after satisfactory completion of both semesters.
6. Religious Education: Any course, but not more than 4 semester hours may be counted.

THE SCHOOL OF MILITARY SCIENCES

The participation of our government in foreign affairs makes it apparent that every young American must recognize his obligation for service to his country and should realize the necessity for coordination of his military and civilian careers. Any student enrolling in the A. and M. College of Texas has the option of participating in the ROTC program or of attending as a civilian student. Those electing ROTC training become members of the famous Cadet Corps, rich in its heritage of service to the nation. The Army and Air Force ROTC courses supplement the student's civilian curriculum and offer him the opportunity of planning his civilian and military careers on a mutually supporting basis.

In the words of President Eisenhower, "ROTC is a ready-made course, designed and perfected to develop the qualities of leadership required in both military and civil enterprise."

The Agricultural and Mechanical College of Texas offers ROTC instruction in ten Army branches and the Air Force, the most diversified military curriculum of any American college or university.

AIR SCIENCE

The United States Air Force is recognized as this country's first line of defense and, thereby, as a deterrent to any attack upon this country by another power. The capability of instantaneous and devastating retaliatory action is necessary in the maintenance of peaceful relations with aggressive warlike powers. The airplane has become the vehicle for delivery of such potent destructive power as to tax the imagination. The destructive power that can be delivered by a single airplane places the key role of the defense of the nation upon the pilot and the air crew. The mission of the Air Force ROTC program is dedicated chiefly to the pre-flight training of future air crew members. The progress of engineering and scientific development in the Air Force also requires a limited number of potential officers who can prove themselves outstanding in these fields. Therefore, a limited number of cadets are selected for advanced ROTC training who are interested in further training in these fields.

While the four-year ROTC course normally leads to a reserve commission, cadets who are selected as Distinguished Air Force ROTC Graduates will have the opportunity to apply for a Regular Air Force Commission.

Basic Air Science, comprising the first and second years of instruction, consists of 180 contact hours, with academic credit of one hour per semester.

Advanced Air Science consists of 300 contact hours in the third and fourth college years with academic credit of three hours per semester. Advanced course students are required to attend a four-week summer camp between their third and fourth college years.

The Air Science program consists of a generalized course of study designed to select and prepare students, through a permanent program of instruction, to serve as officers in the Regular and Reserve components of the United States Air Force. It provides the fundamental training, both personal and professional, to develop the attributes of a leader which will prove of long range value to the cadet and to the Air Force, whether he returns to civilian life or becomes a regular Air Force officer.

MILITARY SCIENCE

While the four-year ROTC course normally leads to a reserve commission, the Army relies upon this source for half of the new regular army officers appointed each year. Under the Distinguished Military Graduate program of the Army, interested cadets can apply for and be granted regular commissions

upon graduation. Those students selected must be outstanding in military aptitude and academic proficiency. They will be tendered the same type of commission given graduates of the United States Military Academy, West Point, New York. Many A. and M. graduates who received their commissions under this program are now actively pursuing Army careers.

The Army Combat Arms

The mission of the entire Army is to support the fighting teams on the battle lines—the men who get there first. These teams are made up of infantry, armor, and artillery. These are the raison d'etre of the Army—highly trained in specialties which can be learned nowhere but in the Army and its training units such as the ROTC.

The young officer who aims for a career in one of the combat arms will follow in the footsteps of many illustrious Americans. He will command greatest respect at every Army gathering. His training, more than any other, fits him for high commands and positions of great responsibility. Most of the top men in the Army today have risen through one of the combat arms.

INFANTRY. Post-World War II hostilities have illustrated again that the infantry officer is the key to success in battle. He is the bulwark of Americanism whose steadfastness is the true measure of our national security.

As the lives of our fighting men are more highly valued than the equipment of war, competent leadership is imperative. To meet this need, the U. S. Infantry officer has developed throughout our history to his present status of personnel management specialist. Toward that end he undergoes a career-long balanced program of training that includes fine service schools and the best civilian colleges, as well as service in both command and staff capacities.

Important to all officers, the qualities of intelligence, manly fortitude, and physical endurance are imperative in an infantry officer. These qualities, rather than a particular academic course, are the qualifications of an infantry enrollee; he must prepare himself to be the Army's "Jack-of-all-missions" without whom no mission of major importance can succeed.

FIELD ARTILLERY. The Field Artillery, one of the combat arms, is the principal agency of ground fire support. It is equipped with mobile cannon, rockets, guided missiles and equipment required for fire control, movement, observation, and communication.

It gives depth to combat and isolates the battlefield by counterfire, by fire on hostile reserves, by restricting movement in the rear areas, and by disrupting hostile command facilities and other installations.

The efficient exploitation of Field Artillery capabilities depends upon control, liaison, communications, observation, location and evaluation of targets, survey control and logistical support.

Service in the Field Artillery is both steeped in the traditions of the past and actively directed to the future. In addition to being a soldier, the artillery officer is a skilled technician and a leader of men. An artillery officer is in a field of endeavor that exacts the same high devotion and diligence that any successful profession demands.

No special academic course is necessary for enrollment in the Field Artillery branch.

ARMOR. Armor is primarily a combat arm with characteristics and capabilities designed for offensive action. It is an arm of mobility, armor-protected fire power, and shock action. It uses its mobility in exploitation of combat successes, in pursuit of a fleeing enemy, in seizing objectives deep in enemy rear areas, in reconnoitering over broad frontages, and providing depth and a wide radius of action in defense. Armor concentrates it fire

power at the decisive area of action to lead, accompany, or support Infantry in the penetration of enemy defenses, and to destroy enemy counter attacks. It utilizes its shock action to close with and destroy the enemy. Armor is massed in close coordination with other arms and is supported by the tactical Air Force.

The weapons of armored units include tanks, self-propelled guns and howitzers, machine guns, mortars, rocket launchers, submachine guns, carbines, pistols, rifles, bayonets, automatic rifles, and grenades. Of these, the tank is the principal weapon.

Army ground reconnaissance usually is performed by light armored units which employ rapidity and flexibility of movement, communication facilities, and fire power. The capabilities of light armored units include both distant and close ground reconnaissance, counter-reconnaissance, seizing and holding critical terrain features for a limited time, march and battlefield security, flank security, combat liaison, and delaying and harassing action.

No special academic course is necessary for enrollment in armor.

ANTIAIRCRAFT ARTILLERY. The Antiaircraft Artillery is that part of the United States Army which attacks hostile forces in the air, on the land, and on the sea.

The activities of antiaircraft artillerymen range from the mobile, hard-hitting automatic weapons units with the Infantry and Armored Divisions to the heavy gun units and guided missile installations employed to attack enemy targets beyond the reach of other weapons.

The weapons of the antiaircraft artillerymen include 50 caliber machine guns, 40mm automatic cannon, 75mm, 90mm and 120mm guns, and guided missiles. Some of the latest scientific advancements are used along with these weapons. These include electronically operated fuses which cause projectiles to explode at or near targets, radar and other electronic equipment for automatically locating and tracking targets, computing firing data, and instantaneously positioning guns by remote control, thereby permitting effective fire to be delivered at either seen or unseen aerial targets.

With the advent of rockets and guided missiles, an even wider field is being opened for the Antiaircraft Artillery. Varieties of rockets and guided missiles have been developed for the use of the Antiaircraft Artillery in coping with the higher speeds and altitudes of modern aircraft and greater ranges to ground targets. The field is open for employment of electronic equipment which will cause rockets to locate and automatically direct themselves to targets at extremely high altitudes, speeds and ranges.

The weapons and equipment of the Antiaircraft Artillery offer a wide appeal to the individual interested in the fields of science and engineering. No special academic course is necessary for admission to this branch.

The Army Services

Behind the man with the gun there has always been and always must be a group of highly specialized administrators, technicians, and scientists. It is their responsibility to see that the cutting edge of the sword is ready, strong, and keen. These are the men of the services.

THE CORPS OF ENGINEERS. The Corps of Engineers is primarily a combat arm but has in addition a service function and a civil mission.

In combat the Engineers increase the power of our combat forces by facilitating the movement of friendly forces and impeding the movement of enemy forces through construction and destruction efforts. Engineer troops are often used as infantry in emergency situations.

The service function of the Corps of Engineers includes the construction of army-wide training facilities, cantonments, and other administrative

structures. They also supply engineer equipment and material for all branches of the army.

The civil works function of the Corps of Engineers is supervised directly by the Congress of the United States and includes river and harbor development, flood control, canals, dams, and relief work in disaster areas.

Noted projects of the Corps of Engineers include the Panama Canal, Ledo Road, Library of Congress, and the Alcan Highway, as well as the flood control works on the major river systems of the United States.

Students pursuing any course of instruction leading to an engineering, technical, or scientific degree are eligible to enroll in the advanced engineer ROTC provided they meet the college academic requirements.

THE CHEMICAL CORPS. The Chemical Corps is charged with the investigation, research, design, and development of chemical, biological, and radiological warfare items. It is concerned with smoke and incendiary materials, toxic gases, all war gas defense appliances, and biological warfare and radiological defense activities. It furnishes advice to all elements of the Department of Defense on chemical and biological warfare and radiological defense. It is responsible for the supervision of training of the army in chemical and biological warfare and radiological defense.

THE QUARTERMASTER CORPS. One of the world's largest business organizations, the Quartermaster Corps supplies over 70,000 items to a million men all over the globe; and in time of war this may be expanded to 85,000 items to ten million men.

Quartermaster officers of outstanding executive caliber and of potentially sound business sense design, produce, test, and supply clothing for every climate, food for every mealtime situation, and petroleum products for all purposes. These officers are at once merchants, importers, exporters, warehouse managers, purchasing agents, and expediters.

The activities of the Quartermaster are diversified to such an extent that students majoring in any of the courses given at this college can fit well into the regular or reserve establishment upon graduation.

THE ORDNANCE CORPS. The Ordnance Corps provides the Armed Forces of our country with materiel for firepower and mobility—rifles, machine guns, artillery, ammunition, tanks, and trucks. Ordnance materiel ranges from time pieces to radar controlled automatic antiaircraft guns; from jeeps to ponderous tank transporters; from pistol cartridges to twenty-ton bombs, pyrotechnics, and guided missiles.

A large part of this type of materiel used by friendly foreign armies is supplied by the Ordnance Corps.

The Ordnance procurement program involves more expenditure of funds than all other Army services put together. Ordnance research projects require millions of dollars annually. The handling of its materiel requires the Army's largest depot system.

Ordnance officers perform work closely related with business and industry. They must be businessmen but the technical nature of Ordnance Corps activities calls for an engineerinng or scientific background. Mechanical and industrial engineers particularly will find a large amount of related work in the Ordnance Corps; and all engineers, physicists, and chemists will find Ordnance a fertile field in which to utilize their regular college courses both before and after graduation.

THE TRANSPORTATION CORPS. The Transportation Corps performs transportation functions for the Army and provides such transportation service to the Air Force or Navy as may be directed. Transportation officers are the Army's traffic managers as well as highway and railroad executives. Con-

stant improvement in the movement of men and supplies throughout the world challenges the initiative, leadership, and ingenuity of transportation officers in command or staff capacities, many of which are closely allied with civilian occupations.

The academic courses which more nearly parallel this type of work are industrial engineering and business administration. However, no special academic course is necessary for admission to this branch.

THE SIGNAL CORPS. The major responsibility of the Signal Corps is to provide communication for the Army in peace and in war by the most practical and efficient means consistent with modern developments, from the Department of the Army Headquarters to the front lines. The major activities of the Signal Corps are directed toward the engineering, installation, operation, and maintenance of fixed army communication; the training of signal specialists; research and development communication, photography, and meteorology; procurement, supply and repair of signal equipment; and ground photography and meteorological work for the Army. Signal Communications are the nerve system of the Army which enables coordination of effort by all branches.

Students pursuing courses leading to a degree in engineering, electronics, physics, meteorology, or mathematics may be admitted to the senior division, Signal Corps ROTC unit.

THE SCHOOL OF VETERINARY MEDICINE

The principal objective of the School of Veterinary Medicine is to provide complete training in all the phases of veterinary medicine. The degree of Doctor of Veterinary Medicine is conferred upon satisfactory completion of the curriculum in veterinary medicine. By following Curricular Option I, the student may qualify after four years of study for the degree of Bachelor of Science in Animal Science. (See Curricular Options below.)

The School of Veterinary Medicine is composed of the Departments of Veterinary Anatomy, Veterinary Medicine and Surgery, Veterinary Microbiology, Veterinary Parasitology, Veterinary Pathology, and Veterinary Physiology and Pharmacology. The Department of Veterinary Medicine and Surgery operates the Veterinary Hospital and Ambulatory Clinics. A large proportion of the faculty from all departments is actively engaged in research. In addition to undergraduate instruction, each department offers courses at the graduate level leading to the degree of Master of Science and, in some cases, to the degree of Doctor of Philosophy.

Training is such that graduates of the School of Veterinary Medicine are well qualified to deal with problems of disease and disease prevention in domestic farm animals, poultry, pet animals, zoo animals, fur-bearing animals, and wild life. Graduates also are well qualified to administer and advise in the public health problems arising from intertransmission of diseases between man and the lower animals. Instruction and practical training are given in milk and meat hygiene and in the inspection of food processing plants. The School is accredited by the Council on Education of the American Veterinary Medical Association and by the United States Department of Agriculture.

ENTRANCE REQUIREMENTS

Admission to the curriculum in veterinary medicine is granted only for the beginning of the fall semester. Formal application must be filed with the Director of Admissions and Registrar between March 1 and May 31 of the year for which admission is sought. Accompanying the application form must be: complete academic records, including the preparatory record and college record; a record of courses in progress; and a statement showing the applicant to be in good standing.

Minimum pre-veterinary requirements are 70 credit hours including:

English composition and rhetoric	6 hours
Biology (at least 4 hours must be zoology)	8 hours
Inorganic chemistry	8 hours
Organic chemistry	8 hours
Physics	6 hours
American history	6 hours
American government	3 hours

CURRICULAR OPTIONS

Three curricular options are open to students planning to study veterinary medicine.

Option I

Students may qualify for the degree of Bachelor of Science in Animal Science, to be conferred after 4 years of study. Under this option the recommended pre-veterinary curriculum and the regular veterinary curriculum are followed. Elective requirements must be met by completing the following courses:

Agronomy 301; Economics 205; English 403, and Genetics 406.

Substitutions for any of the courses required for this Animal Science degree may be made only with approval of the Dean of the School of Agriculture.

Option II

Students may qualify for a Reserve Officer's commission by scheduling advanced military or air science as electives in the first and second years of veterinary medicine. The number who are permitted to follow this option will necessarily be contingent upon the number of advanced ROTC contracts available.

Option III

Students who do not wish to qualify either for a Reserve Officer's commission or for the Bachelor of Science degree may register for electives of their own choosing, subject to approval by the Dean of the School of Veterinary Medicine.

Wherever possible, the student should choose his option early in the pre-veterinary curriculum.

PRE-VETERINARY MEDICINE

The following pre-veterinary curriculum is designed to afford the student the best possible preparation for veterinary training. Courses marked with asterisks are requirements. Substitutions for other courses may be made only with the permission of the Dean of the School of Veterinary Medicine.

Curriculum in PRE-VETERINARY MEDICINE

FRESHMAN YEAR

First Semester	Credit	Second Semester	Credit
Animal Husbandry 107 (2-3)	3	***Biology 101** (2-3)	3
General Animal Husbandry		General Botany of Seed Plants	
***Biology 107** (2-3)	3	***Biology 108** (2-3)	3
Vertebrate Zoology		Invertebrate Zoology	
***Chemistry 101** (3-3)	4	***Chemistry 102** (3-3)	4
General Chemistry		General Chemistry	
***English 103** (3-0)	3	***English 104** (3-0)	3
Composition and Rhetoric		Composition and Rhetoric	
Mathematics 101 (3-0)	3	**Mathematics 103** (3-0)	3
Algebra		Plane Trigonometry	
Military or Air Science (0-3)	1	**Military or Air Science** (0-3)	1
Physical Education 101 (0-2)	R	**Physical Education 102** (0-2)	R
	17		17

SOPHOMORE YEAR

***Chemistry 301** (3-3)	4	***Chemistry 302** (3-3)	4
Organic Chemistry		Organic Chemistry	
Dairy Science 202 (2-2)	3	**English 203** (2-0)	2
Dairying		Composition and Literature	
English 207 (2-0)	2	**Entomology 208** (2-3)	3
Report Writing and Correspondence		Veterinary Entomology	
History 105 (3-0)	3	**History 106** (3-0)	3
History of the United States		History of the United States	
Government 306 (3-0)	3	**Military or Air Science** (0-3)	1
American National Government		***Physics 216** (2-3)	3
Military or Air Science (0-3)	1	Introductory Physics	
***Physics 215** (2-3)	3	**Poultry Science 201** (2-2)	3
Introductory Physics		Poultry Production	
Physical Education 201 (0-2)	R	**Physical Education 202** (0-2)	R
	19		19

Substantially the same pre-veterinary curriculum as that outlined above should be completed by students expecting to qualify for admission to the School of Veterinary Medicine in the minimum time (two college academic years). However, a student with a Bachelor of Science degree may be admitted to the veterinary curriculum with certain pre-veterinary deficiencies provided credit for these is obtained before the degree of Doctor of Veterinary Medicine is conferred. The Dean of the School of Veterinary Medicine shall be the authority on these matters.

Note: All students must complete Entomology 208 or its equivalent before the second year in veterinary school.

LIMITED ENROLLMENT

Enrollment in the first year of the curriculum in veterinary medicine is limited by facilities of the College to a definite number each year. Selection within this quota is based on scholastic record and professional aptitude, and admission to the curriculum in pre-veterinary medicine does not carry assurance that the student will be admitted to the first year in veterinary medicine. Completion of the pre-veterinary requirements with satisfactory grades is a prerequisite for admission to the first year of the curriculum in veterinary medicine or to the veterinary courses of that year.

ADMISSION TO THE THIRD YEAR OF VETERINARY MEDICINE

Regardless of the option chosen, a student may not be permitted to register for the third year of veterinary medicine unless he has completed, with an average grade of C or better, all work prescribed in the first two years of the veterinary curriculum.

READMISSION

A veterinary student who voluntarily withdraws from College, or who is dropped from the rolls of the College for cause, forfeits his standing and must apply for readmission. A student who fails any of his veterinary courses may be required to withdraw from the School of Veterinary Medicine.

ELECTIVES

Students in the School of Veterinary Medicine who do not enroll in advanced ROTC must complete English 403 (Speaking for Professional Men). The remaining 10 credit hours of elective courses must be chosen with the approval of the Dean of the School of Veterinary Medicine.

Curriculum in VETERINARY MEDICINE

FIRST YEAR

First Semester		Credit
Biochemistry and Nutrition 312	(3-6)	5
Veterinary Physiological Chemistry		
Genetics 301	(3-2)	4
Genetics		
Veterinary Anatomy 301	(0-9)	3
Anatomy		
Veterinary Anatomy 303	(2-6)	4
Histology		
Elective		3
		19

Second Semester		Credit
Animal Husbandry 320	(3-0)	3
Animal Nutrition and Feeding		
Veterinary Anatomy 302	(0-9)	3
Anatomy		
Veterinary Anatomy 304	(3-3)	4
Embryology		
Veterinary Anatomy 306	(0-6)	2
Neuroanatomy		
Veterinary Physiology and Pharmacology 326	(4-3)	5
Physiology		
Elective		3
		20

SECOND YEAR

Veterinary Microbiology 435	(3-4)	4
Microbiology and Immunology		
Veterinary Parasitology 481	(2-2)	3
Parasites of Domestic Animals		
Veterinary Pathology 443	(4-3)	5
General Pathology		
Veterinary Physiology and Pharmacology 427	(2-6)	4
Physiology		
Elective		3
		19

Veterinary Medicine and Surgery 416	(1-0)	1
General Surgery		
Veterinary Microbiology 436	(3-3)	4
Pathogenic Microbiology		
Veterinary Parasitology 482	(2-2)	3
Parasites of Domestic Animals		
Veterinary Pathology 444	(5-3)	6
Special Pathology		
Veterinary Physiology and Pharmacology 428	(3-0)	3
Pharmacology		
Elective		3
		20

THIRD YEAR

First Semester		Credit
Veterinary Anatomy 501 Surgical Anatomy	(0-6)	2
Veterinary Medicine and Surgery 511 Non-Infectious Diseases of Large Animals	(3-0)	3
Veterinary Medicine and Surgery 513 Non-Infectious Diseases of Small Animals	(3-0)	3
Veterinary Medicine and Surgery 515 General Surgery	(4-0)	4
Veterinary Medicine and Surgery 519 Clinics	(0-4)	1
Veterinary Medicine and Surgery 521 Reproductive Diseases	(2-0)	2
Veterinary Microbiology 533 Food Hygiene	(1-2)	2
Veterinary Physiology and Pharmacology 529 Pharmacology	(2-3)	3
		20

Second Semester		Credit
Veterinary Medicine and Surgery 512 Radiology	(2-0)	2
Veterinary Medicine and Surgery 514 Infectious Diseases of Small Animals	(2-0)	2
Veterinary Medicine and Surgery 516 Operative Surgery of Large Animals	(2-2)	3
Veterinary Medicine and Surgery 520 Clinical Seminar	(0-4)	1
Veterinary Medicine and Surgery 524 Operative Surgery of Small Animals	(1-2)	2
Veterinary Medicine and Surgery 526 Obstetrics	(2-0)	2
Veterinary Microbiology 536 Infectious Diseases of Large Animals	(5-0)	5
Veterinary Physiology and Pharmacology 530 Toxicology	(2-2)	3
		20

FOURTH YEAR

Veterinary Medicine and Surgery 561 Clinical Laboratory Diagnosis	(0-2)	1
Veterinary Medicine and Surgery 563 Ambulatory Clinic	(0-4)	1
Veterinary Medicine and Surgery 565 Large Animal Clinic	(1-7)	3
Veterinary Medicine and Surgery 567 Small Animal Clinic	(1-7)	3
Veterinary Microbiology 591 Food Hygiene	(2-2)	3
Veterinary Microbiology 595 Poultry Diseases	(2-2)	3
Veterinary Parasitology 585 Clinical Parasitology	(0-2)	1
Veterinary Pathology 577 Applied Pathology	(0-2)	1
Veterinary Physiology and Pharmacology 573 Pharmacy	(0-2)	1
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Business Administration 452 Veterinary Jurisprudence	(3-0)	3
Veterinary Medicine and Surgery 562 Clinical Laboratory Diagnosis	(0-2)	1
Veterinary Medicine and Surgery 564 Ambulatory Clinic	(0-4)	1
Veterinary Medicine and Surgery 566 Large Animal Clinic	(0-7)	2
Veterinary Medicine and Surgery 568 Small Animal Clinic	(0-7)	2
Veterinary Microbiology 592 Public Health	(2-2)	3
Veterinary Microbiology 596 Poultry Diagnosis	(0-2)	1
Veterinary Parasitology 586 Clinical Parasitology	(0-2)	1
Veterinary Pathology 578 Applied Pathology	(0-2)	1
Veterinary Physiology and Pharmacology 574 Pharmacy	(0-2)	1
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THE GRADUATE SCHOOL

The principal objective of the Graduate School is to offer education beyond the Bachelor's level to those men who aspire to become intellectual leaders in various professions and in various fields of teaching and research.

ADMINISTRATION

The faculty of the Graduate School consists of such members of the teaching staff and of the staffs of the Agricultural Experiment Station, the Texas Engineering Experiment Station, the Texas A. and M. Research Foundation, and the Texas Forest Service as the President may appoint on nomination by the Dean of the Graduate School. Appointment to the Graduate Faculty is based on recognized scholarly activity, fundamental research, or professional activity.

The Dean of the Graduate School is the representative of the Graduate Faculty and is responsible for the administration of the academic programs of all graduate students. He administers the policies and regulations set by the Graduate Council and approved by the Academic Council.

The Graduate Council is a standing committee of the Academic Council. It consists of twelve members chosen to give adequate representation to the various parts of the Graduate Faculty. The Graduate Council, acting for the Academic Council, sets the policies and rules by which the graduate programs are administered. Committees on Graduate Instruction are appointed by the individual deans for each of the four degree granting schools. These committees have general jurisdiction over matters pertaining to graduate work in each of their schools and, through recommendation and representation, participate in the decisions of the Graduate Council.

ADMISSION

A formal application is required of all persons seeking admission to the Graduate School. The application forms, which are available at the office of the Director of Admissions, should be filed not later than four weeks prior to the opening of the semester. Admission to the Graduate School cannot be granted until all the credentials enumerated in the application form have been filed.

All communications relating to admission should be addressed to the Director of Admissions. Questions on other matters concerned with graduate work should be addressed to the Dean of the Graduate School or to the appropriate subject matter department.

GRADUATE DEGREES

Graduate courses of study are offered leading to the degrees of:

Master of Agriculture (M.Agr.)
Master of Architecture (M.Arch.)
Master of Business Administration (M.B.A.)
Master of Education (M.Ed.)
Master of Engineering (M.Eng.)
Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)

The Master of Agriculture, Master of Education and Master of Engineering degrees offer broader training with less technical specialization. Individual research resulting in a thesis is not included. The 36 semester hours of work required includes specified written reports.

The Master of Science, Master of Business Administration, and Master of Architecture degrees are awarded to students who have received appropriate Bachelor's degrees and have thereafter successfully completed an approved advanced course of study requiring not less than one academic year (32 semester hours) of work.

The degree of Doctor of Philosophy is awarded in several fields related to agriculture and engineering. A student who has received an appropriate Bachelor's degree and has thereafter completed an approved program of advanced study and research may qualify for this degree.

PROFESSIONAL DEGREES IN ENGINEERING

The following professional degrees in engineering are available only to graduates of this college:

Aeronautical Engineer (Aero.E.)
Agricultural Engineer (A.E)
Architectural Engineer (Arch.E.)
Chemical Engineer (Ch. E.)
Civil Engineer (C.E.)
Electrical Engineer (E.E.)
Geological Engineer (Geol.E.)
Industrial Engineer (Ind.E.)
Mechanical Engineer (M.E.)
Petroleum Engineer (P.E.)

These degrees are offered on the basis of acceptable professional experience, a thesis, and an examination.

RESIDENCE

The Master's degree will be conferred only after a residence at the College of at least one academic year except that this requirement may be satisfied by residence during five summer terms of six weeks each, or an approved equivalent.

The degree of Doctor of Philosophy will be conferred only after residence beyond the Master's degree of either (1) two semesters of 12 hours each or (2) one semester of 12 hours and one summer session of 12 hours.

Full-time staff members engaged in graduate study and registered for less than 12 semester hours will receive proportionate resident credit.

GRADUATE SCHOOL BULLETIN

There is published biennially as a bulletin of the College an announcement of the work of the Graduate School, in which will be found full information concerning conditions of admission and requirements for degrees, including residence, thesis, and examinations. A copy of this bulletin is available upon request at the Office of the Director of Admissions.

COURSES OF INSTRUCTION BY DEPARTMENTS

All courses offered in the College are described on the following pages and are listed by departments, arranged alphabetically.

The course numbering scheme is as follows:

101 to 199, courses primarily open to freshmen.

201 to 299, courses primarily open to sophomores.

301 to 399, courses primarily open to juniors.

401 to 599, courses primarily open to seniors.

601 to 699, courses primarily open to graduates.

Those undergraduate courses marked at the right by a "†" may be taken for graduate credit.

Figures in parentheses following the number of the courses indicate the clock hours per week devoted to theory and practice respectively. Theory includes recitations and lectures; practice includes work done in the laboratory, shop, drawing room, or field. The unit of credit is the semester hour, which involves one hour of theory, or from two to four hours of practice per week for one semester of eighteen weeks.

Roman numerals to the right of the credit value of each course indicate the semester in which it is regularly offered. The letter "S" denotes summer offerings.

Any course may be withdrawn from the session offerings in case the number of registrations is too small to justify the offering of the course.

Department of Aeronautical Engineering

Professor A. E. Cronk,
Professor B. B. Hamner; Associate Professor R. L. Leutzinger

201. Elementary Aerodynamics. (3-3). Credit 4. II, S
Basic aerodynamic phenomena and simplified theory; elementary aircraft performance. Prerequisites: Mathematics 209 and 210, or registration therein; Mechanical Engineering 212 or registration therein; Physics 203, 204 or registration therein.

301. Theoretical Aerodynamics. (3-0). Credit 3. I
Fluid statics, kinematics, energy, momentum, similarity, viscosity, boundary layer, drag, circulation, lift, potential flow, thin airfoil theory, high lift devices. Prerequisite: Aeronautical Engineering 201.

302. Experimental Aerodynamics. (1-3). Credit 2. II
Wind tunnels and testing techniques. Wind tunnel calibration, airfoil pressure distribution, chord loading, airfoil drag by wake survey, boundary layer. Corrections of wind tunnel data for scale and other effects. Prerequisite: Aeronautical Engineering 301.

303. High Speed Aerodynamics. (3-0). Credit 3. II
Airfoil section characteristics and critical Mach Number. Span loading, fundamentals of compressible flow, pressure coefficients, critical conditions, aerodynamic heating, shock waves, compressibility effects, sweepback, and high speed data. Prerequisites: Aeronautical Engineering 301, registration in 302.

304. Elementary Aircraft Structures. (3-0). Credit 3. I
Airplane load analysis, external and internal loads and reactions for trusses, beams and space frameworks. Prerequisites: Aeronautical Engineering 201; registration in Civil Engineering 305; Mechanical Engineering 212.

306. Strength of Aircraft Materials. (2-3). Credit 3. II
Mechanical properties of materials and their use in design of members subject to tension, compression, shear and bending. Combined stresses and margins of safety. Prerequisites: Aeronautical Engineering 304; Civil Engineering 305.

401. Aircraft Design. (2-6). Credit 4. I
Aerodynamic design, specification, arrangement, performance analysis, weight and balance, stability. Prerequisite: Aeronautical Engineering 303.

402. Aircraft Design. (2-6). Credit 4. II
Structural design of major airframe components, consideration of government airworthiness requirements and customer specifications. Prerequisites: Aeronautical Engineering 401, 405.

403. Aircraft Materials and Processes. (1-3). Credit 2. I
Metallography of aluminum alloys, magnesium alloys, steel, nickel alloys, plastics, manufacturing methods, tool design, standards, heat treatment, finishes, factory organization. Prerequisite: Aeronautical Engineering 306.

405. Aircraft Structures. (3-0). Credit 3. I
Analysis of thin sheet metal structures, including shells, beams, and compression members subjected to critical loads. Prerequisite: Aeronautical Engineering 306.

406. Aircraft Power Plant Operation. (2-3). Credit 3. II
The use of modern instruments for testing aircraft engines, analysis of performance, design study, theory of operation. Prerequisite: Mechanical Engineering 410.

408. Seminar. (1-0). Credit 1. II
Readings, reports, conferences, and discussion. Prerequisite: Senior classification in aeronautical engineering.

410. Airplane Detail Design. (2-3). Credit 3. II
Layout and design of aircraft component parts and fittings. Prerequisites: Aeronautical Engineering 306, 405.

417. Aircraft Propulsion Systems. (3-0). Credit 3. II †
A study of the development, fundamentals, theories, construction, design, and performance of turbo-jet, ram jet, pulse jet, and rocket power plants for aircraft. Prerequisites: Aeronautical Engineering 401; Mechanical Engineering 410.

418. Advanced Aerodynamics. (4-0). Credit 4. II †
Theoretical and experimental aerodynamics for students majoring in aerodynamics. Theory of ideal fluid, viscous effects, compressible flow, and application to design problems. Prerequisites: Must have received at least a grade of B in Aeronautical Engineering 303 and Mathematics 307 or special permission.

421. Dynamics of Airplanes. (3-0). Credit 3. II
Linear theory of vibrations of single and multi-degree of freedom systems; self-excited vibrations. Applications of matrix algebra. Elementary theory of flutter; landing impact, gust response, aero-elastic effects, dynamic stability. Prerequisites: Aeronautical Engineering 401; Mathematics 307 or 308.

FOR GRADUATES

601. Principles of Fluid Motion. (4-0). Credit 4. I
Mathematical methods of analysis are emphasized. Perfect fluid theory development. Treatment of viscosity and boundary layer phenomena. Prerequisites: Aeronautical Engineering 303; Mathematics 307.

603. Aerodynamics of the Airplane. (4-0). Credit 4. I
Application of vector analysis to two- and three-dimensional airfoil theory. Viscosity and compressibility. Drag of aircraft components. Static and dynamic stability criteria. Prerequisites: Aeronautical Engineering 303; Mathematics 307.

604. Dynamics of Compressible Fluids. (4-0). Credit 4. II
Properties of compressible fluids, dynamics of one-dimensional motion, channel flows, shock waves, methods of observation, extension to two- and three-dimensional flow, effects of viscosity. Prerequisites: Aeronautical Engineering 303 and Mathematics 307, or approval of Head of Department.

605. Aircraft Structural Analysis. (4-0). Credit 4. I
The classical methods of analysis derived from strain energy and their application to aircraft structural problems. Studies of stresses and strains in aircraft structural arrangements involving thin sheets, sandwich construction, and different materials. Special problems and studies attendant to aircraft column work. Prerequisite: Mathematics 307 or approval of Head of Department.

606. Aircraft Structural Design. (2-6). Credit 4. II
Major structural design requirements of high performance aircraft will be studied. New materials and fabrication methods will be considered (magnesium, metalite, material combinations, etc). Original designs will be undertaken by each student. Prerequisite: Aeronautical Engineering 605.

607. Aircraft Structural Testing. (1-3). Credit 2. I
Static and dynamic testing procedures for aircraft structural testing, instruments used, data taking, data analysis, reports. Prerequisites: Aeronautical Engineering 605; Mechanical Engineering 617.

608. Aircraft Flutter Analysis. (4-0). Credit 4. II
Theoretical development of the structural and aerodynamic equations for two- and three-dimensional aircraft flutter. Numerical solutions in practical problems to determine flutter velocities. Methods of testing to determine vibration characteristics of aircraft. Prerequisites: Aeronautical Engineering 421 or Mechanical Engineering 459 or 617; Mathematics 307.

691. Research. Credit 2 to 6 each semester. I, II
Technical research projects approved by the Head of the Department.

Department of Agricultural Economics and Sociology

Professor T. R. Timm,
Professors L. P. Gabbard, R. L. Hunt, J. G. McNeely, A. C. Magee, B. H. Nelson, W. E. Paulson, Daniel Russell; Associate Professors W. G. Adkins, R. E. Branson, M. S. Brooks*, D. R. Davis, R. L. Skrabanek; Assistant Professors V. W. Edmondson, R. J. Hildreth, F. O. Sargent, J. M. Ward, H. S. Whitney

AGRICULTURAL ECONOMICS

105. Introduction to Rural Economy. (3-0). Credit 3. 1, II
An introduction to the economic problems of agriculture and the place of agriculture in our national economy.

*On leave of absence

205. Cotton Trade Procedure. (3-0). Credit 3, I
Policies and practices employed in the cotton trade with emphasis on local marketing operation.

209. Elementary Cotton Classification. (0-3). Credit 1. I
Introductory studies of cotton quality and cotton classing through practice in identifying the important grades and staples.

210. Principles of Cotton Classification. (1-3). Credit 2. II
Grading and stapling instruction, factors affecting cotton quality, and practice in classing a wide variety of samples.

314. Marketing Farm Products. (3-0). Credit 3. I, II, S
A general introductory course covering the principles, practices, and problems involved in the marketing of agricultural commodities.

315. Economic History of Agriculture. (3-0). Credit 3. II
The economic history of American agriculture and its European background; the interrelationship between development in agriculture and industry and commerce; the growth of institutions and the enactment of legislation for the advancement of agriculture.

321. Farm and Ranch Records and Accounts. (1-2). Credit 2. I
Systems of records and accounts suited to farms and ranches; adaptation of types of records and accounts to meet specific needs. Emphasis on the use of records and accounts as aids to more efficient farm and ranch management. Laboratory work devoted to problems in keeping and using the various types of records and accounts. Prerequisite: Twelve hours of credit in technical agriculture. (Offered in 1956-57 and alternate years thereafter.)

324. Agricultural Prices. (3-0). Credit 3. I
Analysis of factors influencing the price of farm commodities. Prerequisites: Economics 203 and 204, or 205.

404. Marketing Practices. Credit 3. S †
A study of current marketing practices and problems.

413. Cooperation in Agriculture. (3-0). Credit 3. I †
Analysis of the past and present practices and problems of cooperatives in the United States and foreign countries, with major attention to farmers' cooperative marketing and purchasing activities. Prerequisite: Agricultural Economics 314.

416. Economics of Livestock Marketing. (2-0). Credit 2. I †
The practices and problems involved in the marketing of livestock and livestock products. Prerequisite: Agricultural Economics 314.

421. Principles of Farm and Ranch Management. (2-2). Credit 3. I, II
The application of business principles to the organization and operation of farms and ranches. Special attention to the factors influencing farm profits. Laboratory work based on actual farms and ranches. Prerequisite: Twenty hours of credit in technical agriculture.

422. Land Economics. (3-0). Credit 3. I, II
The physical, institutional, and economic factors involved in the utilization of land. Prerequisites: Economics 203 and 204, or 205.

429. Public Policies Affecting Agriculture. (3-0). Credit 3. I, II †
A critical analysis of the past and present programs of governmental agencies and farmers' organizatons for the economic betterment of agriculture Prerequisites: Economics 203 and 204, or 205.

430. Agricultural Finance. (3-0). Credit 3. I, II †
Analysis of the credit requirements of individual farmers and farmers' cooperative organizations; investors and depositors as sources of credit; principles upon which each type of farm credit is extended; the instruments and legal aspects of farm credit; the cost of credit; description of financial institutions which serve agriculture, with major attention to the component units of the Farm Credit Administration. Prerequisites: Economics 203 and 204, or 205.

432. Farm and Ranch Organization and Operation. (1-3). Credit 2. II
Detailed problems involved in the organization and management of specific farms and ranches, covering such matters as efficiency analysis, budget preparation, layout and improvement. Prerequisite: Agricultural Economics 421. (Offered in 1956-57 and alternate years thereafter.)

443. Applied Farm Management. (2-2). Credit 3. S †
A special three-weeks summer course for Extension Service personnel and other professional agricultural workers, reviewing basic economic principles used in farm management, the use of these principles in farm business planning, consideration of some of the more common management problems confronting Texas farmers, and opportunities for and methods of using the farm management approach in educational work with farm people. Laboratory work based on actual farms and ranches and to include visits to several farms. Prerequisites: Baccalaureate degree; experience in professional agricultural work.

444. Farm Family Economics. (1-2). Credit 2. S †
A special two weeks' summer course primarily for women engaged in Agricultural Extension work, covering principles of financial management for farm families. Prerequisite: Approval of the instructor.

452. International Trade and Agriculture. (3-0). Credit 3. II †
World production and demand, present and potential, of agricultural commodities; world trade in farm products with emphasis on causal factors; national and international policies relating to agriculture; status of agricultural resources, technological progress in agriculture, and food requirements in major areas. The course is designed particularly for those interested in foreign agricultural service with governmental agencies or in export-import work with commercial concerns. Prerequisite: Senior classification.

481. Seminar. (1-0). Credit 1. I
Role of social scientist in the agricultural industry; professional opportunities and responsibilites; individual investigations and reports; discussions with prominent leaders in field. Prerequisite: Senior classification in agricultural administration or approval of Head of Department.

FOR GRADUATES

601. Farmers Movements. (4-0). Cedit 4. II
History of efforts of farmers to solve their economic problems. Prerequisite: Approval of instructor.

602. Agricultural Marketing. (4-0). Credit 4. I, S
An analysis of the problems involved in the marketing of farm products. Prerequisite: Agricultural Economics 314.

603. Land Economics. (4-0). Credit 4. II
An extensive study of problems involved in developing state and national policies for the proper utilization of our land resources. Prerequisite: Agricultural Economics 422.

611. Farm Management. (4-0). Credit 4. II
A study of research problems in farm management, methods used in obtaining farm management data, specific problems in conducting farm

management surveys, and cost of production studies; analysis of farm management data; use of findings in formulating farm organization and management programs. Survey of research literature in farm and ranch organization and management. Prerequisite: Agricultural Economics 421.

612. Cotton Marketing. (4-0). Credit 4. I
Extensive study of potential cotton areas of the world, trends in production, trends of consumption of cotton and substitutes for cotton in the various consuming areas; national and international policies that affect the cotton farmers; price determining factors in the various markets; governmental aid in estimating supply and demand; regulations of standards, and control of futures market; cooperative versus individual sale of cotton. Prerequisite: Agricultural Economics 314.

614. Agricultural Policy. (4-0). Credit 4. I
An analysis of public policies and programs affecting agriculture. Prerequisite. Agricultural Economics 429 or approval of instructor.

615. Farm Taxation. (4-0). Credit 4. II
A study of the taxation of farm property and of the cost and services of local government. Prerequisites: Economics 203, 204.

620. Agricultural Finance. (4-0). Credit 4. II, S
Problems in financing agricultural production and marketing. Analysis of operations of financial institutions serving agriculture. Prerequisite: Agricultural Economics 430 or approval of instructor.

627. Agricultural Prices. (4-0). Credit 4. S
An economic and statistical analysis of the prices of agricultural products. Prerequisites: Agricultural Economics 324; Buisness Administration 303.

641. Applied Agricultural Statistics. (3-2). Credit 4. I
Planning the statistical research project, developing forms, selecting the sample, conducting the study, tabulating, analyses, and interpreting the data. Prerequisites: Business Administration 303 or Genetics 406 or equivalent; 15 hours of social science; approval of the instructor.

645. Government and Agriculture. (3-0). Credit 3. S
A special three-weeks summer course for Extension Service personnel and other professional agricultural workers, covering government functions in agriculture; goals and values of farm people; nature and significance of political and economic institutions; processes in formation and execution of agricultural policy; case studies in special agricultural policy areas; and opportunities for and methods in educational work with farm people in the field of agricultural policy. Prerequisite: Approval of the instructor.

681. Seminar. (1-0). Credit 1 each semester. I, II
A review of current literature, preparation of papers on selected topics, and discussions with visiting agricultural economists. Prerequisite: Graduate classification.

685. Problems. Credit 1 to 4 each semester. I, II, S
A directed individual study of a selected problem in the field of agricultural economics. Prerequisite: Approval of the instructor.

691. Research. Credit 1 or more each semester. I, II, S
Methods of research. Investigation and preparation of thesis.

RURAL SOCIOLOGY

205. Principles of Sociology. (3-0). Credit 3. I, II, S
The scope and objectives of sociology and rural sociology. An analysis of culture, social groups, and personality; of their interrelationships; of how they develop and change; and of how these changes produce social problems.

206. Social Processes. (2-0). Credit 2. II
An introduction to social institutions and some of their major problems, to the processes of social interaction, and to population phenomena and problems. Prerequisite: Rural Sociology 205.

304. Criminology and Juvenile Delinquency. (3-0). Credit 3. I, II, S
Extent and cost of crime. Causes of crime. Processes of criminal behavior. Ecology of crime. Theories of criminology and penology. The police system. Criminal and juvenile courts, the indeterminate sentence, and pardon. Punishment and treatment of criminals and juvenile delinquents. Prison systems and reformatories. Probation and parole. Recidivism and reformation. Prevention of crime.

306. Principles of Social Work. (3-0). Credit 3. II, S †
Rise and present organization of social welfare agencies and the social services. Distinctive techniques of social work profession in case work, group work and community organization. Twelve hours of independent field work must be performed if graduate credit is allowed. Prerequisite: Rural Sociology 205 or 6 additional hours of rural sociology or other social science.

311. Social Psychology. (3-0). Credit 3. I †
An analysis of why people behave the way they do. The effect of social experiences and of the groups people belong to upon the development of personality. How to influence and control the behavior of people. Social adjustment and maladjustment including analysis of causes. Public opinion. Prerequisite: Psychology 207 or Rural Sociology 205.

314. Social Problems. (3-0). Credit 3. I
A study of social problems associated with poverty and dependency, unemployment and underemployment, race relations, health, housing, the unmarried, vice, and mental deficiency. Prerequisite: Rural Sociology 205.

315. The Family. (3-0). Credit 3. I, II
A study of the evolution and growth of the family as a fundamental social institution. A critical analysis of changes taking place in the family and in society that affect the family with chief emphasis being placed on the modern family and its problems. Prerequisite: Junior classification.

320. Social Anthropology. (3-0). Credit 3. I
Rise, development, and spread of man's attempts at group living with emphasis on interpretation of artifacts of man's material culture. Particular emphasis is placed on the relationship between culture and personality. Prerequisite: Rural Sociology 205 or 6 hours of social science.

330. War and Group Conflicts. (3-0). Credit 3. II
Analysis of causes of civil and international war and of proposals for preventing or reducing major group conflicts. Interrelationship among the causes of war is emphasized. Extensive illustrations are contemporary and drawn primarily from Asia, Europe, and Africa. Designed to be of special value to those who may perform civilian, military, or other government services abroad. Prerequisite: Rural Sociology 205 or 6 hours in the social sciences.

404. Rural Community Development. (3-0). Credit 3. I †
A study of the community as a fundamental unit of rural organization. An analysis of community types, forces, and resources with suggested comprehensive programs to meet community needs. Orientation into local community settings; such national programs as Extension Service, F.S.A., Soil Conservation, 4-H Clubs, F.F.A.'s, Farm Bureau, Farm Grange, public health, recreation, etc. Not open for graduate credit to students who have taken Rural Sociology 612. Additional assignments will be required of students seeking graduate credit. Prerequisite: Rural Sociology 205 or its equivalent.

407. Rural Social Problems. (3-0). Credit 3. I, II, S
An analysis of the conditions, forces, and agencies influencing the life of the country dweller and the rural community. A study of a number of special social problems relating to rural life, such as population questions, migration, farm labor, farm tenure, rural schools, rural health and sanitation, community organizations, and community planning. Special attention is given to these problems as found in Texas. This course is specifically planned for men in departments other than Rural Sociology. Prerequisite: Junior classification.

408. Organization for Boy Scout Work. (2-0). Credit 2. II
History and development of the Boy Scout movement. Understanding the boy and fitting a program to meet his needs. Developing adult leaders in the boy, man institutional relationship. Specialized programs such as cubbing, senior scouting, sea scouting, etc. Fitting scouting to the rural boy's needs and life pattern.

412. Population Analysis. (3-0). Credit 3. II
Methods of demographic analysis. The influence of population numbers, birth rate, death rate, sex ratio, age composition, nativity, racial composition, and migration on social values and social structure. Theories of population growth and change and their effects on population policies. International aspects of demographic position of the United States. Prerequisite: Junior classification.

418. Public Opinion and Social Control. (3-0). Credit 3. I †
Analysis of processes, planned or unplanned, by which individuals are taught, persuaded, or compelled to conform to usages and life values of groups. Nature and use of public opinion and propaganda. Prerequisite: Rural Sociology 205.

FOR GRADUATES

601. Rural Social Problem Analysis. (4-0). Credit 4. I
Analysis of rural social problems pertaining to health, farm labor, tenancy, the church, welfare work, education, local government, race relations, and population problems with emphasis upon causes and proposed solutions. Concurrent training in outlining and in objective, scientific style of presentation preferred in sociological publication. Prerequisites: Rural Sociology 205 or its equivalent and 9 additional hours of social science*; or 18 hours of social science*.

602. Rural Social Theory. (4-0). Credit 4. II
A review of the contributions of present-day rural sociologists and other social scientists to the field of rural sociology. Emphasis upon critical evaluation as to scientific standards and procedures used in specific studies in the field. Prerequisites: Rural Sociology 205 or its equivalent; 9 additional hours of sociology.

606. Rural Youth Leadership. (4-0). Credit 4. I, S
A survey and analysis of the rural youth problems and a discussion of techniques of rural youth leadership. The course is meant for school teachers, boy scout leaders, F.F.A., 4-H Club, Y.M.C.A., Y.W.C.A., and other youth leaders. The course will consist of lectures and field trips to youth projects. Prerequisites: Rural Sociology 205 or its equivalent and 9 additional hours of social science*; or 18 hours of social science*. If the latter alternative is chosen, suitable practical experience may be substituted at the rate of four months of experience per credit hour up to a total of eight credit hours.

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*For this purpose social science is defined to include only courses in economics, agricultural economics, psychology, political science, anthropology, and sociology.

611. History of Social Thought. (4-0). Credit 4. II
The development of social thought from ancient times to the present. Chief emphasis is placed upon sociological thinkers who have made significant contributions to the field, the theories of these men, and the background from which these theories evolved. Prerequisites: Rural Sociology 205, 206, and 311 or their equivalent; 6 additional hours of other social sciences*. Additional social science* courses may be substituted for any two of the above sociology courses at the ratio of three hours of other social science per one hour of sociology.

612. The Rural Community. (4-0). Credit 4. II
A study of the rural community as to its geographic background, population, social institutions, and occupational attitudes. Different efforts at organizing the rural community, as the county public welfare project, school and church community center projects, recreational and health projects, local, state, and national agencies for rural community cooperation are studied. Not open to students who have taken Rural Sociology 404 for graduate credit. Prerequisites: Rural Sociology 205 or its equivalent and 9 additional hours of social science*; or 18 hours of social science*. If the later alternative is chosen, suitable practical experience may be substituted at the rate of four months of experience per credit hour up to a total of eight credit hours.

618. Educational Sociology. (3-0). Credit 3. S
How our school system can strengthen our democratic way of life. The relationship of education to social organization, social change, and social control. Sociological analysis of the role of education in our society. Prerequisites: Rural Sociology 205 or the equivalent; 9 additional hours of social science or a degree in education.

685. Problems. Credit 1 to 4 each semester. I, II, S
A directed individual study of a selected problem in the field of rural sociology. Prerequisite: Six hours of rural sociology or 12 hours of supporting social science.

691. Research. Credit 1 or more each semester. I, II, S
Initiation and completion of a research project of approved scope for an advanced degree. Prerequisite: Approval of the instructor.

Department of Agricultural Education

Professor E. V. Walton,
Professor Henry Ross; Assistant Professors B. D. Cook**, J. D. Gray,
O. M. Holt, J. R. Jackson, Earl Knebel

301. Principles of Agricultural Education. (3-0). Credit 3. I
An introduction to the study of agricultural education, designed to acquaint the student with the principles of education theory, the aim and meaning of education, leadership training, professional organizations, and literature. Organization and operation of Future Farmer chapters.

425. Course Building. (2-0). Credit 2. II †
Preparing units of instruction in vocational agriculture for all-day, part-time, and evening school classes.

426. Methods in Adult Agricultural Education. (2-0). Credit 2. I †
Planning educational programs and activities for adult farm people in young farmer and adult classes. Developing skill in the use of the group process in teaching.

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*For this purpose social science is defined to include only courses in economics, agricultural economics, psychology, political science, anthropology, and sociology.
**On leave of absence

427. Methods of Developing Farming Programs. (1-2). Credit 2. I †
Planning and supervising farm programs of vocational agriculture students.

431. Student-Teaching in Vocational Agriculture. (2-2). Credit 3. I
Methods of teaching in agricultural education; planning for and teaching vocational agriculture in Texas. Three weeks observation and student teaching in local departments of vocational agriculture. Presentation and discussion of problems encountered by student teacher in the field. Prior planning required.

432. Student-Teaching in Vocational Agriculture. (2-2). Credit 3. II
Planning for and teaching vocational agriculture in selected departments in Texas. Three weeks student teaching and observation in local departments of vocational agriculture. Presentation and discussion of problems encountered by practice teachers in the field. A study of current problems in teaching vocational agriculture. Prior planning required.

441. Agricultural Extension Organization and Methods. (2-2). Credit 3. I, II
Cooperative agricultural extension service, objectives, organization and administration, operation, results, social and economic significance. Analytical approach to farm and home problems. Principles of extension teaching and measuring results. Methods in selecting, training, and using farm leaders. Principles in dealing with practical problems of planning, developing, and executing county programs. Prerequisite: Senior classification.

FOR GRADUATES

(One year of acceptable experience and Agricultural Education 425, 426, 431, 432, or their equivalents are prerequisites to the following courses unless otherwise noted.)

601. Advanced Methods in Agricultural Education. (3-0). Credit 3. I, S
An advanced course in methods of teaching vocational agriculture.

605. Supervised Farming. (3-0). Credit 3. I, S
Advanced study of supervised farming in vocational agriculture and methods of supervising students in carrying out supervised farming programs.

607. Future Farmer and Young Farmer Activities. (3-0). Credit 3. II, S
Methods of conducting Future Farmer and young farmer activities.

610. Adult Education in Agriculture. (3-0). Credit 3. II, S
Methods of organizing and conducting adult education programs in vocational agriculture on a participation basis. Supervision of practice work, determining course content, follow-up work, setting up publicity programs, and evaluating improved practices resulting from evening school instruction.

613. Administration and Supervision of Agricultural Education. (3-0). Credit 3. II, S
Problems of organization, administration, financing, and supervision of vocational agriculture, and extension work.

615. Philosophy of Agricultural Education. (3-0). Credit 3. S
A study of the philosophy and evaluation of agricultural education. Emphasis on the development and use of evaluative criteria and tests in the field of vocational education in agriculture.

616. Program Building in Agricultural Education. (3-0). Credit 3. I, II, S
Organization of programs in agricultural education on local, state, and national basis. Securing assistance of public school administrators, farmers, and county, state, and national agricultural agencies in program building.

619. Workshop in Agricultural Education. (1-6). Credit 3. S
Students select two problem areas for study in the field of vocational agriculture. Committees are set up to utilize consultants in specialized areas of study. Reports are required. Prerequisite: Teaching vocational agriculture or approval of Head of Department.

630. Guidance and Counseling for Rural Youth. (3-0). Credit 3. S
Analysis of occupational and vocational opportunities for rural youth, techniques of individual group counseling and guidance. Practicum in personality and occupational interest testing. Prerequisite: Approval of Head of Department.

685. Problems. Credit 2 to 4 each semester. I, II, S
Studies related to classroom, laboratory, supervised farming, and adult education activities. For Master of Education programs only.

691. Research. Credit 1 or more each semester. I, II, S
Research for thesis for Master of Science programs only.

Department of Agricultural Engineering

Professor F. R. Jones,
Professors R. C. Garrett, Price Hobgood; Associate Professor O. R. Kunze;
Assistant Professor R. N. Craig; Instructors W. H. Aldred, C. W. Keese,
B. R. Stewart

201. Farm Power and Machinery. (2-2). Credit 3. I, II
Construction, operation, adjustment, and servicing of farm engines and tractors. Adaptability, selection, economic utilization, construction, operation, and adjustment of the principal tillage, planting, cultivating, harvesting, and feed processing machines.

205. Materials in Farm Structures. (2-3). Credit 3. I
Selection and utilization of materials for light structures. Specifications and cost estimation. Prerequisite: Engineering Drawing 105.

208. Farm Machinery. (3-3). Credit 4. II
Selection and economic application as well as the design, construction, operation, adjustment, care, and repair of all types of farm machinery. Prerequisite: Physics 203.

213. Food Plant Engineering. (2-3). Credit 3. II
Elementary mechanics, power transmission, steam and steam boilers, pipes and pipe fitting, refrigeration and insulation, temperature measurement and control, electric motors, disposal of waste products, and mechanical problems as applied to foods and food processing.

219. Farm Shop. (2-3). Credit 3. I
A special course in shop work for students majoring in agricultural engineering. Includes some woodwork and roof framing, forging, soldering, welding, pipe fitting, machinery repair, and use of hand and power tools.

221. Farm Shop. (1-3). Credit 2. I
A course for students in agricultural education and general agriculture involving carpentry and woodwork, tool sharpening, preparation of simple drawings and bills of materials, blueprint reading, and rafter cutting.

222. Farm Shop. (1-3). Credit 2. I, II
A course for students in agricultural education and general agriculture involving electric and gas welding, cold metal work, forging, soldering, pipe fitting, and the preparation and use of concrete.

305. Terracing and Drainage. (3-3). Credit 4. I, II
Elementary surveying, use of tape, chain, level, plane table; land drainage; terracing, gully control, irrigation; land clearing and reclamation methods.

324. Automotive Machinery. (3-3). Credit 4. II
Construction, operation, care and repair of tractors, trucks, and automobiles; tractor types and sizes and their economic adaptability and utilization.

325. Farm Electricity. (2-2). Credit 3. I, II
A course for students in agricultural education and general agriculture and including elements of electric current generation and transmission, farm applications of electric heating, lighting and power, wiring motors, power rates, meter reading, safety rules and regulations.

333. Surveying and Water Utilization. (2-3). Credit 3. I, II
Elementary surveying including chaining, leveling, and mapping as applied to farm needs. Water control and conservation with special emphasis on basic irrigation and terracing principles and practices.

410. Irrigation and Drainage Engineering. (2-3). Credit 3. II †
Principles of farm drainage as applied to open ditches and tile drains; drainage districts and laws; land clearing and reclamation methods. Principles of irrigation practice; sources of water supply; distribution systems; application of water to crops; measurement and duty of water; alkali control. Prerequisites: Civil Engineering 201, 311.

413. Farm Structures Design. (2-3). Credit 3. II †
Structural problems in farm building design. Functional planning of farm buildings with respect to economy, convenience, sanitation, and appearance. Prerequisites: Agricultural Engineering 205; Civil Engineering 305.

418. Agricultural Process Engineering. (2-3). Credit 3. I †
Engineering principles and their application to product drying and storage, materials handling, flow rate measurement, conditioning air, instrumentation, fans, sorting and size reduction.

425. Seminar. (1-0). Credit 1. I †
A review of current literature dealing with agricultural engineering problems presented by staff members and students. Prerequisite: Senior classification.

426. Seminar. (1-0). Credit 1. II †
Presentation of papers dealing with new developments and results of investigations of problems related to agricultural engineering. Prerequisite: Senior classification.

428. Soil and Water Conservation Engineering. (2-3). Credit 3. I †
Principles of engineering practice as applied to soil and water conservation, including runoff, terrace and terrace outlet design and construction; proper cultural and tillage practices and related topics. Prerequisites: Civil Engineering 201, 311 or registration therein.

430. Farm Electrification Engineering. (2-3). Credit 3. II †
Economic application and utilization of electric power on farms and in rural communities. Prerequisite: Agricultural Engineering 418.

440. Farm Electrification. (3-0). Credit 3. S †
This course includes the fundamentals of farm wiring and lighting and the design, construction, and operation of electric water systems, refrigeration equipment, brooders, milking machines, feed processing and handling equipment, hay and grain driers, and other electric equipment used in farm production. This is a special course for teachers and prospective teachers in vocational agriculture to be offered for a three-weeks period during the summer.

FOR GRADUATES

601, 602. Drainage and Irrigation. (3-3). Credit 4 each semester. I, II
Advanced study of farm drainage and irrigation with special emphasis on recent developments. Prerequisite: Agicultural Engineering 410.

603, 604. Mechanical Farm Equipment. (3-3). Credit 4 each semester. I, II
Advanced study of farm machinery and equipment with special emphasis on recent developments. Prerequisite: Agricultural Engineering 208.

605, 606. Farm Structures. (2-6). Credit 4 each semester. I, II
Advanced study of farm buildings and farm home utilities. Prerequisites: Agricultural Engineering 205, 413, 418.

609, 610. Farm Power. (2-6). Credit 4 each semester. I, II
Advanced study of farm power with special emphasis on recent developments. Prerequisite: Agricultural Engineering 324.

613, 614. Soil and Water Conservation Engineering. (3-3). Credit 4 each semester. I, II
The advanced study of the design and construction of terraces, outlet channels, and other structures used for soil and water conservation, with special emphasis on late developments. Prerequisite: Agricultural Engineering 428.

685. Problems. Credit 1 to 4 each semester. I, II
Advanced laboratory or field problems not related to student's thesis. Prerequisite: Graduate classification.

691. Research. Credit 1 or more each semester. I, II
Research for the thesis or dissertation.

Department of Agronomy

Professor J. S. Rogers,
Professors H. E. Hampton, J. S. Mogford, J. B. Page, R. C. Potts, I. P. Trotter;
Associate Professors M. E. Bloodworth, C. L. Godfrey, G. W. Kunze,
T. E. McAfee; Assistant Professors J. W. Anderson, J. F. Mills;
Instructor J. A. Wilson

105. Fundamentals of Crop Production. (2-2). Credit 3. I, II
Classification and distribution of farm crops; importance of good varieties and good seed; crop improvement; preparation of the seed bed; commercial fertilizers; manures and lime; seeding practices; crop tillage; harvesting; meadow and pasture management; weeds; crop rotation; diseases and insect enemies.

301. Introductory Soils. (3-2). Credit 4. I, II, S
An introductory course designed to acquaint the student with the field of soil science. Some of the basic principles of the physical, chemical, and biological properties of the soil and their general applications are covered. Prerequisite: Chemistry 102.

308. Forage Crops. (2-2). Credit 3. I, II, S
The production, utilization, and identification of the major forage crop plants with emphasis on adapted species and varieties for the Southwest. Prerequisites: Agronomy 105, 301; Biology 101.

310. Soil Morphology. (1-3). Credit 2. II
Field study of the morphological features of the soil profile in relation to soil utilization and management. Soil development, classification, and mapping are also covered. Prerequisite: Agronomy 301.

314. Cereal Crops. (2-2). Credit 3. I
The classification, production, harvesting, and utilization of corn, wheat, oats, barley, rice, rye, grain sorghums, and flax seed together with a study of the various species and varieties of the crops mentioned. Prerequisites: Agronomy 105, 301; Biology 101.

315. Cotton Production. (2-2). Credit 3. I
History, distribution, and consumption of cotton, and a study of species, varieties, improvements, adaptation, fertilization, tillage practices, insects, diseases, harvesting, ginning, and economics of production. Flax, hemp, and other miscellaneous fiber crops are treated briefly. Prerequisites: Agronomy 105; Biology 101.

316. Commercial Grading of Grain and Hay. (1-3). Credit 2. II
The commercial grading of hay and the grains for which Federal Standards have been established. Ways and means of improving quality to meet the trade requirements are covered. Prerequisite: Agronomy 105.

318. Soil Conservation. (3-3). Credit 4. I, II, S
A course dealing with the importance of soil conservation from the standpoint of different soil types in the agricultural regions of Texas and the United States. Conservation methods are presented according to climatic regions, cropping systems, topographic locations, and other influencing factors. Field practice in the making of a map of a farm, its soil, and a plan of reorganization for soil conservation. Prerequisite: Agronomy 301.

319. Seed Quality. (1-2). Credit 2. I
A study of the important agronomic crop seeds with emphasis on harvesting, cleaning, grading, and storage as they influence quality of planting seed. Prerequisites: Agronomy 105; Biology 101.

413. Soil and Crop Management. (3-0). Credit 3. II †
A study of the special problems in the utilization and management of soils and crops under varying soil and climatic conditions. Independent work in solving current agronomic problems in different parts of the Southwest required. Prerequisites: Agronomy 301; senior classification.

415. Agronomy Seminar. (1-0). Credit 1. I, II
The preparation and presentation by the students of papers on pertinent agronomic topics. Required of all agronomy majors in their last semester. Prerequisite: Senior classification in agronomy.

417. Pasture Management. (2-2). Credit 3. I, II †
Adaptation and management of native and introduced pasture plants; their establishment, production, utilization, and maintenance in permanent and temporary pastures. Field trips are required. Prerequisites: Agronomy 301, and either Agronomy 308 or Range and Forestry 303.

422. Soil Fertility. (3-4). Credit 4. I, S †
An advanced course dealing with the more technical consideration of the physical, chemical, and biological factors influencing the crop producing power of the soil. Prerequisites: Agronomy 301; Chemistry 223, 231; Plant Physiology and Pathology 313.

426. Fertilizer Technology. (2-0). Credit 2. II
A study of the problems of the manufacture, storage, and application of commercial fertilizers, including a limited number of required field trips to various types of fertilizer plants. Prerequisites: Agronomy 301; 14 hours of chemistry and/or physics.

430. Feed Microscopy. (1-3). Credit 2. I
Feed microscopy. The macroscopic and microscopic structure of plant and animal tissues. Histological structures used to detect and maintain identity of ground feed ingredients, separately or in mixtures. Prerequisites: Agronomy 105; Biology 101.

443. Soil Microbiology. (2-3). Credit 3. II †
A study of the occurrence of microorganisms in the soil and the biochemical transformations for which they are responsible. Prerequisites: Agronomy 301; Biology 206. (Offered in 1957-58 and in alternate years thereafter.)

445. Soil Physics. (2-3). Credit 3. I †
A study of the fundamentals of soil physics and their application to the solution of problems in crop production, irrigation, and engineering. Prerequisites: Nine hours of soils and physics, with a minimum of 3 hours of each (may include soil mechanics).

485. Problems. Credit 1 to 4. I, II, S
A course for advanced undergraduates to permit field or laboratory investigations or the study of subject matter not included in established courses. Prerequisites: Ten hours of junior and senior agronomy.

FOR GRADUATES

601. Advanced Cereal Crops. (3-4). Credit 4. II
An advanced study of cereal production and breeding, including a review of investigations in this field.

602. Advanced Forage Crops. (3-4). Credit 4. I
An advanced study of forage production and breeding, including a review of investigations in this field.

605. Pedology. (3-0). Credit 3. I
An advanced study of the development, morphology, constitution, and classification of soils.

617. Advanced Soil Physics. (3-3). Credit 4. I
The physical constitution and properties of soil, including consistence and structure, aeration, soil water, and thermal relationships. Prerequisites: Agronomy 445 or the equivalent and a two-semester course in physics.

618. Advanced Soil Analysis. (2-3). Credit 3. I, II
A course designed to familiarize the student with the more difficult problems of soil analysis and the interpretation of the data. Prerequisite: Agronomy 422.

624. Physical Chemistry of Soils. (3-3). Credit 4. I
The physical chemistry of clay minerals and the inorganic and organic soil colloids. Prerequisites: Agronomy 617, 618; Chemistry 323, 324. (Offered in 1956-57 and in alternate years thereafter.)

626. Soil Mineralogy. (3-3). Credit 4. I
A study of the crystal structures and properties of the more important agricultural and industrial clays combined with identification techniques involving X-rays, differential thermal analysis, and electron microscopy. (Offered in 1957-58 and in alternate years thereafter.)

681. Seminar. (1-0). Credit 1 each semester. I, II
A seminar for graduate students and staff members in soils and crops. Presentation and discussion of special topics and research data in the field of agronomy. Participation is required of all graduate students in agronomy.

685. Problems. Credit 1 or 2 each semester. I, II, S
Advanced problems in some phase of agronomy not directly related to the thesis or dissertation.

691. Research. Credit 1 or more each semester. I, II, S
Investigations leading to the thesis or dissertation.

Department of Air Science

Henry Dittman, Colonel, USAF
Professor of Air Science

United States Air Force

Associate Professors: Lieutenant Colonel W. J. Hall; Majors C. V. Carson, R. K. Conoley, E. W. Rodgers, H. L. Somerville; Assistant Professors: Captains G. G. Cowles, T. J. Dunlap, R. E. Griffith, C. W. Jefferies, G. P. Jones, R. A. McCaulley, J. M. Palmer, T. A. Wright; First Lieutenant R. P. Foster, Jr.; Instructors: Master Sergeants H. H. Allen, D. D. Christensen, L. A. Darnell, H. M. Drake, T. C. Duran, C. L. Thompson, W. Umphress, T. H. Williams; Technical Sergeants B. J. Heaton, H. J. Steinfeldt, Jr.; Staff Sergeants B. W. Smith, M. K. Wilson

AF ROTC GENERALIZED COURSE OF STUDY
BASIC COURSE OF AIR SCIENCE

141. First Year Basic Air Science. (0-3). Credit 1. I
Theoretical: Introduction to AFROTC; introduction to aviation; and fundamentals of global geography.
Practical: Drill—basic military training.

142. First Year Basic Air Science. (0-3). Credit 1. II
Theoretical: International tensions and security organizations; and military instruments of national security.
Practical: Drill—basic military training.

241. Second Year Basic Air Science. (0-3). Credit 1. I
Theoretical: Careers in the United States Air Force; moral and spiritual foundations for leadership; introduction to aerial warfare; targets; and weapons.
Practical: Leadership laboratory—cadet non-commissioned officer training.

242. Second Year Basic Air Science. (0-3). Credit 1. II
Theoretical: Aircraft; bases; and operations.
Practical: Leadership laboratory—cadet non-commissioned officer training.

ADVANCED COURSE OF AIR SCIENCE

341. First Year Advanced Air Science. (2-3). Credit 3. I
Theoretical: Introduction to advanced AFROTC; Air Force commander and staff; creative problem solving; Air Force base functions; and communicating in the Air Force.
Practical: Leadership laboratory—cadet officer training.

342. First Year Advanced Air Science. (2-3). Credit 3. II
Theoretical: Instructing in the Air Force; military justice system; air navigation; weather; and preparation for summer training.
Practical: Leadership laboratory—cadet officer training.

441. Second Year Advanced Air Science. (2-3). Credit 3. I
Theoretical: Career guidance; moral responsibilities of Air Force leaders; leadership and management seminar; and military aviation and evolution of warfare.
Practical: Leadership laboratory—cadet officer training.

442. Second Year Advanced Air Science. (2-3). Credit 3. II
Theoretical: Military aspect of world political geography; and briefing for commissioned service.
Practical: Leadership laboratory—cadet officer training.

Department of Animal Husbandry

Professor O. D. Butler, Jr.,
Professors R. O. Berry, F. I. Dahlberg, Fred Hale, J. C. Miller, J. K. Riggs, T. D. Watkins, Jr.; Associate Professor H. O. Kunkel; Assistant Professors G. T. King, A. M. Sorensen, Jr.; Instructor W. T. Berry, Jr.

107. General Animal Husbandry. (2-3). Credit 3. I, II
An introductory survey course stressing the importance of livestock and livestock farming. General factors influencing efficiency in feeding, market value, breeding, health, and adaptability of various species to geographical and climatic regions are emphasized.

202. The Breeds of Farm Animals. (2-2). Credit 3. I, II
The place of origin and early development of breeds of cattle, horses, sheep, and swine; constructive breeders; adaptability; distribution; breed type and characteristics; breed organizations; publications; score card and comparative judging of representative animals. Prerequisite: Animal Husbandry 107.

303. Animal Nutrition. (3-0). Credit 3. I, II
Chemical composition of feeding stuffs; composition of farm animals; digestion; metabolism; functions of nutrients; vitamins; coefficients of digestibility; energy in feeds and its uses; feed requirements of animals; maintenance; growth; fattening; milk production; wool production; work; nature and uses of feed stuffs. Prerequisite: Chemistry 231.

307. Meats. (2-3). Credit 3. I, II
Study and practice of slaughtering and cutting carcasses of cattle, sheep, and hogs. Meat will be cured and meats products prepared. Uses of by-products will be considered. Methods of handling meats on the farm or ranch will be covered. Factors affecting quality, palatability, and economy in selection of meats will be included. The location, structure, and functions of the endocrine glands, digestive organs, and reproductive organs will be discussed in the laboratory in connection with slaughtering. Prerequisite: Animal Husbandry 107.

315. Livestock Judging. (1-3). Credit 2. I
A detailed consideration of the factors involved in the selection and grading of livestock for both breeding and slaughter purposes.

317. Meats Judging. (1-3). Credit 2. I
A detailed consideration of the factors involved in the selection and grading of carcasses and wholesale cuts of beef, pork, and lamb.

320. Animal Nutrition and Feeding. (3-0). Credit 3. II
A review of the chemical aspects of animal nutrition. The role of carbohydrates, fats, proteins, vitamins, and minerals in animal nutrition. Nutritional requirements of farm animals. Formulation of rations. A study of feeds and feedstuffs which supply the nutritional requirements. For students of veterinary medicine. Prerequisite: Biochemistry and Nutrition 312.

406. Beef Cattle Production. (2-2). Credit 3. I, II, S †
The world population and distribution of beef cattle; systems of production; location of beef enterprise; establishment of the herd; improvement methods; mating and reproduction; calving; feed and care of calf; development of stock for breeding herd; wintering; summer management; cattle feeding; selection of feeds; value of feeds; financial aspects of beef production; equipment; parasites and diseases; fitting and showing; marketing. Prerequisite: Animal Husbandry 303.

409. Feeds and Feeding. (2-2). Credit 3. I, II
A course designed to cover plans for feeding all classes of farm animals from a practical point of view; application of principles of nutrition; comput-

ing rations; economics of livestock feeding; flexible feeding programs; utilization of by-product feedstuffs; feeding investigations; feed control laws, animal feed budgets. Prerequisite: Animal Husbandry 303.

410. Sheep and Angora Goat Production. (2-2). Credit 3. II †
Methods of management; selection and culling; environmental factors affecting kid and lamb production; care and feeding of lambs, kids, and breeding flock; marketing of products from sheep and goats; diseases; wool and mohair grades and classification; methods of improving the clip. Prerequisite: Animal Husbandry 303.

412. Swine Production. (2-2). Credit 3. I †
Historical; feeding and handling the breeding herd during various seasons; culling; records; the sow and the litter; growing and fattening pigs; forage crops; feeding on forage; dry lot feeding; choice and value of feeds; garbage disposal plants; prevention of disease; the purebred herd; fitting and showing. Prerequisite: Animal Husbandry 303.

413. Horse Production. (2-2). Credit 3. II †
Review of situation; historical development; mechanical versus horsepower; anatomy; unsoundness, ailments and diseases; feeding the brood mare; stallions; growing and developing colts; feeding and handling horses at work; stables and equipment; harness; shoeing; fitting and showing; quarter horse breeding and training; horse markets. Prerequisite: Animal Husbandry 303.

416. Livestock Management. (2-2). Credit 3. I, II
A course in the feeding and management of beef cattle, sheep, swine, and horses. Especially designed for agricultural education majors. Prerequisite: Animal Husbandry 303.

418. Wool and Mohair Technology. (2-2). Credit 3. I †
Grades and classification of wool and mohair; physical and chemical properties; marketing; marketing reports; fiber flow through processing; wool and mohair judging and appraisal. Prerequisite: Junior classification or approval of Head of Department.

427. Seminar. (1-0). Credit 1. I, II
A review of current literature and research problems related to the livestock industry. Prominent men in the field of animal husbandry may be invited to conduct the seminar. For senior students in animal husbandry.

433. Reproduction in Farm Animals. (2-2). Credit 3. I, II †
Anatomy and physiology of the male and female reproductive tract; hormones governing reproduction; pregnancy tests; estrus and the estrous cycle; ovulation, mating; gestation; parturition; lactation; sperm physiology; collection, storage, and dilution of semen; artifical insemination; factors affecting fertility; causes of sterility in males and females. Prerequisite: Senior classification or approval of Head of Department.

436. Advanced Livestock Management. Credit 3. S †
A special three-weeks workshop course for teachers of vocational agriculture to be offered during the summer. This course includes problems in all phases of animal production selected by the group under the supervision of the instructor.

437. Marketing and Grading of Livestock and Meats. (2-2). Credit 3. I, II
Factors determining market classes and grades of feeder, stocker, and slaughter animals; grading feeder, stocker, and slaughter animals; marketing machinery and handling market livestock; purebred sales; shipping losses; shrinkage; fills. Prerequisite: Senior classification.

440. Sheep and Wool Production Problems. (2-3). Credit 3. S
Latest developments in the feeding, breeding, and management of the sheep flock including the production, harvesting, preparation for market, and marketing of the wool clip. Special summer course for agricultural agents.

442. Advanced Livestock Judging. (0-3). Credit 1. II
An advanced course in the selection and grading of livestock. Prerequisite: Animal Husbandry 315 or approval of Head of Department.

444. Large Animal Nutrition. (3-0). Credit 3. II †
Review of elementary chemistry of carbohydrates, proteins, and fats, with particular emphasis on the role of these constituents in large animal nutrition. A comparison of the nutrition of the ruminant to that of the monogastric animal. A study of the secretions (enzymatic and hormonal) of large animals and the function of each. The efficiency of each class of animals with regard to converting feed into fats, meat, wool, and work. Prerequisite: Animal Husbandry 303 or approval of Head of Department.

445. Problems. Credit 1 to 4. I, II, S
A directed individual study of a selected problem in the field of animal husbandry. Prerequisites: Senior classification; approval of the Head of the Department.

447. Advanced Meat Selection. (0-3). Credit 1. II
An advanced course in the selection and grading of carcasses and wholesale cuts of beef, pork, and lamb. Prerequisite: Animal Husbandry 317 or approval of the Head of the Department.

FOR GRADUATES

605, 606. Advancements in Beef Cattle Production. (3-0). Credit 3 each semester. I, II
A comprehensive review of recent advances in research relative to the various phases of beef cattle production; the application of the basic principles of nutrition, animal breeding, and disease control to the feeding, breeding, and management of beef cattle. Prerequisites: Animal Husbandry 406; Genetics 306; or approval of Head of Department.

619, 620. Advancements in Sheep and Angora Goat Production. (3-0). Credit 3 each semester. I, II
A comprehensive review of recent advances in research relative to the various phases of sheep and angora goat production; the application of the basic principles of nutrition, animal breeding, and disease control to the feeding, breeding, and management of sheep and angora goats. Prerequisites: Animal Husbanry 410; Genetics 306; or approval of Head of Department.

621, 622. Advancements in Swine Production. (3-0). Credit 3 each semester. I, II
A comprehensive review of recent advances in research relating to the various phases of swine production; the application of the basic principles of nutrition, animal breeding, and disease control to the feeding, breeding, and management of hogs; fitting swine production to the whole farm enterprise; special problems relating to the planning and operation of swine production units. Prerequisites: Animal Husbandry 412; Genetics 306; or approval of Head of Department.

631. Physiology of Reproduction. (2-0). Credit 2. II
A critique of scientific literature concerning the processes of reproduction in farm mammals. Students will compile, evaluate, and summarize the literature on various phases of this subject. Consideration will be given to special problems on which further investigations are desirable and methods of outlining research projects for them. Prerequisite: Animal Husbandry 433.

681. Seminar. (1-0). Credit 1 each semester. I, II
Important current developments in the field of animal husbandry. Review of current literature and presentation of papers on selected animal husbandry topics. Prerequisites: Graduate classification; major in animal husbandry or genetics.

685. Problems. Credit 1 to 4 each semester. I, II, S
Advanced studies in animal husbandry problems and procedures. Problems assigned according to the experience, interest, and needs of the individual student. Registration by approval of Head of Department. Prerequisite: Graduate classification.

691. Research. Credit 1 or more each semester. I, II, S
Investigations leading to the student's thesis or dissertation in the fields of animal production, meats, wool and mohair, nutrition, inheritance of farm animals, and physiology of reproduction. Prerequisite: Graduate classification.

Division of Architecture

Professor C. R. Colbert,
Professors Ernest Langford, M. M. Rotsch; Associate Professors T. R. Holleman, E. J. Romieniec, Richard Vrooman; Assistant Professors C. J. Godwin, K. F. Robinson, W. G. Wagner; Instructors H. M. Farha, H. W. Gooding; Lecturer Joseph Donaldson, Jr.

101. Design I. (0-6). Credit 2. I
Fundamentals of design; techniques of freehand drawing and its application to design.

102. Design I. (0-6). Credit 2. II
Fundamentals of design continued from Architecture 101; presentation techniques. Prerequisite: Architecture 101.

115. Architectural Graphics. (0-6). Credit 2. I
Techniques of instrument drawing; lettering; principles of shades and shadows and perspective drawing.

116. Architectural Graphics. (0-6). Credit 2. II
Problems related to instrument drawing; principles of perspective drawing. Prerequisite: Architecture 115.

201. Design II. (0-12). Credit 4. I
Elementary design; techniques of presentation, simple problems in planning. Prerequisites: Architecture 102, 116.

202. Design II. (0-12). Credit 4. II
Elementary design; detailed planning, with attention to construction; materials and techniques of presentation. Prerequisite: Architecture 201.

205. Freehand Drawing. (0-6). Credit 2. I
Basic techniques of freehand drawing; sketching and drawing in various media.

206. Freehand Drawing. (0-6). Credit 2. II
Freehand drawing with emphasis placed on more advanced techniques of sketching and drawing in various media. Prerequisite: Architecture 205 or equivalent.

227. Structural Principles. (3-0). Credit 3. I
A survey course for the student of the design curriculum to introduce him to the various structural systems, and to point out their structural, economic, and esthetic suitability as applied to architectural problems. Stress is placed on the general usage of significant structural forms and materials, both current and projected. Appropriate principles of calculus are introduced. Prerequisite: Sophomore classification.

228. Elements of Mechanics. (3-0). Credit 3. II
Force systems, composition and resolution of forces, resultant equilibrium; centers of gravity; analysis of simple frames. Prerequisite: Architecture 227 or Mathematics 223.

253. Technology of Materials. (2-0). Credit 2. I
Materials of construction, their properties, characteristics, and uses. Prerequisite: Sophomore classification.

254. Technology of Materials. (2-0). Credit 2. II
Selection of materials, methods of construction, quantity surveys, estimating, outline of specifications. Prerequisite: Sophomore classification.

301. Design III. (0-15). Credit 5. I
Intermediate design, with emphasis on plan, arrangement, and construction; materials and techniques of presentation; methods of construction. Prerequisite: Architecture 202.

302. Design III. (0-15). Credit 5. II
Further studies in intermediate design with emphasis on plan, arrangement, and construction; materials and techniques of presentation; methods of construction. Prerequisite: Architecture 301.

305. Freehand Drawing. (0-6). Credit 2. I
Fundamentals of color and still life sketching. Prerequisite: Architecture 206.

306. Freehand Drawing. (0-6). Credit 2. II
Advanced work in water colors and other media. Prerequisite: Architecture 305.

327. Basic Structures. (3-0). Credit 3. I
Fundamentals of strength of materials and their application in architectural construction. Prerequisite: Architecture 228.

328. Steel Structures. (3-0). Credit 3. II
A study of the systems of framing in architectural construction; analysis and design in wood and steel. Prerequisite: Architecture 327.

329. Art and Civilization. (2-0). Credit 2. I
Historical survey of the cultures of man with respect to art and architecture. Prerequisite: Junior classification.

330. Art and Civilization. (2-0). Credit 2. II
The development of great periods of civilization; their influence on architecture as an art and as a profession. Prerequisite: Junior classification.

331. Mechanics and Materials. (2-3). Credit 3. I
The basic concepts of mechanics and strength of materials and their applications to simple framing systems. For students in industrial education. Prerequisite: Mathematics 223.

401. Design IV. (0-15). Credit 5. I
Advanced design; major projects in building design and construction. Prerequisite: Architecture 302.

402. Design IV. (0-15). Credit 5. II
Advanced design; major projects dealing with more complex building types. Prerequisite: Architecture 401.

427. Concrete Structures. (2-2). Credit 3. I
A study of the systems of framing in architectural construction; analysis and design in reinforced concrete. Prerequisite: Architecture 328.

428. Roof Structures. (2-2). Credit 3. II
Graphical analysis of roof framing systems; evaluation of loads on trusses; truss design. Prerequisite: Architecture 328.

429. History of Architecture. (3-0). Credit 3. I
Study of the development of pre-classic and classic architecture and of the historical development of buildings through the Gothic period. Prerequi-

site: Architecture 330 for students in architecture; senior classification for others.

430. History of Architecture. (3-0). Credit 3. II
Study of the development of architecture from the Gothic period forward; influences and trends; structural and esthetic factors in the development of contemporary buildings. Prerequisite: Architecture 429.

454. Specifications and Working Drawings. (1-6). Credit 3. I, II
Detailed specifications; supervision and superintendence; building laws and codes; working drawings. Prerequisite: Senior classification.

500. Summer Practice. Twelve weeks; required; no credit. S
Summer practice in architectural offices or with building contractors as the student may be registered in the Design Option or in the Construction Option. Required previous to registration for fifth year.

501. Design V. (0-15). Credit 5. I †
Advanced design; major projects in community and regional planning. Prerequisite: Architecture 402.

502. Design V. (0-15). Credit 5. II †
Advanced design; major projects in the design of buildings and groups of buildings. Prerequisite: Architecture 501.

527. Structural Systems. (2-3). Credit 3. I †
Advanced studies in the systems of architectural construction. Prerequisite: Architecture 428.

528. Structural Systems. (2-3). Credit 3. II †
Individual problems in the systems of architectural construction; materials and methods of construction; preliminary surveys of costs. Prerequisite: Architecture 527.

550. Seminar. (1-0). Credit 1. II
Oral presentation of selected topics from current literature in the fields of architecture and building construction. Prerequisite: Fifth year classification.

554. Professional Practice. (2-0). Credit 2. I, II †
Office practice: professional relations and ethics; building law, contracts. Prerequisite: Senior classification.

556. City Planning. (2-3). Credit 3. II †
Survey of planning principles and procedures; legal aspects; physical and social development of the city; housing. Prerequisite: Senior classification.

FOR GRADUATES

629, 630. History and Archaeology. (2-0). Credit 2 each semester. I, II
Individual problems of study and research in the field of American architecture and archaeology.

681. Seminar. (1-0). Credit 1 each semester. I, II, S
Review of current work in architecture; original presentation on selected topics.

685. Problems. Credit 1 to 4. I, II, S
Individual problems involving the application of theory and practice in the design and construction of buildings and groups of buildings.

691. Research. Credit 2 to 4 each semester. I, II, S
Research for thesis.

Basic Division

Dean R. B. Kamm; Associate Dean C. H. Ransdell; Professor D. F. Parry; Assistant Professors W. C. Bonney, D. J. Cannon, S. A. Kerley, W. D. Kutach, F. E. McFarland; Instructors A. E. Denton, R. E. Miller, R. L. Provost

101. Orientation. (0-2). Credit 1. I, II
Designed to assist the student in (1) the process of making adequate personal and social adjustment to college life; (2) the recognition and development of his aptitudes, interests, and abilities, and the selection of attainable life goals; and (3) becoming acquainted with the scope of the curricula and vocational opportunities in the fields of specialization offered by the College.

102. Remedial Reading. (0-3). Credit 1. I, II, S
A laboratory coure designed to remedy a student's reading disability and to increase his reading rate and comprehension. In addition to the regular two one-hour meetings per week, two thirty-minute practice periods are required.

103. College Study. (0-2). Credit 1. I, II
A laboratory course designed to familiarize the student with the principles of learning and to relate them to the study of specific school subjects.

104. Individual Adjustment. (0-2). Credit 1. I, II
A course designed to help the student understand himself and the nature of the society of which he is a member.

105. The World of Work. (0-2). Credit 1. I, II
A course designed to familiarize the student who has not decided upon a vocational goal with the demands, required skills, and rewards of various occupational areas. Most of the major occupational areas will be studied intensively, and each student will be given an opportunity for studying his aptitudes and interests and relating them to various vocational requirements.

106. Survey of Man's Knowledge. (0-2). Credit 1. II
A survey course designed to acquaint the student with the various schools of thought and the many areas of knowledge which comprise our culture. Such disciplines as philosophy, social and physical sciences, religion, law, and literature will be investigated.

107. The Engineering Profession. (0-2). Credit 1. II
Extensive information about the broad general profession of engineering and intensive information about the specific branches of engineering.

Department of Biochemistry and Nutrition

Professor C. M. Lyman,
Professors J. R. Couch, Raymond Reiser, L. R. Richardson; Associate Professors H. O. Kunkel, J. L. Liverman, J. M. Prescott

312. Veterinary Physiological Chemistry. (3-6). Credit 5. I
A study of the chemical nature of physiological processes, including the synthesis and breakdown of body tissues and the chemical changes undergone by metabolites from ingestion to excretion. Variations among domestic animals in normal and abnormal conditions will be considered. Prerequisites: Chemistry 216, 302.

401. Human Nutrition. (3-0). Credit 3. I †
A study of the functions of food constituents in health and in physiological stress. The economic, national, and international aspects of human nutrition. Prerequisite: Chemistry 231 or 302.

410. Introductory Biochemistry. (3-3). Credit 4. II †
The chemistry of the major constituents of living organisms. Biophysical and biochemical processes in plants and animals are stressed. The laboratory

work includes the application of quantitative analytical procedures to plant and animal tissues and fluids. Prerequisites: Chemistry 223 and 231 or 302.

430. Electron Microscopy. (2-3). Credit 3. II
Descriptive treatment of various aspects of electron microscopy and laboratory practice employing selected specimens. Elementary discussion of electron optics, design of electron microscopes, photographic plates, underfocusing, overfocusing, asymmetry, colloidal state, shadow casting. Biological and physical science applications in all technical departmental fields of the College given equal attention. Prerequisite: Senior or graduate classification in a physical or biological science, or approval of the instructor.

Animal Husbandry 444. Large Animal Nutrition. (3-0). Credit 3. II †
See Department of Animal Husbandry for a full description of this course.

Poultry Science 411. Poultry Feeding. (3-2). Credit 4. I †
See Department of Poultry Science for a full description of this course.

FOR GRADUATES

601. Biochemisty of Plants. (3-0). Credit 3. I
A study of the major groups of organic compounds occurring in plants with emphasis on their biological synthesis, physiological function, and changes in chemical structure due to metabolic processes. Prerequisite: Biochemisty and Nutrition 410 or 611 or Chemistry 446. (Offered in 1957-58 and in alternate years thereafter.)

611. General Biochemistry. (3-0). Credit 3. I
A consideration of the chemical constituents and reactions of living cells. Particular emphasis is given to the metabolism and nutritional significance of proteins, carbohydrates, and lipids. Prerequisite: Chemistry 302.

612. Laboratory Procedures in Biochemistry. (0-6). Credit 2. I
A laboratory course designed to familiarize the student with the application of chemical and biological methods to the solution of fundamental biochemical problems. Prerequisite: Biochemistry and Nutrition 611 or registration therein.

613. Vitamins. (3-0). Credit 3. II
The role of vitamins in animal nutrition and their occurrence in plant and animal tissues. Prerequisite: Chemistry 302.

614. The Determination of Vitamins and Minerals. (0-3). Credit 1. II
A laboratory course designed to familiarize the student with methods for the determination of vitamins and minerals in biological materials. Prerequisite: Biochemistry and Nutrition 613 or registration therein.

615. Experimental Animal Procedures. (0-3). Credit 1. II
A laboratory course involving the management, preparation of purified rations, and the production and cure of nutritional diseases. Prerequisites: Biochemistry and Nutrition 613, 614 or registration therein.

618. Chemistry and Metabolism of Lipids. (2-0). Credit 2. II
An advanced course in lipid chemistry and metabolism. Prerequisite: Biochemistry and Nutrition 611. (Offered in 1957-58 and in alternate years thereafter.)

619. Proteins. (2-0). Credit 2. I
Advanced studies on the chemical, physical, and biological properties of proteins. Particular emphasis will be placed on the biological synthesis and metabolism of proteins. Prerequisite: Biochemistry and Nutrition 611.

620. Advanced Biochemical Techniques. (0-6). Credit 2. S
A laboratory course involving practice in the use of special techniques and instruments employed in biochemical research and the isolation, identification, and analysis of biological compounds. Preparation of representative

enzymes and laboratory work on factors affecting their action. Prerequistes: Biochemistry and Nutrition 612, 619 or registration therein; Chemistry 324 or 342. (Offered in 1956-57 and in alternate years thereafter.)

624. Enzymes. (2-0). Credit 2. II
General principles of enzyme chemistry. The physical chemistry of enzyme action. Types of enzymes and coenzymes. Enzymes in the patterns of metabolism. Prerequisites: Biochemistry and Nutrition 601 or 611; Chemistry 324 or 342; or approval of instructor.

626. Radioisotopes Techniques. (1-6). Credit 3. II
A lecture and laboratory course designed to acquaint the student with the methods of utilizing radioactive isotopes in biochemical and physiological research. Prerequisites: Biochemistry and Nutrition 611, 612, 620; or approval of the instructor.

627. Mineral Nutrition and Metabolism. (2-0). Credit 2. II
A study of the role of minerals in animal nutrition with emphasis on physiological function, biochemical interrelationships with other minerals and other nutrients, deficiency symptoms and nutritional significance. Prerequisite: Biochemistry and Nutrition 611.

628. Biochemical Preparations. (0-6). Credit 2. S
A laboratory course dealing with the isolation and synthesis of organic compounds which are important in biological systems. Particular emphasis is placed on recent techniques of isolation. Prerequisite: Biochemistry and Nutrition 612.

630. Metabolism. (3-0). Credit 3. I
A descriptive consideration of the various chemical pathways of metabolism. Prerequisites: Biochemistry and Nutrition 611, 613.

681. Seminar. (1-0). Credit 1 each semester. I, II
The study and discussion of original articles in biochemistry and nutrition and related fields designed to broaden the understanding of problems in the field and to stimulate research.

685. Problems. Credit 1 or more each semester. I, II
An advanced course in biochemical laboratory procedures including preparations and instrumentation. Problems assigned according to the experience, interests, and needs of the individual student.

691. Research. Credit 1 or more each semester. I, II
Research for thesis or dissertation. Laboratory facilities are available for original investigations in various phases of biochemistry and nutrition. Prerequisite: Approval of major advisor.

Department of Biology

Professor C. C. Doak,
Professors S. O. Brown, W. J. Dobson, H. L. Gravett, S. H. Hopkins, Charles LaMotte, G. E. Potter, J. J. Sperry; Associate Professors L. S. Dillon, E. H. Gibbons, A. B. Medlen, H. D. Thiers; Assistant Professors C. M. Rowell, Jr., N. P. Wood; Instructors V. F. Boyd, W. A. Cooper, Jr., W. G. Degenhardt, F. H. Kasten

Courses in the biological sciences administered by the Department of Biology include sequential programs in botany, microbiology, and zoology. All courses, irrespective of subject matter area, bear the departmental designation (Biology) and a course number from a single numerical sequence. The nature of the offerings is more clearly indicated, however, by the subject matter grouping shown on the following pages.

GENERAL BIOLOGY

115. Survey of Biology. (3-3). Credit 4. I, II
A summarization of biological forms and principles and their impact upon man and his affairs.

225. Personal and Public Health. (2-0). Credit 2. I
A general introduction to personal and community health. Designed primarily to enable the individual to utilize available knowledge and facilities to raise the health standard of his home and community.

330. Life Science. (2-0). Credit 2. II
Readings of grouped essays covering fifteen of the major subdivisions of life science together with integrating lectures designed to fit each into its place in life and industry. Prerequisite: Junior classification.

337. Organic Evolution. (2-0). Credit 2. I
A study of the evidences of the evolution of plants, animals, and man. Phylogeny and interrelationships of living things, the main lines of evolution, variation and the origin of species will be studied; man and the future considered. Prerequisite: Three hours of biology or approval of the instructor.

419. Seminar in Biology. (1-0). Credit 1. I †
Recent advances. For graduates and advanced undergraduate majors in either microbiology, botany, or zoology. May be repeated once for credit not to exceed two hours.

420. Seminar in Biology. (1-0). Credit 1. II †
Integration of the branches of biological science. May be repeated once for credit not to exceed two hours.

437. Biological Problems. Credit 1 or 2. I, II
Problems in the various phases of plant, animal, and bacteriological science. Prerequisites: Junior classification; approval of ranking professor in field chosen.

FOR GRADUATES

681. Seminar. (1-0). Credit 1. I, II
Detailed reports on specific topics in the field chosen. Prerequisite: Graduate classification in the appropriate field.

685. Problems. Credit 1 to 4 each semester. I, II
Limited investigations in fields other than those chosen for thesis or dissertation.

691. Research. Credit 1 or more each semester. I, II
Research for thesis or dissertation. Prerequisite: Approval of ranking professor in the field chosen.

BOTANY

101. General Botany of Seed Plants. (2-3). Credit 3. I, II
The seed plant as a living unit; external and internal structures in relation to life processes; reproduction and life history.

102. Taxonomy of Flowering Plants. (2-3). Credit 3. II
Designed to give training in the use of keys and in the identification of flowering plants, family characteristics and relationships, and other applied phases of plant science. Prerequisite: Biology 101.

327. Fundamental Plant Morphology. (2-3). Credit 3. I
Structural, reproductive, and taxonomic features of representatives of the major plant groups, with particular attention to groups not covered in Biology 101. Prerequisite: Biology 101.

349. Field Taxonomy. (2-3). Credit 3. S
Study and identification of the flora of selected areas, technique of collection and preparation of plant specimens. Studies in plant distribution and relationships. Prerequisite: Biology 102.

353. Mycology. (2-3). Credit 3. I †
An introduction to the study of fungi, including structure, reproduction, ecological relationships, and taxonomic aspects. Emphasis on forms of special significance to commercial processes, plant diseases, antibiosis, and fermentation. Prerequisites: Biology 101, 206, or approval of instructor. (Offered in 1957-58 and in alternate years thereafter.)

453. Plant Anatomy. (2-3). Credit 3. I †
Fundamental anatomy of the vegetative and reproductive organs of the plant with emphasis on development of tissue types. Technique of staining and mounting of plant tissues. Prerequisite: Six hours of plant sciences including Biology 101 or the equivalent. (Offered in 1956-57 and in alternate years thereafter.)

FOR GRADUATES

615. Cytology. (2-6). Credit 4. I
An intensive study of the organization and activities of the cell, with emphasis on topics related to cytogenetics and cytotaxonomy. Prerequisites: Genetics 301; approval of the instructor.

619. Advanced Systematic Botany. (2-6). Credit 4. I, II
Principles of taxonomy. Phylogenetic considerations and criteria used in schemes of classification. History of classification. Nomenclature and identification. Field and herbarium techniques. Prerequisite: Biology 102 or 327.

620. Advanced Systematic Botany. (2-6). Credit 4. I, II
Survey of Angiosperms with emphasis on relationships. Biosystematics and modern taxonomy. Procedures in monograph preparation. Monographers. Field and herbarium techniques with problems designed for individual needs and interests. Prerequisite: Biology 619. (Offered in 1957-58 and in alternate years thereafter.)

623. Plant Morphology. (2-6). Credit 4. II
A study of the anatomical, reproductive, and organogenetic features of representative vascular plants; emphasis on economic forms. Prerequisite: Biology 327 or the equivalent.

624. Plant Morphology. (2-6). Credit 4. II
A study of the form, structure, reproductive cycles, evolutionary aspects, and biological interrelations of the non-vascular plants, with emphasis on the algae and fungi. Prerequisites: Biology 327; approval of the instructor. (Offered in 1956-57 and in alternate years thereafter.)

634. Foundations of Plant Geography. (3-0). Credit 3. I
Origin, development, distribution, and history of the vegetation areas of the world. Emphasis on North America. Prerequisites: Geology 210; Range and Forestry 301; or approval of instructor. (Offered in 1956-57 and in alternate years thereafter.)

651. Mycology. (2-6). Credit 4. II
Detailed studies of the fungi, with emphasis on life cycles of representative forms; genetics and cytology; principles of taxonomy; ecology and geographical distribution. Actinomycetes and lichens are also considered. Prerequisite: Biology 353 or approval of the instructor. (Offered in 1957-58 and in alternate years thereafter.)

MICROBIOLOGY

A major in microbiology offers thorough and comprehensive training in the biology of bacteria and certain of the algae, fungi, and protozoa that supplement the study of the microorganisms in their relation to medicine, industry, and agriculture. The curriculum is intended to equip the student with sound training in the principles of microbial life, as either preparation for graduate study or for a career in either industrial or civil service.

206. Introductory Microbiology. (2-4). Credit 3. I, II
Relation of microorganisms to agriculture, industry, and health of man, animals, and plants. Prerequisites: Chemistry 102; 3 hours of biology.

358. General Bacteriology. (2-6). Credit 4. II
Advanced consideration of methods and concepts of cytology, physiology, and taxonomy of microorganisms. Prerequisite: Biology 206. (Offered in 1957-58 and in alternate years thereafter.)

438. Bacterial Physiology. (2-6). Credit 4. II
A detailed study of the physiological activities of bacteria. Prerequisites: Biochemistry and Nutrition 312 or 410; Biology 206.

455. Pathogenic Microbiology. (2-6). Credit 4. I †
The phenomena of pathogenesis of microorganisms and host-parasite interrelationships, as exemplified by bacteria, viruses, and fungi. Prerequisite: Biology 206. (Offered in 1957-1958 and in alternate years thereafter.)

457. Bacterial Ecology. (2-6). Credit 4. I †
Relation of bacteria to their environment, especially to other microorganisms. Methods of isolation, identification, and differentiation. Prerequisite: Biology 206. (Offered in 1956-57 and in alternate years thereafter.)

Agronomy 443. Soil Microbiology. (2-3). Credit 3. II †
See Department of Agronomy for a full description of this course.

Biology 353. Mycology. (2-3). Credit 3. I †
See page 221 for a full description of this course.

Dairy Science 320. Bacteriology of Dairy Products. (3-3). Credit 4. I †
See Department of Dairy Science for a full description of this course.

Dairy Science 326. Food Preservation and Decomposition. (3-3). Credit 4. II †
See Department of Dairy Science for a full description of this course.

Plant Physiology and Pathology 401. Diseases of Field Crops. (2-3). Credit 3. I †
See Department of Plant Physiology and Pathology for a full description of this course.

FOR GRADUATES

635. Physiology of Microorganisms. (2-6). Credit 4. I
An advanced consideration of the physiological activities of bacteria with special emphasis on metabolism. Prerequisites: Biochemistry and Nutrition 312 or 410; Biology 206. (Offered in 1956-57 and in alternate years thereafter.)

647. Industrial Microbiology. (2-6). Credit 4. II
Microorganism as the basis of industrial processes. Practice includes antibiotic assay, analysis of products, of metabolism, and fermentation balances. Prerequisites: Biochemistry and Nutrition 312 or 410; Biology 206. (Offered in 1957-58 and in alternate years thereafter.)

Biology 630. Protozoology. (3-3). Credit 4. II
See page 224 for a full description of this course.

Biology 651. Mycology. (2-6). Credit 4.
See page 221 for a full description of this course.

Plant Physiology and Pathology 607. Physiology of the Fungi. (3-0). Credit 3. I
See Department of Plant Physiology and Pathology for a full description of this course.

Plant Physiology and Pathology 618. Bacterial Plant Diseases. (2-3). Credit 3. I
See Department of Plant Physiology and Pathology for a full description of this course.

Plant Physiology and Pathology 620. Plant Viruses. (2-0). Credit 2. I
See Department of Plant Physiology and Pathology for a full description of this course.

Veterinary Microbiology 643. Veterinary Microbiology. (3-4). Credit 4. I, II
See Department of Veterinary Microbiology for a full description of this course.

ZOOLOGY

107. Vertebrate Zoology. (2-3). Credit 3. I, II
Structure, physiology, and development of animals; emphasis on the biology of vertebrates.

108. Invertebrate Zoology. (2-3). Credit 3. I, II
Classification, comparison, anatomy, and physiology of invertebrate animals. Specimens from the more important invertebrate phyla are studied in the laboratory. Prerequisite: Biology 107 or approval of instructor.

217. Comparative Anatomy of Vertebrates. (2-4). Credit 3. I, II
Comparative anatomy of the Prochordates and the lower vertebrates through Reptilia. Laboratory animals, Molgula, Dolichoglossus, Amphioxus, Squalus, Necturus, and Phrynosoma. Prerequisites: Biology 107, 108.

218. Comparative Anatomy of Vertebrates. (2-4). Credit 3. II
Comparative anatomy of birds and the mammals. Laboratory animals, the chicken and the cat. Prerequisite: Biology 217.

219. Anatomy and Physiology. (2-3). Credit 3. I
Principles of normal anatomy and physiology as applied to man and other vertebrates. Prerequisites: Biology 101, 107.

220. Physiology and Hygiene. (2-3). Credit 3. II
A continuation of Biology 219. Abnormal physiology, disease, causal organisms, prevention and hygiene. Prerequisite: Biology 219.

325. Physical Anthropology. (3-0). Credit 3. II
Man's relation to and position in the animal kingdom. Physical characteristics of mankind. Fossil and living types. Races and racial characteristics. Somatotypes. Prerequisite: Three hours of biological science.

335. Gross and Microscopic Vertebrate Anatomy. (2-3). Credit 3. I
Study of selected features of anatomy, embryology, and histology with emphasis on higher vertebrates. Although the cat is used as the laboratory animal, another vertebrate may be chosen if warranted and approved by the instructor. Prerequisite: Biology 107 or the equivalent.

343. Histology. (2-3). Credit 3. I †
Normal tissues of vertebrates including histogenesis of some. Histogenesis and organography of mammalian tissues reviewed. Prerequisite: Biology 217 or 335.

344. Embryology. (2-3). Credit 3. II †
Introduction to general and comparative vertebrate embryology; emphasis on early development of frog, chick, and pig. Prerequisite: Biology 217 or 335.

345. Aquatic Biology. (2-3). Credit 3. II †
Principles of aquatic biology; habitat studies, field collection, preservation, and identification of aquatic organisms. Prerequisites: Biology 101, 107; Entomology 201.

422. Microtechnique. (1-6). Credit 3. II †
Standard methods in the preparation of permanent microscopic slides of plant and animal tissues. Prerequisite: Twelve hours of biological science.

433. General Physiology. (3-3). Credit 4. I †
Fundamental physiology of protoplasm; basic process, and function of organs and systems. Emphasis is placed on digestion, respiration, metabolism, excretion, muscular contraction, and reproduction. Prerequisites: Biology 107 and either graduate classification, Biology 218, or the equivalent.

434. General Mammalian Physiology. (2-3). Credit 3. II †
General comparative functions of the circulatory and nervous systems, organs of special sense and internal secretion. In the laboratory emphasis will be placed on work with the rat. Prerequisites: Biology 107 and either graduate classification, Biology 218, or the equivalent.

435. Advanced Invertebrate Zoology. (3-3). Credit 4. I †
Morphology, taxonomy, biology, and phylogeny of invertebrate animals. Prerequisite: Biology 107 or 108.

436. Animal Parasitology. (3-3). Credit 4. II †
Study of parasitic worms and protozoa; laboratory methods in parasitology. Prerequisite: Biology 435 or equivalent.

FOR GRADUATES

603. Advanced Vertebrate Zoology. (1-5). Credit 3. II
Phylogeny of vertebrates based on comparative anatomy, histology, embryology, and distribution. Prerequisites: Biology 218, 343, 344, or the equivalent.

604. Advanced Embryology. (1-5). Credit 3. I
Comparative and experimental studies of the mechanics of embryonic development. Prerequisites: Biology 218, 343, 344, or the equivalent. (Offered in 1956-57 and in alternate years thereafter.)

627. Helminthology. (3-3). Credit 4. I
A study of the parasitic worms, especially Trematoda, Cestoda, Nematoda, and Acanthocephala. Prerequisite: Biology 436. (Offered in 1956-57 and in alternate years thereafter.)

630. Protozoology. (3-3). Credit 4. II
Morphology, taxonomy, physiology, reproduction, phylogeny, ecology, and life history of both free living and parasitic protozoa. May be taken concurrently with parasitology. Prerequisite: Biology 108. (Offered in 1957-58 and in alternate years thereafter.)

632. Methods in General Physiology. (2-6). Credit 4. II
Methods for the quantitative study of metabolism, respiration, circulation, excretion, movement, and other basic physiological phenomena. Recent advances in physiological methods to be presented on a seminar basis. Prerequisite: Biology 433 or the equivalent.

649. Biology of the Endocrine Glands. (3-3). Credit 4. I
A study of the structure, development, comparative anatomy, and physiology of the endocrine glands of the different animal groups. Prerequisites: Three hours of either anatomy or anatomy and physiology.

653. Zoogeography. (3-0). Credit 3. II
A study of the distribution of animals during geologic and present times; emphasis on the role of ecology and the effects of geography upon terrestrial and marine distribution. Prerequisite: Twelve hours of biological sciences, including at least 3 semester hours of advanced courses.

656. Analytical Histology. (2-6). Credit 4. II
Designed to acquaint the student with certain quantitative histochemical techniques in plant and animal science as applied to nucleoproteins, carbohydrates, lipids, and enzymes. Presentation of cytological evidences which aid in localizing the activities of nucleoproteins in cell metabolism. Prerequisites: Biology 343 or 453 or the equivalent; Chemistry 301.

Division of Business Administration

Professor T. W. Leland,
Professors L. E. Davids, P. B. Goode, T. R. Hamilton, R. M. Stevenson, T. R. Yantis; Associate Professors R. L. Elkins, D. R. Fitch, S. C. Hoyle, Jr., H. G. Kenagy, T. D. Letbetter, W. S. Manning, E. S. Packenham, H. G. Thompson, Jr., R. P. Wood; Assistant Professors R. L. Smith, Jr., N. A. Stewart, Jr., William Whittington; Instructors J. N. Byers, J. H. Dozier, J. B. Longley, D. C. Lowe, J. L. Sandstedt

105. Introduction to Business. (3-0). Credit 3. I, II
Provides an over-all picture of business operations, develops a business vocabulary, and directs the thinking of each student to the field of business best suited to his interest and talent. Subject matter includes an analysis of the specialized fields within the business organization and of the role of business in modern society.

205. Marketing. (3-0). Credit 3. I, II, S
A study of institutions, processes, and problems involved in transferring goods from producers to consumers, with emphasis on economic and social aspects.

206. Purchasing and Control of Materials. (2-0). Credit 2. I, II, S
Operation of a purchasing department in a manufacturing business; organization of the department; specifications, standards, contract provisions; sources of supply; methods of perpetual inventory.

208. Advertising. (3-0). Credit 3. I, II
Place of advertising in business; advertising media, such as the newspaper, tradepaper, magazine, direct mail, poster, and the radio; description of the various methods of advertising; development of copy and layout of advertisements; consumer habits and psychology; methods of investigations for advertising campaigns; cost of advertising; legal and ethical problems involved in advertising; consideration of advertising from the standpoint of consumers. Prerequisites: Business Administration 205; Economics 203.

209. Principles of Accounting. (2-3). Credit 3. I
An introductory course designed primarily for students who do not plan to major in one of the several fields of business administration but who desire a background in accounting which will be of value in their respective fields. The course is not as comprehensive as Business Administration 227 but covers a survey of the same topics.

210. Principles of Accounting. (2-3). Credit 3. II
A continuation of Business Administration 209. The course is not as comprehensive as Business Administration 228 but covers a survey of the same topics. Prerequisite: Business Administration 209.

216. Building Products. (0-2). Credit 1. II
A study of building products, their physical properties, and their markets. Prerequisite: Business Administration 205.

227. Principles of Accounting. (3-3). Credit 4. I, II, S
An introductory course designed to serve as a foundation for study of advanced accounting and to furnish a knowledge of accounting which will be of value to students in other fields. The subject matter includes: analysis and recording of business transactions; use of journal and ledger; trial balance and work sheet; adjusting and closing entries; accounting statements; payroll records and payroll taxes; introduction to partnership accounting; special journals and ledgers; business papers and business procedures related to accounting; voucher system.

228. Principles of Accounting. (3-3). Credit 4. I, II, S
A continuation of Business Administration 227. Internal control; partnership and corporation accounting; accounting for manufacturing concerns; analysis and interpretation of statements. Prerequisite: Business Administration 227.

303. Statistical Method. (3-3). Credit 4. I, II, S †
Collection, tabulation, presentation, and analysis of data. A study of sampling, graphics, averages, ratios and coefficients, dispersion, skewness, probability and error, index numbers, seasonal and long-time trend, barometers, correlation. Prerequisite: Mathematics 101.

304. Business Cycles and Business Measurements. (3-0). Credit 3. I, II, S †
An empirical and statistical study of economic fluctuations; theory, causes, and control of business cycles; business barometers and forecasting. Study of economic and statistical services. Prerequisite: Business Administration 303.

305. Business Law. (3-0). Credit 3. I, II, S †
Nature and scope of law; court system; homestead and exemption laws of Texas; law of contracts; principal and agent; business organizations, including partnerships and corporations; the Texas community property laws. Prerequisite: Sophomore classification.

306. Business Law. (3-0). Credit 3. I, II, S †
Additional studies in the law of business, dealing with bailments, carriers, mortgages, suretyships, negotiable instruments, banks and banking, wills and estates, sales, bankruptcy. Prerequisite: Business Administration 305.

308. Law of Private Corporations. (3-0). Credit 3. I, II †
Powers and limitations of the corporate form of business organizations as distinguished from other forms of business enterprise. Legal problems encountered in formation, management, financing, and dissolution of corporations. Rights of corporate stockholders and creditors. Legislative control under state and federal statutes. Prerequisite: Business Administration 306.

310. Credits and Collections. (2-0). Credit 2. II
The elements of mercantile and consumer credit; organization of a credit department; sources of credit information; collection tools and procedures.

312. Statistical Charts and Graphs. (2-0). Credit 2. II
Graphic presentation of statistical data, construction of charts, calculating charts and nomographs, statistical maps, rate of change analysis, visual aids in presenting business reports. Prerequisite: Business Administration 303. (Offered in 1956-57 and in alternate years thereafter.)

315. Insurance. (3-0). Credit 3. I, II, S
A general analysis of life, fire, automobile, casualty, suretyship, and liability insurance including a critical examination of selected policy forms. Both the buyer's and the seller's interests will be presented.

316. Office Management. (2-0). Credit 2. I, II, S
The problem of office management; the function of the office manager; office systems, handling of correspondence, filing, mailing; office furniture and equipment; office forms and supplies and their control; the office building and the office layout; selection, training, and compensation of office personnel; office manuals and reports; budgetary control in the office.

317. Punch Card Methods. (1-2). Credit 2. I, II, S
Instruction and practice in the operation of punch card machines for the handling of accounting and statistical data. Prerequisites: Business Administration 228, 303.

318. Wholesale Merchandising. (3-0). Credit 3. I, II
A presentation of the basic principles and economic functions of the wholesaler. Also a study of the modern wholesaling systems and the operation and management of a wholesale business. Prerequisites: Business Administration 205; junior classification.

320. Life Insurance. (3-0). Credit 3. II †
Fundamentals of life insurance and annuities; types of life insurance policies and their utilization in private life and business. Rate determinants, reserves, dividends, policy terms, and selection of risks. Distinguishing characteristics of group and industrial insurance. Basic principles and common uses of annuities. The course is designed to provide a knowledge of the fundamentals of life insurance and annuities as a useful background for laymen, businessmen, and life insurance salesmen. Prerequisite: Business Administration 315.

322. Property Insurance. (3-0). Credit 3. I †
The nature of property insurance and the principles of its employment. Fire insurance, marine insurance, and miscellaneous types of insurance. Emphasis is placed on underwriters, contracts, coverage, special endorsements, and rate determinants for each of the broad fields indicated above. The course is designed for students who are considering employment in the insurance field and for potential property managers. Prerequisite: Business Administration 315.

324. Casualty Insurance and Suretyship. (3-0). Credit 3. II †
Principles and practices of casualty insurance and suretyship. Course covers the following forms of insurance: (1) automobile insurance; (2) aviation insurance; (3) workmen's compensation insurance; (4) general liability lines; (5) power plant and machinery breakdown insurance; (6) theft insurance; (7) accident insurance; (8) fidelity bonds; (9) corporate suretyship; Prerequisite: Business Administration 315.

325. Retailing. (3-0). Credit 3. I, II, S
Fundamental operations of retailing concerns and the need for effective coordination of retailing activities. Prerequisites: Business Administration 205; Economics 203, 204.

327. Intermediate Accounting. (3-3). Credit 4. I, S
Working papers and preparation of statements; correction of books and statements; statement analysis; special phases of corporation accounting. Prerequisite: Business Administration 228.

328. Intermediate Accounting. (3-3). Credit 4. II, S
Cash and receivables; inventories; tangible and intangible fixed assets; investments; liabilities, reserves; statement of application of funds. Prerequisite: Business Administration 327.

329. Cost Accounting. (3-0). Credit 3. I, II, S
Development of cost accounting principles relating to material, labor, and manufacturing expenses; inventory controls, payroll and wage systems; job order cost systems; process costs; joint and by-product costs. Prerequisite: Business Administration 228.

330. Advanced Accounting. (3-0). Credit 3. II, S †
Special phases of partnership accounting; joint ventures; consignments; installment sales, accounting for insurance costs; statement of affairs and accounting for insolvent concerns; compound interest; home office and branch accounting. Prerequisite: Business Administration 328 or registration therein.

333. Business Machines. (0-2). Credit 1. I, II
A study of major types of machines used for assembling and recording accounting and statistical information. Prerequisite: Business Administration 228.

337. Data Processing. (2-2). Credit 3. I, II
Use of electronic computers for recording and reporting, sorting; searching; collating; file maintenance; integrated data processing; coding of information; tables and approximations; storage of information; practical application. Prerequisite: Junior classification.

344. Marketing Problems. (3-0). Credit 3. II †
A study of the problems involved in the marketing of industrial and consumer goods; the problems connected with customer relations, channels of distribution, brands, sales promotion, pricing, and legislation. Prerequisite: Business Administration 205, 208, 325.

352. Personal Finance. (2-0). Credit 2. I, II
Personal and family accounts; budgets, budgetary control; bank accounts; charge accounts; borrowing; investing; insurance; standards of living; renting; home ownership; wills, trust plans. Prerequisite: Economics 203 or the equivalent.

402. Accounting Systems. (3-0). Credit 3. II †
Survey of accounting systems in current use by different types of businesses. System design and installation. Manual and machine procedures. Prerequisite: Business Administration 328.

403. Income Tax. (3-0). Credit 3. I, II †
Income tax legislation; the present income tax law and regulations; treasury decisions, court decisions, and departmental rulings; income tax problems and returns. Prerequisite: Business Adminstration 327.

404. Managerial Accounting. (3-0). Credit 3. II †
A study of the uses of accounting information by management. Emphasis is placed on accounting procedures and reports essential to management. Cost analysis, cost control, budgeting and controllership. Prerequisite: Business Administration 329.

407. Auditing. (3-0). Credit 3. I †
Auditing procedures used by internal auditors and independent public accountants; preparation of working papers. Prerequisites: Business Administration 328, 329.

408. Auditing. (3-0). Credit 3. II †
A continuation of Business Administration 407. Work on an audit practice case with preparation of working papers and audit report, case studies involving auditing problems in special situations. (Required of students who plan to enter public accounting.) Prerequisite: Business Administration 407.

409. Survey of Accounting Principles. (3-0). Credit 3. I, II, S †
Principles of accounting for students majoring in engineering, architecture, agriculture, and veterinary medicine. Emphasis is placed on the viewpoint of the special groups, and in so far as enrollment permits, separate sections will be used to meet their respective needs. The course is not as comprehensive as Business Administration 227, 228 and is not open to students in business administration, agricultural administration, or liberal arts. Prerequisite: Junior classification.

418. Corporation Finance. (3-0). Credit 3. I, II, S †
Common forms of business organization with special attention to the corporation; advantages and disadvantages of incorporation; capital stock and bonds; working capital; surplus and dividend policy; corporate expansion and industrial combination; failure and reorganization. Prerequisite: Economics 205 or the equivalent.

420. Principles of Investment. (3-0). Credit 3. I, II, S †
The development of investment policy; the character of investment risk; a comparison of investment media; a description of security markets and their operations. Prerequisites: Economics 203 and 204, or 205.

422. Personnel Problems of Industry. (3-0). Credit 3. I, II, S †
The relation of the worker to his employer, the methods of job finding, interviewing aids, occupational trends, scientific management, the functions and structure of personnel departments, employee welfare activities, and other problems of contemporary industrial development. Prerequisite: Junior classification.

423. Personnel Policies and Techniques. (3-0). Credit 3. I, S †
Programs and agencies which workers and employers have developed to improve their economic and social status; job analysis, description, and classification; wage and salary problems and procedures; personnel records. Prerequisite: Business Administration 422.

427. Insurance Law. (3-0). Credit 3. II †
Law cases on insurance to develop an understanding of the methods of administrative control by the state; typical clauses of insurance policies and their interpretation by the courts; technical legal pitfalls; case examples from all forms of insurance coverage; Texas insurance law. Prerequisite: Business Administration 305.

428. Real Estate Titles and Conveyances. (3-0). Credit 3. I, II, S †
The ownership and transfer of titles to real property, including deeds, easements, urban and rural property with special attention to zoning, building codes, private restrictions and conditions. The law of fixtures, timber and crops, mortgages and liens, building contracts, plans and specifications, performance bonds, mines and minerals, contracts of sale, escrow and earnest money agreements, real estate brokers, sufficiency of property description and other matters related to real property. Prerequisite: Business Administration 305.

430. Cost Accounting Survey. (3-0). Credit 3. I, II, S †
An introductory cost accounting course following Business Administration 409, for architects, engineers, and agricultural students. Purposes and uses of cost accounting; elements of cost; unit costs for use in bidding on contracts; comparison of cost procedures; job order and process costs, budgets, and standard costs; cost reports. Prerequisite: Business Administration 409.

432. Security Analysis. (3-0). Credit 3. II †
Methods of analyzing individual security issues, establishment of principles of selection and protection of security holdings, setting up sound and workable tests of safe investments including financial statement analysis, understanding rights and interests of investors in senior securities and owners of common stock. Prerequisite: Business Administration 420.

433. Business Management. (3-0). Credit 3. I, II, S
Policies and methods used in managing industrial and business enterprises. Emphasizes the problems of developing and operating an individual business, and of applying effective management principles to firms of varying size and nature. Prerequisite: Junior classification.

434. Problems in Finance. (3-0). Credit 3. II †
The course presents a series of comprehensive financial problems confronting the management of large and small businesses. The analysis and solution of the problems utilize the techniques and methods acquired in prev-

ious courses. The case system is used to give the student practice in linking up the related legal, accounting, and financial aspects of each situation. Prerequisite: Business Administration 418.

435. Salesmanship. (3-0). Credit 3. I, II, S
A consideration of the general principles of successful personal selling. Particular attention is given to personal requisites, qualifications, and training programs to enable the student to become a successful salesman. Prerequisites: Economics 203 and 204, or 205.

436. Sales Management. (3-0). Credit 3. II, S †
A consideration of the problems confronting the modern sales executive; organization of sales departments, product research, selection and recruiting, compensation plans, routing, supervision, and costs connected with sales administration. Prerequisite: Business Administration 435.

437. Applied Life Insurance. (3-0). Credit 3. I †
This course applies the principles of life insurance to the business field with particular emphasis on sole properietorships, partnerships, key-man problems and close corporation stock purchase. It shows how life insurance can be used in preventing estate shrinkage. Business insurance, tax problems, and wills pertaining to life insurance are covered. Stocks, bonds, and real estate are measured against life insurance as good property. Prerequisite: Business Administration 320.

438. Commercial Bank Management. (3-0). Credit 3. S
Managerial problems and policy decisions that confront officers of financial institutions, organizations, capital structure, liquidity, solvency, primary reserves, secondary reserves, investment portfolio, loan policy, service charges, duties of the board. Course is oriented not only for the banker but also for the business man in his relationship to his bank and savings and loan associations. Prerequisite: Economics 311.

440. Real Estate Fundamentals. (3-0). Credit 3. I
Basic factors and agencies which comprise the structure of our modern real estate development. A study of the historic, economic, legal, and financial aspects of realty and the effect of their interplay on the institution of real property, both urban and rural. Designed for the home and business property owner as well as for the professional real estate man.

442. Real Estate Practice. (3-0). Credit 3. II
A study of the practical techniques and procedures employed in real estate transactions, with emphasis on real estate appraisal, sales, finance, and industrial property management. Prerequisite: Business Administration 440 or approval of the instructor.

445. Marketing Research. (3-0). Credit 3. I †
A study of the nature and uses of marketing research in business. Emphasis is on methods of collecting and interpreting marketing information and specific application to problems in marketing. Prerequisites: Business Administration 205, 303.

446. Marketing Industrial Products. (2-0). Credit 2. II †
Management aspects and economic factors affecting marketing policies are considered. Special emphasis is given to marketing research, marketing policies, channels of distribution, brand policy, pricing and control of marketing operations as they affect industrial products. A term project involving a report on the marketing of a specific industrial product is required of each student. Prerequisites: Business Administration 205, and Business Administration 303 or Mathematics 116.

447. Advertising Procedures. (3-0). Credit 3. I
Study of advertising procedures for newspapers, magazines, radio, and television. Specific topics include retail, mail order, national and industrial advertising; advertising agencies; advertising research, and advertising campaigns. Prerequisite: Business Administration 208.

452. Veterinary Jurisprudence. (3-0). Credit 3. II
A study of Texas statutes and court decisions regulating and affecting the practice of veterinary medicine. One of the primary functions of this course is to prepare the student for the State Board examination in veterinary law. Prerequisite: Senior classification in the School of Veterinary Medicine.

456. Applied Salesmanship. (0-2). Credit 1. II
A practical course in personal salesmanship. Analysis of specific products; planning and execution of the interview; psychological aspects of selling. Particular stress is made on sales demonstration and the strategy involved in closing the sale. Prerequisites: Business Administration 435; English 403.

461. Retailing Building Products. (2-0). Credit 2. I
A study of the special problems of the dealers in building products. Prerequisite: Business Administration 325.

463. Employee Supervision. (2-0). Credit 2. II †
A study of the relationships of the first level of management to supervisors and to the staff. The objectives, organization, and tools of the supervisory level; how to handle problems of grievances, absenteeism, discipline, morale, induction, safety, and training of workers. Prerequisite: Senior classification.

FOR GRADUATES

601. Statement Analysis. (3-0). Credit 3. II, S
An analytical study of the different kinds of statements for the guidance of executives, investors, and creditors; balance sheet and profit and loss ratios. Prerequisite: Business Administration 329 or 430.

602. Consolidated Statements. (2-0). Credit 2. II
Consolidated balance sheets, consolidated income and surplus statements, holding companies, mergers. Prerequisite: Business Administration 330. (Offered in 1956-57 and in alternate years thereafter.)

603. Price Analysis. (3-2). Credit 4. I, S
Economic concepts relating to prices, statistical methods of analyzing prices, supply and demand curves, elasticity of demand, price forecasting, study and criticism of works on price analysis. Term paper required on factors affecting the price of a commodity. Prerequisites: Business Administration 303; Economics 203, 204.

604. Statistics. (3-2). Credit 4. II, S
Curve fitting and empirical formulas. Multiple correlation, mathematical and graphic. Sampling and measures of unreliability. Chi-square test. Analysis of variance and covariance. Prerequisites: Business Administration 303; Mathematics 101. Mathematics 110 is recommended.

605. Accounting Problems. (3-0). Credit 3. I
A study of advanced accounting theory and problems dealing primarily with corporation accounting, assets and liabilities, analysis of statements, and cost accounting. The problems considered will be of the type currently stressed in accounting examinations. Prerequisite: Approval of instructor.

606. Accounting Problems. (3-0). Credit 3. II
A continuation of Business Administration 605. The topics will deal primarily with partnerships, fiduciaries, home office and branch, insurance, and auditing. Prerequisite: Approval of instructor.

607. Market Analysis. (3-0). Credit 3. I
A study of the methods of conducting consumer investigations; the forms used; planning the sample, gathering data, testing the sample; tabulating, analysis, and interpretation of the result. Prerequisites: Business Administration 205, 303.

612. Advanced Taxes. (2-0). Credit 2. II
A study of special income tax problems of taxpayers; Federal estate and gift taxes; Texas inheritance tax; Texas franchise tax on corporations; claims for refund of taxes; preparation of protests to deficiency assessments; planning for tax savings. Prerequisite: Business Administration 403. (Offered in 1957-58 and in alternate years thereafter.)

616. Governmental and Institutional Accounting. (3-0). Credit 3. I, S
A study of the accounting principles and procedures peculiar to governmental units and institutions. Prerequisite: Business Administration 328. Economics 412 is recommended.

619. Legal Principles Relating to Accounting. (3-0). Credit 3. I, S
An intensive study of legal principles emphasizing those which arise in the practice of accounting.

620. Law and Business. (3-0). Credit 3. I
Students write a paper on a topic of law in which they are interested, approved by instructor. Also, the following topics are covered: law and business, their relation to each other; present sources of law in Texas today; community property laws of Texas; collection of judgments in Texas; ad valorem taxes; automobile accidents and other topics relating to business. (Offered in 1956-57 and in alternate years thereafter.)

621. Law of Municipal Corporations. (3-0). Credit 3. II
A presentation of the general principles of the law of municipal corporations (city governments) in their relation to private business and the public at large, dealing with aspects of police powers, taxation, indebtedness, administration, public welfare, and legislative control. Prerequisite: Business Administration 305. (Offered in 1957-58 and in alternate years thereafter.)

622. Trade Regulations. (3-0). Credit 3. II, S
Delineation of governmental control intended to promote free competition and curb its abuses. A study of the federal anti-trust acts and their application by the courts; the Federal Trade Commission and its method of dealing with unauthorized business practices such as unfair competition, misleading advertising, price discrimination, and retail price maintenance. Prerequisite: Business Administration 305.

630. Problems of Corporation Finance. (3-0). Credit 3. I
The financial problems of the profit seeking corporation are discussed from the viewpoint of the corporate financial officer. Consideration is given to such matters as current financing, financial aspects of promotion, refunding operations, dividend policies, and corporate reorganization. The course is designed to exercise the principles of corporation finance. Prerequisite: Business Administration 418. (Offered in 1956-57 and in alternate years thereafter.)

631. Business Investigation and Analysis. (3-0). Credit 3. II
The problems arising in the quantitative and qualitative analysis of railroad, public utility, and industrial securities are presented so as to train the advanced student of investments in the use of the tools of security analysis. The text material is supplemented by the consistent use of representative sources of investment information. Prerequisite: Business Administration 418. (Offered in 1957-58 and in alternate years thereafter.)

634. Statistical Method Applied to Business Problems. (3-0). Credit 3. II
The use of statistical methods applied to sales control, cost studies, personnel management, forecasting sales and production of an individual concern, and forecasting general business activity. Readings, reports, and problems. Prerequisites: Business Administration 303, 604. (Offered in 1956-57 and in alternate years thereafter.)

681. Seminar. (1-0). Credit 1 each semester. I, II
A critical examination of the subject matter presented in current periodicals, recent monographs and bulletins. Separate seminars will be conducted as required in fields such as accounting, finance, marketing, personnel administration, and statistics.

685. Problems. Credit 1 to 3 each semester. I, II, S
Directed study on selected problems not covered in the thesis research or in other courses. Prerequisites: Graduate classification; approval of instructor.

691. Research. Credit 1 or more each semester. I, II, S
Research for thesis.

Department of Chemical Engineering

Professor J. D. Lindsay,
Professor W. D. Harris; Associate Professors S. P. Clark, W. B. Harris, C. D. Holland; Instructor W. B. Hayes

204. Elementary Chemical Engineering. (3-0). Credit 3. I, II
An introduction to the fundamentals of chemical engineering which involves the solution of elementary problems on the application of mass balances, energy balances, equilibrium balances, rate of approach to equilibrium, and economic balances. Prerequisites: Chemistry 205; Mathematics 210 or registration therein.

304. Unit Operations. (3-0). Credit 3. I, II †
A study of fluid and heat flow, evaporation and drying. Prerequisite: Chemical Engineering 204.

314. Unit Operations Laboratory. (0-3). Credit 1. II †
Laboratory work based on Chemical Engineering 304. Prerequisite: Chemical Engineering 304.

409. Oil and Gas Technology. (3-0). Credit 3. I †
Application of the principles of chemical engineering to the treatment and processing of petroleum and its products. Emphasis is on unit operations. Prerequisite: Chemical Engineering 423.

423. Unit Operations. (3-0). Credit 3. II, S †
A continuation of Chemical Engineering 304 covering distillation, gas absorption, filtration, size reduction, separation, and mixing. Prerequisite: Chemical Engineering 304.

426. Plant Design. (2-6). Credit 4. II †
The solution of problems involved in the design and development of chemical engineering plants. These problems cover such factors as the capacity, selection, and location of equipment, reaction rates, economic balances, specifications, drawings, cost estimates, and plant location. Prerequisite: Chemical Engineering 441.

428. Industrial Chemical Processes. (3-0). Credit 3. II
A study of representative chemical manufacturing processes and their relationships. Prerequisite: Chemical Engineering 441.

429. Oil and Gas Technology Laboratory. (0-3). Credit 1. I †
Laboratory work to accompany Chemical Engineering 409.

433. Unit Operations Laboratory. (0-3). Credit 1. I †
Laboratory work based on Chemical Engineering 423. Prerequisite: Chemical Engineering 314.

438. Seminar. (1-0). Credit 1. I
Oral discussion of selected topics from recent technical publications. Prerequisite: Senior classification.

441. Chemical Engineering Unit Processes. (3-0). Credit 3. I
A study of such unit processes as sulfonation, nitration, hydrogenation, and alkylation, and the equipment required for them. Prerequisites: Chemical Engineering 423; Chemistry 302.

445. Advanced Problems in Chemical Engineering. Credit 1 to 5. I, II
Special problems in chemical engineering are assigned to individual students or groups. The work may cover the numerous particular problems in chemical engineering processes or operations. It may be laboratory work or conference and discussion. Prerequisites: Chemical Engineering 423; approval of the Head of the Department.

447. Nuclear Engineering. (3-0). Credit 3. I †
A study of the applications of engineering fundamentals to nuclear processes. The course will discuss nuclear reactions and how they may be applied to obtain power. Engineering problems involved in the construction and operation of nuclear reactors will be covered. Atomic fuels and their radioactive residues, as well as attendant health hazards, will be included. Prerequisites: Mathematics 210; Physics 204; senior classification.

448. Nuclear Engineering. (3-0). Credit 3. II
This is a continuation of Chemical Engineering 447, Nuclear Engineering, including such topics as detectors and control instruments, separation of isotopes and their use. Prerequisite: Chemical Engineering 447.

454. Chemical Engineering Thermodynamics. (3-0). Credit 3. I †
A study of the applications of thermodynamics to chemical engineering processes and operations. Prerequisites: Chemical Engineering 423; Chemistry 324.

461. Process Control and Instrumentation. (2-0). Credit 2. I †
A study of the fundamental principles and methods used in the measurement and control of the process variables such as pressure, temperature, and flow rate. Prerequisite: Chemical Engineering 423.

464. Chemical Engineering Kinetics. (3-0). Credit 3. II †
An introduction to the kinetics of reactions and the application of fundamental principles to the design and operation of commercial reactors. Prerequisites: Chemical Engineering 441, 454.

FOR GRADUATES

605. Chemical Engineering Economics. (3-0). Credit 3. I
Advanced calculations involving process design and process control as limited by least cost or maximum profit. Problems are based on the various unit operations and unit processes. Prerequisite: Chemical Engineering 423.

606. Unit Operations. (3-0). Credit 3. II
Applications of chemical engineering fundamentals in the refining of petroleum. Prerequisite: Chemical Engineering 423.

607. Thermal Cracking. (3-0). Credit 3. I
Application of fundamentals of chemical engineering to process calculation on thermal cracking. This includes process control and process design. Prerequisites: Chemical Engineering 423, 606.

608. Heat Transmission. (3-0). Credit 3. I
Process and process design calculations on equipment involving the transfer of heat by conduction, convection, and radiation. Prerequisite: Chemical Engineering 423.

611. Furnace Design. (3-0). Credit 3. II
Process designs of furnaces. Involves radiant and convection heat transmission. Prerequisite: Chemical Engineering 608.

612. Distillation. (3-0). Credit 3. I
Process and process design calculations involving distillation of multicomponent and complex systems. Extractive and azeotropic distillation are covered. Prerequisite: Chemical Engineering 423.

616. Estimation of Investment Cost. (2-0). Credit 2. II
Simplified methods of estimating cost of process equipment in the preparation of preliminary appraisals. Prerequisite: Chemical Engineering 423.

617. Unit Processes in Petroleum Refining. (4-0). Credit 4. I
Calculations involving the effect of process variables on product yield and quality, rate of reaction, operating cost, and investment cost. Processes such as alkylation, isomerization, catalytic cracking, polymerization, thermal cracking, etc. will be covered. Prerequisites: Chemical Engineering 454, 616.

618. Appraisal and Presentation of Chemical Engineering Data. (3-0). Credit 3. II
Emphasis will be placed on analysis of experimental data. Practice is obtained by writing reports based on specific problems. Prerequisite: Chemical Engineering 423.

619. Corrosion and Materials of Construction. (3-0). Credit 3. I
The uses of materials of construction to preclude high corrosion rates in process equipment. Prerequisite: Chemical Engineering 423.

623. Applications of Thermodynamics to Chemical Engineering. (3-0). Credit 3. II
A study of the applications of thermodynamics to chemical engineering operations and processes. Prerequisite: Chemical Engineering 454.

624. Chemical Engineering Kinetics I. (3-0). Credit 3. I
A study of rates and mechanisms of chemical reactions. Thermal and catalytic reactions both homogeneous and heterogeneous are considered. Prerequisite: Chemical Engineering 423.

625. Chemical Engineering Kinetics II. (3-0). Credit 3. II
A study of the physical factors affecting chemical reaction rates and of methods for design of reaction equipment. Prerequisite: Chemical Engineering 624.

626. Oil and Fat Technology. (3-0). Credit 3. I
A study of the composition and properties of oils and fats, methods of extraction and purification, and their industrial utilization. Prerequisites: Chemical Engineering 423; Chemistry 302.

627. Oil Mill Operation. (2-6). Credit 4. I
A study of the theoretical and practical operating characteristics of the various units used in vegetable oil production. The economic factors of each unit and their over-all effect on plant operation will be covered. Prerequisites: Chemical Engineering 423, 626 or registration therein.

681. Seminar. (1-0). No credit. I, II
Graduate students will be required to attend one hour per week to discuss problems of current importance in connection with their research.

685. Problems. Credit 1 to 6. I, II, S
Special work to suit individual or small group requirements. The work may cover the numerous particular problems in chemical engineering processes and operations. It may be laboratory work or conference and discussion. Prerequisite: Approval of Head of Department.

691. Research. Credit 1 or more each semester. I, II, S
Problems of unit operations and unit processes. For maximum credit comprehensive thesis must be prepared which is of sufficiently high calibre to permit a publication in the scientific and technical journals. Prerequisite: Approval of Head of Department.

Department of Chemistry

Professor F. W. Jensen,
Professors C. K. Hancock, C. C. Hedges, E. B. Middleton, W. M. Potts; Associate Professors T. S. Burkhalter, E. L. Harter, A. F. Isbell, J. O. Page, A. F. Schram, R. E. Snuggs, H. K. Zimmerman, Jr.; Assistant Professors J. B. Beckham, A. W. Jache, D. R. Lee, W. H. McCoy, E. A. Meyers, Henry Rakoff, N. C. Rose, P. L. Sarma, R. A. Zingaro; Instructors R. B. Alexander, I. T. Collier, C. H. Dickson

101. General Chemistry. (3-3). Credit 4. I, II, S

Fundamental laws and theories of chemical activity. Practical applications of the more important chemical processes involving non-metals are briefly described.

General laboratory work deals with non-metals and simple tests of technical importance supplementing lecture demonstrations.

102. General Chemistry. (3-3). Credit 4. I, II, S

Fundamental theories of structure and activity. Practical application of the more important chemical processes involving metals described. Organic chemistry is briefly outlined.

Laboratory work consists of elementary qualitative separation and identification of metallic and non-metallic ions. Prerequisite: Chemistry 101.

106. General Chemistry. (3-3). Credit 4. II

A survey course in chemistry for students needing it as a cultural subject and not as a basis for advanced work.

109. General Chemistry. (3-3). Credit 4. I

Fundamental principles and processes; metals and non-metals. For properly qualified students only. Prerequisites: Examinations administered by Basic Division; previous scholastic record.

205. Qualitative Analysis. (2-6). Credit 4. I, II

The theory and practice of fundamental analytical operations assigned to enable the student to make rapid and accurate analysis of substances of average complexity, and to understand the steps by which his results are obtained.

The laboratory work consists of a study of the properties and reactions of the more common basic and acidic radicals, their separation and identification from mixtures, the method of getting solids into solution for analysis of unknown substances. Prerequisite: Chemistry 102 or 109.

207. Elementary Quantitative Analysis. (2-3). Credit 3. I, II, S

A considerable portion of the classroom time is devoted to chemical calculation involved in the practice.

The laboratory work consists of a number of carefully selected experiments in quantitative analysis designed to typify operations of general application. Prerequisite: Chemistry 102 or 109.

216. Quantitative Analysis. (2-6). Credit 4. I, II, S

An introduction to the methods of exact analysis as preliminary training for the more advanced courses. In the classroom the practice and theory of the laboratory exercises are dealt with by lectures and recitations. Special attention is given to stoichiometry.

The laboratory work consists of a number of carefully selected experiments in quantitative analysis designed to typify operation of general application. The work is first volumetric, then gravimetric. In the early periods samples of known composition and purity are analyzed. Prerequisite: Chemistry 102 or 109.

223. Elementary Quantitative Analysis. (2-3). Credit 3. I, II, S

Stress is placed on the basic principles and theories of quantitative analysis, both gravimetric and volumetric. The treatment is not highly mathemati-

cal. The laboratory work is designed to illustrate basic techniques. Not open to engineering students. Prerequisite: Chemistry 102 or 109.

225. Elementary Organic Chemistry. (2-0). Credit 2. I, II
A study of the hydrocarbons and their relation to the field of petroleum. Prerequisite: Chemistry 102 or 109.

231. Elementary Organic Chemistry. (3-0). Credit 3. I, II, S
A study of the aliphatic series of organic compounds including an introduction to the benzene series and to vitamins, proteins, and related substances. Applications are taken from the field of agriculture. Not open to engineering students. Prerequisite: Chemistry 102 or 109.

301. Organic Chemistry. (3-3). Credit 4. I, II, S †
An introduction to the chemistry of the compounds of carbon. A study of general principles and their application to various industrial processes.
The laboratory work serves as a basis of the course; the student here familiarizes himself with the reactions, properties, and relations of typical organic compounds. Prerequisite: Chemistry 102 or 109. Chemistry 216 is strongly recommended.

302. Organic Chemistry. (3-3). Credit 4. I, II, S †
A continuation of Chemistry 301. Prerequisite: Chemistry 301.

323. Physical Chemistry. (3-3). Credit 4. I †
Explanation and mathematical development of the theories and principles of chemistry. Topics discussed are atomic structure, gas laws, thermodynamics, thermochemistry, liquids, solutions, osmotic pressure, and colloids. Experiments in the laboratory substantiate the theories and principles developed in the classroom. Prerequisites: Chemistry 216; Mathematics 210.

324. Physical Chemistry. (3-3). Credit 4. II †
Intensive study of homogeneous and heterogeneous equilibria, the phase rule, chemical kinetics, catalysis, hydrogen-ion concentration, electrolytic and galvanic cells and electrochemistry, photochemistry, and radioactivity. Prerequisite: Chemistry 323.

342. Physical Chemistry. (3-3). Credit 4. II †
Explanation of basic chemical theories and principles with reference to their relationship to transformations in living matter. Special emphasis on such topics as atomic structure, diffusion and osmotic pressure, colloids, chemical equilibrium, catalysis, reaction velocity, hydrogen-ion concentration and its importance in biological processes. Prerequisites: Chemistry 207 or 216, and 301.

344. Physical Chemistry. (3-0). Credit 3. I, II
Structure of atoms, molecules, and crystals. Valence. Theories of polarity and ionization. Properties of gases, liquids, solids, and fugacities. Solubilities and properties of solutions. Study of colloids and surface energy. Equilibria. Electromotive force and oxidation potentials. Prerequisites: Chemistry 207; Mathematics 209; Physics 204.

400. Industrial Analysis. (1-6). Credit 3. I †
Lectures, recitations, and conferences dealing with technical methods of analysis both rapid and exact. Before beginning an analysis the student is required to consult current literature and standard books of reference and present a written outline for criticism and suggestion.
The laboratory work comprises the analysis of limestone, fuels, lubricating oils, gas, boiler water, iron and steel, alloys, ores, paint, soap, sugar, asphalt, and other materials of engineering and industrial importance. Prerequisite: Chemistry 216.

447. Qualitative Organic Analysis. (1-6). Credit 3. II †
The identification of the principal classes of organic compounds. Prerequisite: Chemistry 302.

448. Electrochemistry. (2-3). Credit 3. II †
A study of the theory of galvanic and electrolytic cells and their applications. Prerequisite: Chemistry 324.

449. Energetics. (4-0). Credit 4. I †
Study and mathematical treatment of energy relationships involved in chemical and physical transformations. Special attention given to free energy, fugacity, and activity. Prerequisites: Chemistry 302, 324.

450. Colloidal Chemistry. (3-3). Credit 4. I †
A study of the theories and preparation of disperse systems. Prerequisites: Chemistry 302, 324.

452. Inorganic Chemistry. (3-3). Credit 4. II †
The periodic relationship of the elements, their application and compounds. Laboratory work consists of advanced inorganic preparations. Prerequisite: Chemistry 324.

454. Seminar. (1-0). Credit 1. I
Oral discussion of selected topics from technical publications.

455. Paints and Coatings. (4-0). Credit 4. I
Study of types, composition, drying properties, and behavior of natural and synthetic oils and resins. Prerequisite: Chemistry 302.

FOR GRADUATES

607. Organic Preparations. (1-6). Credit 3. I
Preparation of organic compounds. Prerequisite: Chemistry 302.

608. Qualitative Organic Analysis. (1-6). Credit 3. II
Analysis of organic compounds. Prerequisite: Chemistry 302.

609. Theory of Organic Chemistry. (3-0). Credit 3. I
The development and application of chemical theories to organic compounds. Prerequisite: Chemistry 302.

611, 612. Principles of Physical Chemistry. (4-0). Credit 4 each semester. II, S
Study of gas laws, atomic structure, spectra, equilibria, and catalysis. Prerequisite: Chemistry 324.

620. Principles of Quantitative Analysis. (3-0). Credit 3. S
A study of the principles of gravimetric and volumetric analysis; theories and stoichiometry; recent developments. Prerequisite: Chemistry 400.

621. Chemical Kinetics. (3-0). Credit 3. I
Study of some of the present theories about chemical reaction rates and mechanisms. Prerequisite: Chemistry 324.

624. Physico-Organic Chemistry. (3-0). Credit 3. II
Mathematical and quantitative investigation of organic chemical phenomena. Prerequisites: Chemistry 302, 324. (Offered in 1956-57 and in alternate years thereafter.)

625. Petroleum Chemistry. (3-0). Credit 3. II
Practical and theoretical consideration of chemical reactions of petroleum hydrocarbons. Prerequisites: Chemistry 302, 324. (Offered in 1957-58 and in alternate years thereafter.)

626. Thermodynamics. (3-0). Credit 3. II
Theory and applications of classical thermodynamic functions. Prerequisite: Chemistry 449 or the equivalent.

628. The Non-Metallic Elements. (3-0). Credit 3. I
Study of the non-metals and their compounds. Recent developments. Knowledge of German or French desirable. Prerequisites: Chemistry 324; 449 and 452 desirable.

630. The Metallic Elements. (3-0). Credit 3. I
Study of the metals and their compounds. Recent developments. Knowledge of German or French desirable. Prerequisites: Chemistry 324; 449 and 452 desirable.

632. Thermodynamics of Irreversible Processes. (3-0). Credit 3. I
Thermodynamics in non-equilibrium system, e.g., conduction of electricity and heat, thermoelectricity, relation phenomena, diffusion, viscosity, etc. Prerequisite: Chemistry 626.

633. Alicyclic Compounds. (3-0). Credit 3. I
Occurrence, preparation, and properties of alicyclic compounds with special attention to those having biological activity. Prerequisite: Chemistry 302. (Offered in 1957-58 and in alternate years thereafter.)

635. Heterocyclic Compounds. (3-0). Credit 3. I
Structure, preparation, and properties of heterocyclic compounds with special emphasis on those with biological activity. Prerequisite: Chemistry 302. (Offered in 1956-57 and in alternate years thereafter.)

636. Electrochemistry. (3-0). Credit 3. II
Advanced treatment of conductivity, electrochemical thermodynamics, galvanic cells, electrodeposition, and corrosion. Prerequisite: Chemistry 448 or the equivalent.

637. Infrared Spectrometry. (3-3). Credit 4. I
The origin and nature of absorption in the rotational-vibrational region are developed. Analytical applications are made in the laboratory. Prerequisites: Chemistry 302, 324; Mathematics 210.

639. Instrumental Methods of Analysis. (1-6). Credit 3. II
Study and application of colorimetric methods. Nephelometry, turbidimetry, and fluorometry. Prerequisite: Chemistry 400.

640. Principles of Qualitative Analysis. (3-0). Credit 3. II
Study of special reagents which exhibit a high degree of selectivity or specificity in their use in qualitative analysis. Prerequisite: Chemistry 620.

641. Structural Inorganic Chemistry. (3-0). Credit 3. I
Study of nuclear and extranuclear structure, isotopes, valency of the elements, and sterochemistry of inorganic compounds. Prerequisites: Chemistry 324, 452. (Offered in 1957-58 and in alternate years thereafter.)

642. Methods of Structural Chemistry. (3-0). Credit 3. II
A study of theory, methods, and application of structural determinating (arrangement and bonding) of chemical species. Prerequisite: Chemistry 641 or approval of the instructor. (Offered in 1957-58 and in alternate years thereafter.)

643. Inorganic Complex Compounds. (3-0). Credit 3. II
History, theories, and methods of investigations of inorganic complex compounds. Prerequisites: Chemistry 324, 452. (Offered in 1956-57 and in alternate years thereafter.)

644. Quantitative Organic Analysis. (1-6). Credit 3. I
Determinations: Macro Dumas, sulfur, Carius hologen, Micro residue, fractionation, Micro Dumas, catalytic hydrogenation, carbon and hydrogen, Micro Kjeldahl, Rast molecular weight, molar refraction, active hydrogen, alkoxyl, semi-micro saponification number. Prerequisites: Chemistry 302 reading knowledge of German.

645. Solubility. (4-0). Credit 4. II
Study of experimental methods of solubility measurements. Solubilization and detergency. Introduction to solubility theory. Prerequisites: Chemistry 324, 449; Mathematics 210.

646. Organic Reactions. (3-0). Credit 3. II
A comprehensive course stressing the scope and limitations of the useful synthetic reactions in organic chemistry. Not only will some of the more familiar reactions be discussed in greater detail, but some of the newer and less familiar reactions will be presented. Some time will be spent in describing unique experimental procedures as well as reaction mechanisms. Prerequisite: Chemistry 609.

647. Polarography. (3-3). Credit 4. II
The treatment of the theory, instrumentation, and practical applications of polarography. Prerequisites: Chemistry 302, 324, 449.

685. Problems. Credit 1 to 6. I, II, S
This is a course in special topics to suit small group requirements. The work will deal with the more recent problems and results in the various branches of chemistry. It may be laboratory work or conference and discussion. Prerequisite: Graduate classifiaction.

691. Research. Credit 1 or more each semester. I, II, S
Research for thesis or dissertation.

Department of Civil Engineering

Professor S. R. Wright,
Professors J. B. Baty, S. J. Buchanan, R. M. Holcomb, H. J. Miles, J. A. Orr, R. L. Peurifoy, C. E. Sandstedt, J. H. Sorrels; Associate Professors C. F. DeVilbiss, B. M. Gallaway, E. L. Harrington, C. J. Keese, W. H. Nedderman, R. E. Schiller, Jr.; Assistant Professors E. P. Segner, Jr., F. M. Smith; Instructors D. E. Flatt, T. J. Gingles, T. J. Hirsch, W. R. McCasland, J. S. Noel, R. H. Schleider, Jr.

201. Plane Surveying. (3-3). Credit 4. I, II
Chaining, the adjustments, use and care of compass, transit, level, plane table, and hand instruments; measurement of angles; land surveys and computations; stadia, topographic, city, and general surveying; observations for true meridian and latitude; plotting results. Prerequisite: Mathematics 103.

202. Advanced Surveying. (2-3). Credit 3. I, II
Outlining reconnaissance, preliminary, and location of route surveys; computing and staking out simple and compound curves; cross-sectioning, earth work computations, mass curves; drainage areas, size of drainage structures; topographic mapping; profiles plans, and calculations of quantities for engineering projects. Prerequisite: Civil Engineering 201.

206. Plane Surveying. (0-3). Credit 1. I, II
Fundamental principles of surveying; use of transit and level; boundary surveys, area computations, profile surveys. Prerequisite: Mathematics 103.

208. Topographic Surveying. (1-3). Credit 2. I, II
Fundamental principles of surveying; use of transit and level; special emphasis placed on use of plane table in topographic mapping. Prerequisite: Mathematics 103.

300s. Summer Surveying Practice. Credit 5. S
Six weeks of surveying practice. Hortizontal and vertical control; base line measurements; transit-stadia surveys; plane table surveys; boundary surveys; area and coordinate computation; polaris observations; route surveys. Prerequisite: Civil Engineering 202.

305. Mechanics of Materials. (3-0). Credit 3. I, II, S
Stresses, deformations, mechanics of pipes, beams, shafts, columns, riveted joints, welded joints, elastic curve and deflections, moment areas, combined stresses, resilience. Prerequisites: Mathematics 210; Mechanical Engineering 212 or the equivalent.

311. Hydraulics. (3-0). Credit 3. I, II
The laws governing the action of water at rest and in motion, as related to engineering problems; the flow of water in pressure mains, sewers, aqueducts, open channels, and in rivers; measurement of the flow of water by nozzle, orifices, weirs and meters; flow of viscous fluids. Prerequisite: Mechanical Engineering 212 or equivalent.

315. Strength of Materials Laboratory. (0-2). Credit 1. I, II
Determination of the strength, ductility, modulus of elasticity, and other properties of engineering materials. Tests of timber, steel, cast iron, concrete, and reports showing results. Prerequisite: Civil Engineering 305 or registration therein.

336. Hydraulics Laboratory. (0-2). Credit 1. I, II
Calibration of nozzles, orifices, water meters, weirs, pressure gauges; measurement of pipe friction; measurement of pipe flow with pitot instrument and Venturi meter; efficiency tests on impulse motor, hydraulic ram, and centrifugal pump; solution of assigned problems. Prerequisite: Civil Engineering 311 or registration therein.

338. Design of Drainage Structures. (2-0). Credit 2. I, II
An elementary study of rainfall and runoff and the hydraulics of culverts and drainage structures; flow in open channels; pumps. Prerequisite: Civil Engineering 311.

344. Plain and Reinforced Concrete. (2-3). Credit 3. I, II, S
Properties of concrete; plain concrete structures; theory of stress distribution in reinforced concrete in bending, shear, bond, and anchorage; design of typical beams, slabs, and walls; stress distribution in spiral and tied columns with axial and eccentric loading; design of typical columns; interpretation of typical current specifications and use of available tables and charts; economic factors. Prerequisites: Civil Engineering 305, 345.

345. Analysis of Structures. (3-3). Credit 4. I, II, S
An introduction to structural engineering; loads, reactions, and structural force systems; algebraic and graphical computations of reactions and stresses in beams, three-hinged arches, and trussed structures used as roofs, floor systems, and bridges; influence lines and criteria for moving loads; analysis of indeterminate structures by the general deflection procedure and by moment distribution; reactions and stresses in bents. Pererequisite: Civil Engineering 305 or registration therein.

346. Design of Members and Connections. (2-3). Credit 3. I, II, S
The design of tension members, compression members, beams, riveted joints, and welded joints. Theory and practice as indicated in typical current specifications. Prerequisites: Civil Engineering 305, 345.

401. Water and Sewage Treatment. (2-2). Credit 3. I, II, S †
Principles and methods of water purification and sewage treatment and disposal; laboratory demonstrations of control tests and correlation of results with treatment plant operation; interpretation of reports; inspections of local plants. Prerequisite: Chemistry 102.

402. Water Supply and Sewerage Practice. (2-2). Credit 3. I, II †
Development of sources of water supply; determination of the quantity of storm water and domestic sewage; short problems relating to water supply distribution systems, sewer systems, and the general features of water purification and sewage treatment plants; appurtenances and treatment plant equipment; local inspections of water supply and sewerage systems. Prerequisites: Civil Engineering 338, 401.

403. Sanitary Design. (2-3). Credit 3. II †
Practical problems in the design of sewer systems and appurtenances; sewage treatment plants; water collection and distribution systems; water

purification plants. Prerequisite: Civil Engineering 402 or registration therein.

406. Sanitation and Public Health. (3-0). Credit 3. I †
Relation of sanitation to public health; residential water supply and excreta disposal methods; municipal sanitary work, including refuse disposal; plumbing; control of food supplies; mosquito, fly, and rodent control; sanitation of swimming pools; industrial hygiene; organization of health departments. Prerequisite: Junior classification.

407. Highway Engineering. (3-0). Credit 3. I, II, S †
An introduction to problems in location, design, drainage, construction, and maintenance of highways, streets, and pavements. Road laws, finances, highway organizations and supervision briefly considered. The text is supplemented by lectures, the use of bulletins, models, and samples of materials. Prerequisites: Civil Engineering 202, 338, 465 or registration therein.

408. Municipal Administration. (3-0). Credit 3. I †
City government, including the city manager plan; relation of city to state; administration of city departments; public utilities; city planning. Prerequisite: Junior classification.

409. Sanitary Laboratory. (2-3). Credit 3. I †
Theory and practice in fundamental tests used in water and sewage treatment processes. Prerequisite: Civil Engineering 401.

417. Bituminous Materials. (2-3). Credit 3. II †
Origin, production, specifications, and tests of bituminous materials and mixtures used in the construction and maintenance of roads and pavements. Prerequisites: Senior classification in engineering and Civil Engineering 407 or registration therein.

443. Materials of Construction. (1-3). Credit 2. I, II †
Laboratory tests, supplemented with theory, of aggregates, cement, concrete mixtures, and masonry materials. Prerequisite: Senior classification.

448. Engineering Economy. (2-0). Credit 2. I, II †
Analysis of operating costs of engineering projects including interest, depreciation, fixed costs, overhead. Comparison of first cost economy versus ultimate economy. Prerequisite: Junior classification in engineering.

457. Traffic Engineering. (3-0). Credit 3. I †
A study of vehicle operating characteristics, traffic flow, geometric design of roads, streets, and intersections, and methods of traffic control. Prerequisites: Civil Engineering 202, 407 or registration therein; Physics 204.

458. Hydraulic Engineering. (3-0). Credit 3. II †
Flow in pipes and complex pipe systems; non-uniform flow in open channels; pumping machinery; elementary hydraulic model theory. Prerequisite: Civil Engineering 338.

463. Hydrology. (3-0). Credit 3. I †
A study of the occurrences and measurements of precipitation and stream flow; relations between precipitation and run-off; estimating seepage; evaporation, run-off; surface, and flood discharges for drainage basins. Prerequisite: Civil Engineering 311.

465. Soil Mechanics and Foundations. (2-2). Credit 3. I, II, S †
An elementary introduction to soil mechanics and its application to the usual problems encountered in civil and architectural engineering. The origin, formation processes, and types of soils are reviewed. Methods of exploration and soil testing required for the design of various types of foundation, retaining walls, bridge abutments, coffer dams, earth dams, and other engineering structures. Prerequisites: Civil Engineering 305; Geology 320 or 422.

468. Statically Indeterminate Structures. (2-3). Credit 3. I †
Definitions, functions, and identifications of statically indeterminate structures; their uses, advantages, and disadvantages; general method of design; general method of analysis based on deflections; deflection computation for beams by elastic-curved-beam theory, moment areas, and conjugate beam; deflections of trusses by virtual work and Williot diagrams; preliminary designs; formulation and solution of simultaneous equations; superposition, final stresses; moment distribution; applications in the design of arches, rigid frames, and continuous beams. Prerequisite: Civil Engineering 345.

473. Cost Estimating. (3-0). Credit 3. I, II, S †
Approximate and detailed estimates of the cost of construction projects including earthwork, foundations, concrete, masonry, steel, and miscellaneous items. Costs are developed to include materials, equipment, labor, overhead, and profit. Prerequisite: Senior classification.

474. Contracts and Specifications. (2-0). Credit 2. I, II †
Study of types of contracts frequently encountered in engineering practice, including agency, tort, real estate, sales, transportation. Preparation of representative specifications and contractural documents for engineering projects. Prerequisite: Senior classification in engineering or architecture.

476. Seminar. (1-0). Credit 1. I, II †
A study of the methods of job procurement subsequent to graduation including letters of application and job interviews; responsibilities and obligations of the young civil engineer; professional ethics; membership in professional societies; professional registration; lectures by staff and practicing engineers. Prerequisite: Senior classification.

478. Construction Plant and Methods. (3-0). Credit 3. II †
Plant and equipment selection for earthwork, foundations, concrete and structural steel, based on performance and economy. Contruction schedules, progress reports, and performance records. Prerequisite: Senior classification in engineering or architecture.

482. Aerial Photogrammetry. (2-3). Credit 3. I †
A study of photogrammetric optics, characteristics of aerial photographs, aerial cameras, map projections, ground control, radial plots, mosaics, interpretation of aerial photographs, stereoscopic plotting instruments, and mapping form from oblique photographs. Prerequisite: Civil Engineering 201.

483. Analysis and Design of Structures. (2-3). Credit 3. I, II †
The over-all procedure of analysis and design, including functions, loads, layouts of force systems, analysis, design drafting, specifications, cost comparisons, and maintenance as applied to typical simple bridge and building structures, design of plate girders, trusses, and reinforced concrete buildings. Prerequisites: Civil Engineering 344, 346, 465.

484. Design of Bridges and Buildings. (2-3). Credit 3. II †
Continued practice in the over-all process of design as applied to more complex structures, continuous beam bridges, rigid frames, multi-story buildings. Prerequisite: Civil Engineering 483.

FOR GRADUATES

601, 602. City Management. (4-0). Credit 4 each semester. I, II
Development of European and American cities; forms of city government; functions of the city manager; administration of municipal affairs; organization of city departments; city finances; public utilities; fire prevention and protection; police administration; parks and playgrounds; public health and welfare; housing; city planning.

603. Sewage Treatment and Stream Sanitation. (4-0). Credit 4. I
Advanced studies of the theories of the various processes of sewage treatment, with special attention given to the details of the individual methods and units employed to effect these processes; and the requirements regarding the quality of sewage treatment plant effluents in relation to the sanitary protection of the receiving waters. Prerequisite: Civil Engineering 402.

604. Water Quality and Treatment. (4-0). Credit 4. II
Advanced studies of the characteristics of available sources of water, standards of quality of public water supplies, and the theories of treatment and purification processes, with special attention given to the details of the methods and units employed to effect these processes. Prerequisite: Civil Engineering 402.

607, 608. Environmental Sanitation. (4-0). Credit 4 each semester. I, II
Detailed study of environment and its relation to disease, covering malaria and its control; rodent control; sanitation of milk, shellfish, and other foods; collection and disposal of municipal refuse; sanitary aspects of air conditioning; housing sanitation, including plumbing and ratproofing; rural water supply and excreta disposal; sanitary inspection procedure.

610. Industrial Wastes. (4-0). Credit 4. II
Amount and characteristics of the common industrial wastes; their effects upon sewage treatment; methods of treatment. Prerequisite: Civil Engineering 401 or the equivalent.

621. Advanced Reinforced Concrete Design. (3-3). Credit 4. II
Plastic flow, pre-stressed concrete, torsion, deep beams; domes, ribbed arch roofs, flat-slab and girderless floors; rectangular tanks. Prerequisite: Civil Engineering 483.

625, 626. Highway Engineering. (3-3). Credit 4 each semester. I, II
The fundamentals of traffic flow and traffic control. Advanced theory and practice in alignment design for safe vehicle operation, highway capacity and cross-section design, design of drainage structures. Design and construction of subgrades and rigid and flexible pavements. Design of intersections. Laboratory consists of field and office problems supplementing the theory. Prerequisites: Civil Engineering 407, 465.

627, 628. Hydraulic Engineering. (3-3). Credit 4 each semester. I, II
Advanced hydrology, water power development, flood control, irrigation.

629. Hydraulics of Open Channels. (3-3). Credit 4. I
Advanced problems in uniform and non-uniform flow in open channels; the hydraulic jump; control section; backwater profiles.

630. Ground Water Hydrology. (1-3). Credit 2. II
A quantitative study of the application of the principles of hydrology to the development and use of ground water supplies. Prerequisites: Geology 620 or the equivalent, registration in 625.

631. Advanced Structural Analysis. (3-3). Credit 4. I
Review and correlation of general procedures for analyzing indeterminate structures, deflections by structural geometry and by energy considerations; simultaneous equations by deflections and by energy considerations; neutral point and column analogy methods for fixed arches and frames; application of moment distribution to complex structures. Prerequisite: Civil Engineering 483.

632. Advanced Structural Design. (2-6). Credit 4. II
Design of complex and indeterminate structures; built up columns; members with variable section; grillage foundations; design and detailing of continuous frames, arches, towers, and building frames. Prerequisites: Civil Engineering 468, 483.

633. Advanced Mechanics of Materials. (4-0). Credit 4. I
Principal stresses and theories of failure of elastic action; stress concentration; unsymmetrical bending; mechanical methods for study of internal stresses; special problems such as bending in flat plates, buckling of webs, bending in curved beams and hooks.

634. Airfield Planning and Design. (2-0). Credit 2. II
Study of regional planning, air traffic routing, landing requirements, methods for development of master plans for site selection, airfield design requirements involving layouts, pavement selection, and design. Review and application of criteria of design of drainage for all types of fields.

635, 636. City Street Design. (2-0). Credit 2 each semester. I, II, S
The fundamentals of city planning as related to street planning, design, and construction. Traffic characteristics and operation. Geometric design of streets and intersections, drainage, pavement types and design, and financing municipal street improvements. Prerequisite: Civil Engineering 407.

639. Advanced Traffic Engineering. (3-3). Credit 4. II
Advanced theory and practice in techniques of investigations in traffic characteristics. Advanced theory and application of traffic regulations, traffic control, traffic design, administration, and planning. Laboratory consists of field and office problems supplementing the theory. Prerequisites: Civil Engineering 407, 457.

649. Soil Mechanics. (3-3). Credit 4. I
A study of foundation materials as they exist and of the various types of soils, their physical properties, testing procedure, and principles of classification. For advanced undergraduates and for graduate electives. Prerequisites: Civil Engineering 465; Geology 320.

650. Soil Mechanics. (3-3). Credit 4. II
A study of theory and practice in foundation exploration, laboratory investigations of undisturbed foundation samples, stress distribution through soils; problems in foundation design, correlation of settlement data from actual observations on the behavior of existing structures, stability of embankments, backfill pressures. Prerequisite: Civil Engineering 649.

651. Advanced Theory and Application of Soil Mechanics. (3-3). Credit 4. I
Special lectures, discussions and applications of theory to solution of major problems encountered in practice of soil engineering, embracing the fields of seepage, earth work design, foundation design, port structures, and special problems. Prerequisite: Civil Engineering 650.

685. Problems. Credit 1 to 6 each semester. I, II, S
A course offered to enable majors in civil engineering to undertake and complete with credit in their particular fields of specialization limited investigations which do not fall within their thesis research and which are not covered by other courses in the established curriculum. Credit for this course normally will be limited to four credits per semester, but in exceptional circumstances, the Head of the Department may approve a maximum of six credits in one semester or summer term.

691. Research. Credit 1 or more each semester. I, II, S
Research for thesis or dissertation.

Department of Dairy Science

Professor I. W. Rupel,
Professors A. L. Darnell, R. E. Leighton, A. V. Moore; Associate Professor I. I. Peters; Assistant Professor W. C. Van der Zant; Instructor M. A. Brown

202. Dairying. (2-2). Credit 3. I, II, S
A survey of the dairy industry; dairy breeds, standards for selection and culling, herd replacements, feeding, management, and health maintenance. Food value of milk, tests for composition and quality, utilization and processing of market milk and dairy products. Prerequisite: Chemistry 101.

301. Market Milk. (3-2). Credit 4. I †
Nutritional value of milk; milk and public health; organization of city milk supplies; processing and distribution and inspection of market milk. Prerequisites: Biology 206; Dairy Science 202.

303. Dairy Cattle Judging. (0-3). Credit 1. I
A study of comparative judging of dairy cattle. Student contest and commercial judging techniques. Prerequisite: Dairy Science 202.

307. Judging Dairy Products. (0-3). Credit 1. II
Practice in judging and scoring dairy products according to established student contest and commercial standards. Prerequisite: Dairy Science 202.

310. Advanced Dairy Cattle Judging. (0-2). Credit 1. II
Advanced study of dairy cattle judging with particular attention to show ring type and classification. Prerequisite: Dairy Science 303.

311. Technical Control of Dairy Products. (2-6). Credit 4. II †
Methods of analysis of milk and milk products, and their use in controlling the composition and quality of dairy products. Prerequisites: Chemistry 223, 231; Dairy Science 301.

313. Dairy Products Plant Operation. (2-2). Credit 3. I
The influence of production and processing methods on the physical, chemical, and sanitary properties of dairy products. May not be taken for credit toward graduation by dairy science majors. Prerequisite: Enrollment in veterinary medicine.

316. Butter and Cheese Manufacture. (3-4). Credit 4. II †
Processing procedures in the commercial manufacture of domestic and foreign cheeses; creamery butter manufacture. Prerequisites: Dairy Science 301, 320. (Offered in 1956-57 and in alternate years thereafter.)

320. Bacteriology of Dairy Products. (3-3). Credit 4. I †
Relation of micro-organisms to quality in milk and milk products; starter and fermented milk culture management; sanitary control on farms and in commercial dairies; standard analytical procedures according to the American Public Health Association. Prerequisite: Biology 206.

324. Commercial Dairy Products. (3-0). Credit 3. II
A modification of Dairy Science 316, 407, 415. Prerequisite: Dairy Science 202. (Offered in 1957-58 and in alternate years thereafter.)

326. Food Preservation and Decomposition. (3-3). Credit 4. II †
The microbiology of human foods and accessory substances. A study of raw and processed foods, emphasizing the physical, chemical, and biological phases of spoilage. Standard industry techniques of inspection and control. Prerequisite: Biology 206.

407. Ice Cream Manufacturing. (2-3). Credit 3. I †
The manufacture of ice cream, sherbets, and ices, and the physical and chemical principles involved; ice cream plant equipment; flavoring materials; merchandising. Prerequisites: Agricultural Engineering 213; Dairy Science 202.

410. Dairy Plant Management. (1-2). Credit 2. II †
Dairy plant operating efficiency. Special economy problems incident to plants handling fluid milk, butter, cheese, and concentrated dairy products. Prerequisite: Senior classification in dairy science.

415. Condensed and Powdered Milk. (2-2). Credit 3. I †
The manufacture and distribution of condensed and evaporated milk, milk powder, milk sugar, casein, and other milk products. Prerequisites: Chemistry 231 or equivalent; Dairy Science 301; one semester of physics.

417. History and Development of Dairy Cattle. (2-2). Credit 3. I †
The breeding and development of a dairy herd, including artificial breeding, selection of breeding animals, production testing and classification, breeding programs, herd analysis, and a review of history of the breeds. Prerequisites: Dairy Science 202; Genetics 301.

418. Feeding and Management of Dairy Cattle. (3-2). Credit 4. II †
The feeding, care, and management of the dairy herd exclusive of management practices covered in Dairy Science 417; calf raising, developing the dairy heifer, care of dry and fresh cows, feeding for milk production, disease control, silage buildings, and related topics. Prerequisites: Animal Husbandry 303 or Biochemistry and Nutrition 401; Dairy Science 202.

420. Dairy Management. (2-2). Credit 3. I
A combination of Dairy Science 417, 418 for agricultural education students. Prerequisites: Animal Husbandry 303; Dairy Science 202; Genetics 301.

421. Seminar. (1-0). Credit 1. I, II †
A review of current dairy literature and presentation of papers on selected dairy topics. May be elected a second time for one additional credit. Prerequisite: Senior classification.

451. Special Problems. Credit 1 to 4. I, II †
Special problems in dairy production or dairy manufactures. May be repeated for additional credit when less than four credits have been earned. Prerequisites: Senior classification; approval of Head of Department.

FOR GRADUATES

601, 602. Dairy Production. (2-6). Credit 4 each semester. I, II
An advanced study of dairy production, feeding, breeding, and management. Prerequisite: Dairy Science 418.

603, 604. Dairy Manufactures. (2-6). Credit 4 each semester. I, II
An advanced study of dairy manufactures. Prerequisites: Dairy Science 316, 407, 415.

609. Dairy Cattle Breeding and Management. (3-0). Credit 3. S
Advancements in dairy cattle feeding, breeding, management, and commercial milk production. A three-weeks course for agricultural workers offered in summer sessions only. Not open to dairy science majors. Prerequisite: Dairy Science 418 or 420 or approval of Head of Department.

685. Problems. Credit 1 to 4 each semester. I, II, S
A study of research methods and a review of scientific literature dealing with individually selected problems in production or manufactures and not pertaining to thesis or dissertation. Prerequisite: Graduate classification.

691. Research. Credit 1 or more each semester. I, II, S
Research leading to thesis or dissertation in the respective fields of dairy production and dairy manufactures. Prerequisite: Graduate classification.

Department of Economics

Professor A. F. Chalk,
Professors W. H. Delaplane, Aurelius Morgner*; Associate Professors E. E. Liebhafsky, H. R. Putnam; Assistant Professors M. H. Butler, M. G. Daniels, V. T. McKenna, L. H. Stern; Instructor W. A. Mauer

203. Principles of Economics. (3-0). Credit 3. I, II, S
The nature of the economic problem and the role of prices in production and distribution. The first half of a year course.

204. Principles of Economics. (3-0). Credit 3. I, II, S
Management and control of economic resources, national income analysis, government finance and the banking system, international trade, comparative economic systems. The second half of a year course.

205. Principles of Economics. (3-0). Credit 3. I, II, S
A survey course designed for students specializing in technical fields. The economic problem; the measurement and determination of natural income; money, credit, and banking; the theory of price, production, and distribution. Cannot be substituted for Economics 203, 204.

311. Money and Banking. (3-0). Credit 3. I, II, S
The fundamental principles of money, credit, and banking and their exemplification in modern currency and banking history, particularly that of the United States. Special attention is given to present-day conditions and problems. Prerequisites: Economics 203 and 204, or 205.

318. Economics of Labor. (3-0). Credit 3. I, II, S
Special attention is given to the labor force, unemployment, labor markets, wages, work periods, the aged worker, industrial accidents, and phases of social security. Prerequisites: Economics 203 and 204, or 205.

319. Economic Development of the United States. (3-0). Credit 3. I, II, S
A survey of the economic development of the United States from colonial times to the present. The course will describe the origin and development of our economic and social institutions and provide a basis for an understanding of our present economic problems. Prerequisites: Economics 203 and 204, or 205.

320. Economic Development of Europe. (3-0). Credit 3. II
A survey of the steps by which economic activities have evolved from the Medieval period into the complex capitalistic economy of today. Special emphasis on the development of the wage system, the Industrial Revolution, the expansion of markets, the ebb and flow of industrial activities, the financial structure, and the relation of industrial development to political policy. Prerequisites: Economics 203 and 204, or 205.

321. International Trade and Finance. (3-0). Credit 3. I †
A study of international economics, including the theory of international trade, foreign exchange, and the balance of payments; tariffs, exchange controls, and other barriers to trade; international investment; and contemporary problems of international disequilibrium. Prerequisites: Economics 203 and 204, or 205.

323. Economic Analysis. (3-0). Credit 3. I †
The importance of prices in directing production and distributing income under both competitive and monopolistic market situations is considered, along with a survey of the effects of governmental policies on the pricing system. Prerequisites: Economics 203 and 204, or 205.

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*On leave of absence

324. Comparative Economic Systems. (3-0). Credit 3. I
A study of the economic systems of the leading nations. Prerequisites: Economics 203 and 204, or 205.

412. Public Finance. (3-0). Credit 3. II †
A survey of all aspects of government finance. The main topics studied are public expenditures, taxation, public debt, and financial administration at federal, state, and local levels. Attention will be given to spending and borrowing policies of the government, and the role of taxation as an instrument of fiscal policy. Prerequisites: Economics 203 and 204, or 205.

421. Government and Business. (3-0). 3. I
The problems created by the existence of monopoly power in those industries in which entrance of new firms and the prices charged are not controlled by governmental commissions. An attempt is made to examine the extent and intensity of monopoly power and our past and present public policies toward it. Prerequisites: Economics 203 and 204, or 205.

424. Economics of Transportation. (3-0). Credit 3. II
A description of the structure and functioning of our highway, rail, water, and air transportation systems; the economic significance of transportation in our society; and an analysis of the theory and practice of regulation of the transportation industries by the Interstate Commerce Commission and other governmental agencies. Prerequisites: Economics 203 and 204, or 205.

433. Seminar. (1-0). Credit 1. II †
Primarily for students majoring or minoring in economics. A study of methodology, scope, and philosophy of economic science, followed by individual investigation of some current economic problems. Prerequisite: Approval of the Head of the Department.

434. Economic Analysis of the South. (3-0). Credit 3. II
A study of the economic resources and problems of the South in the light of their geographic and historical background and of current movements for improvements. Prerequisites: Economics 203 and 204, or 205.

435. Collective Bargaining and Labor Disputes. (3-0). Credit 3. I †
A study of the economic significance of collective bargaining including techniques, union contracts, and contract formation. Prerequisite: Economics 318 or approval of the Head of the Department.

437. Government and Labor Relations. (2-0). Credit 2. II †
A study of court decisions and laws regulating and protecting labor in the interest of national welfare with attention given to the social and economic environment in which such regulations were developed. Special attention is given to the major legislative acts of Congress and some of the state laws pertaining to labor relations, with some attempt to evaluate these in the light of a changing conception of labor relations. Prerequisite: Economics 318 or approval of the Head of the Department.

440. Latin-American Trade. (3-0). Credit 3. II †
A study of Latin-American trade and commercial policies, together with an analysis of the economic problems of this region. Prerequisite: Economics 321 or approval of the Head of the Department.

441. Russian Economy. (3-0). Credit 3. I †
A study of the development of Russian trade, agriculture, industry, government, finance, and standards of living in successive periods in relation to the historical, geographic, economic, and ideological background. Prerequisites: Economics 203 and 204, or 205.

443. Contemporary Economic Problems. (3-0). Credit 3. II †
A study of current economic problems which lie within the following major areas of economic policy: economic stability, control of monopoly power, distribution of income, and international economic relations. Prerequisites: Economics 203 and 204, or 205.

FOR GRADUATES

601. History of Economic Thought. (4-0). Credit 4. I
Primary emphasis is given to the Classical Period of 1776-1848, although a brief survey of pre-classical economic thought is made at the beginning of the course. Students are expected to read extensively in original sources, and special attention is devoted to the works of Smith, Malthus, West, Ricardo, and Mill. Prerequisite: Approval of the Head of the Department.

602. History of Economic Thought. (4-0). Credit 4. II
Following a general survey of the wage-fund controversy, an intensive study is made of marginal utility theory as developed by Menger, Jevons, Boehm Bawerk, etc., followed by the Neo-Classical period. The final portion of the course is devoted to the synthesis of classical and marginal utility theory found in Marshall's system. Prerequisite: Approval of the Head of the Department.

606. The Labor Movement. (4-0). Credit 4. II
A historical survey of the evolution of labor movements and programs. Discussion of economic principles involved in the leading problems of labor. Prerequisite: Economics 318.

607. Contemporary Economic Theory. (4-0). Credit 4. II
This is a survey of the more important contributions to economic thought which have been made during the last generation. The current writings of important contemporary economists are read and evaluated. Prerequisite: Economics 323.

611. Government Fiscal Policy. (3-0). Credit 3. I
This course concerns the development of modern national income analysis and the role of fiscal policy in promoting economic stability. The conceptual problems of measuring national income are considered, analytical systems explaining the determination of national income are surveyed, and contemporary policy recommendations for the maintenance of full employment without inflation are discussed. Prerequisite: Economics 311 or 412.

613. International Economic Policies. (3-0). Credit 3. II
A critical examination of governmental policies toward international trade both at home and abroad; includes study of the role of the individual and the state in foreign trade; examines export and import controls, exchange control and exchange stabilization funds; considers tariff and rehabilitation policies of the government and their relation to foreign trade. Prerequisite: Economics 321.

685. Problems. Credit 1 to 3 each semester. I, II, S
Individual problems not related to a thesis or dissertation. Prerequisites: Graduate classification with major or minor in economics; approval of the Head of the Department.

691. Research. Credit 1 or more each semester. I, II, S
Thesis research.

Department of Education and Psychology

Professor G. P. Parker,
Professors W. P. Ewens, W. A. Varvel, G. B. Wilcox; Associate Professors M. S. Kavanaugh; Assistant Professors E. C. Ellis, S. A. Kerley, F. E. McFarland

EDUCATION

121. An Introduction to Education. (3-0). Credit 3. I, II
A survey course in the social foundations of American education.

321. Secondary School Methods. (3-0). Credit 3. I, S
Methods of teaching high school subjects; for students who expect to teach in secondary schools.

421. History and Philosophy of Education. (3-0). Credit 3. I, S †
An evaluation of the educational achievements of the various nations and people of the western world; the development of the social, religious, political, and cultural beliefs and attitudes that underlie American education today. Prerequisite: Six hours of education.

425. Supervised Student Teaching. (2-12). Credit 6. I, II
Observation and participation in classroom activities. Techniques of teaching the student's special subjects. Two hours per week devoted to student's problems. Preparation of units of work preparatory to teaching. Supervised teaching. Prerequisites: Senior classification; approval of the Head of the Department.

426. Tests and Measurements. (3-0). Credit 3. II, S †
The development of scientific measurement. The fundamental principles of sound measurement and an intensive study of the methods of appraising achievements of instructional objectives. Primary emphasis upon methods of constructing teacher-made objective tests and techniques for improving other types of written examinations. Prerequisite: Education 321, or the equivalent.

427. Principles of Guidance. (3-0). Credit 3. I, S †
Introduction to the field of guidance and student personnel work. Treatment of principles underlying the aims, methods, and instruments employed in counseling and guidance. Attention to relationship of instruction and guidance. Prerequisite: Psychology 207, or 301, or 303.

433. Improvement of Reading, Spelling, and Speech. Credit 3. S †
Application of phonetics in the teaching of reading, spelling, and speech in the primary and elementary grades. A study of International Phonetic Alphabet with reference to speech organs and correct pronunciation. (To be given on a full day schedule in a three-week period. Ten hours per week to be given over to demonstration teaching). Prerequisite: Senior classification.

434. Improvement of Reading, Spelling, and Speech. Credit 3. S †
An advanced course in the application of phonics in teaching reading, spelling, and speech to pupils in the upper level of the primary grades. Prerequisite: Approval of the instructor.

435. Audio-Visual Education. (3-0). Credit 3. II †
Basic philosophy of visual education; a study of areas of instruction in relation to visual aids; scope of materials, equipment and materials available; technical information and practice in the operation and use of types of equipment; production and development of other materials for use by the teacher. This course is designed primarily for teachers and advanced students in education. Prerequisite: Education 321.

436. Organization and Administration of the Elementary School. (3-0). Credit 3. S †
The functional study of the participation in, and the organization and administration of, the elementary school. Designed to meet the needs of elementary school principals, supervisors, teachers, and school superintendents. Prerequisite: Twelve hours of education.

437. Organization and Administration of the Secondary School. (3-0). Credit 3. II, S †
The functional study of the participation in, and the organization and administration of, the secondary school. Designed to meet the needs of secondary school principals, supervisors, teachers, and school superintendents. Prerequisite: Twelve hours of education or the equivalent.

439. Educational Statistics. (3-0). Credit 3. I †
Statistical techniques for classroom teachers, principals, students of psychology and education, and educational research workers. Problems originating in classrooms, offices of principals, laboratories of educational investigators will be used for illustrative materials and exercises. Not open to students who have received credit for any other course in statistics. Prerequisite: Six hours of advanced education.

443. Elementary School Curriculum. (3-0). Credit 3. S †
Curriculum problems as they relate to the growth, development, and adjustment of the child in the elementary school. Emphasis given to the study of curriculum materials and upon the resource unit approach within the modified elementary curriculum structure. Prerequisite: A previous course in elementary school methods.

444. Secondary School Curriculum. (3-0). Credit 3. I, S †
Inquiry into current curriculum practices and their backgrounds, basis for curriculum reorganization, emphasis upon the resource unit approach within the modified curriculum structure. Prerequisite: Education 321 or the equivalent.

FOR GRADUATES

601. College Teaching. (2-0). Credit 2. I
Conceptions of higher education underlying typical programs including general education, the learning process, and effective use of techniques and instrumentalities of classroom instruction. Prerequisite: Graduate classification.

607. Programs and Procedures in Supervision. (3-0). Credit 3. II, S
Designed for teachers, supervisors, and administrators. Deals with the philosophy, organization, and administration of supervision of both the elementary school and the secondary school. Prerequisites: Education 321, 444 or the equivalent.

608. Administration of Local School Finance. (3-0). Credit 3. II, S
A study of school funds on the local school level: sources, budgeting, systems of accounting and reporting. Supply management as related to school efficiency.

609. Public School Laws. (3-0). Credit 3. II, S
A review of the constitutional provisions, statute laws, court decisions, and regulations governing the public schools, with special reference to Texas.

610. Pupil Accounting. (3-0). Credit 3. I
A study of devices to record and improve census taking and attendance; classification and promotional schemes; school record system; school reports and pupil appraisal studies; marking systems.

613. The School Plant. (3-0). Credit 3. II, S
A study of plans for determining the extent and character of present and future building and equipment needs of a school unit; efficiency of present plant; operation and maintenance; planning the building program.

615. Structural Organization and Administration. (2-0). Credit 2. I, S
A study of state school administrative organizations; origin and development of local units; proper relationships of the State to local units; state boards of education and their functioning; training and certification of teachers.

616. Administration of Staff Personnel. (3-0). Credit 3. I, S
A study of selection, salary schedules, tenure, and promotion of teachers, including in-service training; efficiency records and ratings.

619. Resources Use Education. (4-0). Credit 4. S
Major emphasis will be given to wise use and protection of our natural and human resources. Consultants will give the technical information concerning each area, and the students will translate this information into teaching units of work for use in public school curriculum. The areas to be considered are soils, water, forests, wildlife, minerals and industry, human resources, health, and physical and safety education. Prerequisite: Education 321 or 443 or 444 or the equivalent.

623. Standardized Tests and Measurements. (3-0). Credit 3. I
Use of standardized tests in instruction and guidance. Study of various tests of achievement, aptitude, interest, and personality. Methods of construction, experimental trial, and standardization of published tests. Interpretation of test results. Prerequisite: Education 426, or 439, or the equivalent.

624. Individual Testing. (2-3). Credit 3. I
Practicum in administration and interpretation of the Stanford-Binet and Wechsler-Bellevue intelligence tests. Introduction to individual tests of personality. Prerequisites: Education 426 or 439; 623 or registration therein.

625. Practicum in Secondary Education. (2-3). Credit 3. I
A course designed for secondary school teachers in which a study is made of current problems of the secondary school. The student, with the advice of the instructor, will select an individual problem from the following areas: planning, including the school survey; curriculum development; life adjustment education; education for out-of-school youths and adults; evaluative criteria; counseling; supervision; citizen's committee for the public schools. Prerequisites: Individual approval; teaching experience.

626. Practicum in Secondary Education. (2-3). Credit 3. II
This is a continuation of Education 625. The student selects an individual secondary school problem different from the one used for Education 625.

627. Practicum in Elementary Education. (2-3). Credit 3. I
A course designed for elementary school teachers in which a study is made of current problems of the elementary school. The student, with the advice of the instructor, will select an individual problem from the following areas: evaluation, a detailed study of testing programs; curriculum development in specific areas; health and safety education; child growth and development; improving teaching techniques; counseling; supervision, school and community programs. Prerequisites: Individual approval; teaching experience.

628. Practicum in Elementary Education. (2-3). Credit 3. II
This is a continuation of Education 627. The student selects an individual elementary school problem different from the one used for Education 627.

629. Practicum in Counseling and Guidance. (2-3). Credit 3. II
Supervised practice in individual counseling and group guidance. Cases assigned in Basic Division and local public schools. Prerequisites: Education 624, 631.

631. Techniques of Counseling. (3-0). Credit 3. II
Methods of gathering, analyzing, and interpreting case data in counseling. Analysis of dynamics of counselor-counselee relationship. Interviewing techniques. Use of test results in counseling. Prerequisites: Education 427 or 635, 623; Psychology 634.

632. Educational and Occupational Information. (3-0). Credit 3. II, S
Sources, classification, and analysis of educational and occupational information. Occupational trends, local occupational surveys. The use of occupational information by the classroom teacher and the guidance specialist.

633. Methods of Group Guidance. (3-0). Credit 3. I, S
Methods and practices in group guidance. The homeroom, classroom, and school clubs as opportunities for guidance. Prerequisite: Education 427 or 635.

635. Organization and Administration of Pupil Personnel Services. (3-0). Credit 3. I, S
A course for administrators, counselors, supervisors, and teachers designed to help them develop an understanding of the role of pupil personnel services; responsibility for the techniques of evaluating the program of pupil personnel services. Prerequisite: Graduate classification.

637. Advanced Elementary School Methods. (3-0). Credit 3. S
A study of teaching methods, devices, and techniques of learning-teaching situations on the elementary school level. Prerequisite: Twelve hours in elementary education or an elementary school certificate.

638. Advanced Secondary School Methods. (3-0). Credit 3. II, S
A study of teaching methods, devices, and techniques of learning-teaching situations on the secondary school level. Prerequisite: Twelve hours in secondary education or a secondary school certificate.

639. Processes in Educational Leadership. (3-0). Credit 3. II, S
An analysis of the skills and techniques of the administrator in the modern school, with emphasis on democratic leadership, teacher-administrator relationships, group processes, and evaluation of the administrative programs. Prerequisite: Twelve hours of advanced education.

640. School-Community Relationships. (3-0). Credit 3. II, S
Considers the total educational and social patterns of living which exist in any community. The home, the school, the church, clubs, recreation centers, and all agencies of the community are conceived collectively as dominating educational influences in the life of the child. Prerequisites: Twelve hours of advanced education; graduate classification.

641. Teaching of High School Physics. (5-3). Credit 6. S
This course taught by members of the Physics faculty will aim to develop convictions concerning the fundamental principles of classical and modern physics which should be taught in a course in high school physics and to develop techniques and methods in preparing and conducting demonstrations and laboratory exercises. Prerequisites: Graduate classification; approval of the Heads of the Education and Physics Departments.

681. Seminar. (1-0). Credit 1. II
Problems pertinent to the superintendent, principal, counselor, supervisor, and visiting teacher are selected. Recent developments and research in the different areas will be presented. Prerequisites: Eighteen hours of advanced education; approval of the Head of the Department.

685. Problems. Credit 1 to 4 each semester. I, II, S
A directed individual study of a selected problem in the field of education. Prerequisite: Graduate classification in education.

691. Research. Credit 1 or more each semester. I, II, S
Research for thesis.

PSYCHOLOGY

207. General Psychology. (3-0). Credit 3. I, II, S
An introductory course dealing with the elementary principles of human behavior. Designed especially for those students majoring in the social or biological sciences, in pre-medicine, or in education. Credit cannot be obtained for both Psychology 207 and 303.

301. Educational Psychology. (3-0). Credit 3. I, II, S
The application of psychology to the problems of teaching. The nature and operation of the laws of learning; transfer of training; nature, measurement, and significance of individual difference; conditions that influence efficiency of learning.

303. Psychology for Technical Students. (3-0). Credit 3. I, II, S
An introductory course emphasizing the applications of general psychology. Designed for students of agriculture, business administration, and engineering. Credit cannot be obtained for both Psychology 207 and 303.

305. Personality Adjustments. (3-0). Credit 3. I
Emphasis upon adjustment problems of normal people. Principles of mental hygiene in relation to family, school, and community life. Prerequisite: Psychology 207, or 301, or 303.

307. Child Growth and Development. (3-0). Credit 3. II
Growth and development of the normal child from infancy to adolescence with emphasis upon the elementary school years. Prerequisite: Psychology 207, or 301, or 303.

323. Psychology of Adolescence. (3-0). Credit 3. I, II, S
The psychological problems of the normal teen-age individual, including the consideration of the ways and means of aiding youth to meet these problems constructively. Prerequisite: Psychology 207, or 301, or 303.

401. Industrial Psychology. (3-0). Credit 3. I, II, S
Significance of individual differences in industry; instruments and techniques of selecting and placing personnel; motivating, training, and supervising the worker; nature and control of fatigue; psychological aspects of labor relations; morale and attitude measurement; industrial counseling. Prerequisite: Psychology 207, or 303, or advanced standing in industrial engineering or industrial technology.

403. Dynamics of Human Behavior. (3-0). Credit 3. II †
The motivation of behavior and the mechanisms of adjustment to conflict. Types of maladjustment and their causation. The development and integration of the personality. Theories of personality. Prerequisites: Psychology 207 or 301 or 303, and 305 or graduate classification in education or sociology.

FOR GRADUATES

634. Principles of Human Development. (3-0). Credit 3. I, S
Biological, psychological, and cultural interrelationships in human development. Emphasis upon principles and methods as illustrated in research and theoretical contributions. Experiences in procedures of child study. Prerequisite: Graduate classification.

Department of Electrical Engineering

Professor M. C. Hughes,
Professors H. C. Dillingham, G. D. Hallmark, L. M. Haupt, Jr., E. W. Markle, N. F. Rode, R. P. Ward; Associate Professors E. H. Andrew, Jr., J. S. Denison, A. J. Druce, W. T. Matzen, Jr.; Assistant Professor Ahmad Ullah; Instructors J. R. Biard, M. G. Rekoff, Jr.,* W. P. Worley

201. Electricity and Magnetism. (3-4). Credit 4. I, II
Lectures, recitations, and problems in electricity and magnetism.
A laboratory investigation of the phenomena studied in the textbook. Prerequisites: Mathematics 104, registration in 209.

208. Direct Current Machinery. (3-3). Credit 4. II, S
A study of the application of the fundamental laws of the electric and the magnetic circuits to the design and operation of direct current motors and generators.

The laboratory work includes practice in the wiring up and the operation of DC generators and motors; the determination of characteristics and the

*On leave of absence

measurement and calculation of losses, efficiencies, and regulations. Prerequisite: Electrical Engineering 201.

305. Electrical Circuits and Machines. (3-3). Credit 4. I, II, S
A study of the fundamental principles of electrical circuits, including fundamental electronic circuits, machines, and control devices. The practice is designed to familiarize the general engineering student with test procedures for and characteristics of both direct and alternating current machines. Prerequisites: Mathematics 210; Physics 204.

307. Electrical Circuits. (3-3). Credit 4. I, II, S
A study of the fundamental principles of direct and alternating current circuits.
The practice includes measurements of the circuit phenomena, including fundamental amplifiers and rectifiers. Prerequisites: Mathematics 210; Physics 204.

308. Electrical Machinery. (3-3). Credit 4. I, II, S
A study of the principal types of electrical machines, including their characteristics, applications, and control devices.
The practice includes actual operation and testing of electrical machinery and equipment most commonly used in industry. Prerequisite: Electrical Engineering 307.

315. Alternating Currents. (3-3). Credit 4. I, II †
A study of the fundamentals of the steady-state characteristics of sinusoidal alternating current circuits, both single and three phase. The practice consists of laboratory work designed to supplement the classroom theory. Prerequisites: Electrical Engineering 201; Mathematics 307 or registration therein.

316. Electrical Circuit Theory. (3-0). Credit 3. II, S
Transients in direct and alternating current circuits. Non-sinusoidal voltages and currents in single phase and polyphase circuits. Study of circuits that have conductive, electric, and magnetic coupling. Prerequisite: Electrical Engineering 315; Mathematics 308 or registration therein.

318. Electrical Measurements. (1-3). Credit 2. II, S
An introduction into the concepts of electric and magnetic fields. Study of the precision and accuracy of measurements. Studies of the various instruments and methods available for the measurements of resistance, inductance, and capacitance; voltage and current in AC and DC circuits; power, power factor, and phase angle; frequency and wave shape; magnetic flux and iron losses. Prerequisites: Electrical Engineering 315; Mathematics 307 or registration therein.

320. Electronics. (3-3). Credit 4. II, S
An introduction to the theory of electron tubes and transistors. Thermionic, gaseous, light sensitive, and cathode ray tubes; solid state devices, rectifier circuits, and amplifier equivalent circuits will be covered. Laboratory includes experiments illustrating the principles covered in the theory section. Prerequisites: Electrical Engineering 315; Mathematics 308 or registration therein.

322. Electric and Magnetic Fields. (2-0). Credit 2. II, S
Application of vector analysis to the theory of electric and magnetic fields. Maxwell's equations are used to study the propagation and reflection of electromagnetic waves. Prerequisites: Electrical Engineering 315; Mathematics 308 or registration therein.

401. Alternating Current Machinery. (3-0). Credit 3. I †
A graphical and mathematical study of alternating current machines, including transformers and synchronous generators and motors. Prerequisites: Electrical Engineering 208, 316, registration in 403; Mathematics 308.

402. Alternating Current Machinery. (3-0). Credit 3. II †
A continuation of the study of synchronous machines; asynchronous machines, polyphase and single phase motors; rectifiers and converters and control equipment. Prerequisites: Electrical Engineering 401, 403, registration in 404.

403. Alternating Current Laboratory. (0-6). Credit 2. I
A laboratory study of the alternating current machines covered in Electrical Engineering 401. Prerequisites: Electrical Engineering 316, 318, registration in 401.

404. Alternating Current Laboratory. (0-6). Credit 2. II †
A continuation of the laboratory study of alternating current machines. Prerequisites: Electrical Engineering 401, 403, registration in 402.

406. Electric Power Distribution and Transmission. (2-2). Credit 3. II †
Lectures and recitations on the transmission and distribution of power by electrical methods including symmetrical components. Detailed calculations of line constants, lightning phenomena, switching surges, and cost estimates of transmission and distribution systems. Prerequisites: Electrical Engineering 415.

415. Transmission Networks. (2-2). Credit 3. I †
An analytical study of the theory of transmission lines and impedance matching devices. Hyperbolic-function treatment is generalized to apply to power, electronic, and communication circuits. The laboratory will consist of group problems and demonstrations. Prerequisites: Electrical Engineering 316; Mathematics 308.

419. Radio Communication. (3-3). Credit 4. I †
A study of the basic circuits used in radio, television, and computers. An analytical study of modulators, demodulators, oscillators, and amplifiers. The laboratory work covers experimental studies of the above devices. Prerequisites: Electrical Engineering 316, 320; Mathematics 308.

420. Servomechanisms and Control Devices. (3-0). Credit 3. I
A general study of closed-loop control devices, including electrical, hydraulic, and mechanical systems. Prerequisites: Electrical Engineering 307 or 316; Mathematics 308.

428. Communication Circuits. (2-3). Credit 3. I, II †
A study of the engineering principles used in wire line communications, including telephone and telegraph systems, transmission theory, inductive interference, networks, filters, loading, repeater and carrier systems. Laboratory investigations include transmission measurements on artificial lines involving the use of vacuum tube measuring devices and impedance bridges. Prerequisite: Electrical Engineering 415 or registration therein.

432. Public Utility Problems. (3-0). Credit 3. II
Problems in the mathematics of finance, depreciation, engineering economy, accounting, distribution factors, and rates with particular reference to the electric power industry. Prerequisite: Electrical Engineering 401.

436. Electrical Equipment for Buildings. (3-0). Credit 3. I, II
The application of electrical equipment in building construction including a study of electrical material and method of installation; principles of electrical circuit design and wiring system commonly employed; electrical machinery; elevators; illumination both for interior lighting and floodlighting; and electrical acoustical aids.

441. Symmetrical Components of Polyphase Circuits. (3-0). Credit 3. II †
The solution of current, voltages, and power flow during fault conditions on a power transmission system by the application of a method of symmetrical components. Prerequisite: Electrical Engineering 308 or 401.

446. Television. (2-3). Credit 3. II †
An introduction to the principles and practice of television engineering; image analysis, television camera action, synchronizing circuits, video amplifiers, receivers, laboratory study of transmitters and receivers. Prerequisite: Electrical Engineering 419.

449. Seminar. (0-2). Credit 1. I
Written reports and oral presentations of selected topics from current literature in the various fields of electrical engineering. Prerequisite: Senior classification.

450. Seminar. (0-2). Credit 1. II
Oral presentation of selected topics from current literature of the field. Technical films showing practical application of theories of electrical engineering. Prerequisite: Second semester senior classification.

451. Radiation and Propagation. (3-0). Credit 3. I †
Application of vector analysis and Maxwell's equations to the study of electromagnetic waves, current and voltage distribution in antennas, electromagnetic radiation, field distribution, directional antennas, propagation of electric waves; ionosphere, ground wave, sky wave, direct wave, fading characteristics. Prerequisites: Electrical Engineering 415 or registration therein; Mathematics 308.

452. Ultra High Frequency Techniques. (2-3). Credit 3. II †
An introduction to the theory and practice of ultra high frequency radio wave generation, transmission, and radiation. Development of Maxwell's equations and their application to transmission of electrical energy in wave guides. Prerequisite: Electrical Engineering 419.

457. Principles of Digital Computers. (3-2). Credit 4. I †
Organization and operation of digital computers; block diagramming; serial and parallel systems; communication with the computer; number systems; programming and coding of elementary problems. Prerequisite: Senior classification.

458. Programming of Digital Computers. (3-2). Credit 4. II †
Operation of digital computer; flow charts; sub-routines; library programs; floating point; multiple precision; error analysis; optimum coding; symbolic coding; interpretive coding; automatic coding; practical applications. Prerequisite: Electrical Engineering 457.

501. Theory and Application of Electron Tubes. (3-3). Credit 4. I, S †
This course is designed to familiarize the students of all engineering fields with basic electron tube phenomena and their applications to electrical instrumentation, particularly strain gauges, amplifiers, cathode ray oscilloscopes, electronic recorders, nuclear counters, pulse forming devices, oscillators, and associated equipment in the electrical field of measurements.

FOR GRADUATES

601.* Advanced Alternating Currents. (3-4). Credit 4. I
Wave analysis; mechanical and electrical wave analyzers; non-linear circuits; multiple winding transformer theory; transient solution of general network. The study of transients with oscillographs.

602.* Advanced Alternating Currents. (3-4). Credit 4. II
Steady-state and transient solution of recurrent networks, operational calculus methods of solution of circuits with lumped and distributed constants, non-linear circuits.

603. Electrical Machine Design. (1-3). Credit 2. I
The design of electrical machines and the predetermination of their characteristics.

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*In the summer session these courses may be divided into two parts, a and b, each with two hours of credit.

604. Electrical Plant Design. (1-3). Credit 2. II
The design of power plants with special emphasis on the electrical machinery.

605. Servomechanisms. (4-0). Credit 4. I
A study of the theory of feed back control systems with special emphasis on the synthesis of such systems. Includes the transient and steady-state behavior of electrical, mechanical, and hydraulic systems. Prerequisites: Mathematics 308; graduate classification.

606. Servomechanisms. (3-3). Credit 4. II
A study of feed back control system components and their power requirements; and sample data, on-off, and other discontinuous control systems. Prerequisite: Electrical Engineering 605.

607.* Alternating Current Circuits and Machines. (3-4). Credit 4. I
The study of transient conditions in electrical machines.

608.* Advanced Alternating Current Machinery. (3-4). Credit 4. II
A study of complicated alternating current machines.

609.* Advanced Communication Engineering—Audio Systems. (3-3). Credit 4. I
A study of the design and operation of audio systems with particular reference to high fidelity reproduction, and transmission measuring devices; laboratory investigations include frequency characteristics of lines, transmission measurements on typical networks, and audio amplifiers.

610.* Advanced Communication Engineering—Broadcast Systems. (3-3). Credit 4. II
A detailed study of the design and operation of radio frequency receiving and transmitting systems for both standard and FM broadcasting. Field strength measurements and determination of the characteristics of broadcast equipment are the major laboratory investigations.

611.* Symmetrical Components Applied to Electrical Engineering. (3-4). Credit 4. II
The solution of unbalanced electrical circuits by means of symmetrical components; the study and measurement of machine constants by means of the oscillograph.

612. Application of Electrical Machinery to Industrial Operations. (4-0). Credit 4. I
A study of characteristics of electrical motors with special emphasis on their application to different types of loading, electrical control, and the development of electrically operated drives.

613. Public Utility Administration. (4-0). Credit 4. I
A study of the development of public service regulation by commissions; status of public service corporations in the courts; the fixing of rate bases and analyses of methods used in determining cost of service, and other problems pertaining to public utility administration.

614. Public Utility Administration. (4-0). Credit 4. II
A continuation of the study of problems pertaining to public utility administration.

616.* Acoustic Devices in Sound Reproducing Systems. (3-3). Credit 4. II
A detailed study of microphones, recorders, and loud speakers with an introduction to the basic ideas in high-fidelity systems and a brief study of architectural and physiological acoustics incident to the proper application of sound reproducing systems. Laboratory work includes measurements of speakers, recorders, and microphones, noise surveys, and performance of sound systems in small auditoria.

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*In the summer session these courses may be divided into two parts, a and b, each with two hours of credit.

620.* Advanced Illuminating Engineering. (3-3). Credit 4. I
A study of fundamentals of illuminating engineering concepts; advanced design of various types of lighting installations; problems of a research character.

621. High Voltage Phenomena. (2-0). Credit 2. I
A study of dielectrics as applied to insulation of high voltage systems; lightning and lightning protection.

622. High Voltage Laboratory. (0-6). Credit 2. II
Sixty-cycle and impulse testing; measurement of impulse voltage and currents with a high voltage cathode ray oscillograph.

624. Electronic Circuits for Instrumentation and Computation. (3-3). Credit 4. II
Theory, analysis, and design of the electronic circuits used in instrumentation and computation. DC amplifiers, operational amplifiers, and function generators are included. Problems of drift compensation in DC amplifiers and closed-loop stability in multi-stage amplifiers are treated in detail. Prerequisites: Electrical Engineering 419; Mathematics 601.

626.* Introduction to Electron Tube Design. (4-0). Credit 4. I
The motion of ions in electric and magnetic fields, electron emission, and conduction through gases are studied. The applications in mass spectrometry, electron optics, and electron tube design are considered.

627.* Electron Tube Design. (2-6). Credit 4. II
The theory of design and laboratory techniques applied in the experimental development of electronic tubes.

628. Theory and Design of Feedback Networks. (4-0). Credit 4. I
A study of regeneration and feedback theory with emphasis on circuit analysis methods suitable for treatment of these topics. Prerequisites: Electrical Engineering 601; Mathematics 601 or the equivalent.

640. Electrical Computer Machines. (3-3). Credit 4. II
Electric analog machines for computations and simulations will be covered. Particular emphasis will be given to EESEAC, the Texas A. and M. Engineering Experiment Station's Electric Analog Computer, as used for the solution of problems in the various fields of engineering. The use of the network analyzer, the IBM machine and digital computers will be covered. Prerequisite: Registration in engineering graduate course.

642. Transistors. (3-3). Credit 4. I, S
Theory of junction triodes; voltage, current, power and frequency limitations. Small signal parameters and equivalent circuits for transistors; analysis and design of circuits at both small and large signal levels. Prerequisite: Electrical Engineering 419.

653. Digital Computer Circuitry. (3-3). Credit 4. I, S
Switching networks; Boolean Algebra applied to computer components. Adders, subtractors, and accumulators; multipliers and dividers. Binary and decimal counters. The digital differential analyzer. Memory systems and control circuits. The laboratory will be partly conducted in the digital computer laboratory of the College. Prerequisites: Electrical Engineerinig 415, 419, or approval of the Head of the Department.

685. Problems. Credit 1 to 4 each semester. I, II
Research problems of limited scope designed primarily to develop research technique.

691. Research. Credit 1 or more each semester. I, II
Research for thesis or dissertation.

*In the summer session these courses may be divided into two parts, a and b, each with two hours of credit.

Department of Engineering Drawing

Professor W. E. Street,
Professors J. G. McGuire, B. F. K. Mullins, J. P. Oliver; Associate Professors W. F. Adams, S. M. Cleland, C. H. Ransdell, L. E. Stark; Assistant Professors B. A. Hardaway, P. M. Mason; Instructors J. C. Baker, N. B. Bardell, Jr., R. H. Davey, Jr., J. E. McGarrah, W. L. Walton, C. C. Webb, Jr., I. W. Woolsey

105. Engineering Drawing. (0-6). Credit 2. I, II, S
Care and use of drawing instruments and equipment, vertical freehand lettering, engineering gometry, view drawings, revolutions, auxiliaries, sections, engineering sketching, pictorials, dimensioning, working drawings.

106. Descriptive Geometry. (0-6). Credit 2. I, II, S
Point, line, and plane relationships. Bearings and slopes of lines. Contours, cuts, and fills. Strike and dip. Successive auxiliary view problems. Revolution about an axis and true length diagrams. Developments and intersections. Prerequisite: Engineering Drawing 105.

127. Industrial Freehand Sketching. (1-3). Credit 2. I, II
Basic techniques of freehand drawing in line and tone; delineation of form, textures, materials, sketching, and industrial applications of freehand drawing.

128. Methods of Industrial Reproduction. (0-2). Credit 1. II
Basic techniques of reproduction processes for industrial use.

221. Building Construction Drawing. (1-3). Credit 2. I
Architectural details in frame and masonry construction; general drawings and techniques of presentation. (For students in industrial education.) Prerequisite: Engineering Drawing 105 or the equivalent.

222. Building Construction Drawing. (1-3). Credit 2. II
Architectural details in various types of construction; working drawings and techniques of presentation. (For students in industrial education.) Prerequisite: Engineering Drawing 221.

FOR GRADUATES

601. Advanced Industrial Drawing. (2-3). Credit 3. I, S
Problems pertinent to all industrial fields. Solutions involve projections, primary auxiliary views, successive auxiliary views, revolutions, flat pattern layouts, perspective, and shades and shadows. Use of drafting machines and other special drafting equipment. Appropriate for high school and college teachers. Prerequisite: Engineering Drawing 106 or equivalent.

603. Advanced Machine Drawing. (1-6). Credit 3. II, S
Conventional practices, dimensioning, fastenings, machine and pictorial sketching. Empirical design including problems of stuffing boxes, piping, shafting, gears, cams, ship and aircraft parts. Use of special drafting equipment such as drafting machine, section liner, proportional dividers, erasing machines, light table, and mechanical lettering guides. Methods of reproduction. Appropriate for high school and college teachers. Prerequisite: Engineering Drawing 106 or equivalent.

605. Spherical Projections.* (2-0). Credit 2. I, S
Advanced graphics including recent developments in drawing, review of graphical research, and related fields. Prerequisite: Engineering Drawing 106 or the equivalent.

606. Stereographic and Clinographic Projections.* (2-0). Credit 2. II, S
Advanced graphics including recent developments in drawing, review of graphical research, and related fields. Prerequisite: Engineering Drawing 106 or the equivalent.

*Primarily for graduate students interested in education. Not available for major or minor work toward an engineering degree, except by permission of the Dean of the Graduate School.

607. Descriptive Geometry for Teachers.* (4-0). Credit 4. II, S
Fundamental concepts of descriptive geometry. The design and organization of problems and teaching devices for college teachers. Prerequisite: Engineering Drawing 106 or the equivalent.

611. Technical Illustration.* (3-3). Credit 4. I, S
Axonometric projection including shading. Design and construction of display layouts. Commercial and technical illustrating. Prerequisite: Engineering Drawing 106 or the equivalent.

Department of English

Professor S. S. Morgan,
Professors J. P. Abbott,** D. B. Cofer, F. E. Ekfelt, J. Q. Hays, E. D. Hedgcock, C. D. Laverty; Associate Professors J. Q. Anderson, R. H. Ballinger, K. E. Elmquist, C. A. Greer, P. C. Key, H. L. Kidd, Jr., N. W. Quick, S. B. Southwell; Assistant Professors A. L. Bennett, S. S. Cox, H. S. Creswell, E. P. Crittenden, C. K. Esten, L. F. Hauer, H. E. Hierth, M. A. Huggett,** J. S. Jernigan, L. B. Keel, L. J. Martin, J. F. Pierce, F. W. Powell, J. N. Shepperd, E. E. Stokes, Jr., Victor Wiening, E. C. York; Instructors R. W. Barzak, B. W. Boothe, R. E. Cain, W. A. Ferrell, R. A. French, R. W. Gladish, P. C. Hunter, Jr., C. L. Hurley, W. B. Kadow, B. J. McKinney, T. J. Mattern, J. C. Reed, M. A. Rodgers, R. G. Sherrill

100. Fundamentals of Writing. (3-0). Credit 3. I, II, S
Emphasis on spelling, punctuation, grammatical correctness, clearness, and naturalness. For students at all levels who are deficient in English. **No credit toward a degree will be granted for the satisfactory completion of this course.**

103. Composition and Rhetoric. (3-0). Credit 3. I, II, S
Composition, oral and written. Readings in modern prose (not fiction). Emphasis on grammar and the structure of the sentence and the paragraph.

104. Composition and Rhetoric. (3-0). Credit 3. I, II, S
Composition, oral and written. A continuation of the study in English 103. Emphasis on the short composition and the writing of investigative papers.

203. Composition and Literature. (2-0). Credit 2. I, II, S
Advanced composition, based upon the reading and discussion of modern plays, stories, and novels, and the critical analysis of one or two current moving pictures. Prerequisites: English 103, 104.

207. Report Writing and Correspondence. (2-0). Credit 2. I, II
A course in the preparation of technical reports and of the more common types of business letters. Prerequisites: English 103, 104.

210. Writing and Discussion. (2-0). Credit 2. I, II, S
A study of the principles of reasoning as these apply to all types of composition intended to influence thought and conduct; reading practice in evaluating evidence, inference, and logic of presentation; writing and speaking practice in the analysis and support of a proposition. Prerequisites: English 103, 104.

212. Shakespeare. (3-0). Credit 3. I, II, S
A study of the major plays of Shakespeare, with lectures on his life, his language, and his cultural environment. Prerequisites: English 103, 104.

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*Primarily for graduate students interested in education. Not available for major or minor work toward an engineering degree except by permission of the Dean of the Graduate School.
**On leave of absence

231. Survey of English Literature. (3-0). Credit 3. I, II, S
A survey of the literature of England from Anglo-Saxon times to Dr. Johnson. Emphasis on readings in such major writers as Chaucer, Spenser, Shakespeare, Donne, Jonson, Milton, Dryden, Pope, Addison and Steele, Swift, Goldsmith, and Johnson. Special attention to the Shakespeare of the sonnets. Includes both poetry and prose, and both drama and fiction. Prerequisites: English 103, 104.

232. Survey of English Literature. (3-0). Credit 3. II, S
A survey of the literature of England as reflected in the poems of Thomson through the last Victorians, in the essays of Lamb through Huxley, and in the novels of Scott through Hardy, with special attention to reports and discussions on the main current of English thought on revolution, reform, democracy, religion, science, and industrialism. Prerequisites: English 103, 104.

301. Writing for Professional Men. (3-0). Credit 3. I, II, S
Advanced writing in scientific and technical fields including technical reports and papers designed for technical and scientific journals; business correspondence. Prerequisite: The completion of the freshman-sophomore program of English.

309. The English Language. (3-0). Credit 3. I †
Survey of the grammatical structure, vocabulary, and history of the English language, with brief discussion of related languages. Examples of the study of literature and writing from the standpoint of language. Prerequisites: Two courses in sophomore English. (Offered in 1957-58 and in alternate years thereafter.)

310. Phonetics and Pronunciation. (3-0). Credit 3. II †
Brief introductory discussion of the nature of language and of language study. Detailed study of the formation of English sounds, of usage in pronunciation, and of phonetic and phonemic principles. Prerequisites: Two courses in sophomore English. (Offered in 1956-57 and in alternate years thereafter.)

315. Seventeenth Century Literature. (2-0). Credit 2. I, S
A period course in English poetry and prose of the seventeenth century, not including Shakespeare. Prerequisites: Two courses in sophomore English.

316. Eighteenth Century Literature. (2-0). Credit 2. I, S
A period course in English poetry and prose of the eighteenth century. Readings in poetry, the essay, and the novel. Prerequisites: Two courses in sophomore English.

319. Report Writing. (1-0). Credit 1. I
A course in the preparation of technical reports in the form observed by the Petroleum Division of the A.I.M.E., the American Petroleum Institute, and the American Association of Geologists, with instruction in the preparation of bibliographies and the use of library material. Prerequisite: English 104.

320. Selected Reading. (1-0). Credit 1. I, II
The careful, reflective reading, with lectures and class discussions, of four selected books which are both enjoyable and thought-provoking. The objects of the course are both to acquaint students intimately with these books and to teach them to read good literature wih understanding and pleasure. Prerequisite: One course in sophomore English.

321. Nineteenth Century Literature (Romantic). (3-0). Credit 3. I †
A study of the intellectual tendencies of the nineteenth century as reflected in the poetry of Wordsworth, Coleridge, Byron, Shelley, Keats, and others. Prerequisite: Two courses in sophomore English.

322. Nineteenth Century Literature (Victorian). (3-0). Credit 3. II †
A continuation of the study in nineteenth century thought as reflected in the writings of Tennyson, Browning, Arnold, and other Victorians. Prerequisites: Two courses in sophomore English.

325. Creative Writing. (2-0). Credit 2. I
The writing of stories, one-act plays, essays, editorials, and feature articles, especially intended to aid the students in their extracurricular writing. Limited to students who have made an average of C in the prerequisite courses. Prerequisites: Two courses in sophomore English. (Offered in 1956-57 and in alternate years thereafter.)

327. American Literature to 1870. (2-0). Credit 2. I †
A study of American literature from the Colonial Period through the Civil War, with attention to the intellectual and social movements reflected in that literature. Special emphasis is placed upon the evolution of the democratic ideal as it is pictured in American literature. Prerequisites: Two courses in sophomore English.

328. American Literature from 1870 to 1920. (2-0). Credit 2. II †
A study of American writing from Whitman and Mark Twain to Frost and Dreiser; chief emphasis on major writers; incidental attention to social and literary movements. Limited to students who have made an average of C or better in the prerequisite courses. Prerequisites: Two courses in sophomore English.

334. Science in Literature. (3-0). Credit 3. II
This course will trace the main developments in the history of science as they are presented in the literature of the Western World. The course will show the way in which science has influenced the literature production of important writers, especially in English and American literature. Prerequisites: Two courses in sophomore English. (Offered in 1956-57 and in alternate years thereafter.)

336. Life and Literature of the Southwest. (3-0). Credit 3. II
A study of the culture of the Southwest as expressed in literature, with emphasis on its different strains and their interweaving. Prerequisites: Freshman English and one course in sophomore English. (Offered in 1957-58 and in alternate years thereafter.)

340. Modern Drama. (3-0). Credit 3. II, S †
A study of representative plays (in translation) by such dramatists as Ibsen, Hauptmann, Rostand, and Pirandello on the Continent, and Pinero, Shaw, Synge, O'Neill, and Maxwell Anderson in England and America. Prerequisites: Two courses in sophomore English.

350. Modern Literature. (3-0). Credit 3. I †
A study of the most interesting British and American novelists, poets, and dramatists from about 1920 to the present, with lectures on the social and intellectual background. Among the authors studied are Galsworthy, Aldous Huxley, Lewis, Wolfe, Hemingway, Steinbeck, O'Neill, Eliot, Millay, and Jeffers. Prerequisites: Two courses in sophomore English. (Offered in 1957-58 and in alternate years thereafter.)

371. Great Books. (3-0). Credit 3. I, II, S
Greek plays, Roman lives (from Plutarch), Dante's **Inferno**, Shakespeare's **King Lear**, a Russian novel, twenty English poems, a modern novel. Prerequisite: Completion of the freshman-sophomore program in English; for students majoring in architecture, English 210.

375. Great American Writers. (2-0). Credit 2. II
The most important works of five or six distinguished American writers of the nineteenth and twentieth centuries. (The list will vary but will be chosen from such writers as Emerson, Melville, Whitman, Twain, James, Glasgow, and Frost.) Prerequisite: One course in sophomore English.

381. Play Production. (2-3). Credit 3. I
An effort to obtain an understanding of play production by a study of important aspects of social drama, Shakespeare, and special problems in college and community theater. Students will study selected plays from the Greek drama through the Restoration period. Students will also participate in the presentation of two plays each semester. Prerequisite: Completion of freshman-sophomore program in English. (Offered in 1957-58 and in alternate years thereafter.)

382. Stagecraft. (2-0). Credit 2. II
A study of the methods of staging plays, including scene design, scene construction and stage lighting. Students will design sets to interpret mood and idea of plays; draft floor plans drawn to scale, make sketch and water color of set, and construct model set. Students will participate in the staging of two plays each semester. Readings will cover the history of the theater from the time of the Greeks until today. Prerequisite: Completion of freshman-sophomore program in English. (Offered in 1957-58 and in alternate years thereafter.)

401. Public Speaking. (0-2). Credit 1. I, II, S
Practice in the use of the voice, in the planning and delivery of speeches, in parliamentary procedure, and in group discussion. Prerequisite: Completion of the freshman-sophomore program in English.

403. Speaking for Professional Men. (1-2). Credit 2. I, II, S
Speech training for technical students in their professional fields. Topics include: how the professions serve society; how the professions have helped shape the course of society; technical reports; group discussions; parliamentary procedure. Prerequisite: Completion of freshman-sophomore program in English.

405. Radio Speaking and Studio Practice. (2-0). Credit 2. I
Training in the preparation and delivery of radio talks, interviews, discussions, and announcements. Elementary principles of script and writing, practice in WTAW studio. Prerequisites: Two courses in sophomore English; approval of the instructor. (Offered in 1957-58 and in alternate years thereafter.)

407. Speaking and Oral Interpretation. (1-2). Credit 2. II
Speech training with special attention to the student's professional field. The course will also include instruction and practice in the oral interpretation of literature, both prose and poetry. Required of English majors and education majors with a teaching major in English. Students may not receive credit for both English 403 and 407. Prerequisite: Completion of freshman-sophomore program in English. (Offered in 1956-57 and in alternate years thereafter.)

428. The Novel in English. (3-0). Credit 3. I †
A study of the novel in English in the eighteenth, nineteenth, and early twentieth centuries. Lectures; readings in the works of representative novelists such as Fielding, Austen, Scott, Dickens, Thackeray, Eliot, Hardy, Conrad, Galsworthy, Woolf, Forster, Melville, James, Dreiser. Prerequisites: Two courses in sophomore English. (Offered in 1956-57 and in alternate years thereafter.)

461. Teaching of Language and Composition. (3-0). Credit 3. S †
A study of administrative and teaching problems involved in high school and college courses in composition. The organization and presentation of courses designed to improve student writing; various points of view toward language study held by teachers and students of linguistics; papers written by students and graded and criticized by instructor; supervised practice in grading and criticizing of student writing; the organizing of the curriculum in English from the grades to college. The course is intended for students expecting to teach English, for teachers of other subjects, and for principals

and superintendents confronted with problems of organizing and administering the English program. Prerequisite: Senior classification or approval of instructor.

485. Problems. Credit 1 to 3. I, II, S †
Individual supervision; no class meetings. Readings designed for the student with a major or a minor in English and selected to round out his overall knowledge of literature and the criticism of literature. The selection of books will be determined for each student separately, and the student will read each book under the supervision of a professor in the Department of English who is a specialist in the field embracing the book. There will be written reports on the readings and a semester examination. Prerequisite: Eighteen hours of English.

Department of Entomology

Professor J. C. Gaines,
Professors V. A. Little, D. F. Martin, H. J. Reinhard; Associate Professor R. L. Hanna; Assistant Professors D. R. King, M. A. Price

201. General Entomology. (2-2). Credit 3. I, II, S
A study of the principal orders of insects; the relation of anatomy and physiology of insects to control methods; the principal insecticides and their uses; the development, habits, and economic importance of the more common insects with control methods for the injurious species.

208. Veterinary Entomology. (2-3). Credit 3. II
A study of insects and other arthropods that are parasitic upon domestic animals or concerned in the transmission of diseases. Methods of eradication and control are emphasized. Prerequisite: Sophomore classification in pre-veterinary medicine.

301. Systematic Entomology. (2-3). Credit 3. I †
A systematic study of the orders and families of insects, their distinguishing characteristics, and the habitat and feeding habits of representative species. The preparation of insect collection and the use of keys for identification are emphasized in practice. Prerequisite: Entomology 201 or equivalent.

302. Systematic Entomology. (2-3). Credit 3. II †
A continuation of Entomology 301, including orders and families of insects not included in Entomology 301. Prerequisite: Entomology 301.

305. Insect Morphology. (2-3). Credit 3. I †
General morphology of typical insects with special emphasis on those structures of particular importance in systematic and applied entomology. Prerequisite: Entomology 201 or equivalent.

306. Insect Physiology. (2-3). Credit 3. II †
Internal anatomy and principles of physiology as applied to insects. Prerequisite: Entomology 305.

307. Principles of Beekeeping. (2-2). Credit 3. I
The life history of the honey bee, swarm control, division of colonies, feeding, wintering, and general apiary management.

309. Livestock Pests. (2-3). Credit 3. I
Field identification, biology, and control of insects, ticks, and mites found on domestic animals. Control measures will be emphasized. Relations of arthropods to diseases considered briefly. Prerequisite: Entomology 201 or the equivalent.

313. Biology of Insects. (2-3). Credit 3. I
General biology and taxonomy of the classes of Arthropoda. Emphasis is placed on the orders and more important families of Hexapoda, their marks

of identification, general biology, and their relations to other animals. The use of keys for the identification of insects and other arthropods is stressed in the laboratory. Prerequisite: Six hours of biological sciences.

401. Principles of Insect Control. (2-3). Credit 3. I †
A study of both applied and natural controls emphasizing the uses, practical application, the physical and chemical properties of the more important insecticides. Prerequisite: Entomology 201.

402. Agricultural Pests. (2-3). Credit 3. II †
The biological developments, habits, and control of insect pests attacking farm crops, including livestock. Prerequisite: Entomology 201.

405. Fruit and Vegetable Insects. (2-2). Credit 3. II
The life history, habits, and control of insect pests of fruit and truck crops; the value of parasites and orchard management considered in control. Prerequisite: Entomology 201 or equivalent.

418. Problems. Credit 1 to 4. I, II, S
Individual problems for beginners in research. Prerequisite: Entomology 302.

421. Seminar. (1-0). Credit 1. I, II
Report of original investigations, current literature, and special features. Required for entomology seniors and graduate students each semester.

423. Comparative Anatomy of Arthropods. (2-3). Credit 3. I
A detailed comparison of the digestion, respiration, circulation, excretion, and nervous system of arthropods and related animals. Taxonomic characters are also stressed. Prerequisite: Entomology 305 or equivalent.

424. Insect Ecology. (2-3). Credit 3. II
The effect of environmental factors upon the distribution, abundance, competition, and ecological succession of insects. Prerequisite: Entomology 302 or equivalent.

427. Arthropods of Veterinary and Medical Importance. (2-3). Credit 3. I
A study of the taxonomy, biology, relation to disease and control of arthropods of medical and veterinary importance. Prerequisite: Entomology 208 or the equivalent.

FOR GRADUATES

601, 602. Systematic Entomology. (3-3). Credit 4 each semester. I, II
A taxonomic study of the orders, families, and sub-groups of the class Hexapoda; a study of the International Rules of Nomenclature. A special study of some particular group of insects is required in practice. Prerequisite: Entomology 302.

607. Economic Entomology. (3-3). Credit 4. I, S
This course is designed chiefly for workers in vocational agriculture and the Extension Service. It includes studies of agricultural pests, their biologies, damage as determined by making infestation records and the use of control measures. Insecticides and methods of application are also considered. Prerequisite: Approval of Head of Department.

608. Economic Entomology. (3-3). Credit 4. II
A detailed study of insect pests, including identification, distribution, principles and methods of natural, cultural, and chemical controls; literature and research methods. Prerequisite: Entomology 401 or 402.

613, 614. Morphology. (3-3). Credit 4 each semester. I, II
A detailed study of anatomical structures of insects. Prerequisite: Entomology 305.

615. Insect Physiology. (3-3). Credit 4. I
A study of the physiology of respiration, circulation, digestion, and excretion; the mechanical and chemical senses of insects considered. Prerequisite: Entomology 306 or equivalent.

617, 618. Medical Entomology. (3-3). Credit 4 each semester. I, II
The taxonomy and biology of parasitic insects, ticks, mites and their role in the causation and transmission of diseases affecting man and domestic animals. Prerequisite: Entomology 208 or equivalent.

619. Insect Toxicology. (3-3). Credit 4. II
Chemical compounds which posses toxic properties; actions of poisons on insects; evaluation of insecticides in the laboratory and field; and mathematical analysis of data. Prerequisite: Entomology 615.

685. Problems. Credit 1 to 4 each semester. I, II, S
Individual problems or research not pertaining to a thesis or dissertation. Prerequisites: Graduate classification with major or minor in entomology; approval of Head of Department.

691. Research. Credit 1 or more each semester. I, II, S
Research problems on taxonomy, life histories, biological control, ecology, physiology, or toxicology of insecticides. Prerequisite: Graduate classification.

Department of Floriculture and Landscape Architecture

Professor A. F. DeWerth,
Professor R. F. White; Assistant Professors E. R. Jensen, J. W. MacQueen

FLORICULTURE

120. Ornamental Plant Production. (2-2). Credit 3. I
Status of the horticultural specialties in agriculture. Classification and distribution of ornamental crops. Principles and practices of ornamental plant production. Prerequisite: Biology 101.

206. Ornamental Plants. (2-2). Credit 3. I
This course is devoted to a detailed study of trees, shrubs, and vines; their identification, adaptation to environmental conditions, value and management in landscape plantings. Major consideration will be given in this course to woody deciduous plants. Prerequisite: Biology 102.

207. Ornamental Plants. (2-2). Credit 3. II
A continuation of Floriculture 206. Major consideration will be given to the narrow and broad-leaf evergreens. Prerequisite: Floriculture 206.

220. Propagation of Ornamental Plants. (2-2). Credit 3. II
A study of the principles and practices used in the propagation of ornamental plants. The course is designed to acquaint the student with the commercial methods followed in the propagation of florists' crops and woody ornamentals. The reproduction of these plants by seeds, cuttings, grafting, layers, runners, separation and division is considered.

222. Greenhouse Construction and Management. (2-2). Credit 3. I
Basic principles of construction for greenhouses and other forcing structures used for the horticultural specialty crops. Fundamental principles and practices involved in scientific management of these structures.

320. Garden Management. (2-2). Credit 3. II
The identification and uses of garden annuals, herbaceous perennials, and roses. The development, planting, and maintenance of garden areas devoted to ornamental plantings.

321. Commercial Florists' Crops. (2-2). Credit 3. I
The production, harvesting, grading, and marketing of florists' crops. Field trips to commercial establishments. Prerequisite: Floriculture 120.

323. Nursery Management. (2-3). Credit 3. II
The principles and practices involved in the scientific operation and management of the modern nursery devoted to the production and distribution of ornamental plants. (Offered in 1956-57 and in alternate years thereafter.)

421. Marketing or Ornamental Plants. (3-3). Credit 4. I †
The economic status of the horticultural specialties in the United States and Texas. The application of market techniques to these products and the problems involved in grading, packing, and shipping procedures. (Offered in 1957-58 and in alternate years thereafter.)

422. Outdoor Production Methods. (3-3). Credit 4. II †
The principles and practices involved in the production of horticultural specialty crops outdoors with emphasis on the climatic factors in Texas. Cultural practices for both florist and nursery crops are included. (Offered in 1957-58 and in alternate years thereafter.)

426. Flower Store Management. (2-3). Credit 3. II
The principles and practices involved in the scientific management of the modern flower shop including the fundamentals of commercial floral designing. (Offered in 1956-57 and in alternate years thereafter.)

427. Seminar. (1-0). Credit 1 each semester. II
Review of current experimental work in the field of ornamental plants and landscape development. Presented by staff members, graduate and senior students. For graduate and senior students in the Department.

FOR GRADUATES

605. Techniques of Floriculture. (2-0). Credit 2. I
A critical survey of the literature and problems of floriculture and ornamental horticulture. Prerequisites: Plant Physiology and Pathology 301, 313; approval of Head of Department. (Offered in 1956-57 and in alternate years thereafter.)

607. Propagation of Ornamental Plants. (1-6). Credit 3. I
This course is devoted to an intensive and detailed physiological, anatomical, and practical study of the principles and practices of plant propagation. Prerequisites: Floriculture 207, 220, 321 or their equivalent in Horticulture; approval of Head of Department. (Offered in 1956-57 and in alternate years thereafter.)

609, 610. Experimental Floriculture. (1-6). Credit 3 each semester. I, II
Studies on the effect of environmental factors upon the growth of flowering plants. Emphasis is placed on the examination of the plants themselves. Particular attention given to the relationship between the environment and practical problems in the greenhouse. Among subjects considered are: Soilless culture, nitrogen, phosphorus, potassium, calcium, and magnesium deficiencies, and water relations in greenhouse plants. The effect of various treatments on flowering greenhouse crops. (Offered in 1957-58 and in alternate years thereafter.)

685. Problems. Credit 1 to 4 each semester. I, II, S
This course is for students who desire to work out special problems. Students will elect work in their desired subjects after a conference with instructor in charge. Prerequisites: Genetics 301; Plant Physiology and Pathology 301, 313; approval of Head of Department.

691. Research. Credit 1 or more each semester. I, II, S
Research for thesis or dissertation.

LANDSCAPE ARCHITECTURE

300. Summer Practice. Ten weeks, required. No credit. S
Approved summer practice with a recognized landscape architect or nursery.

301. Intermediate Landscape Design. (1-15). Credit 6. I
A first course in landscape design. Arranged to give a general knowledge of the various problems met in the practice of landscape design, including private, semi-public, and public areas. Prerequisites: Architecture 202; Floriculture 207. (Offered in 1956-57 and in alternate years thereafter.)

308. Park and Recreational Development. (2-0). Credit 2. II
A study of the history, location, administration, and maintenance of public parks, and present trends in the field of recreation as it pertains to these areas.

310. History of Landscape Architecture. (3-0). Credit 3. I
A study of the development of the art of landscape design from the earliest efforts to the present day. Illustrated lectures, collateral readings, and reports. (Offered in 1965-57 and in alternate years thereafter.)

311. Intermediate Landscape Design. (1-15). Credit 6. II
A second course in landscape design. Arranged to give a general knowledge of the various problems met in the practice of landscape design including private, semi-public, and public areas. Prerequisite: Landscape Architecture 301. (Offered in 1956-57 and in alternate years thereafter.)

312. Landscape Construction. (2-3). Credit 3. II
Treatment of various phases of work included in a landscape development. Finish grading, drainage, and preparation of detailed drawings. Field practice in construction phases. Prerequisite: Floriculture 207. (Offered in 1956-57 and in alternate years thereafter.)

401. Advanced Landscape Design. (1-15). Credit 6. I
Major landscape design problems and their respective land use application. Private estates, parks, subdivisions, and other private and public areas. Prerequisite: Floriculture 207. (Offered in 1957-58 and in alternate years thereafter.)

402. Advanced Landscape Design. (1-15). Credit 6. II
A continuation of Landscape Architecture 401 and fundamentals of city and regional planning. Prerequisite: Landscape Architecture 401. (Offered in 1956-57 and in alternate years thereafter.)

406. Planting Design. (2-3). Credit 3. I
A study of mass, form, and texture of plant material in relation to one another as well as to structures and site development. Prerequisite: Floriculture 207. (Offered in 1957-58 and in alternate years thereafter.)

411. Landscape Design for the Architect and Engineer. (2-2). Credit 3. I, II
Designed to present the principles of, and technical requirements involved in the landscape development of residential, industrial, and other outdoor areas. Special emphasis is placed on the relationship of the architectural and engineering professions to such developments. Not open to students majoring in landscape architecture.

Department of Genetics

Professor C. B. Godbey,
Professors R. G. Reeves, R. R. Shrode; Associate Professor H. H. Hadley; Instructor J. S. Williams

301. Genetics. (3-2). Credit 4. I, II, S †
Fundamental principles of genetics: variation, heredity, the physical basis of Mendelian inheritance, the expression and interaction of genes, linkage,

sex linkage and mutation. Laboratory includes demonstrations of Mendelian ratios with Drosophila and an introduction to biometrical methods. Prerequisite: Biology 101 or 107.

304. Plant Breeding. (3-2). Credit 4. II †
The improvement of crops by hybridization and selection. Special breeding methods and techniques applicable to naturally self-pollinated, cross-pollinated, and asexually reproduced plants. Prerequisite: Genetics 301.

306. Animal Breeding. (2-2). Credit 3. I, II †
Genetics as applied to the problems of the animal breeder. Genetic and phenotypic effects of selection. Comparison of various selection methods such as mass selection, family selection, progeny and sib testing. Selection indexes. Systems of mating such as grading, cross-breeding, inbreeding, linebreeding, outbreeding, and random mating. Genetic analysis of pedigrees. Prerequisite: Genetics 301.

406. Biometry—Experimental Technique. (2-3). Credit 3. I, II, S †
The purpose of this course is to acquaint the student with the common methods of analyzing biological data. The planning, analyzing, and interpreting of experiments in plants and animal sciences. A study of measures of type, variability, linear relationship, significance of means, reliability, goodness of fit, analysis of variance.

Poultry Science 414.—Poultry Breeding. (2-2). Credit 3. I †
See Department of Poultry Science for a full description of this course.

FOR GRADUATES

603. Genetics. (3-0). Credit 3. I
Advanced study of genetics with special attention forcused on the evidence supporting the principles of heredity. Historical development of Mendelian genetics and the chromosome theory of heredity, statistical treatment of qualitative genetics, detection and measurement of linkage, extra nuclear inheritance, mutation and position effect, introduction to biochemical and developmental genetics. Prerequisite: Genetics 301; approval of the instructor.

604. Genetics Laboratory. (0-3). Credit 1. I
Inheritance studies principally with Drosophila including laboratory techniques and analysis of data. Arranged to complement Genetics 603 and required for genetics majors.

605, 606. Biometry. (3-3). Credit 4 each semester. I, II
A study of the elementary statistics; Chi square; design of simple experiments; analysis of variance, covariance; design and analysis of complex experiments. This course is designed to meet the needs of students majoring in either plant or animal science.

612. Plant Genetics. (3-3). Credit 4. II
Specialized study of plant genetics and plant breeding with emphasis on quantitative inheritance, heterosis, induced mutation, ploidy, and reproductive systems and the bearing these have on plant breeding procedures. Prerequisites: Genetics 304, 603.

616. Animal Genetics. (3-3). Credit 4. II
Specialized study of animal genetics. Population genetics especially as related to breed improvement. Causes of change in gene frequency. Effectiveness of various methods of selection under various genetic circumstances. Analysis of genetic problems. Systems of mating. Standard textbooks and current scientific literature used. Prerequisites: Genetics 306, 406, 603.

620. Cytogenetics. (3-3). Credit 4. II
A study of correlated genetical and cytological phenomena. Prerequisites: Biology 615; Genetics 301.

623. Special Topics in Genetics. Credit 2 to 4. I
Content of this course will depend upon the interest of the students and the specialty of the instructor. Lecturers who have attained distinction in genetics or related fields will conduct this course.

625. Speciation. (2-0). Credit 2. I
A study of the genetic and environmental forces which operate in species formation together with a critical examination and comparison of the more important current explanations of speciation. Prerequisites: Biology 346 or equivalent; Genetics 301.

628. Animal Breeding. (2-0). Credit 2. I
A course designed to acquaint the student with the current status of knowledge in the field of animal breeding through a critical survey of the literature. Emphasis is given papers dealing with problems of breeding for quantitative traits of economic importance in farm animals including beef cattle, dairy cattle, poultry, sheep, and swine. Considerable attention is focused on methods which have been used or are available for use in studying animal breeding problems. Prerequisite: Genetics 616.

631. Biochemical Genetics. (2-0). Credit 2. I
A study of the genetic control of cellular metabolism and a theoretical consideration of the mechanism of gene action. A consideration of nutrition and the genetic capacity for biosynthesis, gene-enzyme relationships, pleiotropism, plasmagenes, and the chemical nature of the agents of heredity. Prerequisites: Biochemistry and Nutrition 410 or Chemistry 301; Genetics 301.

633. Forest Genetics. (3-0). Credit 3. I
Specialized study of genetics as applied to forest trees; forest genetics, forest tree improvement and forest tree breeding, with emphasis on genetics of conifers, especially pines. Fundamental and applied phases are included. Prerequisites: Genetics 603; approval of the instructor.

634. Forest Genetics Laboratory. (0-6). Credit 2. II
Methods and techniques in forest genetics, forest tree breeding; crossing, grafting, air layering, field layouts, seed handling, greenhouse techniques. Prerequisite: Genetics 633.

685. Problems. Credit 1 to 4 each semester. I, II, S
Technical research problems subject to approval of Head of Department.

691. Research. Credit 1 or more each semester. I, II, S
Prerequisites: Genetics 603, 620.

Poultry Science 613. Breeding and Genetics of Poultry. (3-3). Credit 4. II
See Department of Poultry Science for a full description of this course.

Department of Geography

Professor G. W. Schlesselman;
Instructor J. R. Howard

201. Principles of Geography. (3-0). Credit 3. I, II, S
The study of human society in relation to the physical conditions and natural resources of the earth. This course should make clear such factors of the natural environment as location, climate, relief, soils, surface and underground water, minerals and forests, with emphasis on the human response to these factors.

203. Physical Geography. (3-3). Credit 4. I, II
This course consists of a systematic description and interpretation of the distribution patterns and the regional associations of natural phenomena on the face of the earth.

204. Economic Geography. (3-0). Credit 3. I, II
A study of the commercial regions of the world, dealing with the production types or occupations, such as grazing, plantation farming, grain farming, fishing, lumbering, mining, and manufacturing.

302. Geography of Europe. (3-0). Credit 3. II
A geographical survey of Europe as a whole and of the individual countries.

303. Geography of South America. (3-0). Credit 3. I
Investigations of trade opportunities in South America. The economic activities of the major geographic regions as reflecting the present day utilization of the natural resources. Possibilities of future development.

304. Geography of Asia. (3-0). Credit 3. II
A general study of the continent of Asia and a more detailed study of selected regions.

306. Meteorology. (3-0). Credit 3. I
This course aims to present concisely and systematically the science of meteorology in its present state of development. The primary purpose is to set forth the facts and principles concerning the behavior and responses of the atmosphere.

310. Climatology. (3-0). Credit 3. II
A study of the nature and elements of climate and the factors that give rise to climatic differences and that determine the distribution of climatic types.

312. Conservation of Natural Resources. (3-0). Credit 3. II
A study of natural resources including ways and means of insuring wise utilization of essential or strategic resources.

401. International Political Geography. (3-0). Credit 3. I †
A study of some of the present social and political problems of world powers and also the weaker nations. An effort to find geographic factors back of these problems and possible geographic adjustments. (Offered in 1957-58 and in alternate years thereafter.)

FOR GRADUATES

601. Economic Geography. (4-0). Credit 4. I
A regional survey of the world distribution of major agricultural and industrial commodities with particular attention to the causal action of natural, social, and economic factors. (Offered in 1957-58 and in alternate years thereafter.)

Department of Geology and Geophysics

Professor S. A. Lynch,
Professors H. R. Blank, T. J. Parker, W. L. Russell, F. E. Smith, Paul Weaver; Associate Professors Peter Dehlinger, K. J. Koenig, M. C. Schroeder, C. L. Seward, Jr.; Assistant Professor G. V. Carroll; Instructor J. M. Egar

GEOLOGY

201. General Geology. (3-0). Credit 3. I, II
The agents and processes that have produced the surface features of the earth and the structure of the earth's crust. Prerequisites: Chemistry 101 or equivalent; registration in Geology 203 or 207; registration in Geology 209 for majors in geology, geophysics, and geological engineering.

203. Crystallography and Mineralogy. (2-6). Credit 4. I, II
Crystallography and descriptive mineralogy. Sight recognition of crystal forms and of common minerals. Prerequisites: Chemistry 102; Engineering Drawing 106; Mathematics 102, 103.

204. Mineralogy and Rock Study. (1-3). Credit 2. II, S
Continuation of Geology 203. Recognition and classification of common rocks by their megascopic characteristics. Prerequisites: Chemistry 207 or registration therein; Geology 203.

205. Elementary Geology. (3-3). Credit 4. I, II
General principles of physical geology, physiography, geologic processes, and an introduction to historical geology. Laboratory work on common minerals, rocks, and maps. Elective for arts and science students.

207. Mineralogy and Rock Study. (2-6). Credit 4. I, II
Practical hand specimen determination of common minerals and rocks by means of their physical properties. Study of well cuttings and cores. This course should be taken simultaneously with Geology 201. A course designed for petroleum engineers and not available to geology majors. Cannot be substituted for Geology 203. Prerequisites: Chemistry 102; Mathematics 103 or the equivalent.

209. Introduction to Field Work. (0-3). Credit I. I, II
One-half day each week studying geologic processes. Scientific methods of field work are stressed. Should be taken concurrently with Geology 201 and cannot be taken for credit after credit is received for Geology 210.

210. Historical Geology. (3-3). Credit 4. II, S
Principles of stratigraphy and paleontology, the physical and organic record of the earth's history, hypotheses of the earth's origin. Prerequisites: Geology 201 and 203, or 201 and 207, or 205 and approval of Head of Department.

299. Field Geology. Credit 2. Intersession
Geological observations and mapping in an area exhibiting diversity of rock types, structures, and physiography. Prerequisites: Geology 201; approval of Head of Department.

300. Field Geology. Credit 6. S
Geologic mapping in selected areas in the Llano Uplift and the Marathon Basin. Written report. Prerequisites: Civil Engineering 208; Geology 204, 305, 306, 312.

303. Petrography and Petrology. (2-3). Credit 3. I †
Principles of optical mineralogy; identification of minerals in fragments and thin sections by use of the petrographic microscope; thin section study of igneous rocks, and their classification. Prerequisites: Chemistry 207; Geology 204.

304. Sedimentary Petrography. (2-3). Credit 3. II †
Microscopic study of sedimentary and metamorphic rocks in thin sections; heavy mineral analysis; description, origin, and classification of sedimentary and metamorphic rocks. Prerequisite: Geology 303.

305. Invertebrate Paleontology. (3-3). Credit 4. I
The morphology, classification, and geologic range of the principal invertebrate groups. Prerequisite: Geology 210.

306. Stratigraphy. (3-3). Credit 4. II
Stratigraphic studies of the United States with emphasis on the Gulf Coastal Plain formations and their correlation by means of invertebrate fossils. Laboratory studies consist of stratigraphic principles and the changing faunas through geologic time. Prerequisite: Geology 305.

309. Agricultural Geology. (3-3). Credit 4. II
Erosion, transportation, and deposition by water, wind, and ice. Chemical and physical processes of development and destruction of soils. Origin,

development, and interpretation of surface features of the earth. Elements of earth structure and geologic history. Earthquakes, volcanoes, and mountains. Laboratory work in determination of rockmaking minerals and common rocks and interpretation of topographic and geologic maps.

311. Petroleum and Structural Geology. (3-3). Credit 4. I
A detailed study of the origin, migration, and accumulation of petroleum with special consideration of typical productive areas. Interpretation of rock structures. Laboratory devoted to subsurface work. Limited to non-geology majors. Prerequisites: Geology 201, 207, 210.

312. Structural Geology. (2-3). Credit 3. II
The interpretation of rock structures; their relation to stratigraphic, physiographic and economic problems. Prerequisites: Geology 201, 203, 204, 210.

315. Principles of Sedimentation. (2-3). Credit 3. I
Factors of environment, production, transportation, and deposition of sediments; products resulting from the operation of sedimentary processes; structures, textures, and colors of sediments. Laboratory work in collecting and sampling, mechanical analysis, methods of analyzing and presenting data. Prerequisites: Geology 201, 203, 204, 210.

320. Geology for Civil Engineers. (2-3). Credit 3. I, II
Principles of dynamic and structural geology and study of common minerals and rocks with their relationships and applications to construction, foundation, and excavation. Prerequisite: Sophomore classification in civil engineering.

399. Field Geology of the Gulf Coast Tertiary. Credit 6. S
Mapping, stratigraphy, and structure in the Tertiary of the Gulf Coast area. Given as a summer field camp. May be used to substitute for Geology 433 and 4 hours of technical elective. Prerequisite: Geology 300.

404. Geology of Petroleum. (2-3). Credit 3. I
Origin, migration, and accumulation of petroleum. Typical United States oil and gas fields. Laboratory work in subsurface geology. Prerequisites: Geology 300, 306, 312.

406. Economic Geology. (3-0). Credit 3. II †
The application of principles of geology, chemistry, and physics to the formation of useful minerals and rocks and a general survey of such deposits. Prerequisites: Chemistry 344; Geology 300, 306, 312.

409. Geology of Non-Metallics Other than Petroleum. (3-0). Credit 3. I †
The mineralogy, stratigraphic, and structural relations, origin, geographic distribution, uses, and economics of non-metallic mineral deposits other than petroleum. Prerequisites: Chemistry 344; Geology 300, 306, 312.

422. Natural Structural Materials. (2-3). Credit 3. II
Building stones and stone products, with special emphasis on clays and clay products, their qualities, occurrences, uses, and processes of fabrication and manufacture. For students registered in architecture or engineering. Prerequisite: Junior classification.

423. Micropaleontology. (1-6). Credit 3. II †
A systematic survey of the important groups of micro-fauna with particular emphasis on their classification and use. Prerequisite: Geology 305.

425. Subsurface Geology. (2-3). Credit 3. II †
Study of well cuttings and cores; electrical, radioactive, drilling time, and caliper logs. Preparation of subsurface contour maps and cross sections.

Prerequisites: Geology 300 and 404; or 311 and senior classification in petroleum engineering.

431. Geomorphology. (2-3). Credit 3. I
Principles and fundamentals of geomorphology. Laboratory work in advanced map interpretation. Prerequisites: Geology 300, 306, 312.

433. Field Geology. (0-6). Credit 2. II †
Two full afternoons per week devoted to the acquirement of techniques of field geology in areas adjacent to the campus. Prerequisites: Geology 300, 306.

437. Cenozoic Micropaleontology. (1-6). Credit 3. I †
Cenozoic micro-fauna of the Gulf Coast Province with emphasis on subsurface correlation. Prerequisite: Geology 423.

441. Advanced Engineering Geology. (3-3). Credit 4. I †
A survey of those phases of mineralogy, petrology, historical geology, structural geology, and sedimentation that may be applied to engineering problems. Not available to geology or petroleum engineering majors. Prerequisites: Senior classification; approval of Head of Department.

443. Paleontology. (2-3). Credit 3. II
Advanced invertebrate paleontology — megafossils. Prerequisite: Geology 305.

449. Seminar. (1-0). Credit 1. I
Review of current literature and technical developments. Discussion of certain legal aspects of the petroleum industry. Each student will make both oral and written reports. Prerequisites: Geology 300, 306, 312.

450. Seminar. (1-0). Credit 1. II
Continuation of Geology 449. Each student will prepare more advanced reports. Prerequisites: Geology 300, 306, 312.

485. Problems. Credit 1 to 3. I, II, S
Advanced problems in geology.

FOR GRADUATES

609. Field Geology. Credit 2 to 6. I, S
Systematic geologic surveying of selected areas. Prerequisite: Geology 300.

612. Structural Geology. (3-0). Credit 3. I
A detailed study of geologic structures and a consideration of theories regarding earth movements, with selected readings. Prerequisite: Geology 312.

616. Micropaleontology. (1-6). Credit 3. I
Study of microscopic fossils and their uses in correlation. Laboratory work in the examination of well samples. Prerequisite: Geology 423.

618. Sedimentation. (3-0). Credit 3. II
Investigation of processes of sedimentation with analytical laboratory work on sedimentary rocks. Seminar. Prerequisite: Geology 315.

619. Petroleum Geology. (3-0). Credit 3. II
A theoretical study of some of the problems in petroleum geology. Prerequisite: Geology 404.

620. Geology of Ground Water. (3-0). Credit 3. I
Principles of occurrence and movement of water beneath the earth's surface, and the influence of various geologic situations upon its behavior.

Factors applying to estimates of supply. Engineering aspects of ground water.

622. Stratigraphy. (3-0). Credit 3. I
Sources and depositional environment of sediments, character and relation of sedimentary strata, and the principles involved in delimiting, correlating, and naming stratigraphic units.

625. Advanced Ground-Water Geology. (3-0). Credit 3. II
Seminar course in the application of the principles of advanced geology to the development and use of ground water supplies. To be taken concurrently with Civil Engineering 630, Ground Water Hydrology. Prerequisites: Geology 620 or the equivalent; approval of Head of Department.

627. Continental Evolution Outside of North America. (2-0). Credit 2. II
A reading and conference course on the available literature, dealing with the basic geology of areas outside of North America in which industries and governments are asking for the services of American geologists. Designed for students contemplating foreign service. Areas to be studied will be suited to individual needs.

629. Structural Framework of North America. (3-0). Credit 3. I
Description of the important geologic structures of North America and of the development of regional structural features in geological times. Prerequisite: Graduate classification.

631. Geology in Engineering Construction. (3-0). Credit 3. I
Geologic principles applied to the construction of highways, foundations, bridge abutments and piers, tunnels, dams, reservoirs, etc. Construction materials. Test borings and their interpretation. Prerequisite: Geology 441.

639. Paleozoic and Mesozoic Paleontology. (3-0). Credit 3. I
Study of the important faunas of these eras. Prerequisites: Graduate classification; approval of Head of Department.

640. Cenozoic Paleontology. (3-0). Credit 3. II
Study of the important faunas of this era with emphasis on the megafossils of the Gulf Coast. Prerequisites: Graduate classification; approval of Head of Department.

643. Paleozoic Stratigraphy. (3-0). Credit 3. I
Stratigraphy of the Paleozoic System with particular emphasis on the Paleozoic of West Texas and Oklahoma. Prerequisites: Graduate classification; approval of Head of Department.

644. Mesozoic Stratigraphy. (3-0). Credit 3. II
Study of the stratigraphy of the Mesozoic System. Prerequisites: Graduate classification; approval of Head of Department.

645. Cenozoic Stratigraphy. (3-0). Credit 3. II
Study of the Cenozoic System. Prerequisites: Graduate classification; approval of Head of Department.

646. Gulf Coast Stratigraphy. (3-0). Credit 3. II
Detailed study of the Mesozoic and Cenozoic Systems of the Gulf Embayment. Prerequisites: Graduate classification; approval of Head of Department.

685. Problems. Credit 1 to 4 each semester. I, II, S
A course to enable graduate students with a major or minor in geology to undertake and complete with credit limited investigations which do not fall within their thesis or dissertation research and are not covered in the estab-

lished curricula. Geological problems in engineering are included. Prerequisites: Graduate classification; approval of Head of Department.

691. Research. Credit 1 or more each semester. I, II, S
Original research on problems in various phases of geology. Research for thesis or dissertation.

GEOPHYSICS

435. Survey of Geophysical Exploration. (3-3). Credit 4. I †
A study of the methods and instruments used in geophysical prospecting for petroleum deposits. Prerequisites: Geology 311, 312 or 441; Physics 204; or approval of Head of Department.

436. Seismic Exploration. (2-3). Credit 3. II †
Study of seismic prospecting methods, instruments, and interpretive procedures. Prerequisite: Geophysics 435.

446. Physics of the Earth. (3-0). Credit 3. II †
A survey course in physics of the earth and its implications during geologic history. Primarily for geophysicists but also for geologists, oceanographers, and others in the School of Arts and Sciences. Prerequisites: Geology 311, 312, or 441; Physics 204; approval of Head of Department.

485. Problems. Credit 1 to 3. I, II, S
Advanced problems in geophysics.

FOR GRADUATES

651. Theoretical Seismology. (2-0). Credit 2. I
Mathematical study of elasticity; wave propagation; effect of boundary conditions on elastic waves; types of elastic waves; energies, amplitudes, and absorption of elastic waves; elastic properties of rocks; propagation of elastic waves within the earth. Prerequisites: Geophysics 435; Mathematics 308 or registration therein; Physics 204.

653. Gravity and Magnetic Exploration. (2-0). Credit 2. I
Study of gravity and magnetic methods, instruments, and interpretation procedures. Prerequisites: Geophysics 435; Mathematics 308 or registration therein; Physics 204.

655. Electrical and Radioactivity Exploration. (2-0). Credit 2. II
Study of electrical and electromagnetic prospecting methods, instruments, and interpretation procedures. Also study of radioactive, thermal, fluorescent, and geochemical exploration methods. Prerequisites: Geophysics 435; Mathematics 308 or registration therein; Physics 204.

657. Earthquake Seismology. (2-0). Credit 2. I
Study of earthquakes, their causes, effects, method of location, determination of wave paths, interpretation of deep structures; and instruments used for recording. Prerequisites: Geophysics 435, 651 or registration therein; Mathematics 308 or registration therein; Physics 204.

685. Problems. Credit 1 to 4 each semester. I, II, S
A course to enable graduate students with a major or minor in geophysics to undertake and complete with credit limited investigations which do not fall within their thesis or dissertation research and are not covered in the established curricula. Geophysical problems in engineering are included. Prerequisites: Graduate classification; approval of Head of Department.

691. Research. Credit 1 or more each semester. I, II, S
Original research on problems in various phases of geophysics. Research for thesis or dissertation.

Department of History and Government

Professor R. W. Steen,
Professors J. H. Bass, S. R. Gammon, J. H. Hill, A. B. Nelson; Associate Professors J. M. Nance, P. J. Woods; Assistant Professors J. T. Duncan, C. H. Hall, R. L. Harris, H. H. Lang, T. L. Miller; Instructors A. C. Ashcraft, G. E. Bayliss, W. S. Chumlea, C. E. Frazier, Jr., E. T. Millen, J. C. Roberts, Jr., S. I. Roberts, G. M. Rodgers, L. C. Taylor, Jr.

GOVERNMENT

305. Government of the United States and Texas. (3-0). Credit 3. I, II
The organization, functions, and nature of the national government; the rights and privileges of citizenship; the immigration and naturalization laws, all as closely related to the constitution as possible, are treated first. A similar treatment is then applied to the government of Texas. Open only to military juniors and seniors in agricultural education and industrial education.

306. American National Government. (3-0). Credit 3. I, II, S
The organization, functions, and nature of the national government; the rights, privileges, and obligations of citizenship; immigration and naturalization laws, all as closely related to the constitution of the United States as possible.

307. State and Local Government. (3-0). Credit 3. I, II, S
The nature, organization, and general principles of local government in the United States with especial attention to these forms of government in Texas. Prerequisite: Government 306 or its equivalent. Required as condition to degree of all students who have not had at least three semester hours credit in military training before graduation.

308. United States Constitutional Development. (3-0). Credit 3. II
A study of leading decisions of the Supreme Court. The various trends in our constitutional growth since 1789 are treated, as well as the expansion through judicial interpretation of the powers delegated to the national government. Some attention is given to legal terminology and to the composition and functioning of the national judiciary. Required of all pre-law students in three-year pre-law program. Prerequisites: Government 306; History 105.

310. Comparative Government. (3-0). Credit 3. II
A survey of major European governments. Stress will be placed upon the parliamentary democracies of Great Britain, France, West Germany, and Italy. The dictatorships of the U.S.S.R. and Spain will also be considered. Governmental background, structure, and operation will receive attention. Prerequisite: Junior classification.

315. American Political Parties. (3-0). Credit 3. I
A study of the organization, history, and functions of political parties, and the place they occupy in the operation of national, state, and local governments in the United States. Attention is concentrated on the two major political parties, but some attention is given third party movements. Prerequisite: Junior classification.

320. Elements of Political Thought. (3-0). Credit 3. II
A study of ancient, medieval, and modern concepts of government as developed by the principal contemporary political writers, and as reflected in political institutions. Prerequisite: Junior classification.

HISTORY

105. History of the United States. (3-0). Credit 3. I, II, S
English colonization; the Revolution; adoption of the constitution; growth of nationalism; cotton and the slavery problem; war for Southern independence.

106. History of the United States. (3-0). Credit 3. I, II, S
Reconstruction; new social and industrial problems; rise of the progressive movement; United States emergence as a world power; Warld War I; reaction and the New Deal; World War II; contemporary America.

213. History of England. (3-0). Credit 3. I
British, Saxon, and Norman origins; national development; struggles between church and state; crown and nobles; nobles and commons; development of parliament. Required in three-year pre-law program.

214. History of England. (3-0). Credit 3. II
Agrarian and Industrial Revolutions; relations with Ireland; evolution of democracy; struggles with France and Napoleon; social legislation in the twentieth century; growth of the Empire until World War II. Required in three-year pre-law program.

217. Development of Europe. (3-0). Credit 3. I
The history of western Europe in the Middle Ages. A survey of the development of European civilization from the decline of the Roman Empire to the Renaissance. The course is designed to give the student historical perspective as well as a basic historical knowledge of the period. Major topics include the Graeco-Roman heritage, the barbarian migrations, the growth and development of the church, the rise of capitalism, medieval society, and the origin of nationalism in Europe. Required of majors in history.

218. Development of Europe. (3-0). Credit 3. II
The history of western Europe from the Renaissance to the present. A survey of modern European civilization, dealing especially with the Renaissance and the Reformation, the Age of Reason and the French Revolution, the Napoleonic wars, the growth of nationalism and democracy in the nineteenth century, the causes and consequences of the two world wars and the rise of dictatorship. Required of majors in history.

313. The Latin-American Nations to 1820. (3-0). Credit 3. I †
The period when the Americas south of the United States belonged to Spain and Portugal; discovery; colonial system; social and economic aspects; the wars of independence to the founding of the republics.

314. The Latin-American Republics, 1820 to the Present. (3-0). Credit 3. II †
The twenty Latin-American republics since 1820; independence and the dictators; rise of the ABC states; Latin-American civilization after a century of independence; relations with Europe and with the United States in Pan-American movement; participation in world affairs.

315. The United States, 1901 to the Present. (3-0). Credit 3. I, II, S †
A study of United States history during the twentieth century. Emphasis is placed primarily on the development and application of progressive principles from the "square deal" of the first Roosevelt to include the subsequent "new deal" and "fair deal" of the Roosevelt and Truman administrations; secondary emphasis is on the international relations of the United States as the nation became a world power, moved from isolation to leadership and back, followed by the development of the "good neighbor" policy toward Latin-America and our participation in World War II. The United Nations and problems.

318. International Developments since 1918. (3-0). Credit 3. I †
A general survey of world politics since the close of World War I. Particular attention will be given to the problems and ideologies of the great powers of Europe and to those factors and conditions which explain present political tendencies and policies. Due consideration will also be given to colonial problems in Asia and Africa, the Sino-Japanese question, and the clash of United States-Japanese policies. World War II; the conflict of ideologies.

325. Trends in American History. (3-0). Credit 3. I, II, S
The sources and development of leading American institutions constituting representative democracy, their influence upon our nation's development and upon the twentieth century world. Course stresses the institutional rather than the chronological and political aspects of the United States, endeavoring to present what has been well styled "The Epic of America." Students who have credit for History 105 or 106 may not receive credit for History 325.

326. History of Texas. (3-0). Credit 3. I, II, S
A history of Texas from the Spanish period to the present day. Stress will be placed upon the period of Anglo-American settlement, the revolution, the republic, and the development of the modern state.

331. Medieval Civilization. (3-0). Credit 3. I
History of medieval thought ranging from the influence of Plato and Aristotle to the age of Erasmus and Machiavelli. The course outlines the intellectual history of the Middle Ages and includes in broad outline the interests of man in philosophy, science, education, law, and religion.

332. Renaissance and Reformation. (3-0). Credit 3. II
A study of the fifteenth and sixteenth centuries with emphasis upon the intellectual history of the era. Political ideas, art, and humanism of the Renaissance are stressed. The doctrinal controversy and the benefits of Luther, Calvin, and Zwingli are emphasized in the Reformation.

411. The Old South. (3-0). Credit 3. I, S †
A history of the antebellum South. Emphasis will be placed on the following topics: physical bases of Southern regionalism; Southern alignments on national issues; the slavery-plantation economy and society of the Old South; secession and formation of the Confederacy.

415. The Institutional Background of Texas, 1519-1845. (3-0). Credit 3. I, S †
A study of the history of Texas from the Spanish period to annexation to the United States. Particular stress is placed upon the Spanish legal and administrative system, the Mexican administrative system, the establishment of Anglo-Americans in Texas, the revolution, the republic, and the fight for annexation. In each of these topics emphasis is placed upon principles and developments of this period which are reflected in the state's present-day society.

416. Texas Since 1845. (3-0). Credit 3. II, S †
A history of Texas since annexation. Careful attention is given to social, cultural, economic, and political developments, and to the place of Texas in national affairs.

422. International Rivalry in the Gulf-Caribbean Area, 1840 to the Present. (3-0). Credit 3. I †
Background of Spanish colonial policy, with British, French, and Dutch intrusion; conflict of interests; influence of islands on mainland settlement. Early United States interest; Monroe Doctrine and its extension; vital treaties with Colombia and Great Britain. European interests in the islands, Central America, Mexico, and Venezuela. Later policies of the United States, rise of Pan-Americanism and Pan-Hispanism. First reciprocal trade treaties and rise of United States imperialism. Policy of "the good neighbor" under Wilson and Roosevelt. Recent progress of Pan-Americanism toward western hemisphere solidarity.

423. American Foreign Relations. (3-0). Credit 3. I †
The history of the United States foreign relations and development of our leading foreign policies to 1868. The Revolution and alliance with France; the development of isolation and neutrality; neutral rights and the War of 1812; nationalism and the Monroe Doctrine; Manifest Destiny and its conse-

quences; diplomacy of the Civil War; the Monroe Doctrine applied to France in Mexico; the "Alabama" claims arbitration.

424. American Foreign Relations. (3-0). Credit 3. II †
The history of the United States foreign relations and development of our leading foreign policies, 1875 to the present; America becomes a world power; imperialism; World War I and the failure of neutrality; the League of Nations and its desertion; Pan Americanism; failure of disarmament and rise of aggression; neutrality fails again; World War II; United Nations and problems.

425. United States Policy in the Far East, 1841 to the Present. (3-0). Credit 3. I
An examination of the principles and policy of the United States in its political and economic contacts with China and Japan during the century just ended. The origin and development of initial contacts; imperialism and the "Open Door"; Japanese opportunistic aggression; the treaty status of the Pacific; the attitude of the Philippines; Axis policy in the Orient; post-war policy.

FOR GRADUATES

607. The United States, 1763-1800. (3-0). Credit 3. I
A study of the causes of the American Revolution, the Revolution, the Articles of Confederation, and final union under the Constitution. Careful attention will be given economic and social developments as well as political developments. Prerequisites: Eighteen hours of history and government; graduate classification.

610. The Trans-Mississippi West. (3-0). Credit 3. II
A study of the West in American history. The course will emphasize political, economic, social, and cultural influences of the frontier. Extensive reading will be required. Prerequisites: Eighteen hours of history and government; graduate classification.

612. The French Revolution and Napoleon. (3-0). Credit 3. II
Detailed consideration of the decline of the ancient regime, the influence of the Encyclopedists, the causes and course of events during the revolution, and a study of the Napoleonic Era. Critical evaluation of the source material as well as interpretation of the historical importance of the period is stressed. Prerequisites: Eighteen hours of history and government; graduate classification.

615. Growth of Spanish Institutions in America, 1492-1857. (3-0). Credit 3. I
A study of the growth of political, economic, religious, military, and related institutions, both in theory and in practice, as proposed, developed, and applied in the Spanish-American colonies and nations, 1492-1857. Prerequisites: Eighteen hours of history and government; graduate classification.

685. Problems. Credit 1 to 3 each semester. I, II, S
Individual instruction in selected fields of history. The course will stress reports and wide reading in the field selected. Prerequisites: Eighteen hours of history and government; graduate classification.

Department of Horticulture

Professor G. W. Adriance,
Professor F. R. Brison; Associate Professors A. H. Krezdorn, H. C. Mohr; Assistant Professors E. E. Burns, G. R. Williams

201. General Horticulture. (2-2). Credit 3. I, II
A survey of the general field of horticulture; the growth and fruiting habits of horticultural plants; a study of the principles and practices of propaga-

tion, including seedage, cuttage, graftage, and special methods; a study of the planting, care, culture, harvesting, handling, and utilization of fruit and vegetable crops. Prerequisite: Biology 101.

311. Processing Horticultural Crops. (2-3). Credit 3. I
A study of the principles and practices of canning, quick freezing, dehydration, pickling, and juice manufacture of fruits and vegetables. Fundamental concepts of the various techniques of preparation, processing, packaging, and use of additives will be given. Field trips to commercial processing plants will be made.

319. Orchard Management. (2-2). Credit 3. II
Study of orchard practices including soils and sites, planting, cultivation, pruning, spraying, harvesting, temperature relations, water relations, and selection of varieties. Prerequisite: Horticulture 201.

322. Vegetable Crops Management. (2-3). Credit 3. II
The principles of vegetable crop production will be covered. The factors of climate, soil, crop rotation, variety, plant growing, transplanting, planting, irrigation and drainage, weed control, insect and disease control, harvesting, marketing, storage, and special cultural practices will be considered. All of the major vegetable crops will be discussed with reference to these factors.

418. Nut Culture. (1-3). Credit 2. II †
Importance of nut crops, emphasis on pecan; problems of developing and maintaining pecan groves; developing native trees; study of varieties, fruit setting, soils, fertilizers, propagation methods, harvesting, handling, shelling, storage, and marketing the crop. Practice: Budding and grafting nursery stock, topworking native trees, storage and handling of budwood, examination of soils, spray application, visits to shelling plants.

422. Citrus and Subtropical Fruits. (2-2). Credit 3. I †
A study of subtropical fruits, with attention to citrus fruits, figs, olives, avocados, and dates. Practice: Study of varieties of subtropical fruits and their products; propagation and care of the various subtropical fruits. Prerequisite: Agronomy 301 or Plant Physiology and Pathology 313.

426. Commercial Propagation. (2-2). Credit 3. II †
A study of principles and practices followed in the propagation of fruit trees. The course includes a study of graft union, congeniality between stocks and scions, adaptation of stocks to environment, and commercial propagation practices for important fruits. Practice includes special treatments for seeds, budding, grafting, and transplanting for important fruits.

427. Seminar. (1-0). Credit 1 each semester. I, II †
Review of current experimental work in the field of horticulture, presented by staff members, graduate and senior students. Required of all graduate and senior students in horticulture.

434. Grading and Packing Vegetables. (2-2). Credit 3. I †
A consideration of the factors of good quality in market vegetables. Standard grades and packages. Shipping methods. The relation of production methods to quality. Transit losses. The methods of marketing open to the producer. Recent trends in marketing and packaging.

441. Problems in Horticulture. Credit 1 to 4. I, II, S
Special problems in fruit and vegetable crop production and processing. Prerequisite: Senior classification or approval of Head of Department.

FOR GRADUATES

601. Environmental Relations of Fruit Plants. (3-3). Credit 4. I
Water, soil, and temperature relations of fruit plants, and their modification by management practices will receive primary consideration. Specific problems of management will be studied under field conditions.

602. Factors Influencing Fruit Production. (3-3). Credit 4. II
Responses of the principal fruit plants to pruning, differentiation of fruit buds, and internal and external factors influencing fruit setting will be considered in detail. Field studies of important problems will receive considerable attention.

603. Structure of Vegetable Plants. (3-3). Credit 4. I
A consideration of the morphological and anatomical features of important families of vegetable plants and the relation of these features to growing practices and progressive improvement of the various plants. Prerequisite: Biology 619 or 623.

604. Physiology of Vegetable Plants. (3-3). Credit 4. II
The topics of thermoperiodism, photoperiodism, nutrient deficiencies, water relations, temperature relations, fruit setting, growth, and seed germination will be taken up for each of the major vegetable crops. The recent developments in the use of hormones and selective herbicides in vegetable production will be discussed. Prerequisites: Horticulture 322; Plant Physiology and Pathology 314.

685. Problems. Credit 1 to 4 each semester. I, II, S
A comprehensive review of fundamental principles in research and methods employed in research. Practice in the various techniques which may be used in different investigations of horticultural problems.

691. Research. Credit 1 or more each semester. I, II, S
Research in horticultural problems for thesis or dissertation.

Department of Industrial Education

Professor C. H. Groneman;
Associate Professor L. V. Hawkins; Assistant Professors J. L. Boone, Jr., L. B. Hardeman, L. V. Patterson; Instructors C. A. Bertrand, F. D. Nixson, Jr.

105. Wood Craft. (1-5). Credit 3. I, II
A comprehensive study of woods, wood products, and wood industries; including growth and botanical structure, production and uses, design, construction, and finishing.

106. Sheet Metal. (1-5). Credit 3. II
A study of industrial practices in developing, laying-out, and fabricating sheet metal products. Problems involving parallel-line, radial-line, and triangulation will be provided.

107. Industrial Materials and Manufacturing Processes. (2-3). Credit 3. I, II
A study including the processing of woods, metals, fuels, ceramics, and plastics; the fabrication of products from these materials; concepts of accepted manufacturing processes. Laboratory work will consist of problems involving experimentation.

204. Development and Practice in Industrial Education. (3-0). Credit 3. II
The history and development of industrial education, its meaning and objectives, and present practices in schools and industry.

205. Ornamental Iron. (1-5). Credit 3. I
A study of metals and metal products; including the alloying and proper use of iron, steel, aluminum, copper, brass, and bronze. Problems involving casting, spinning, machining, forging, welding, tubular construction, and electroplating are required.

301. Methods of Teaching and Class Management. (2-0) or (3-0). Credit 2 or 3. I
An introduction to the fundamentals of teaching as applied to industrial subjects; the management of the class, equipment, and supplies.

304. Applied Industrial Electricity. (2-3). Credit 3. I, II
A theoretical and practical study of electrical circuits, motors, generators, transformers, lighting, controls, and instruments. Laboratory experiences consist of experiments and projects in circuits and machines.

308. A Study of Modern Industries. (3-0). Credit 3. I
The political, historical, and geographical factors which have a direct influence upon the development and distribution of industries. Specific studies of individual industries are made, such as iron and steel, paper, automobiles, petroleum, cement, leather, plastics, and textiles. Essential features of these industries are considered: location, machinery, power, raw material, market, labor.

310. Course Making. (2-0). Credit 2. II
Methods of outlining courses of study to meet the needs of the different types of classes. Each student will make a complete course for some particular subject.

323. Methods of Teaching Mechanical Drawing. (1-3). Credit 2. I
The student should have completed courses equivalent to Engineering Drawing 105, 106 before attempting this work. Analysis of problems and the selection of instructional material and methods of presentation for general drafting.

326. General Metalwork. (1-5). Credit 3. I, II
The designing and construction of power machinery including the development of plans for procedure, jigs, and fixtures. A study is made of materials and industrial processes and procedures of the foundry, welding, and machine shop.

327. Industrial Arts Handcraft. (1-5). Credit 3. I
Development and preparation of instructional materials; designing and building of teaching type projects and problems in plastics, leather, bookbinding, and other related handcraft activities. Prerequisite: Nine hours of shop courses.

328. Industrial Accident Prevention. (3-0). Credit 3. I, II
Analysis of fundamentals of accident prevention and their application to industrial supervision and management. Prerequisite: Junior classification.

332. Plastics and Ceramics. (1-3). Credit 2. I
Sources, manufacture, supply, and uses of plastics and ceramic materials; designs appropriate for plastics projects; essential processes in fabrication of plastics and ceramic objects.

334. Upholstery. (1-3). Credit 2. II
Instruction in the essentials of upholstery processes, including the construction of frames and foundations with and without springs. Prerequisite: Industrial Education 105.

336. Design in the Arts and Crafts. (1-3). Credit 2. II
Analysis and solution of design problems applicable to the arts and crafts. Experiences are provided for the designing of industrial products related to industrial arts through the use of common presentation media, proportion, balance, and harmony. Prerequisites: Engineering Drawing 105, 127; Industrial Education 105; Mechanical Engineering 106, 201, 202, 309.

404. Visual Aids for Industrial Subjects. (1-2). Credit 2. I †
This course is designed to develop an understanding of, need for, construction of, and use of visual aids for instruction in industrial subjects. Student activity consists of determining values of color in aids, use of projection equipment, mock-ups, posters, and blackboard illustrations.

406. Vocational Guidance. (2-0). Credit 2. I †
A study of the instruments and techniques of vocational guidance, its relation to education and industry, its meaning and purpose, and the analysis of methods of investigation and guidance procedures.

409. Methods of Introducing Industrial Organizations and Management into Industrial Schools. (2-0). Credit 2. S †

The management of modern industrial enterprises and the possible adaptation to industrial schools.

419. Laboratory of Industries Methods. (1-3). Credit 2. II †

The student will make a study of the units of industries as generally recommended for public school industrial arts and will select, plan, and design problems and projects to meet these requirements.

420. Follow-Up, Visitations, and Coordination in Part-Time Schools. (2-0). Credit 2. S †

Selecting occupations suitable for young people to learn, placing students in suitable employment on a part-time basis, and coordinating their school duties with their work activities.

423. Analysis Procedure. (1-2). Credit 2. I, II †

Analysis is made of occupations to obtain content for instructional information. Jobs and operations are studied to determine the order and content of operation, job description, job evaluation, and job safety.

424. Organization of Instructional Material. (1-2). Credit 2. S †

A study will be made of published material available in the student's occupational field. Those parts found suitable for vocational classes will be indexed and organized for class use. Types of instruction sheets found necessary for efficient teaching will be written.

427. Driver Education. (1-6). Credit 3. I, II

A study and the application of state and federal regulations and policies governing the efficient and safe operation of automotive vehicles in traffic.

429. Foremanship and Supervision. (3-0). Credit 3. I

Positions of supervisory responsibility in an industrial organization, relation of supervisor to the supervised and supervisors; and procedures for meeting the responsibilities of the positions. Prerequisite: Senior classification.

438. Industrial Safety. (2-3). Credit 3. II

Continuation of Industrial Education 328. This course will include analysis of various types of accident prevention; organizations and programs in industry including detail study of typical safety departments; control of environmental hazards including inspections, investigations, mechanical guarding, maintenance, and the application of safety engineering principles in design and specifications. Prerequisites: Industrial Education 328; Industrial Engineering 302; and either Industrial Education 429 or Industrial Engineering 401 or registration therein.

442. Supervised Teaching in Industrial Arts. (2-12). Credit 6. II

Observation of, and participation in, the activities of a typical industrial arts classroom. The student will prepare lesson plans and present demonstrations to pupils in industrial arts in the public schools of Bryan and College Station. Prerequisites: Industrial Education 204; senior classification.

444. Industrial Distribution. (3-0). Credit 3. I, II

A seminar approach to the study of the problems of industrial distribution with the assistance of representatives from the Southern Association of Distributors. Prerequisite: Junior classification.

447. Electricity and Electronics. (2-3). Credit 3. I

An advanced course in applied industrial electricity and electronics for industrial arts teachers. Emphasis is placed on the methods of teaching electricity in industrial arts programs of the public schools. Prerequisites: Industrial Education 304; Physics 202.

449. Seminar in Industrial Education. (1-0). Credit 1. I, II

General discussion of laws, legislation, certification, professional ethics, and other current problems relating to industrial and teaching fields. Prerequisite: Senior classification.

FOR GRADUATES

601. History of Industrial Education. (2-0). Credit 2. I, II, S
A study of leaders, movements, and agencies, with special emphasis on the economic, social, and philosophical factors which have contributed to the development of industrial education in the United States.

602. Industrial Arts Administration and Supervision. (2-0). Credit 2. I, II, S
Problems of the local director or supervisor of industrial arts.

603. Administration and Supervision of Vocational Industrial Education. (2-0). Credit 2. I, II, S
Problems of the local director or supervisor of vocational industrial education.

604. Industrial Programs for Junior Colleges and Technical Schools. (2-0). Credit 2. I, II, S
A study of the kinds, purpose, size, accreditation, growth, and teaching problems in the junior colleges, technical institutes, and adult schools, with particular emphasis on organization and presentation of industrial subject material in these schools.

605. Problems in Industrial Safety. (2-0). Credit 2. I, II, S
Basic reasons for accidents; prevention of industrial accidents; qualifications and duties of safety consultants; methods of making investigations; making investigations and how to prepare safety reports.

606. Organization of Industrial Arts Department. (2-0). Credit 2. I, II, S
Problems in determining the type and size of industrial arts programs for the various types and sizes of schools with plans for the organization of each.

609, 610. Methods of Teaching High School Drawing. (2-3). Credit 3 each semester. I, II, S
A survey of the field of drawing. The designing and organizing of problems and teaching devices. The first semester is devoted to general mechanical drawing as taught in the first two years of high school, the second semester to machine drawing. Either semester may be taken separately.

614. Guidance Seminar. (2-0). Credit 2. I, II, S
The organization of occupational information; educational and vocational guidance; counseling case problems. Prerequisite: Industrial Education 406 or equivalent.

616. Methods of Teaching Industrial Arts in Secondary Schools. (2-0). Credit 2. I, II, S
Selecting and organizing instructional material for problems in a particular arts activity.

618. Tests and Measurements in Industrial Education. (2-0). Credit 2. I, II, S
A study of testing and measuring devices and their application to industrial education subjects.

619. Related Subjects in Part-Time Cooperative Programs. (2-0). Credit 2. I, II, S
The organization and presentation of content material necessary in part-time cooperative programs, and the direction of the study of the students engaged in such programs.

621. Philosophy of Vocational Education. (2-0). Credit 2. I, II, S
The basic principles involved in the development and operation of industrial education programs under the State and Federal vocational laws.

622. Philosophy of Industrial Arts Education. (2-0). Credit 2. I, II, S
The principles involved in the development and operation of industrial arts courses and their purpose and function in the field of general education.

623. Vocational Guidance Procedures. (3-0). Credit 3. I, II, S
A workshop approach to the study of vocational guidance, programs, relationships, group techniques, and methodology of the clinical approach.

626. Classroom Management and Shop Organization. (2-0). Credit 2. I, II, S
The organization of routine procedures to facilitate teaching; setting up roll-checking devices, issuing procedures for tools and materials, keeping material inventory, using assignment charts and progress charts, using student leadership in routine non-teaching class and shop routine, and keeping records.

627. Teacher Training for Local Supervisors of Trade and Industrial Classes. (2-0). Credit 2. I, II, S
A course for local supervisors of industrial education programs or individuals responsible for conducting teacher training and upgrading programs on the local level. Methods for organizing and conducting teacher improvement programs, preparation and correlation of instructional material.

628. Organization of Vocational Industrial Schools and Classes. (2-0). Credit 2. I, II, S
Methods of making surveys, determining possible vocational education programs to meet the needs of different types of communities and the proper organization for these classes under the State plan for vocational education.

630. Auto Mechanics. (1-4). Credit 2. I, II, S
Development and preparation of instructional materials and the testing of laboratory problems pertaining to the economic selection, operation, and maintenance of the automobile.

631. Electricity. (1-4). Credit 2. I, II, S
Development and preparation of instructional materials and the testing of laboratory problems pertaining to practical theories and their application to electrical units within a high school program.

632. Cabinet Making. (1-4). Credit 2. I, II, S
Development and preparation of instructional materials and the testing of laboratory problems pertaining to modern methods of kiln drying, veneer construction, upholstery, and fabrication within the furniture industry.

633. Machine Shop. (1-4). Credit 2. I, II, S
Development and preparation of instructional materials and the testing of laboratory problems pertaining to modern practices and problems in the teaching of advanced machine shop.

634. Ornamental Metal Work. (1-4). Credit 2. I, II, S
Development and preparation of instructional materials and the testing of laboratory problems pertaining to mild steel and tubular metal.

681. Seminar. (1-0). Credit 1. I, II, S
General discussions of laws, legislation, certification, professional ethics, and other current problems relating to the industrial education teaching profession.

685. Problems. Credit 1 to 4 each semester. I, II, S
A course designed to enable graduate majors to undertake and complete with credit limited investigations which do not fall within the thesis research and which are not covered by any other course.

691. Research. Credit 1 to 4 each semester. I, II, S
Research for thesis. Topic subject to approval of the Head of the Department.

Department of Industrial Engineering

Professor A. R. Burgess,
Professors J. P. CoVan, S. A. Wykes; Associate Professor R. F. Bruckart;
Instructor R. C. Burke

202. Introduction to Industrial Engineering. (2-0). Credit 2. II
The place of industrial engineering in the factory organization. Relationship of industrial engineering to management, purchasing, cost control, inspection, product development, and maintenance. Historical origins and development of the profession.

302. Production Engineering. (1-2). Credit 2. I, II
A coordinated study of manufacturing processes and equipment; operation sequence planning; economic aspects of equipment selection. Tooling and processing a product from product design to final assembly for quantity production. Emphasis is placed on latest developments in manufacturing techniques. Prerequisites: Mechanical Engineering 202, 310.

401. Survey of Industrial Engineering. (3-0). Credit 3. I, II, S. †
A survey of the industrial engineering field; administrative decisions, plant location and design, layout of equipment, materials handling, production control, quality control, motion and time study, cost determination, wage plans, job evaluations, and merit rating. Prerequisite: Junior classification in engineering or business administration, or approval of Head of Department.

404. Motion and Time Study. (2-3). Credit 3. I, II †
Standardization of job conditions; methods improvement and motion economy; use of flow process charts and diagrams, micromotion analysis of motion pictures, simo-charts, multiple-activity charts; allowances; rating methods; taking time studies; use of standard data and development of time formulas. An actual methods improvement is made of a current industrial operation and a report prepared on the improved method. Prerequisite: Junior classification in engineering or business administration.

406. Industrial Case Analysis. (1-0). Credit 1. II †
Practice in arriving at decisions in the solution of typical management problems through the study and analysis of actual case problems. Prerequisites: Industrial Engineering 202, 302, 404, and registration in 411, 414, 415.

408. Seminar. (0-2). Credit 1. II
Oral presentation by students of current developments in industrial engineering and management. Technical films on manufacturing operations and economic and social development of the United States. Prerequisite: Senior classification in industrial engineering.

410. Current Practices in Industrial Engineering. Credit 3. S †
A study of outstanding applications of industrial engineering principles through direct visit to the plants in the industrial Middle West. Course comprises a three-weeks tour, with emphasis on discussion with men in industry who have pioneered in new ideas in organization, labor relations, materials handling, incentive plans, production control, quality control, and other important management techniques. Prerequisite: Senior classification in industrial engineering.

411. Wage and Salary Control. (3-0). Credit 3. I, II †
Personnel procedures, methods of hiring employees, wage systems, wage administration, job evaluation, merit rating, salary classification, fringe benefits, direct and hidden labor costs, morale building. Prerequisite: Junior classification in engineering or business administration, or approval of Head of Department.

412. Labor and Industry. (3-0). Credit 3. I, II †
A brief review of the history of organized labor; critical study of fundamental Federal and State laws governing labor-management relations; study

of current interpretations of labor laws, controversial labor-management issues and their solutions. Prerequisite: Senior classification in engineering or business administration, or approval of Head of Department.

414. Statistical Control of Quality. (2-3). Credit 3. I, II †
The engineering aspects of controlling quality through the use of statistical methods. Frequency distributions, control charts for variables, control for fraction defective and defects per unit. Sampling inspection plans. Design of specifications; tolerance system and gaging. Administration of inspection. Prerequisite: Junior classification in engineering.

415. Production Control. (1-3). Credit 2. I †
The planning and control of production; operation analysis; routing; scheduling; dispatching; use of visual production charts and boards; inventory control; accumulation of material requirements; design of production control forms; forecasting production requirements; economic lot size; controls for job order, repetitive cycle, and straight line production. Prerequisite: Industrial Engineering 302, registration in 404.

416. Factory Layout. (1-6). Credit 3. II †
The layout of a complete factory for a selected product. Use of machine templates and models; design of materials handling systems; machine erection; auxiliary services; design of storerooms; loading docks; choice of building types; machine selection; estimate of unit costs; estimate of capital requirements; personnel organization; safety considerations in plant layout. Prerequisites: Industrial Engineering 404, 415.

420. Manufacturing Costs. (3-0). Credit 3. I
The study of modern techniques used by engineers for controlling manufacturing costs. Computing probable returns from investments in new plants and new equipment. Use of break-even charts, profit graphs, machine replacement studies, comparison of alternative methods, standard costs, and budgeting, to control manufacturing costs. Introduction to operations research.

430. Special Problems in Industrial Engineering. Credit 1 to 3. I, II
A course which permits work on a special project in industrial engineering. Project must be approved by the Head of the Department. Prerequisite: Senior classification in industrial engineering.

451. Tool Engineering. (2-0). Credit 2. I
Principles of selection and design of tools, jigs, fixtures, and gages. Economic considerations in choice of tooling methods. Estimating tooling costs. Dimensioning and tolerances. Methods of locating, clamping, and feeding. Principles of automation. Tool cataloguing, maintenance, and control. Prerequisites: Civil Engineering 305; Industrial Engineering 202, 302.

452. Tool Design Laboratory. (0-3). Credit 1. II
Solution of tool design problems on drawing board. Problems to include drill jig detailing and layout, punch and die design, milling fixture design, turret lathe tooling, and compound angle calculation. Prerequisites: Industrial Engineering 451; Mechanical Engineering 337.

FOR GRADUATES

601. Industrial Surveys. (2-0). Credit 2. II
Engineering problems related to industrial investigations, reports on organizations, personnel, capital equipment, financial policies, market, etc. Prerequisites: Industrial Engineering 415, 416.

602. Incentive for Management and Men. (2-0). Credit 2. II
Direct worker incentive, seasonal bonuses, quality incentives, profit-sharing plans for executives, profit-sharing for wage earners. Prerequisite: Industrial Engineering 404 and 411, or the equivalent.

603. Human Relations in Industry. (3-0). Credit 3. I

Causes of misunderstandings between management and labor; interdepartmental relations; conditions which influence the attitudes and productivity of workers; principles of leadership; selection, training, follow-up, dismissals; the industrial engineer's relations with shop employees; critical study of current labor-management problems. Prerequisite: Business Administration 422 or Industrial Engineering 412.

604. Advanced Time and Motion Studies. (1-6). Credit 3. I

Development of standard time data through use of motion pictures and other short interval timing devices; experimental measurement of physical and mental fatigue; work sampling studies; extended training in performance rating; procedure analysis; interference formulas in multi-machine operation. Prerequisite: Industrial Engineering 404 or the equivalent in practical time study experience in industry.

608. Industrial Case Analysis. (3-0). Credit 3. II

Practice in the application of principles to the solution of actual case problems involving broad management decisions. Special attention is given to problems indigenous to Texas industry. Prerequisite: Graduate classification in industrial engineering or approval of Head of Department.

614. Advanced Quality Control. (2-3). Credit 3. I

Advanced statistical methods applied to quality control problems; significance of differences; single and multiple correlation; analysis of frequency distributions; sequential sampling; writing of specifications; design of special gages; administration of inspection staff; gage laboratory work in checking gages; keeping charts on actual machine processes. Prerequisites: Graduate classification in engineering; Industrial Engineering 414.

620. Principles of Operation Analysis. (4-0). Credit 4. II

Use of mathematical models in making decisions; optimizing overall policies; probability methods; linear programming; transportation models; queing theory; learning curves; information theory; Monte Carlo methods; use of high speed computers for managerial control. Prerequisites: Industrial Engineering 420, 614; graduate classification in industrial engineering.

651. Tool Design. (2-3). Credit 3. II

Design of automatic machine tools; tracer and director control of tool paths; automatic feeding, holding, indexing and ejection of work pieces; tool replacement analysis. Study of cutting forces, workpiece and fixture distortion. Automatic inspection and sorting, assembly, and packaging. Prerequisites: Industrial Engineering 451, 452; graduate classification in industrial engineering.

681. Seminar. (2-0). Credit 2. II

Group study and discussion of current developments in industrial engineering practices as reported in the literature and as presented by representatives from industry. Prerequisite: Graduate classification in industrial engineering.

685. Problems. Credit 1 to 4 each semester. I, II, S

Investigation of special topics not within the scope of theses research and not covered by other formal courses. Prerequisite: Graduate classification in industrial engineering.

691. Research. Credit 1 or more each semester. I, II

Research in the industrial engineering field; subject to meet the needs of the individual student.

Department of Journalism

Professor D. D. Burchard;
Associate Professor H. O. Miller; Assistant Professor W. D. Calvert

201. News Writing. (2-3). Credit 3. I
Beginner's reporting; study of types of news; leads; body treatment of story; feature in lead; facts; background and practice in writing straight news story. Prerequisite: Knowledge of typing.

202. Beginning News Reporting. (2-3). Credit 3. II
Study of news sources; style; interviewing; news analysis and discussion; handling of various types of news; emphasis on clear writing; practical reporting experience. Prerequisite: Knowledge of typing.

205. Principles of Typography. (2-3). Credit 3. II
Effective use of type and printing materials in advertising and editorial production; practice in fundamentals of printing; illustrations and other elements of layout and composition for publications. Prerequisites: Sophomore classification; approval of instructor.

304. Feature Story Writing. (2-2). Credit 3. I
The writing of magazine and feature stories; types of feature articles; sources; titles; markets; slanting articles for particular markets; style; word usage; beginnings; illustrations.

306. Newspaper Production and Management. (2-2). Credit 3. II
The business of managing a newspaper; the community newspaper; study of the weekly and small town daily newspaper as a service organization; social responsibilities; influence of the community; mechanics of printing; managership; business side of conducting a paper. Prerequisites: Journalism 202, 205.

307. News Editing. (2-3). Credit 3. I
The editing of news; makeup of a newspaper; copy reading; proofreading; headline writing. Prerequisite: Journalism 202.

308. Newspaper Advertising. (2-3). Credit 3. I
Advertising layout and copy for newspapers and other publications; intensive practice in newspaper layouts; writing of retail copy; servicing of newspaper accounts. Prerequisite: Approval of instructor.

311. Radio News Writing. (2-2). Credit 3. II, S
A study and analysis of the basic methods of writing for radio with special emphasis on the techniques required in processing news copy for broadcast purposes. Students receive thorough groundwork in the fundamentals of radio news style and intensive practice in re-writing and condensing from original news stories. Prerequisite: Approval of the instructor.

315. Photography. (1-3). Credit 2. I, II
Fundamentals of photographic theory and practice; cameras, lenses and shutters; light meters; properties of photographic film and paper; exposure and development of the negative; black and white printing processes; use of filters; lighting (natural, flash, and flood). Emphasis on photography as a medium of communication.

321. Industrial Journalism. (2-2). Credit 3. I, II, S
A study of the technique of writing technical articles and reporting news related to engineering, industry, science, and other specialized interests; preparation of fact articles for technical and trade journals.

406. Publicity and Public Relations. (3-0). Credit 3. II †
Practical analysis of the various fields of publicity and public relations. Students make surveys and perform laboratory work on actual projects. Theory and practice in various aspects of functioning publicity, including news writing, advertising, and radio.

409. History and Principles of Journalism. (3-0). Credit 3. I
Development of American journalism from colonial times to the present, projecting the press as an institution against the background of the economic, social, and political history of the nation. Includes ethics of the profession. Prerequisite: Journalism 202.

412. Editorial Writing. (3-0). Credit 3. II
The writing of editorials; editorial page; editorial campaigns; what constitutes editorial policy; ethics in editorial writing. Prerequisite: Journalism 304.

415. Agricultural Journalism. (2-2). Credit 3. I, II, S
The principles of newspaper writing; especially the preparation of material for agricultural papers and country weeklies; the part a country paper should play in country development; in the laboratory work, opportunity is given for actual writing for newspapers and farm journals. The Information Office of the College and the Information Department of the Extension Service are cooperative in the course.

485. Problems. Credit 1 to 4 each semester. I, II, S
Research problems related to the communications field. Individual work, fitted to the special needs of the specific student as determined by his interests and aptitude.

Liberal Arts

201. Survey of Music Literature. (1-2). Credit 2. I, II
A study of various types and styles of music literature. Lectures supplemented by listening. Music illustrations selected primarily from standard concert repertoire. For the music listener with little or no formal training in music.

301. Introduction to Philosophy. (3-0). Credit 3. I
An introduction to the nature of philosophic inquiry; theories of reality and of knowledge; including idealism, naturalism, and pragmatism; the relation of philosophy to religion, science, history, politics, and education. The aim is to stimulate thinking about problems of conduct and to develop principles and methods of passing judgment on current social issues. Prerequisite: Junior classification.

304. Philosophies of Life. (3-0). Credit 3. II
A survey including the biographical and historical backgrounds of the philosophies of the major philosophical thinkers from Socrates to Russell, and of their influence upon the thinking of mankind; incidental consideration of the ideals and values involved in moral, religious, esthetic, and scientific points of view.

311. Use of Library Resources. (0-2). Credit 1. I, II
A course designed to develop in students skill in the use of library resources at the upper level. Emphasis placed on specialized reference tools. Prerequisites: Completion of sophomore English; junior classification.

Department of Mathematics

Professor E. C. Klipple,
Professors R. E. Basye, J. T. Hurt, H. A. Luther, W. L. Porter; Associate Professors Dan Hall, J. T. Kent, E. R. Keown, W. E. Koss, R. V. McGee, B. C. Moore, T. R. Nelson; Assistant Professors K. R. Bailey, J. R. Hillman, R. R. Lyle, W. S. McCulley, S. A. Sims, M. E. Tittle; Instructors O. L. Baugh, W. H. Clayton, L. M. Hovorak, F. N. Huggins, S. M. Kindall, W. S. Lang, Jr., H. D. Perry, C. D. Sanderlin, A. R. Wapple, M. L. Williams

100. General Mathematics. (3-0). Credit 3. I, II
Review of fractions, mensuration, percentage, fundamental algebraic operations, signs of aggregation, factoring, formulations of equations, simple

equations, systems of linear equations, graphs, exponents, radicals. **No credit toward a degree will be granted for the satisfactory completion of this course.**

101. Algebra. (3-0). Credit 3. I, II, S
Factoring, fractions, linear equations in one unknown, graphs, systems of linear equations, exponents and radicals, quadratic equations.

102. Algebra. (3-0). Credit 3. I, II, S
Quadratic equations, ratio, proportion, variation, progressions, binomial theorem, complex numbers, theory of equations, determinants, partial fractions.

103. Plane Trigonometry. (3-0). Credit 3. I, II, S
Definitions of the trigonometric functions, evaluation of the functions of special angles, fundamental relations, solution of right triangles, trigonometric reductions, angular measure, functions of a composite angle, logarithms, solution of oblique triangles, inverse trigonometric functions, trigonometric equations.

104. Analytics. (3-0). Credit 3. I, II, S
Equation of a locus, locus of an equation, the straight line, circle, parabola, ellipse, hyperbola, transformation of coordinates, polar coordinates, parametric equations, plane, quadric surfaces. Prerequisite: Mathematics 103.

110. Survey Course in Mathematics. (3-0). Credit 3. I, II, S
Linear equations, quadratic equations, functions and graphs, derivatives of polynomials, integrals of polynomials, systems of equations, logarithms, progressions, binomial theorem, compound interest and annuities, permutations and combinations, probability.

116. Plane Trigonometry and Analytics. (4-0). Credit 4. I, II
Trigonometric functions, fundamental relations, solution of right triangles, trigonometric reductions, angular measure, functions of a composite angle, logarithms, solution of oblique triangles, functions and graphs; the straight line, circle, parabola, ellipse, the hyperbola, polar coordinates, sketching of surfaces. Prerequisite: Mathematics 102. (For students registered in architecture.)

209. Calculus. (3-0). Credit 3. I, II, S
Variables, functions, and limits. Derivatives and differentials for polynomials and applications. Integration of polynomials and applications. Differentiation of algebraic functions. Prerequisite: Mathematics 104.

210. Calculus. (3-0). Credit 3. I, II, S
Differentiation and integration involving transcendental functions together with applications. Improper integrals, approximate integration, indeterminate forms, mean value theorems. Prerequisite: Mathematics 209.

223. Differential and Integral Calculus. (4-0). Credit 4. I, II
Limits, rate of change, the derivative, maxima and minima, differentiation of polynomials; the definite integral; volume, differentiation of implicit functions, special devices for integration, center of gravity, moment of inertia, double integrals. Prerequisite: Mathematics 116. (For students registered in architecture.)

303. Theory of Equations. (3-0). Credit 3. II
Complex numbers, remainder theorem, factor theorem, synthetic division, nature of roots of equation, ruler and compass construction, solution of cubic and quartic equations, isolation of a root, solution of numerical equations, determinants, matrices, systems of linear equations, symmetric functions, elimination, resultants, discriminants. Prerequisite: Mathematics 210.

307. Calculus. (3-0). Credit 3. I, II, S †
Introduction to series, Taylor's series, partial differentiation, elementary differential equations, applications. Prerequisite: Mathematics 210.

308. Differential Equations. (3-0). Credit 3. I, II, S †
Fourier series, linear equations, solution by Laplace transforms and by series, applications. Prerequisite: Mathematics 307.

405. Vector Analysis. (3-0). Credit 3. I †
Elementary operations, vector and scalar products of two vectors, vector and scalar products of three vectors, differentiation of vectors, the differential operators, applications to electrical theory, applications to dynamics, mechanics, and hydrodynamics. Prerequisite: Mathematics 210.

409. Advanced Calculus. (3-0). Credit 3. I, S †
The concept of a function, limit of a sequence, continuity, theorems on continuous functions, the definite integral, the derivative, mean value theorems, hyperbolic functions, improper integrals. Prerequisite: Mathematics 210.

410. Advanced Calculus. (3-0). Credit 3. II †
Theory of plane curves, mechanics of a particle, Taylor's theorem and applications, numerical integration, convergence and divergence of series, power series, periodic functions, Fourier series. Prerequisite: Mathematics 409.

411. Mathematical Probability. (3-0). Credit 3. I †
Introductory concepts, permutations and combinations, elementary principles of the theory of probability, probability of experiment, distribution functions and continuous variables, averages, curve fitting, applications. Prerequisite: Mathematics 210.

414. Mathematical Statistics. (3-0). Credit 3. II †
History and terminology of statistics, probability theory, discrete and continuous distributions, expected values, moments, sampling, confidence intervals, tests of hypotheses. Prerequisite: Mathematics 210.

415. Modern Algebra. (3-0). Credit 3. I †
Integers, rational numbers, real numbers, complex numbers. Groups, rings, integral domains, fields. Polynomials over a field. Prerequisite: Mathematics 210.

FOR GRADUATES

601. Higher Mathematics for Engineers and Physicists. (4-0). Credit 4. I, II, S
Surface integrals, line integrals, vector analysis, partial differential equations, elementary complex variables, applications. Prerequisite: Mathematics 308.

602. Higher Mathematics for Engineers and Physicists. (4-0). Credit 4. I, S
Fourier integrals, Bessel functions, Legendre polynomials, sources and sinks, method of images, Green's functions, applications. Prerequisite: Mathematics 601.

606. Theory of Probability. (4-0). Credit 4. II
Formulae for combinations and arrangements, problems in total and compound probability, expectation, risk, the problem of repeated trials. Stirling's formula, the probability integral, theorems in mean value, dispersion, determination of best value, the law of error, the correlation coefficient, curve fitting. Prerequisite: Mathematics 411.

607. Real Variables. (4-0). Credit 4. I
Fundamental theory of number sets and point sets, elementary applications to real functions, theory of linear measure. Prerequisite: Mathematics 409.

608. Real Variables. (4-0). Credit 4. II
Measurable functions, the Riemann integral, the Lebesgue integral, applications to real functions and series. Prerequisite: Mathematics 607.

609. Numerical Calculus. (3-3). Credit 4. I
Simultaneous linear equations, algebraic and transcendental equations, interpolation, numerical integration and differentiation, numerical solution of differential equations, finite differences, divided differences, approximation by least squares, simple difference equations. The laboratory will consist of programming and operating a large digital computer (magnetic drum stored program computer). Prerequisite: Mathematics 308.

610. Numerical Methods in Differential Equations. (3-3). Credit 4. II
Elementary numerical solutions, analytical foundations, systems of equation, higher order equations, two-point boundary problems, numerical methods of partial differential equations, linear analysis, numerical methods in linear analysis, and introduction to linear programming. The laboratory will consist of programming and operating a large digital computer (magnetic drum stored program computer). Prerequisites: Mathematics 308; approval of the instructor.

611. Ordinary Differential Equations. (4-0). Credit 4. I
Definitions, general methods of solving first order differential equations, singular solutions, geometrical applications, trajectories, motions of a particle, special methods for the equation of the first order, linear equations of the second order, the method of successive approximations, systems of ordinary differential equations, interpolation and numerical integration, symbolic methods, numerical solution of differential equations. Prerequisite: Mathematics 308.

612. Partial Differential Equations. (4-0). Credit 4. II
General solution of first order partial differential equations, solution of second order equations from physics and mechanics by separation of variables, solution of second order equations by Green's functions. Prerequisite: Mathematics 611 or the equivalent.

615. Advanced Algebra. (4-0). Credit 4. I
Polynomials and their most fundamental properties, determinants, linear dependence, linear equations, theorems concerning the rank of a matrix, linear transformations and combinations of matrices, invariants, bilinear forms, quadratic forms, pairs of quadratic forms. Prerequisite: Mathematics 308 or 409.

616. Advanced Algebra. (4-0). Credit 4. II
Properties of polynomials, factors and common factors of polynomials in one variable and of binary forms, factors of polynomials in two or more variables, integral rational invariants, symmetric polynomials, elementary divisors, the equivalence and classification of pairs of bilinear forms and collineations, equivalence and classification of pairs of quadratic forms. Prerequisite: Mathematics 615.

617. Complex Variables. (4-0). Credit 4. I
Fundamental theory of analytic functions, conformal mapping, applications. Prerequisite: Mathematics 601.

618. Complex Variables. (4-0). Credit 4. II
The Schwarz-Christoffel theorem, infinite products, meromorphic functions, elliptic functions, special functions, applications. Prerequisite: Mathematics 617.

620. Fourier Series and Allied Topics. (4-0). Credit 4. I
Convergence of Fourier series, the cosine series, the sine series, uniform convergence of Fourier series, differentiation and integration of Fourier series, Fourier integrals, Bessel functions. Prerequisite: Mathematics 608.

622. Laplace Transforms. (4-0). Credit 4. II, S
Fundamental theorems concerning Laplace transforms. Applications to ordinary and partial differential equations, difference equations, and integral equations. Prerequisite: Mathematics 601.

623. Higher Mathematics for Chemical Engineers. (4-0). Credit 4. II
Derivation and solution of the differential equations of chemistry and chemical engineering, mathematical theory of distillation, series solutions of differential equations, Bessel functions. Prerequisite: Mathematics 308.

624. Higher Mathematics for Chemical Engineers. (4-0). Credit 4. I
Equations of finite differences, applications of partial differentiation, solution of partial differential equations, Fourier integrals, orthogonal systems, numerical and graphical methods, theory of errors. Prerequisite: Mathematics 623.

625. Matrix Algebra and Tensor Calculus. (4-0). Credit 4. I, II, S
Elementary matrix operations; linear transformations; canonical and modified triangular forms of matrices; inverse of a non-singular matrix; diagonal and rotation matrices; characteristic roots of a matrix; symmetric matrices; tensor concept, covariance and contravariance; algebra of tensors; metric tensors; Christoffel's symbols; covariant differentiation of tensors; applications. Prerequisite: Mathematics 405 or 601.

641, 642. Modern Analysis. (4-0). Credit 4 each semester. I, II
Recent developments in the theory of functions. Prerequisite: Mathematics 608.

685. Problems. Credit 1 to 4 each semester. I, II, S
A course offered to enable students to undertake and complete with credit limited investigations which do not fall within their thesis research and which are not covered by any other courses in the curriculum. Prerequisite: Mathematics 601.

691. Research. Credit 1 or more each semester. I, II, S
Research for thesis or dissertation.

Department of Mechanical Engineering

Professor C. W. Crawford,
Professors A. V. Brewer, L. S. O'Bannon, C. M. Simmang, J. G. H. Thompson, W. I. Truettner, R. M. Wingren, J. R. Woolf; Associate Professors J. H. Caddess, D. W. Fleming, R. H. Gibbs, W. S. Guthrie, E. S. Holdredge; Assistant Professors A. B. Alter, R. W. Downard, R. H. Fletcher, A. M. Gaddis, J. V. Perry, Jr.; Instructors O. W. Albritton, S. E. Brown, R. H. Gibson, E. D. Kranz, Earl Logan, Jr., T. A. Noyes, H. G. Stallings, P. D. Weiner

101. Engineering Problems. (0-3). Credit 1. II
Use of the slide rule, dimensional equations, solution of problems involving various fields of engineering, trigonometry, and principles of motion. Logical thinking, neatness, and form stressed throughout. Prerequisites: Mathematics 101 or 102, and 103 or 116, or registration therein.

105. Carpentry and Mill Work. (1-6). Credit 3. I
This course is designed for freshman architectural students and for business administration freshmen taking building products marketing. The course includes simple building constructions such as framing, roof construction, general carpentry work, exterior and interior finishing, forms, working drawings, and mill work including the use of machines, hand tools, safety, and built-in cabinet construction in the home.

106. Cabinet Making. (1-6). Credit 3. II, S
Design, rod making, construction, and finishing of furniture; glues, varnishes, lacquers, and other finishing materials; production methods; care and maintenance of woodworking machinery.

108. Engineering Problems. (2-3). Credit 3. I, II, S
A practical problems course involving a study of the slide rule, dimensional consistency, significant figures, motion and Newton's Laws, including a

brief treatment of work, energy, and power. Prerequisites: Mathematics 102, 103.

201. Welding and Foundry. (0-3). Credit 1. I, II, S
Simple pattern layouts and construction of patterns; pattern storage; costs and weights of patterns and castings; kiln-drying and moisture content of pattern woods; the patternmaking industry. Cupolas; gas fired furnaces, moulding sands; core-making; foundry layouts; and practice in moulding and casting both ferrous and non-ferrous metals. Welding materials and equipment, demonstration and practice in Heliarc, Atomic-hydrogen, metallic arc, electrical resistance, and oxy-acetylene.

202. Welding and Foundry. (0-3). Credit 1. II
A continuation of Mechanical Engineering 201, including advanced methods of patternmaking, moulding, and weld inspection and testing, fundamentals of joint design and metallography.

212. Engineering Mechanics. (3-0). Credit 3. I, II, S
Forces and couples, force systems, resultants, components, equilibrium, frame structures, center of gravity; and moment of inertia. Prerequisites: Mathematics 210 or registration therein; Mechanical Engineering 108.

220. Engineering Mechanics. (4-0). Credit 4. I
The principles of mechanics as related to both statics and kinetics. A condensation of the material in Mechanical Engineering 212 and 313. Prerequisites: Mathematics 210 or registration therein; Mechanical Engineering 108.

309. Machine Shop. (0-3). Credit 1. I, II, S
Lecture demonstrations and practices in safety, care of machines and hand tools, shop organization, cutting speeds and feeds, standard machine tool work in metals, single point tool grinding, layout, drilling, tapping, shaping, turning, boring, threading, and milling.

310. Machine Shop. (0-3). Credit 1. II, S
A continuation of Mechanical Engineering 309. Machining of metals with both standard and production machine tools. Manufacture of interchangeable parts, jigs, fixtures, and fixed gages. Prerequisite: Mechanical Engineering 309.

313. Engineering Mechanics. (3-0). Credit 3. I, II, S
A continuation of Mechanical Engineering 212, including kinematics, both graphical and algebraic solutions of relative linear velocities and accelerations, kinetics, dynamics of translation and rotation, work, energy, impact, momentum, and balancing. Prerequisite: Mechanical Engineering 212.

323. Thermodynamics. (4-0). Credit 4. I, II, S
The thermodynamics of perfect gases, including non-flow and steady-flow processes; internal combustion engines; gas compressors; combustion; vapors and vapor mixtures, boilers, and vapor cycles. Prerequisites: Mathematics 210; Physics 204.

327. Thermodynamics. (3-0). Credit 3. I, II
The thermodynamics of gases, vapors, and liquids in various non-flow and steady-flow processes; internal combustion engines; gas compressors; power plant equipment. Prerequisites: Mathematics 210; Physics 204.

328. Thermodynamics. (3-0). Credit 3. I, II, S
A continuation of Mechanical Engineering 327, covering gas mixtures, variable specific heats, turbines, modern power plant cycles, refrigeration; air conditioning, heat transfer. Prerequisite: Mechanical Engineering 327.

329. Advanced Cabinet Making. (1-6). Credit 3. II, S
Cabinet and furniture design, estimating, detailing, rod making, construction and finishing. A major project is to be constructed from a set of draw-

ings and details made by the student. A term paper is required on some related subject, such as design, finishing, safety, production methods, etc. Prerequisite: Mechanical Engineering 105 or 106, or equivalent experience.

335. Mechanical Equipment of Buildings. (2-0). Credit 2. I, II
The mechanical equipment of buildings; heating and ventilating; air conditioning; plumbing, water supply, working methods of design arranged especially for architectural students. Prerequisite; Junior classification.

336. Mechanical Equipment of Buildings. (2-0). Credit 2. II
Plumbing, heating, and cooling. Prerequisite: Mechanical Engineering 335.

337. Kinematic Drawing. (0-3). Credit 1. I
Problems and drafting involving linkages, centros, relative linear velocities, cams and gears. Designed especially to supplement the kinematics of motion included in the course of dynamics for industrial engineers. Prerequisite: Mechanical Engineering 313 or registration therein.

338. Kinematics and Machine Design. (2-3). Credit 3. II
A study of instantaneous centers, velocities, and accelerations, followed by the design of cams and an introduction to elementary stress analysis. Must be preceded or accompanied by Civil Engineering 305 and Mechanical Engineering 313.

344. Fluid Mechanics. (3-0). Credit 3. I, II, S
Application of the laws of statics, buoyancy, stability, energy, and momentum to the behavior of ideal and real fluids. A study of dimensional analysis and similitude and their application to flow through ducts and piping, dynamic lift and related problems. Prerequisites: Mechanical Engineering 313, and 323 or 327.

403. Engineering Laboratory. (1-3). Credit 2. I, II, S
Study and testing of instruments used in laboratory work and simple tests of engines and pumps. Calculations and written reports on the investigations and results obtained. Prerequisite: Mechanical Engineering 323 or 327.

404. Engineering Laboratory. (1-3). Credit 2. I, II, S
A continuation of Mechanical Engineering 403 with more advanced work in testing of steam and internal combustion engines, turbines, boilers, fans, and refrigeration machinery. Prerequisite: Mechanical Engineering 403.

407. Mechanical Refrigeration. (3-0). Credit 3. I †
The application of the principles of thermodynamics to mechanical refrigeration. The equipment and methods of practical production of refrigeration, ice making, and cold storage. Prerequisite: Mechanical Engineering 323 or 327.

410. Internal Combustion Engines. (3-0). Credit 3. I, II †
Thermodynamics of cycles for internal combustion engines and gas turbines. Fuels, combustion, and knock testing. Performance characteristics of various types of engines. Prerequisite: Mechanical Engineering 323 or 327.

412. Advanced Problems in Mechanical Engineering.
Credit 2 to 5. I, II †
Special problems in the various phases of mechanical engineering are assigned to individual students or to groups. Readings are assigned, and frequently consultations are held. Prerequisites: By permission and senior classification in mechanical engineering.

414. Steam and Gas Turbines. (2-3) Credit 3. II †
Analysis of gas turbine cycles, high speed gas flow, turbine and compressor kinematics and thermodynamics; study of steam turbines and of special cycles. Prerequisites: Mechanical Engineering 328, 344.

417. Power Engineering. (4-0). Credit 4. I, II, S
The application, operation, and performance of all types of power plant equipment. The selection and arrangement of such equipment from the standpoint of economics. Prerequisites: Mechanical Engineering 328, 344.

432. Automotive Engineering. (3-0). Credit 3. II
The modern automobile, its power plant, fuels, performance, vibration, dynamic balancing, electrical equipment, braking systems, construction, etc., from an engineering standpoint. Prerequisites: Mechanical Engineering 313, and 323 or 327.

436. Heating, Ventilating, and Air Conditioning. (3-0). Credit 3. II †
The thermodynamics of heating, cooling, and conditioning of air of residence, office, and factory. The calculations for and selections of heating, ventilating, and air conditioning equipment, piping, and duct layouts. Prerequisite: Mechanical Engineering 323 for non-mechanical engineering majors, 328 for mechanical engineering majors.

440. Physical Metallurgy. (2-3). Credit 3. I, II, S †
The fundamentals of the physical metallurgy of irons, steels, and their alloys; precipitation hardening and corrosion resistance of non-ferrous alloys; laboratory work in polishing, etching, and preparation of specimens, making and studying photomicrographs. Prerequisite: Junior classification.

445. Machine Design. (2-3). Credit 3. I, II †
The theory and practice of machine design applied to various machine parts, such as columns, screws, shafts (considering combined stresses), bearings, brakes, springs, and complete machines. Prerequisite: Mechanical Engineering 338.

446. Machine Design. (2-3). Credit 3. I, II †
The theory and practice of machine design applied to problems encountered in transmission of power by means of belts, ropes, chains, and gears. Prerequisite: Mechanical Engineering 338.

449. Seminar. (0-2). Credit 1. I
Oral presentation of selected topics from current literature of the field. Technical films showing practical application of theories of engineering and manufacturing processes. Prerequisite: Senior classification.

450. Seminar. (0-2). Credit 1. II
A continuation of Mechanical Engineering 449 but with more extensive reports and with lectures from visitors. Prerequisite: Senior classification.

457. Engineering Analysis. (3-0). Credit 3. I †
Mathematical and experimental methods of solving problems in the various fields of engineering. Dimensional analysis, representation and analysis of experimental data, graphical and numerical solution of differential equations, analogies and computers. Prerequisites: Mathematics 308; senior classification in engineering.

459. Mechanical Vibration. (3-0). Credit 3. I †
The basic theory of vibrating systems with single and multiple degrees of freedom and the principles of transmission and isolation of vibrations. Prerequisites: Mathematics 307; Mechanical Engineering 313.

FOR GRADUATES

601. Advanced Machine Design. (4-0). Credit 4. I
A study of combined stresses and theories of failure, statically indeterminate structures, piping design, flat plates, curved beams, and the theory of lubrication. Prerequisites: Mathematics 307 and 308 or registration therein.

603. Power Plants. (2-6). Credit 4. II
The design of central and isolated power plants with special attention to over-all economic operation. Prerequisite: Mechanical Engineering 417.

605. Engineering Analysis. (4-0). Credit 4. I
A study of analytical, graphical, and approximate methods of solving problems common to engineering; dimensional analysis and model study; design of experiments; statistical analysis and interpretation of test data including derivation of empirical equations. Prerequisite: Mathematics 308 or registration therein.

613. Engineering Dynamics. (4-0). Credit 4. II
The use of the vectorial approach to velocities, accelerations, and dynamics; the virtual work principle, Lagrange's and Euler's equations of motion, and Hamilton's principle applied to engineering problems. Prerequisite: Mathematics 308.

615. Advanced Engineering Thermodynamics. (4-0). Credit 4. I
The theories of thermodynamics and their application to the more involved problems in engineering practice. Prerequisite: Mechanical Engineering 328.

616. Heat Transmission. (4-0). Credit 4. II
The fundamental laws relating to heat flow, the application of these laws to engineering materials used in various industrial processes; a study of recent developments by reference to current literature. Prerequisite: Mathematics 308.

617. Mechanical Vibrations. (4-0). Credit 4. I
The theory of vibrations of machines and structures. Prerequisites: Mathematics 308; Mechanical Engineering 313.

618. Advanced Air Conditioning. (2-6). Credit 4. II
Thermodynamics of air vapor mixtures applied to problems of air conditioning. Practice in design and selection of equipment with emphasis on the preparation of plans and specifications. Prerequisite: Mechanical Engineering 436.

619. Theoretical Methods of Machine Design. (4-0). Credit 4. II
Applications of the theory of elasticity to machine design. Study of compatability equations, stress functions, energy methods, etc. Prerequisites: Mathematics 601 or registration therein; Mechanical Engineering 601.

620. Experimental Methods of Machine Design. (3-3). Credit 4. II
Use of experimental methods in machine design. Study of photoelasticity, electric strain gauges, stresscoat, etc. Prerequisites: Mathematics 308 or registration therein; Mechanical Engineering 601 or registration therein.

621. Turbomachinery. (4-0). Credit 4. II
A study of flow problems encountered in the design of water, gas, and steam turbines; centrifugal and axial-flow pumps and compressors. Prerequisites: Mathematics 308; Mechanical Engineering 344.

640. Ferrous Metallurgical Design. (3-3). Credit 4. II
A detailed study of the phase transformations in steel, the resulting changes in mechanical properties, the peculiarities of the steels, and their influence upon the design of machine elements. Prerequisite: Mechanical Engineering 440.

685. Problems. Credit 1 to 4 each semester. I, II
The content will be adapted to the interest and needs of the group enrolled.

691. Research. Credit 1 or more each semester. I, II, S
Methods and practice in mechanical engineering research for thesis or dissertation.

Department of Military Science and Tactics

D. P. Anderson, Colonel, Artillery, USA, Professor of Military Science and Tactics

UNITED STATES ARMY

Associate Professors: Colonel H. L. Phillips; Lieutenant Colonels W. M. Cuningham, H. V. Ellis, Jr., G. H. Watson; Majors J. F. Birkner, K. J. Edwards, Jr., W. W. Edwards, Jr., T. A. George, G. F. Moore, D. E. Philips, R. P. Scoggins, E. C. Wright; Assistant Professors: Captains A. A. Hord, H. A. Pate, Jr., K. D. Reel, M. G. Stafford, F. A. Walker, B. R. Wright; Lieutenants D. A. Slingerland, D. H. Smith, Jr.; Chief Warrant Officer H. G. McKimm; Instructors: Master Sergeants L. L. Adam, H. N. Chandler, J. Engst, W. H. Gard, L. E. Harris, A. M. Linton, E. Matula, A. E. Miller, C. A. Pantalion, F. E. Silence, R. M. Temple; Sergeants First Class J. R. Brown, W. J. Brown, R. E. Carr, H. H. Dayton, B. E. Eastman, C. E. Gentry, J. E. Helm, P. D. Lovejoy, L. T. Miller, W. B. Shanks, V. S. Warner; Sergeants J. R. Allen, H. Barcelon, H. A. Bodey, C. E. Kimmel, R. R. Kothmann, F. H. Meek, G. B. Stroud

Basic Course of Military Science

121. First Year Basic Military Science. (0-3). Credit 1. I
Theoretical: Organization of the Army and ROTC, individual weapons and marksmanship, American military history.
Practical: Leadership, drill, exercise of command; individual weapons and marksmanship.

122. First Year Basic Military Science. (0-3). Credit 1. II
A continuation of Military Science 121.

221. Second Year Basic Military Science. (0-3). Credit 1. I
Theoretical: Map and aerial photograph reading, crew-served weapons and gunnery, and basic tactics and elementary communications.
Practical: School of the soldier and exercise of command.

222. Second Year Basic Military Science. (0-3). Credit 1. II
A continuation of Military Science 221.

INFANTRY

301. First Year Advanced Military Science. (2-3). Credit 3. I
Theoretical: Leadership, military teaching methods, advanced maps and aerial photographs, crew-served weapons and gunnery, mine warfare, field fortifications, patrolling, tactics of rifle squad, tactics of rifle and heavy weapons, platoons and companies, and tactics—infantry battalion in attack and defense.
Practical: School of the soldier and exercise of command.

302. First Year Advanced Military Science. (2-3). Credit 3. II
A continuation of Military Science 301.

401. Second Year Advanced Military Science. (2-3). Credit 3. I
Theoretical: Operations, logistics, military administration and military justice, service orientation, the military team.
Practical: Leadership, drill, and exercise of command.

402. Second Year Advanced Military Science. (2-3). Credit 3. II
A continuation of Military Science 401.

FIELD ARTILLERY

303. First Year Advanced Military Science. (2-3). Credit 3. I
Theoretical: Leadership, military teaching methods, field artillery organization and capabilities, instruments, field artillery materiel, communication,

gun section drill, artillery survey, firing battery, observed fires, fire direction, antiaircraft artillery orientation, introduction to artillery tactics, operation of field artillery battery.

Practical: School of the soldier and exercise of command.

304. First Year Advanced Military Science. (2-3). Credit 3. II
A continuation of Military Science 303..

403. Second Year Advanced Military Science. (2-3). Credit 3. I
Theoretical: Military administration and military justice, service orientation, command and staff, military intelligence, employment of artillery in combined arms team, supply and evacuation, troop movements, motor transportation, gunnery, new developments.

Practical: Leadership, drill, and exercise of command.

404. Second Year Advanced Military Science. (2-3). Credit 3. II
A continuation of Military Science 403.

SIGNAL CORPS

305. First Year Advanced Military Science. (2-3). Credit 3. I
Theoretical: Leadership, military teaching methods, communication security, field wire communication techniques, field radio communication techniques, message center and communication center procedures, applied signal communication (division), signal orders.

Practical: School of the soldier and exercise of command.

306. First Year Advanced Military Science. (2-3). Credit 3. II
A continuation of Military Science 305.

405. Second Year Advanced Military Science. (2-3). Credit 3. I
Theoretical: Military administration and military justice, wire communication—materiel, radio communication—materiel, signal corps logistics, higher echelon signal communication systems and equipment, career guidance plan for signal corps officers, signal corps photographic activities and laboratory techniques, military intelligence, command and staff.

Practical: Leadership, drill, and exercise of command.

406. Second Year Advanced Military Science. (2-3). Credit 3. II
A continuation of Military Science 405.

ARMOR

307. First Year Advanced Military Science. (2-3). Credit 3. I
Theoretical: Leadership, military teaching methods, history and mission of armor, organization of armor, tactics and troop leading in armor, basic communication in armor, automotive maintenance and driver training, tank gunnery.

Practical: School of the soldier and exercise of command.

308. First Year Advanced Military Science. (2-3). Credit 3. II
A continuation of Military Science 307.

407. Second Year Advanced Military Science. (2-3). Credit 3. I
Theoretical: Operations, logistics, military administration and military justice, service orientation, organization and employment of armor units, automotive maintenance and driver training review, tank gunnery review, communications review.

Practical: Leadership, drill, and exercise of command.

408. Second Year Advanced Military Science. (2-3). Credit 3. II
A continuation of Military Science 407.

CORPS OF ENGINEERS

311. First Year Advanced Military Science. (2-3). Credit 3. I
Theoretical: Leadership, military teaching methods, basic engineer organization, use of explosives, construction materials, military structures, engineer computations and layouts, fortifications and camouflage construction.
Practical: School of the soldier and exercise of command.

312. First Year Advanced Military Science. (2-3). Credit 3. II
A continuation of Military Science 311.

411. Second Year Advanced Military Science. (2-3). Credit 3. I
Theoretical: Military administration and military justice, engineer logistics, construction management, engineer operations.
Practical: Leadership, drill, and exercise of command.

412. Second Year Advanced Military Science. (2-3). Credit 3. II
A continuation of Military Science 411.

ANTIAIRCRAFT ARTILLERY

313. First Year Advanced Military Science. (2-3). Credit 3. I
Theoretical: Leadership, military teaching methods, advanced map reading, AAA fundamentals and materiel, introduction to field artillery.
Practical: School of the soldier and exercise of command.

314. First Year Advanced Military Science. (2-3). Credit 3. II
A continuation of Military Science 313.

413. Second Year Advanced Military Science. (2-3). Credit 3. I
Theoretical: Operations, logistics, military administration and military justice, service orientation, organization and employment of AA in air defense.
Practical: Leadership, drill, and exercise of command.

414. Second Year Advanced Military Science. (2-3). Credit 3. II
A continuation of Military Science 413.

CHEMICAL CORPS

315. First Year Advanced Military Science. (2-3). Credit 3. I
Theoretical: Leadership; military teaching methods; origin, development, and mission of chemical corps; organization and function of chemical corps and of chemical corps units; characteristics of and defense against CBR agents; detection of CBR agents and individual protective equipment; chemical corps materiel; decontamination; collective protection; field behavior of CBR agents; employment of CBR agents; chemical combat intelligence.
Practical: School of the soldier and exercise of command.

316. First Year Advanced Military Science. (2-3). Credit 3. II
A continuation of Military Science 315.

415. Second Year Advanced Military Science. (2-3). Credit 3. I
Theoretical: Operations; logistics; military administration and military justice; service orientation; chemical corps supply and field service; duties of staff chemical officers; responsibilities and duties of chemical corps officers; employment of chemical corps units; operations and training.
Practical: Leadership, drill, and exercise of command.

416. Second Year Advanced Military Science. (2-3). Credit 3. II
A continuation of Military Science 415.

QUARTERMASTER CORPS

317. First Year Advanced Military Science (2-3). Credit 3. I
Theoretical: Leadership, military teaching methods, organization and mission of the quartermaster corps, principles of supply, procurement func-

tions, aerial supply and delivery, quartermaster operations in theater of operations.

Practical: School of the soldier and exercise of command.

318. First Year Advanced Military Science. (2-3). Credit 3. II
A continuation of Military Science 317.

417. Second Year Advanced Military Science. (2-3). Credit 3. I
Theoretical: Military administration and military justice; service orientation; logistical organization, CONUS; quartermaster activities at installations; training management; command and staff; petroleum supply functions; officer indoctrination; research and development; quartermaster unit mess and motor activities.

Practical: Leadership, drill, and exercise of command.

418. Second Year Advanced Military Science. (2-3). Credit 3. II
A continuation of Military Science 417.

ORDNANCE CORPS

319. First Year Advanced Military Science. (2-3). Credit 3. I
Theoretical: Leadership, military teaching methods, organization and role of ordnance corps, automotive materiel, small-arms materiel, ammunition materiel, ammunition supply, artillery materiel, fire control materiel, guided missiles and special weapons, ordnance service in the field.

Practical: School of the soldier and exercise of command.

320. First Year Advanced Military Science. (2-3). Credit 3. II
A continuation of Military Science 319.

419. Second Year Advanced Military Science. (2-3). Credit 3. I
Theoretical: Operations, logistics, military administration and military justice, service orientation, ordnance maintenance and supply service.

Practical: Leadership, drill, and exercise of command.

420. Second Year Advanced Military Science. (2-3). Credit 3. II
A continuation of Military Science 419.

TRANSPORTATION CORPS

353. First Year Advanced Military Science. (2-3). Credit 3. I
Theoretical: Leadership; military teaching methods; transportation, general; highway organizations and operations; terminal organizations and operations; amphibious operations; transportation railway service; army aviation organizations and operations.

Practical: School of the soldier and exercise of command.

354. First Year Advanced Military Science. (2-3). Credit 3. II
A continuation of Military Science 353.

453. Second Year Advanced Military Science. (2-3). Credit 3. I
Theoretical: Operations, logistics, military administration and military justice, service orientation, transportation intelligence, transportation services —CONUS, highway traffic planning, leadership, the transportation corps officer.

Practical: Leadership, drill, and exercise of command.

454. Second Year Advanced Military Science. (2-3). Credit 3. II
A continuation of Military Science 453.

Department of Modern Languages

Professor J. J. Woolket,
Professor J. M. Skrivanek; Associate Professors E. C. Brietenkamp;
J. A. Dabbs; Assistant Professor T. E. Comfort

Foreign languages, in addition to their unquestioned cultural value, have a utilitarian value of great importance for those expecting to engage in research or purely practical pursuits. It is, therefore, advisable, when possible, for students to take up such a language during their undergraduate studies and thereby have the use of it when they begin advanced work in agriculture, engineering, or in pure science. Otherwise, as often happens, their specialization may be hampered or delayed.

101. Beginning French. (3-0). Credit 3. I
Study of standard elementary grammar with emphasis on modern usage; elementary readings begun at mid-semester; early attention given to background for conversation; tape recorder and phonograph recordings available for collateral training.

102. Beginning French. (3-0). Credit 3. II
Continuation of Modern Language 101 with completion of study of elements of grammar; extensive reading of elementary texts with written and oral exercises designed to develop conversational ability. Oral-aural equipment available for laboratory practice.

103. Beginning German. (3-0). Credit 3. I, II
Study of standard elementary grammar with emphasis on modern usage; elementary readings begun at mid-semester; early attention given to background for conversation; tape recorder and phonograph recordings available for collateral training.

104. Beginning German. (3-0). Credit 3. II, S
Continuation of Modern Language 103 with completion of study of elements of grammar; extensive reading of elementary texts with written and oral exercises designed to develop conversational ability. Oral-aural equipment available for laboratory practice.

105. Beginning Spanish. (3-0). Credit 3. I, II
For students who have had no previous training in Spanish. Study of standard elementary grammar with oral, written, and reading exercises; early attention given to background for conversation. Tape recorder and phonograph recordings available for collateral training. On completion of course the student should have a 500-word active vocabulary; he should be capable of easy conversation and be able to read simple texts.

106. Beginning Spanish. (3-0). Credit 3. I, II, S
Continuation of Modern Language 105. Extensive reading of easy texts with written and oral exercises and grammar review. Oral exercises designed to develop conversational ability. On completion of the course the student should have an active vocabulary of 900 words and passive vocabulary of about 1300.

109. Beginning Russian. (3-0). Credit 3. I
Study of standard elementary grammar with oral, written, and reading exercises; early attention given to background for conversation. Tape recorder and recordings of native speakers available for collateral training.

110. Beginning Russian. (3-0). Credit 3. II
Continuation of Modern Language 109 with completion of study of elements of grammar; oral exercises designed to develop conversational ability; continued use of oral-aural laboratory equipment.

127. Beginning Czech. (3-0). Credit 3. I
Study of standard elementary grammar with oral, written, and reading exercises; tape recorder to check each student's pronunciation and conversational progress.

128. Beginning Czech. (3-0). Credit 3. II
Continuation of Modern Language 127 with oral exercises designed to develop conversational ability.

201. Intermediate French. (3-0). Credit 3. I
Introduction to French readings of average difficulty, principally through short stories and selections from longer works. Review of grammar; composition; practice in conversation. Prerequisite: Modern Language 102 or equivalent.

202. Intermediate French. (3-0). Credit 3. II
Continuation of Modern Language 201 with increased conversational material. Some scientific selections included in class readings; collateral readings and reports. (Scientific or technical students may be assigned outside reading in their respective fields if they so request.)

203. Intermediate German. (3-0). Credit 3. I
Introduction to German readings of average difficulty, principally through short stories and selections from longer works. Review of grammar; composition; practice in conversation. Prerequisite: Modern Language 104 or equivalent.

204. Intermediate German. (3-0). Credit 3. II
Continuation of Modern Language 203 with increased conversational material. Some scientific selections included in class readings; collateral readings and reports. (Scientific or technical students may be assigned outside reading in their respective fields if they so request.)

205. Intermediate Spanish. (3-0). Credit 3. I, II
Rapid review of Spanish language structure, followed by intensive practice on the 1,500-word level, with emphasis on development of aural comprehension and speaking ability. Supplemental written and oral exercises designed to develop self-expression and recognition ability. Prerequisite: Modern Language 106 or two years of high school Spanish.

206. Intermediate Spanish. (3-0). Credit 3. I, II
Continuation of Modern Language 205. Reading of standard literary works on the 2,000-word level. Extensive written and oral work, translation and original aimed at fixing correct grammatical usage and ease of self-expression. Partly conducted in Spanish. On completion of the course the student should have the basic ability to understand and speak standard Spanish and, with a dictionary, to read any modern text.

209. Intermediate Russian. (3-0). Credit 3. I
Review of grammar; reading of selected articles based on everyday subjects; supplementary material to develop self-expression and recognition ability. Prerequisite: Modern Language 110 or two admission units in Russian.

210. Intermediate Russian. (3-0). Credit 3. II
Continuation of Modern Language 209. Emphasis upon Lermontov's **Taman**, Pushkin's **The Stationmaster, A Shot**, and others.

227. Intermediate Czech. (3-0). Credit 3. I
Review of grammar; reading of literature in the Czech language. Prerequisite: Modern Language 128 or two entrance units in Czech.

228. Intermediate Czech. (3-0). Credit 3. II
Continuation of Modern Language 227 with emphasis upon the works of Alois Jirasek, Svätopluk Cech, Karel Jaromir Erben, and others. Prerequisite: Modern Language 227.

305. Modern Spanish-American Drama. (3-0). Credit 3. I
A study of representative plays by such Spanish-American dramatists as Florencio Sanchez, Martinez Cuitiño, Bustillo Oro, Rodolfo Usigli, and others. (The dramatists studied will vary depending on their contribution to the Spanish-American theater.) An effort is made to obtain an understanding of the economic, social, and cultural background of the Spanish-American republics. The course is conducted largely in Spanish, and short written reports in Spanish are required as part of the daily assignment. In addition, term papers in Spanish are required on assigned collateral reading. Prerequisite: Modern Language 206 or the equivalent. (Offered in 1957-58 and in alternate years thereafter.)

306. Modern Spanish-American Drama. (3-0). Credit 3. II
Continuation of Modern Language 305. However, the authors and plays studied will differ from those offered in Modern Language 305. Prerequisite: Modern Language 206 or the equivalent. (Offered in 1957-58 and in alternate years thereafter.)

325. Public Speaking in Spanish. (1-2). Credit 2. I
Training in the preparation and delivery of talks in Spanish. Students are required to prepare and deliver a three-minute talk in Spanish once a week, and to conduct a question-answer period of three minutes on their talk. These talks are based on subjects dealing with the student's professional field and on those dealing with Spanish-America. The talks are recorded, and individual weekly interviews are scheduled for analysis of the recording with reference to pronunciation, diction, and syntax. Prerequisite: Completion of any 300 course in Spanish, or approval of Head of Department.

326. Public Speaking in Spanish. (1-2). Credit 2. II
Continuation of Modern Language 325 with round-table discussions. Prerequisite: Completion of any 300 course in Spanish, or approval of Head of Department.

335. Spanish-American Novel. (3-0). Credit 3. I
A study of the most important works of some distinguished contemporary Spanish-American novelists. (The list will vary but will be chosen from such writers as Guiraldes, Azuela, Gallegos, Lopez y Fuentes, Guzman, Pietri, etc.) The course is conducted largely in Spanish, and short written reports in Spanish are required as part of the daily assignment. In addition, term papers in Spanish are required on assigned collateral reading. Prerequisite: Modern Language 206 or the equivalent. (Offered in 1956-57 and in alternate years thereafter.)

336. Spanish-American Novel. (3-0). Credit 3. II
Continuation of Modern Language 335. However, the authors and novels studied will differ from those offered in Modern Language 335. Prerequisite: Modern Language 206 or the equivalent. (Offered in 1956-57 and in alternate years thereafter.)

385. Readings in French. Credit 1 or 2. I, II
Individual supervision of readings selected for each student separately. There will be written and oral reports and a semester examination; no class meetings. Prerequisites: Nine hours of French; junior classification; approval of Head of Department.

386. Readings in German. Credit 1 or 2. I, II
Individual supervision of readings selected for each student separately. There will be written and oral reports and a semester examination; no class meetings. Prerequisites: Nine hours of German; junior classification; approval of Head of Department.

388. Readings in Russian. Credit 1 or 2. I, II
Individual supervision of readings selected for each student separately. There will be written and oral reports and a semester examination; no class

meetings. Prerequisites: Six hours of Russian; approval of Head of Department.

401. Introduction to Scientific French. (3-0). Credit 3. S
This course is designed to assist the graduate student to prepare himself to read scientific material with sufficient adequacy to pass the foreign language examination requirement for the Doctor of Philosophy degree. Grammar and syntax will be presented by units. Technical vocabulary and translation ability will be developed by the study of sample reading material in the fields of the various sciences.

402. Readings in Scientific French. (1-2). Credit 2. S
Continuation of Modern Language 401. Study of more involved grammatical difficulties; vocabulary building; theory hour devoted to translation from reader of scientific articles; laboratory hours assigned to prepare individual translations in student's own field with personal conferences. Satisfactory completion of course will satisfy foreign language reading requirement for the Ph.D. degree. Prerequisite: Modern Language 401 or approval of Head of Department.

403. Introduction to Scientific German. (3-0). Credit 3. S
This course is designed to assist the graduate student to prepare himself to read scientific material with sufficient adequacy to pass the foreign language examination requirement for the Doctor of Philosophy degree. Grammar and syntax will be presented by units. Technical vocabulary and translation ability will be developed by the study of sample reading material in the fields of the various sciences.

404. Readings in Scientific German. (1-2). Credit 2. S
Continuation of Modern Language 403. Study of more involved grammatical difficulties; vocabulary building; theory hour devoted to translation from reader of scientific articles; laboratory hours assigned to prepare individual translations in student's own field with class discussion. Satisfactory completion of course will satisfy foreign language reading requirement for the Ph.D. degree. Prerequisite: Modern Language 403 or approval of the Head of the Department.

Department of Oceanography and Meteorology

Professor D. F. Leipper,
Professor J. G. Mackin; Associate Professors R. G. Bader, A. H. Glaser, M. H. Halstead, D. W. Hood, M. G. H. Ligda, R. O. Reid, W. J. Saucier, B. W. Wilson; Assistant Professors J. D. Cochrane, W. P. Elliott, G. A. Franceschini, W. W. Hildreth, G. H. Jung, George Moskovits, J. E. Stein; Instructors K. C. Brundidge, N. W. Cunningham

METEOROLOGY

317. Meteorological Instruments, Observations, and Communications. (2-3) Credit 3. I
Theory, design, and accuracy of standard meteorological instruments; surface weather observations; weather codes and symbols; global and local weather networks; methods and forms of data transmission; data presentation and elementary data analysis. Prerequisites: Mathematics 209; Physics 201 or 203.

318. Meteorological Instruments, Observations, and Communications. (1-3). Credit 2. II
Methods and instruments for aerological observation, including the theory and limitations of pilot balloon, radiosonde, rawin and radar observations; computation, coding, and plotting of data. Forms of data representation; meteorological charts and diagrams; techniques of data analysis. Prerequisite: Meteorology 335.

325. Physical Climatology. (3-0). Credit 3. I
The horizontal, vertical, and seasonal distributions of meteorological elements in their relation to such basic controls as solar and terrestrial radiation, physiography, rotation of the earth, the general circulation, air mass exchange, and various atmospheric processes. Prerequisite: Physics 201 or 203.

326. Regional Climatology. (2-0). Credit 2. II
The broader climatic regimes of the earth and the physical basis for their differences; tropical and polar climatology; local climates; introduction to microclimatology. Prerequisite: Meteorology 325.

335. Atmospheric Statics and Thermodynamics. (3-0). Credit 3. I
Geopotential; chemical composition of the atmosphere; the physical variables; the hydrostatic equation; hypsometry; thermodynamics of dry, moist, and saturated air; mixing and convection; thermodynamic charts and diagrams; thermodynamics applied to atmospheric analysis and weather processes. Prerequisites: Mathematics 209; Physics 201 or 203.

336. Atmospheric Motions. (3-3). Credit 4. II
Kinematics; conservation equations; equations of motion; geostrophic and accelerated motions; streamlines; trajectories; circulation and vorticity theorem; dynamics of wind systems and stratified media; theories of the general circulation. Prerequisites: Mathematics 307; Meteorology 335.

445. Atmospheric Physical Processes. (3-0). Credit 3. II †
The physics of heat, moisture, and momentum transfer in the atmosphere; radiation, evaporation, condensation, advection, convection, turbulence, and diffusion; their consequences upon the weather. Prerequisites: Meteorology 335, 336.

457. Fundamentals of Weather Analysis. (1-12). Credit 5. II
Theory, methods, and practice of synoptic weather analysis in three dimensions. Detailed studies of the structure and motions of air currents, fronts, cyclones, anticyclones, pressure waves, tropical storms, and other features of the circulation. Prerequisites: Meteorology 318, 336.

458. Weather Analysis. (1-12). Credit 5. II, S †
A continuation of Meteorology 457, but with the emphasis on motions of wind and weather patterns and on weather sequence. Introduction to principles and methods of prognosis and weather forecasting. Prerequisites: Meteorology 445, 457.

465. Agricultural Meteorology. (2-0). Credit 2. II †
Study of principles of meteorology as they are related to agriculture, with special emphasis upon the climate of the surface layers of the atmosphere. Prerequisite: Approval of the instructor.

FOR GRADUATES

636. Dynamic Meteorology. (3-0). Credit 3. I
A formal treatment of the principles of fluid dynamics as they apply to the atmosphere; the Navier-Stokes equations; perturbation theory, energy equations and transformations, vorticity, barotropic and baroclinic systems, cyclone theories, and numerical weather prediction. Prerequisites: Mathematics 601; Meteorology 336; or the equivalent. (To be offered in 1956-57 and in alternate years thereafter.)

646. Atmospheric Physics. (3-0). Credit 3. II, S
Description of the atmosphere and its various properties. Emphasis placed on cloud and precipitation physics. Study of recent findings and observational techniques employed in the study of the atmosphere. Extensive reference to original literature of recent investigators. Prerequisites: Meteorology 445; graduate classification in meteorology.

658. Weather Analysis. (2-6). Credit 4. I
Discussion, application, and critical evaluation of methods employed by American and foreign centers for analyzing and forecasting circulation and weather patterns over periods up to 3 days; objective analysis and numerical prediction; recent developments; techniques for analysis of specific weather patterns. Prerequisites: Meteorology 457 or the equivalent; approval of Head of Department.

665. Micrometeorology. (3-0). Credit 3. I
A study of the physical processes occurring at the interface between earth and atmosphere, with special emphases upon evaporation, turbulent diffusion of gases, variations in wind, temperature, and humidity in the lowest few meters of the atmosphere. Prerequisites: Mathematics 308; Meteorology 445 or 465; Physics 301. (Offered in 1957-58 and in alternate years thereafter.)

675. Radar Meteorology. (3-0). Credit 3. I
Study of the theory and practice of radar storm observations. Prerequisites: Meteorology 445, 457.

676. Hydrometeorology. (3-0). Credit 3. I
The role of weather and weather processes in land water problems. Prerequisite: Geography 310, or Meteorology 326, or approval of the instructor.

679. Military Applications of Meteorology. (3-0). Credit 3. S
Applications of meteorological knowledge and data to related activities and problems in the national defense not under security classification. Prerequisite: Meteorology 457.

681. Seminar. (2-0). Credit 2. II
Presented by students and based upon their research work and upon surveys of the literature.

685. Problems. Credit 1 to 4 each semester. I, II, S
A course offered to enable majors in meteorology to undertake and complete with credit in their particular fields of specialization limited investigations which do not fall within their thesis research and which are not covered by any other courses in the established curriculum.

691. Research. Credit 1 or more each semester. I, II, S
For thesis or dissertation. Topic subject to approval of the Head of the Department.

OCEANOGRAPHY

201. Sea and Air Sciences. (1-0). Credit 1. I, II, S
Oceanography and meteorology as scientific career fields. Features of the natural environment which affect man's daily life and activities. A survey course open to all college students.

401. Introduction to Oceanography. (3-0). Credit 3. II †
The various aspects of oceanography with emphasis upon those pertinent in the Gulf of Mexico. The principles upon which the disciplines of the subject are based. The unity of the marine sciences and their importance to man. The relations between oceanography and the fields of biology, chemistry, engineering, geography, geology, mathematics, meteorology, and physics. Opportunities in oceanography. Prerequisite: Senior classification in engineering or in a biological or physical science or the approval of the instructor.

431. Geological Oceanography. (3-0). Credit 3. I †
Topography and characteristic features of the ocean bottom; marine shorelines and processes operating in the coastal zone; nature of marine sediments; marine transportation and deposition of sedimentary materials; erosion of beaches. Prerequisites: General prerequisites for oceanography.

441. Chemical Oceanography. (3-0). Credit 3. I †
The chemical composition and properties of sea water; the definition and calculation of salinity; the pH, excess base, and carbon dioxide system in the sea; nutrients, their cycles and their distribution; oxygen and other dissolved gases; chemistry of sedimentation; composition of organisms and organic constituents of sea water; marine corrosion; extraction of raw materials from the sea. Prerequisites: General prerequisites for oceanography.

FOR GRADUATES

601. Research Methods in Oceanography. (1-0). Credit 1. I, II, S
Selection of a research problem for thesis work; planning the program of investigation. Prerequisites: General prerequisites for oceanography.

603. Sea Laboratory Techniques. (0-6). Credit 2. II
Practice in techniques used regularly aboard ship and in collecting field data. Cruise planning, navigational methods, collection of hydrographic, bathymetric, and meteorological data, sediment sampling, biological sampling, and the collection of water samples for chemical analysis will be stressed. Prerequisites: General prerequisites for oceanography.

610. Physical Oceanography. (3-0). Credit 3. I
Survey of the physics of the sea; physical properties, transmission of light and sound in the sea, sea ice; heat budget of the sea and transformation of energy within the sea and at the boundaries; evaporation from the sea, description of water masses and their origin; the horizontal and vertical circulation of the seas; the applied dynamic and kinematic formulas for circulation in the sea; the concept of dynamic equilibrium of the different concentrations within the sea; introduction to waves and tides of the sea. Prerequisites: General prerequisites for oceanography.

611. Theoretical Physical Oceanography. (3-0). Credit 3. II
Theoretical and quantitative aspects; equations of motion; equation of continuity; boundary conditions; distribution of properties in the presence of diffusion; heat budget; stability; dynamics and computation of ocean currents; wind currents; turbulence; friction; work at sea. Prerequisites: Mathematics 601 or registration therein; Oceanography 610.

612. Theory of Ocean Waves. (3-0). Credit 3. II
Generation and decay of waves in deep water; modification of waves and swell in shallow water; longshore currents and rip currents; wave action on structures. Prerequisites: Mathematics 308; Oceanography 610.

613. Engineering Aspects of Oceanography. (3-0). Credit 3. I
Review of practical information gained from oceanography research, including information on ocean waves, currents, sea level changes, and on physical, chemical, and biological parameters from an engineering point of view; application of this knowledge to such engineering problems as the maintenance of harbors, marine structures and ships, together with a discussion of related strategic operations at sea; marine instrumentation. Prerequisites: Oceanography 610, 612.

614. Dynamics of the Ocean and Atmosphere. (3-0). Credit 3. I
Advanced theory of the ocean dynamics, a comparison of the hydrodynamic and thermodynamic character of the ocean and the atmosphere; the mutual dependence of the dynamics and thermodynamics of the sea on those of the air and vice versa; some special theories from the mean equations of motion, gradient wind, jet stream, mutual adjustment of the mass field and velocity field in the sea; mutually coupled temperature variations of the sea and the air; wind driven currents; the general hydrodynamic problem of the ocean and of the atmosphere, and an investigation of its uniqueness; the maintenance of the general circulation. Prerequisites: Mathematics 602; Oceanography 611. (Offered in 1957-58 and in alternate years thereafter.)

620. Biological Oceanography. (3-0). Credit 3. I
A study of the oceans as a biological environment. Survey of physical, chemical, geological and biological features of the marine environment. Relations of organisms to this environment and effects on distribution and abundance of populations. Prerequisites: General prerequisites for oceanography.

621. Biological Oceanography of the Gulf of Mexico. (1-6). Credit 3. II
Detailed study of selected topics in biological oceanography; the dynamic relations between organisms and their physical and chemical environment including nutrient cycles, organic production, and pollution problems; biological deterioration of material in water; symbiosis and parasitism in the sea. Where appropriate, application will be made to the Gulf of Mexico. Prerequisites: Oceanography 620; undergraduate major in biology.

631. Geological Oceanography of the Gulf of Mexico. (2-3). Credit 3. II
Topography, stratigraphy, paleontology, and environments of the Gulf; littoral region and adjacent plains; forces acting on shorelines and bottoms; depositional surfaces, equilibria, equilibrium structures; tectonics; pleistocene history of region. Field trips. Prerequisites: Oceanography 431; undergraduate major in geology.

641. Chemical Oceanography. (3-0). Credit 3. II
Detailed study of selected topics in chemical oceanography which pertain to the Gulf of Mexico; industrial utilization of sea water and chemical products obtained from marine plants and animals; water freshening; industrial corrosion problems; chemical aspects of photosynthesis and fertility of the sea; chemistry of estuarine waters. Prerequisites: Oceanography 441; undergraduate major in chemistry; approval of the instructor.

642. Laboratory Techniques in Oceanography. (0-6). Credit 2. I
Detailed study will be made of methods of preparation and analysis of samples for biological, chemical, and geological investigations. The methods of analysis will concern oxygen, phosphate, silicate, nitrate, nitrite, salinity, carbon, sediment particle size, mineralogy, organic production, and others. Prerequisites: Oceanography 431, 441, 603, 610, 620, or approval of the instructor.

643. Geochemistry of the Ocean. (3-0). Credit 3. I
Geochemistry of the oceanic hydrosphere, biosphere, and lithosphere; how these are related to the atmosphere; study of the elements within the them. Prerequisites: Oceanography 431, 441, and 641 or graduate classification in geology. (Offered in 1957-58 and in alternate years thereafter.)

644. Geochemistry of the Ocean. (3-0). Credit 3. II
A detailed critical study of the geochemistry of sedimentation, the geochemical evolution of the oceans, the biogeochemistry of calcium carbonate and isotope geochemistry as related to the ocean. Prerequisite: Oceanography 643.

651. Meteorological Oceanography. (1-3). Credit 2. II
The use of the conservative characteristics of the sea in forecasting meteorological and oceanographic phenomena. Calculation of ocean waves and swell, transformation of waves in shallow water, preparation of wave refraction diagrams and statistical summaries, modification of air masses in contact with the ocean, forecasting of fog and squalls, effect of the oceans upon climate of the world, meteorological tides. Prerequisite: Oceanography 610.

652. Ocean Boundary Layer Problems. (3-0). Credit 3. I
Theory of radiative exchange of energy at the sea surface; the theory of turbulent flow over hydrodynamically rough and smooth surfaces with application to the evaluation of the fluid frictional stresses at the boundaries of

the sea, the evaluation of wind stress, evaporation, etc.; the micro-structure of temperature and salinity near the ocean surface; evaluation of turbulent exchange coefficients. Prerequisite: Oceanography 611. (Offered in 1956-57 and in alternate years thereafter.)

681. Seminar. (2-0). Credit 2. II
Presented by students and based upon their research work and upon surveys of the literature.

685. Problems. Credit 1 to 4 each semester. I, II, S
A course offered to enable majors in oceanography to undertake and complete with credit in their particular fields of specialization limited investigations which do not fall within their thesis research and which are not covered by any other courses in the established curriculum. An example of the solution of a special problem in oceanography would be the work done in analyzing a special set of data collected on a cruise at sea. The course may also consist of a special series of problem discussions not given periodically, such as those offered by visiting scientists. Prerequisites: Oceanography 431, 441, 610.

691. Research. Credit 1 or more each semester. I, II, S
For thesis or dissertation. Topic subject to approval of the Head of the Department.

Department of Petroleum Engineering

Professor R. L. Whiting,
Professors R. B. Bossler, J. C. Calhoun, Jr., H. T. Kennedy; Associate Professors J. W. Amyx, J. R. Pedigo; Assistant Professor D. M. Bass, Jr.

204. The Petroleum Industry. (2-0). Credit 2. I
A general introductory study of the petroleum industry including historical development, exploration, development and production methods, transportation and refining of petroleum and the natural gas and natural gasoline industries. Prerequisite: Sophomore classification.

300. Petroleum Engineering Field Problems. (1-6). Credit 3. S
A field study of the problems encountered in oil and gas fields. Course consists primarily of visits to oil and gas fields. The requirements of this course will not permit a student to take any other course at the same time. Prerequisite: Completion of junior petroleum engineering courses.

NOTE: This course may be taken in place of field work as required of all graduates in petroleum engineering. Field work or this course required before registration in any of the senior or fifth year petroleum engineering courses.

305. Petroleum Development. (3-0). Credit 3. I
Petroleum exploration, principles of oil field development, rotary and cable tool drilling methods, drilling fluids, oil field hydrology, well completion practice, and well records. Prerequisites: Geology 201, 207; Mathematics 210; Physics 203; registration in English 207 and Geology 311 except for students taking the five-year petroleum engineering curriculum.

306. Petroleum Production Methods. (3-0). Credit 3. II
Elements of reservoir engineering, factors influencing the flow of oil into the well, operation of flowing, gas lift and pumping wells. Prerequisites: Petroleum Engineering 305, 307.

307. Petroleum Development Laboratory. (0-3). Credit 1. I
Properties of petroleum; operation of rotary drilling rig; well surveying practices; tests on drilling fluids and cements. Prerequisite: Petroleum Engineering 305 or registration therein.

308. Petroleum Production Laboratory. (0-3). Credit 1. II
Efficiency of oil well plunger pump; balancing of pumping wells; determination of surface tension; core analysis; gas-lift methods. Prerequisite: Petroleum Engineering 306 or registration therein.

402. Petroleum Production Economis. (3-0). Credit 3. II †
Factors which influence the value of oil and gas properties; preparations of valuation reports, cost data, operating organization, regulation of petroleum production. Prerequisites: Petroleum Engineering 413, 428.

405. Equipment and Applications. (2-2). Credit 3. I †
A study of the drilling and production equipment used in oil field practice. Prerequisites: Civil Engineering 305; Petroleum Engineering 305, 306, 307, 308.

409. Subsurface Engineering. (1-3). Credit 2. I †
Well logging, contour maps, isopachous maps, and the determination of the size, shape, and volume content of petroleum reservoirs. Prerequisites: Petroleum Engineering 305, 306, 307, 308.

413. Natural Gas Engineering. (2-2). Credit 3. I †
Theory of measurement, treatment and transportation of natural gas. Phase behavior of hydrocarbon mixtures and the production of natural gas liquids. Prerequisites: Chemistry 344; Mechanical Engineering 323; Petroleum Engineering 306.

414. Oil Measurements and Transportation. (3-0). Credit 3. II †
The separation of gas and oil, and methods of treating oil field emulsions. The measurements, sampling and testing of crude oil, tank strapping and preparation of tank tables, oil storage, the prevention of loss by evaporation, fire and lightning protection. The principles of fluid mechanics as applied to pipeline design and construction. Prerequisites: Mechanical Engineering 344; Petroleum Engineering 413.

415. Gas Measurement Laboratory. (0-3). Credit 1. I †
Construction and operation of orifice and positive displacement meters, measurement by pitot tube, orifice well tester and critical flow prover, analysis of natural gas. Determination of specific gravity, hydrogen sulphide content, gasoline content and heating value of natural gas. The operation of regulators and flow controls, determination of compressibility factors of natural gas. Prerequisite: Petroleum Engineering 413 or registration therein.

416. Oil Measurements and Transportation Laboratory. (0-3). Credit 1. II †
Guaging practices, treating of oil-water emulsion, heat and sulphur content of petroleum and its products, determination of viscosity, gravity, water content, carbon residue, and the coefficient of expansion of petroleum. Determination of vapor pressure of natural gasoline. Distillation of crude oil and gasoline. Methods of metering petroleum. Water analysis. Prerequisite: Petroleum Engineering 414 or registration therein.

417. Petroleum Engineering Seminar. (0-2). Credit 1. I †
The study and presentation of papers pertaining to recent developments in the field of petroleum engineering. Prerequisites: Petroleum Engineering 305, 306, 307, 308.

418. Petroleum Engineering Seminar. (0-2). Credit 1. II †
The study and presentation of papers pertaining to recent developments in the field of petroleum engineering. Prerequisites: Petroleum Engineering 305, 306, 307, 308.

419. Drilling Fluids. (0-3). Credit 1. II †
A laboratory course in which field technique and control of mud fluids to facilitate drilling are taught. Prerequisites: Senior classification in petroleum engineering; approval of the Head of the Department.

428. Reservoir Engineering. (3-0). Credit 3. I †

A study of the pressure-volume-temperature-composition relationships in oil and gas mixtures (P-V-T relationships). The flow of fluids through porous media. Material balance methods, including identification of type of reservoir mechanism, volume calculations, future production under primary recovery and gas injection; water influx calculations. Prerequisites: Petroleum Engineering 305, 306, 307, 308, and registration in 413 and 415.

429. Reservoir Mechanics Laboratory. (0-3). Credit 1. I †

A laboratory course to supplement the theory of Petroleum Engineering 428. Advanced core analysis; fundamental tests of PVT properties of petroleum at reservoir conditions. Prerequisites: Petroleum Engineering 305, 306, 307, 308.

438. Secondary Recovery Methods. (3-0). Credit 3. II †

A study and application of the principles and practices relating to the recovery of oil by water flooding and gas injection. Prerequisite: Petroleum Engineering 428.

FOR GRADUATES

601, 602. Drilling and Completing Wells. (3-3). Credit 4 each semester. S

An advanced study of the problems encountered in the drilling and completing of oil and gas wells. Prerequisite: Approval of Head of Department.

603, 604. Advanced Reservoir Engineering. (3-3). Credit 4 each semester. I, II

An advanced course in petroleum production practices, with special reference to the fundamental principles of flow of reservoir fluids. Prerequisite: Approval of Head of Department.

605. Phase Behavior of Petroleum Reservoir Fluids. Credit 2 to 4 each semester. I

A study of the pressure, volume, temperature, composition relationships of petroleum reservoir fluids. Prerequisite: Approval of Head of Department.

607. Recovery Methods. Credit 2 to 4 each semester. II

A study of methods of increasing recovery of petroleum from petroleum reservoirs. Prerequisite: Approval of Head of Department.

608. Well Logging Methods. (2-3). Credit 3. II

An advanced study of well logging methods for determining the nature and fluid content of formations penetrated by the drill. Prerequisite: Approval of Head of Department.

681. Seminar. (1-0). Credit 1 each semester. I, II

A study and presentation of papers on recent developments in reservoir mechanics. Prerequisite: Approval of Head of Department.

685. Problems. Credit 1 to 4 each semester. I, II

A course offered to enable students to undertake and complete limited investigations which do not fall within their thesis research and which are not covered by any other courses in the curriculum. Prerequisite: Graduate classification.

691. Research. Credit 1 or more each semester. I, II

Advanced work on some special problem within the field of petroleum engineering. A thesis course. Prerequisite: Approval of the Head of Department.

Department of Physical Education

Professor C. E. Tishler,
Professors A. D. Adamson, W. M. Dowell, C. W. Landiss; Associate Professors P. M. Andrews, N. A. Ponthieux, H. B. Segrest; Assistant Professors L. A. Harrison, Jr., Emil Mamaliga, L. L. Palmer; Instructors J. W. Amann, R. C. Bell, N. D. Matthews, R. K. Wieder

Physical Education 101, 102, 201, and 202 are required in all curricula. Those students who are unable to pass a prescribed swimming test will be required to register for elementary swimming instruction, and students who are unable to pass a physical fitness test will be required to register for general conditioning activities. All others may elect to register for one of the following activities: badminton, bowling, boxing, conditioning, diving, fencing, golf, gymnastics, handball, life saving, swimming, tennis, volleyball, water polo, weight training, or wrestling. The purpose of these courses is to teach the student through instruction and practice the fundamental knowledge and skills of at least two activities in which he will be able to participate in adult life. No student will be permitted to repeat an activity unless he has failed it.

Students may elect Physical Education 301, 302 for credit of one hour each after having completed the required courses.

101. Required Physical Education. (0-2). No credit. I, II

102. Required Physical Education. (0-2). No credit. I, II

151. Sports in American Culture. (3-0). Credit 3. I
A study of the history and evolution of sports; the role and cultural implications of sports in American democracy; the Olympic games; sports and their function in American schools and colleges.

152. Fundamental Football. (1-3). Credit 2. II
Fundamentals of the various positions as they are applied in the different systems stressing individual techniques.

201. Required Physical Education. (0-2). No credit. I, II

202. Required Physical Education. (0-2). No credit. I, II

210. Life Saving and Pool Management. (1-3). Credit 2. II
Designed to qualify students for Red Cross Senior Life Saving and Instructor's certificates; includes a study of sanitary codes and pool sanitation, problems of pool and waterfront management; selection of personnel. Prerequisite: Advanced swimming. (Offered in 1956-57 and in alternate years thereafter.)

211. Physical Education Activities. (1-3). Credit 2. I
A basic course designed to provide instruction and development of skill in physical education activities.

213. Introduction to Health and Physical Education. (3-0). Credit 3. I, II
The approach, fundamental principles and application of principles; definition, traditions, developments, psychology, aims, objectives, and results of physical education; building a program of health and physical education. Prerequisites: Sophomore classification; approval of instructor.

216. First Aid. (0-3). Credit 1. I, II, S
Prepares students for Red Cross Standard, Advanced, and Instructor's First Aid certificates.

218. Athletic Injuries. (1-3). Credit 2. II
A study of the conditioning and training of the individual and team; care and prevention of injuries. Prerequisites: Biology 219; Physical Education 216.

221. Safety Education. (2-0). Credit 2. I
A study of the general program of safety education; accidents, preventive measures, traffic safety, safety at home, school, and work; visual aids, safety projects, special programs; utilization of agencies outside of school.

226. Introduction to Recreation. (2-0). Credit 2. II
A study of the nature, extent, significance, and history of recreation; leadership personnel, its function, training, and selection; planning recreation areas and facilities; program planning and activity organization.

251. Coaching of Basketball. (1-3). Credit 2. I
Theory and practice of coaching fundamentals in basketball.

252. Offensive Football. (1-3). Credit 2. II
This course is designed to acquaint the student with the more popular types of offense used in modern football. The strengths, weaknesses, alignments, variations, and theories will be explored. Teaching techniques in the use of drills, movies, and coaching will be fully covered.

253. Coaching of Baseball. (1-3). Credit 2. II
Teaching of individual techniques; position play; training; team offensive and defensive strategy. Prerequisites: Junior classification; approval of instructor. (Offered in 1957-58 and in alternate years thereafter.)

255. Coaching of Track. (1-3). Credit 2. I
Theory and practice of coaching fundamentals in track and field events.

301. Physical Education. (0-3). Credit 1. I, II
This course may be elected by students having completed the two required years of physical education. It is designed to give students an opportunity to improve skill in carry-over sports.

302. Physical Education. (0-3). Credit 1. I, II
This course may be elected by students having completed the two required years of physical education. It is designed to give students an opportunity to improve skill in carry-over sports.

315. Elementary School Physical Education. (3-0). Credit 3. II
Organization of physical activities in public schools; methods in teaching games used in public school programs. Prerequisites: Junior classification; approval of instructor.

316. Secondary School Physical Education. (3-0). Credit 3. I
Class organization, control, and management; methods of presenting subject matter; special methods in activities. Prerequisites: Junior classification; approval of instructor.

317. Coaching of Football. (1-3). Credit 2. II
Teaching of fundamentals; individual techniques; training; offensive and defensive strategy; officiating.

321. Coaching of Tennis. (1-3). Credit 2. I
Analysis, theory and practice of tennis strokes; strategy; methods of coaching; organizing and conducting tournaments. Prerequisites: Junior classification; approval of the instructor. (Offered in 1957-58 and in alternate years thereafter.)

325. Outdoor Activities. (2-0). Credit 2. II
A course designed to acquaint the student with the function of the camp and outdoor activities as educational agencies through the medium of practical projects and activity, organization, problems, and modern programs in the various areas.

351. Sports Strategy. (2-0). Credit 2. I
A course to consider problems of strategy in football, baseball, and basketball; presenting some specific situations and methods for reaching

strategic conclusions in all three sports. Prerequisites: Junior classification; approval of instructor.

354. Defensive Football. (1-3). Credit 2. II
Course will consider basic principles of defensive football. It will cover basic defenses against more popular offensive formations with particular attention to the weakness or strength of each. Defensive adjustments, kicking, pass and stunting defenses will be discussed. Prerequisites: Junior classification and approval of instructor.

415. Secondary School Health Education. (3-0). Credit 3. I, S †
A study of health problems; needs of the individual; cooperation of home and community; resources for health in community, state, and nation; techniques of evaluation. Prerequisites: Biology 225; approval of instructor.

421. Elementary School Health Education. (3-0). Credit 3. II †
A study of modern trends and methods in the elementary school health program; survey of materials and agencies and their value to an adequate health program. Prerequisites: Biology 225; approval of instructor.

423. Administration of Health and Physical Education. (3-0). Credit 3. II, S †
Administrative problems involved in the coordination of the health, physical education, intramural, and athletic areas in a comprehensive program of physical education. Prerequisites: Biology 225; Physical Education 213, 415.

425. Tests and Measurements. (3-0). Credit 3. I, S †
Use, interpretation, evaluation, and administration of existing tests in health and physical education; application of elementary statistical procedures. Prerequisites: Physical Education 415; senior classification.

427. Remedial Exercises. (3-0). Credit 3. I
Elementary techniques in diagnosing functional and structural defects; procedures of individual exercise with emphasis on preventive and remedial measures. Prerequisites: Biology 219, 220; approval of instructor.

450. Directed Teaching. (2-12). Credit 6. I, II
Construction of lesson plans, observation and supervised practice teaching in public schools. Prerequisites: Physical Education 316; senior classification.

452. Organization of Sports. (2-0). Credit 2. II
Course designed to give student knowledge of details involved in the sports program which are not a part of the techniques learned in participation; pre-season conditioning; daily practice schedule; itineraries; selection and duties of team managers; public relations. Prerequisites: Junior classification and approval of instructor.

453. Athletic Finance. (2-0). Credit 2. I
This course is designed to acquaint the beginning coach with those phases of athletic finance unique to his position. Common finance problems as well as special problems of different types and size school systems will be studied. Prerequisite: Junior classification, or approval of instructor.

481. Seminar. (1-0). Credit 1. II
General discussion of professional ethics and current problems relating to health, physical education, and athletics. Prerequisite: Senior classification.

FOR GRADUATES

601. Survey of Research. (3-0). Credit 3. S
A study of published reports and research in the field of health and physical education. Prerequisite: Education 426 or Physical Education 425.

603. Coaching and Officiating. (3-0). Credit 3. S
Advanced coaching and officiating techniques in football, basketball, track, and baseball. Prerequisites: Teaching and coaching experience.

610. Administration of Interschool Athletics. (2-0). Credit 2. S
This course is designed for school superintendents, principals, and athletic directors. A study of the University Interscholastic League rules and regulations and the various problems confronting the school administrator in administration of the interschool athletic program. Prerequisites: Eighteen hours of education and physical education; graduate classification.

614. Philosophy and Principles. (3-0). Credit 3. S
Divergent origins, leaders, conditions, and forces affecting the development of health and physical education. Critical analysis of objectives. Principles of education, psychology, and physiology, and their implications in health and physical education. Prerequisite: General prerequisite for minor. (Offered in 1957-58 and in alternate years thereafter.)

622. Supervision of Health and Physical Education. (3-0). Credit 3. S
Methods and policies of the school supervisor; conferences, planning and presenting the program, evaluating results, improving teachers-in-service. Prerequisite: Physical Education 423. (Offered in 1956-57 and in alternate years thereafter.)

631. Community and Public Health. (3-0). Credit 3. S
A study of community health problems and of public health measures to solve them. Typical organizations and specific functions of state and local health departments; relationship of local health department to state and federal health agencies and programs. Prerequisite: Physical Education 415 or 421. (Offered in 1957-58 and in alternate years thereafter.)

636. Advanced Tests and Measurements. (3-0). Credit 3. S
Critical study of tests and measurements available; methods of constructing and evaluating new tests and measurements. Prerequisite: Physical Education 425. (Offered in 1956-57 and in alternate years thereafter.)

681. Seminar. (1-0). Credit 1. I, II, S
General discussions of laws, legislative certification, professional ethics, and other current problems relating to health, physical education, and recreation. Prerequisites: Eighteen hours of education and physical education; graduate classification.

685. Problems. Credit 1 to 3 each semester. I, II, S
Directed study of selected problems of health, physical, education, and recreation not related to a thesis. Prerequisites: Graduate classification; approval of the instructor.

Department of Physics

Professor J. G. Potter,
Professors E. G. Smith, E. E. Vezey*, D. F. Weekes; Associate Professors P. W. Barker, C. H. Bernard, J. B. Coon, Melvin Eisner, M. E. Ennis; Assistant Professors B. B. Boriskie, J. S. Ham, R. W. Mitchell, R. K. Russell, F. C. Whitmore; Instructors J. P. Decker, Joseph Keren, C. M. Loyd, R. S. Musa, J. W. Overall, N. R. Rao

Students who present for transfer courses in college physics of less credit value than the required courses in this college may validate their transfer work and receive credit in physics by examination if they wish to do so.

*On leave of absence.

It is recommended, however, that students transferring with only eight hours of physics into curricula requiring 10 hours register for Physics 225 and 226. These courses are designed to supplement the students' previous instruction in physics.

201. College Physics. (3-3). Credit 4. I, II, S
An elementary course with material selected especially with reference to the needs of premedical and predental students and students of architecture and education. Fundamentals of classical mechanics, heat, and sound. Prerequisite: Mathematics 103.

202. College Physics. (3-3). Credit 4. I, II, S
A continuation of Physics 201. Fundamentals of classical electricity and light and introduction to contemporary physics. Prerequisite: Physics 201.

203. General Physics. (4-3). Credit 5. I, II, S
A comprehensive course for students of engineering and the physical sciences, providing the background for many of the engineering courses as well as for other physics courses. Cultivation of the capacity to utilize the fundamental concepts in the solution of problems is emphasized. Mechanics, wave motion, and heat. Prerequisites: Mathematics 209 or registration therein; Mechanical Engineering 101 or 108, or Physics 211 or 213.

204. General Physics. (4-3). Credit 5. I, II, S
A continuation of Physics 203. Sound, light, electricity, and atomic phenomena. Prerequisites: Mathematics 209; Physics 203.

207. General Physics. (3-3). Credit 4. I
A course planned especially for students pursuing independent courses in electricity or electrical engineering. The content of this semester is equivalent to the mechanics included in Physics 203. Prerequisites: Mathematics 209 or registration therein; Mechanical Engineering 101 or 108 or Physics 211.

208. General Physics. (3-3). Credit 4. II
A continuation of Physics 207. The content of this semester is equivalent to the heat, sound, light, and atomic physics included in Physics 203, 204. Prerequisites: Mathematics 209; Physics 207.

211. A Brief Survey of Physics. (3-3). Credit 4. II
A course designed to acquaint students with a field of knowledge and contemporary activity of importance in modern thinking. Prerequisite: Mathematics 101 or 110.

213. Physics for Students of Agriculture. (2-2). Credit 3. I, II
A brief course emphasizing fundamentals of special importance to students of agriculture in the fields of mechanics, heat, light, and electricity. Prerequisite: Mathematics 101.

215. Introductory Physics. (2-3). Credit 3. I
A course for pre-veterinary medicine students restricted to those topics in physics of importance to all students of veterinary medicine. The material of the first semester is in the fields of mechanics, heat, and sound. Laboratory exercises emphasize measurements, concepts, and the experimental basis for physics. Prerequisites: Mathematics 101, 103.

216. Introductory Physics. (2-3). Credit 3. II
A continuation of Physics 215. The material of the second semester is in the fields of light, magnetism and electricity, and atomic, molecular, and nuclear phenomena. Prerequisite: Physics 215.

225. Supplementary General Physics. (2-0). Credit 2. I
An intensive course designed to supplement the physics instruction of certain transfer students to bring the level of their preparation in physics to a

par with that of students completing Physics 203. Prerequisites: Mathematics 209, or registration therein, and at least 3 semester hours of credit for a college physics course devoted primarily to mechanics and heat.

226. Supplementary General Physics. (2-0). Credit 2. II
A continuation of Physics 225 to bring the level of physics instruction of certain transfer students to a par with that of students completing Physics 204. Prerequisites: Mathematics 209; Physics 203 or 225 and at least 3 semester hours of credit for a college physics course devoted primarily to sound, electricity, and light.

301. Heat. (3-3). Credit 4. I †
Heat transfer, specific heats, developments of thermodynamic concepts introducing statistical mechanics and kinetic theory, phase and change of state, and radiation. Prerequisites: Mathematics 210; Physics 204 or 208.

302. Mechanical Properties of Matter. (2-3). Credit 3. II †
Rotational inertia, simple harmonic motion of translation and rotation, Kater's pendulum, gravitational fields and potential theory, gyroscopic motion, elasticity of beams, torsion, theory of elasticity, elasticity of fluids, surface tension and its application to the optimum shape for pressure vessels, diffusion, units and dimensions. Special attention is given to the setting up of equations representing physical facts, the interpretation of their solutions, and the determination of the limitations imposed by each approximation and assumption. Prerequisites: Mathematics 308 or registration therein; Physics 204 or 208.

310. Applications of Modern Physics. (2-2). Credit 3. II
A comparatively non-technical survey of modern applications of atomic and nuclear phenomena of interest to students of geology, biochemistry, genetics, biology, engineering, and especially premedical and predental students. Electrons, ions, isotopes, spectra, x-rays, atomic structure, radioactivity, atomic particles, nuclear accelerators, induced radioactivity, radioactive tracers, nuclear reactors, and atomic energy. Some demonstration laboratory work will accompany certain phases of the course. Prerequisites: Chemistry 101; Physics 202, 204, or 216.

311. Atomic and Nuclear Physics. (3-0). Credit 3. I †
An introduction to the particles of modern physics, quantum theory, relativity, atomic structure, spectra, the periodic table, photoelectricity, thermionic emission, electrical phenomena in gases, x-rays, natural and induced radioactivity, nuclear structure and phenomena, the various means of transmutation, accelerating equipment, radiation measurements, pair and meson production, cosmic ray phenomena, nuclear forces, nuclear fission, nuclear reactor operation, isotope tracer techniques, and atomic energy. Prerequisites: Mathematics 210; Physics 204 or 208.

312. Atomic and Nuclear Physics. (2-0). Credit 2. II †
An extension of Physics 311 to more specialized phases of molecular, atomic, and nuclear phenomena in so far as they may be treated without special mathematical methods and quantum mechanics. Prerequisite: Physics 311.

314. Survey of Astronomy. (3-0). Credit 3. I
A study of the solar system, meteors, asteroids, comets, stars, clusters, nebulae, Kepler's laws, laws of gravitation and astronomical instruments. Occasional evening meetings will be held for observation. Prerequisites: Mathematics 101, 103.

317. Celestial Mechanics. (4-0). Credit 4. II †
A mathematical formulation of the principles of celestial mechanics, including such fundamental astronomical principles as central forces, potential

and attractions of bodies, the problem of two bodies, the problem of three bodies, the problem of n bodies, the laws of binary star systems, the determination of orbits, and perturbations. Prerequisites: Mathematics 210; Physics 201 or 203.

401. Optics. (3-3). Credit 4. II †
A systematic treatment of physical and geometrical optics featuring applications to optical instruments. Prerequisites: Mathematics 210; Physics 204 or 208.

405. Physical Mechanics. (3-0). Credit 3. I †
A comprehensive formulation of the principles of mechanics employing the calculus and vectorial methods. Orbital motion, Coriolis accelerations, motions of rigid bodies, forced vibrations and resonance phenomena, wave propagation. Prerequisites: Mathematics 405 or registration therein; Physics 302 or the equivalent.

407. Geophysical Theory. (3-0). Credit 3. II †
The physical theory of each of the various geophysical methods used in petroleum exploration is developed from fundamental principles of elementary general physics. Prerequisites: Mathematics 210; Physics 204 or 208.

411. Experimental Modern Physics. (0-6). Credit 2. II †
Selected practical topics of atomic and nuclear physics are pursued to the point where measurements and investigations are conducted in the laboratory. Prerequisite: Physics 311.

413. Electricity and Magnetism. (2-3). Credit 3. I †
DC and AC circuit theory, thermal and chemical electromotive forces, electrical instruments, electron emission. Prerequisites: Mathematics 308; Physics 204.

414. Electricity and Magnetism. (1-3). Credit 2. II †
Non-linear circuits, functions of tubes in electrical circuits, electronic circuits and circuit elements for physical measurements. Prerequisites: Physics 413 or approval of the instructor.

416. Electromagnetic Fields. (3-0). Credit 3. II †
Electric and magnetic field theory with emphasis on vector analysis and culminating in an introduction of electromagnetic radiation; properties of dielectrics and magnetic materials. Prerequisites: Mathematics 405; Physics 204 and 413 or approval of the instructor.

418. Theoretical Physics. (3-0). Credit 3. II †
An introduction to theoretical physics with emphasis on fundamental concepts and general principles. Prerequisites: Mathematics 307; Physics 204 or 208.

FOR GRADUATES

601. Analytical Mechanics. (4-0). Credit 4. I, S
Dynamics of particles and of rigid bodies, gyrodynamics, potential theory, Hamilton's principle, principle of least action, LaGrange's equations, and the Hamilton-Jacobi equation with applications. Prerequisites: Mathematics 405 or 601; Physics 405.

602. Fluid Mechanics and Elasticity. (4-0). Credit 4. II, S
Mechanics of continuous media. Foundations of elasticity with application to theory of beams, plates, and shells. Hydrodynamics of viscous and non-viscous fluids. Supersonic flow and shock wave propagation. Boundary layer theory. Lubrication theory. Prerequisite: Physics 601 or the equivalent.

603. Electromagnetic Theory. (4-0). Credit 4. II, S
Theory of electromagnetism; static and time-varying fields; propagation, reflection, and refraction of electromagnetic waves. Prerequisites: Mathematics 601 or the equivalent; Physics 416 or the equivalent.

605. Thermodynamics. (4-0). Credit 4. II, S
The fundamentals of classical thermodynamics including first and second laws, thermodynamic potentials, conditions for equilibrium, properties of gases; thermodynamics of electromagnetic systems, and a brief treatment of kinetic theory including Maxwell velocity distribution law, viscosity, and diffusion. Prerequisites: Mathematics 308; Physics 301 or the equivalent.

607. Statistical Mechanics. (4-0). Credit 4. I
Fundamentals of statistical methods and their application to physical systems; ensembles, principles of classical statistics by most probable distributions and mean value distributions; Maxwell-Boltzman distributions; thermodynamics and statistics; statistical basis of entropy; Fermi-Dirac and Bose-Einstein statistics; degenerate electron gas applied to electronic phenomena in metals; degenerate Bose-Einstein statistics applied to liquid helium; Debye theory of specific heats; statistical mechanics in atomic and nuclear physics. Prerequisite: Approval of instructor.

611. Advanced Optics. (4-0). Credit 4. I, S
The electromagnetic theory of optical phenomena in discontinuous, isotropic, and anistropic media. Prerequisite: Physics 603. (Offered in 1957-58 and in alternate years thereafter.)

612. Atomic Structure. (3-0). Credit 3. I, S
A study of the atom and atomic spectra from the quantum mechanical viewpoint including the hydrogen atom, perturbation method, complex atoms, transition probabilities, angular momentum operators, multiplet structure of energy levels, fine structure and electron spin. Prerequisites: Mathematics 308 or the equivalent; Physics 311.

614. Molecular Structure. (4-0). Credit 4. II
The quantum mechanical theory of valence; the hydrogen molecule ion, molecular orbitals for diatomic molecules; the hydrogen molecule; coulombic and exchange integrals; Pauli exclusion principle and the covalent bond; hybrid atomic orbitals; general molecular orbital method. Prerequisite: Physics 612. (Offered in 1958-59 and in alternate years thereafter.)

617. Physics of the Solid State. (3-0). Credit 3. II
A study of the electrical, magnetic, thermal, and mechanical properties of crystalline solids. Lattice energy of ionic crystals, lattice vibrations, dielectric phenomena, luminescence and phosphorescence, electron theory of metals, band theory, semi-conductors, low temperature behavior of solids. Prerequisite: Approval of the instructor.

618. Nuclear Theory. (3-0). Credit 3. I
Application of quantum mechanics to nuclear phenomena. Prerequisites: Physics 623, 625, or the equivalent. (Offered in 1956-57 and in alternate years thereafter.)

623. Quantum Mechanics. (4-0). Credit 4. I, S
Foundations of quantum mechanics; theories of Heisenberg and De Broglie with applications especially to nuclear physics. Prerequisites: Mathematics 602 or the equivalent; Physics 601, 612, 625.

624. Quantum Mechanics. (4-0). Credit 4. II
A continuation of Physics 623. A postulational development of the foundations of quantum mechanics; classical foundations, Hamiltonian formalism, canonical transformations, representation and expansion theory, relativistic-quantum mechanics, quantum electrodynamics, quantum field theory, fundamental particles, meson field theories, and high energy phenomena. Prerequisite: Physics 623. (Offered in 1958-59 and in alternate years thereafter.)

625. Nuclear Structure. (3-0). Credit 3. II, S
Properties of fundamental particles; theory of simple nuclear models; scattering, spins, magnetic moments and cross sections; alpha, beta, and gamma decay; detection, measurement, and production of nuclear particles; nuclear spectroscopy; interactions of nuclear radiations with matter; nuclear reactions; high energy nuclear phenomena. Prerequisites. Mathematics 308, 601; Physics 312 or the equivalent.

627. Relativity. (3-0). Credit 3. II
Special relativity and its application to covariant formulation of mechanics and electrodynamics. Theory of general relativity including development of necessary tensor calculus and non-Euclidean geometry. Predictions of general relativity and experimental tests of theory; cosmological problems and unified field theories. Prerequisites: Physics 601, 603. (Offered in 1957-58 and in alternate years thereafter.)

631. Quantum Theory of Solids. (3-0). Credit 3. II
Development of solid state theory from the basic theory of quantum mechanics. Theory of perfect and imperfect crystal lattices. Interaction of electromagnetic radiation with non-conducting crystals. Electrons in perfect crystal lattices. Theory of metallic cohesion. Transport phenomena. Electric and magnetic properties of solids. Semiconductors, superconductors, superfluids. Prerequisite: Physics 617.

633. Experimental Physics. (0-3). Credit 1. I
Experiments in atomic, nuclear and solid state physics, designed to complement theory courses in these fields and to prepare the student for experimental research in physics. Prerequisite: Graduate classification.

685. Problems. Credit 1 to 4 each semester. I, II, S
Individual problems not related to thesis.

691. Research. Credit 1 or more each semester. I, II, S
Research toward thesis or dissertation.

Department of Plant Physiology and Pathology

Professor G. M. Watkins,
Professor W. C. Hall; Associate Professors H. E. Joham, D. W. Rosberg;
Assistant Professor R. B. Stewart

301. Plant Pathology. (2-3). Credit 3. I
An introduction to the fundamental principles of plant pathology, including diagnosis, cause, and control of plant diseases. Prerequisites: Biology 101, 206.

313. Intoduction to Plant Physiology. (2-3). Credit 3. I
A general course dealing with the principal life processes of the higher plants, with particular emphasis on the influence of environmental factors on the processes and development of crop plants. Prerequisites: Biology 101; Chemistry 102.

314. Principles of Plant Physiology. (3-3). Credit 4. II †
A more advanced and detailed study of the physiology of green plants than Plant Physiology and Pathology 313, with emphasis on water relations, mineral nutrition, photosynthesis, and growth. Prerequisites: Chemistry 231; Physics 213; Plant Physiology and Pathology 313.

401. Diseases of Field Crops. (2-3). Credit 3. I †
Designed to give a detailed knowledge of the major diseases of our field crops such as cotton, corn, sorghum, small grains, flax, peanuts and other legumes, and forage grasses. Types of diseases studied will include rusts and smuts of cereals, leaf spots, root rot, seedling blights, wilts, mildews, anthracnose, stem rots, and virus diseases. Prerequisite: Plant Physiology and Pathology 301.

403. Diseases of Fruits and Vegetables. (2-3). Credit 3. II †
Identification and control of the important diseases of fruit and vegetable crops in Texas. Consideration will also be given to diseases of major berry crops and pecans. Various diseases and types of decay affecting products in shipment or storage will be studied. Prerequisite: Plant Physiology and Pathology 301.

405. Diseases of Ornamental Plants. (2-3). Credit 3. II †
A course dealing with the recognition, nature, and control of diseases of grasses, flowering plants, shrubs, and trees used for ornamental purposes in the southwestern states. Attention will be paid also to soil sterilization, common greenhouse and nursery problems, and plant quarantine. Prerequisite: Plant Physiology and Pathology 301.

FOR GRADUATES

605. Plant Metabolism. (2-0). Credit 2. II
Photosynthesis and respiration are discussed in detail, including the history and recent developments in these fields. Prerequisite: Plant Physiology and Pathology 314, or Biochemistry and Nutrition 601 and approval of instructor. (Offered in 1957-58 and in alternate years thereafter.)

607. Physiology of the Fungi. (3-0). Credit 3. I
A general course in the physiological activities of fungi, including growth and development, mineral nutrition, carbon and vitamin nutrition, the chemistry of metabolic products, fungicides, and the physiology of parasitism and resistance. Prerequisite: Plant Physiology and Pathology 314. (Offered in 1957-58 and in alternate years thereafter.)

609. Quantitative Plant Physiology. (2-6). Credit 4. II
Methods employed in the various types of physiological investigations and the interpretation of results obtained by them. Prerequisite: Plant Physiology and Pathology 314. (Offered in 1957-58 and in alternate years thereafter.)

611. Plant Nutrition. (2-0). Credit 2. II
This course deals with the inorganic nutrition of plants. It includes solute absorption, accumulation and translocation; growth of plants in artificial media; physiological roles of various elements in the plant, and biochemical problems associated with salt absorption. Prerequisite: Plant Physiology and Pathology 314 or equivalent. (Offered in 1956-57 and in alternate years thereafter.)

612. Phytohormones and Plant Growth Regulators. (3-0). Credit 3. II
This course includes material on the classification, properties, and action of naturally occurring plant hormones as well as a discussion of the synthetic growth regulators. Material is included on practical applications and uses of phytohormones and growth regulators. Prerequisite: Plant Physiology and Pathology 314 or equivalent. (Offered in 1956-57 and in alternate years thereafter.)

613. Plant Growth and Development. (2-0). Credit 2. I
A course dealing with the growth, differentiation, and development of higher plants. A comprehensive study of vernalization and photoperiodism is included as well as a discussion of the influences of water relations, mineral nutrition, and hormones on the developmental cycle. Consideration is also given to differentiation within the plant as related to such qualities as winter hardiness and drought resistance. Prerequisite: Plant Physiology and Pathology 314 or equivalent. (Offered in 1956-57 and in alternate years thereafter.)

616. Methods in Plant Pathology. (2-6). Credit 4. II
A presentation of the methods by which plant diseases are identified and investigated. Emphasis is placed on preparation for research work in plant

pathology. Prerequisite: Plant Physiology and Pathology 401, 403 or 405 or the equivalent. (Offered in 1957-58 and in alternate years thereafter.)

617. Parasitism in Plant Disease. (3-3). Credit 4. II
A critical presentation of the literature on the invasion of plant tissues by parasitic bacteria, fungi, and nematodes. Mechanisms of host defense are examined. Processes are illustrated in the laboratory through the study of histological preparations and by experimentation. Prerequisites: Plant Physiology and Pathology 401, 403, or 405. (Offered in 1956-57 and in alternate years thereafter.)

618. Bacterial Plant Diseases. (2-3). Credit 3. I
A detailed study of bacterial diseases of fruit and vegetable crops, field crops and ornamental plants, with special emphasis upon the nature of the disease, dissemination of the pathogen and methods of control. Prerequisites: Plant Physiology and Pathology 401, 403 or 405 or the equivalent. (Offered in 1957-58 and in alternate years thereafter.)

619. Seed-Borne Diseases. (2-3). Credit 3. I
An intensive study of seed-borne plant diseases. Morphology of the seed will be treated from the standpoint of parasitic invasion. Germination techniques and problems concerning disease-free and infected seed will be studied along with the morphology of the disease organisms, processes of infection, types of injury, and means of control. Prerequisite: Biology 353 or Plant Physiology and Pathology 301. (Offered in 1957-58 and in alternate years thereafter.)

620. Plant Viruses. (2-0). Credit 2. I
Lecture presentation and discussion of the nature and properties of plant viruses. Methods of virus transmission, host plant reactions to viruses, serological reactions, and methods of purification of viruses for examination under the electron microscope, and the study of economically important plant virus diseases and their control. Prerequisites: Plant Physiology and Pathology 401, 403, or 405 or the equivalent. (Offered in 1956-57 and in alternate years thereafter.)

621. Plant Parasitic Nematodes. (2-3). Credit 3. I
The morphology, identification, and biology of plant parasitic nematodes; the damage they cause; methods of control. Non-plant-pathogenic nematodes commonly found in the soil will be studied also. Prerequisite: Approval of the instructor.

622. Plant Nematology. (1-6). Credit 3. II
Advanced study of the principal groups of plant parasitic nematodes, with emphasis on methods used in research. Prerequisite: Plant Physiology and Pathology 621.

681. Seminar. (1-0). Credit 1 each semester. I, II
Reports and discussions of topics of current interest in plant physiology and plant pathology, including reviews of literature on selected subjects.

685. Problems. Credit 1 to 4 each semester. I, II
Individual problems or research not pertaining to a thesis or dissertation. Prerequisites: Plant Physiology and Pathology 314 or the equivalent (for physiology), 401, 403, or 405, or the equivalent (for pathology).

691. Research. Credit 1 or more each semester. I, II
Original investigations in support of thesis or dissertation.

Biochemistry and Nutrition 601. Biochemistry of Plants. (3-0). Credit 3. I
See Department of Biochemistry and Nutrition for a full description of this course.

Department of Poultry Science

Professor J. H. Quisenberry
Professors J. R. Couch, E. D. Parnell; Associate Professors W. E. Briles, L. C. Grumbles, W. F. Krueger; Assistant Professors R. L. Atkinson, M. M. Miller, C. B. Ryan

201. Poultry Production. (2-2). Credit 3. I, II
The breeds and types of poultry, culling poultry for egg production, incubation, brooding and feeding for growth and egg production, winter and summer management, housing and hygiene, preparing poultry for market, methods of marketing, practical application of these subjects to general farm conditions. The practice consists of the identification of breeds and varieties, judging poultry for egg production, plans for poultry farms and poultry houses, identification of feeds.

303. Turkey Production. (2-0). Credit 2. I, II
Varieties of turkeys; breeding practices with turkeys; management and feeding of turkeys; incubation practices with turkeys; management of poults from hatching to market; special turkey marketing practices; sanitation and disease prevention with turkeys.

308. Hatchery Management. (2-3). Credit 3. II
Commercial hatching in America, early commercial hatcheries, expansion, types of hatchery enterprise, related activities, localization of hatchery business, how and where to start, actual location, hatchery building, inside arrangement, ventilation, heat and temperature control, hatchery equipment, types of incubators; hatchery flock improvement, study of the National Poultry and Turkey Improvement Plans, sanitation, incubation practices, prices and hatchery costs. Trends in size of hatcheries and causes. Practice consists of culling and blood testing hatchery flocks, putting 5,000 eggs in incubator, fumigating and disinfecting incubator, candling hatching eggs, pedigreeing and judging baby chicks.

309. Broiler Production. (2-2). Credit 3. I
A study of types and breeds for broiler production. Cross breeds, including color of plumage, body conformation, rate of growth, rate of feathering, equipment for broiler production, comparison of colony house, multiple unit, and battery production of broilers including feed cost, weight gains, mortality, culls; time required to produce a 3-pound broiler; marketing wholesale and retail; gross returns and net profit. Fundamentals of chick brooding.

401. Management and Selection. (2-2). Credit 3. I, II †
How to select breeding males and females; culling the farm flock; planning a poultry program for a community with emphasis on good management and soundness of health; how to plan and manage county poultry shows. A thorough study of the National Poultry Improvement Plans, with enough practice work in selecting and testing to qualify students for official Plan participation.

403. Judging. (2-2). Credit 3. I
The judging of standard breeds and varieties; special instructions for judges; methods of fitting and showing birds; types of shows and show management; a study of standard disqualifications and their application to various selection standards; grading of live and dressed market poultry, and of market eggs. Practice work consists of judging classes for production, for market quality, and for exhibition. Several small poultry shows will be judged, and visits made to egg and poultry processing plants and farms of poultry breeders.

407. Technology and Marketing of Poultry and Poultry Products. (2-2). Credit 3. I
A study of the U.S.D.A. grades of eggs, and of live and dressed poultry; preparing poultry for market—killing, dressing, chilling, and packaging;

candling, grading, and packing shell eggs; drying and freezing eggs; storage problems and techniques with special emphasis on maintenance of quality during storage; planning poultry and egg plant layouts with special emphasis on meeting U.S.D.A. requirements for sanitation; a study of commercial egg and poultry plants and their operation; newer developments in packaging and merchandising poultry and eggs; effects of feed upon quality and quality retention; a careful study of regulations governing the grading and inspection of poultry of the U. S. Department of Agriculture, with special emphasis on inspection for wholesomeness. Prerequisite: Poultry Science 201.

411. Poultry Feeding. (3-2). Credit 4. I †
The history of poultry nutrition, a short study of the chemical composition of carbohydrates, proteins, fats, vitamins, and mineral mixtures as found in poultry feeds. Composition, functions, sources, and care of vitamins commonly required for efficient poultry feeding. A study of the nutritive value of the different grains, roughages, mill feeds, and protein concentrates used in poultry nutrition. Practice work in feeding of chicks, laying hens, and turkeys. Identification of feeds, the making of complete rations, diagnosis of lack of essentials in poultry rations. Prerequisites: Chemistry 223, 231.

414. Poultry Breeding. (2-2). Credit 3. I †
The basic principles of poultry breeding. The inheritance of characters of economic importance. The records essential for a sound breeding program; the selection of breeders on the basis of records and standard bred characteristics. Practice includes taking records on breeding birds, interpreting the records, and the techniques involved in pedigree breeding. Prerequisite: Genetics 301.

449. Poultry Seminar. (1-0). Credit 1. I
Extensive review of the literature on poultry problems. The student will be required to prepare and present to the class comprehensive reviews of the literature on various phases of poultry science. Each student will be assigned a certain number of technical journals for current reporting to the seminar group. Prerequisite: Senior classification.

450. Poultry Seminar. (1-0). Credit 1. II
Continuation of Poultry Science 449.

FOR GRADUATES

603. Principles and Practices of Incubation. (3-3). Credit 4. II
A study of the developmental stages of the chick during incubation. Correlation of development with genetic and environmental factors. Study of the fundamental principles underlying successful artificial incubation of eggs. Relation of egg characters to hatchability. Effects of pre-incubation treatment on hatchability of chicken and turkey eggs. Control of disease during the incubation process. Relation of maternal diet to embryonic development and hatchability of the chick. Prerequisite: Poultry Science 308 or equivalent.

604. Principles of Brooding and Rearing. (3-3). Credit 4. I
A study of principles involved in the brooding of poultry. Relative cost and efficiency of different brooding methods. Relation of brooding practice to growth and livability of chicks and poults. Relation of diet to growth and mortality during the brooding period. Optimum levels of protein, minerals, and vitamins necessary to avoid malformation and to attain good growth. Prerequisites: Poultry Science 201 and 303, or equivalent.

611. Poultry Processing, Storing, and Distribution. (3-0). Credit 3. II
A study of egg quality and of egg quality maintenance. Effects of storage on egg and meat quality. The latest methods of processing eggs and poultry; feeding of market birds to improve grade; costs of production for various areas, and for various sized flocks and methods of management; planning optimum sized units for economical production. Prerequisites: Agricultural Economics 314 or equivalent; Poultry Science 407 or the equivalent.

612. Laboratory Problems in Poultry Processing, Storing and Distribution. (0-3). Credit 1. II

A survey of improved methods of processing poultry and eggs. Certain selected modern processing plants will be visited and a study made of operating methods. Students may assist with experimental work in progress on poultry and egg processing and storage. Laboratory comparisons of various methods of fattening and their effects on market and storage quality of fowl will be made. Effects of temperature and methods of dressing on market and storage quality will be studied. Prerequisite: Poultry Science 611 or registration therein.

613. Breeding and Genetics of Poultry. (3-3). Credit 4. II

Rapid and intensive survey of the mode of inheritance of the most important morphological and physiological characters in poultry. Analysis of the comparative efficiency of various systems of breeding in the improvement of poultry. Scientific journals and technical literature reviewed. Research methods discussed. Prerequisite: Poultry Science 414 or the equivalent.

681. Seminar. (1-0). Credit 1 each semester. I, II

Intensive review and reporting of literature on poultry feeding, breeding, incubation, marketing, and management problems. Development of familiarity not only with literature but with organizations, agencies, and personnel working with poultry problems. Prerequisite: Graduate classification. May be repeated as many semesters as desired but maximum of two credits allowed towards Master's degree.

685. Problems. Credit 1 to 6 each semester. I, II, S

An intensive study of newer principles and methods in the various specialized fields related to successful poultry production. Prerequisite: Approval of the Head of the Department.

691. Research. Credit 1 or more each semester. I, II, S

Intensive study of research methods and techniques in poultry breeding, nutrition, physiology, or physical aspects of marketing. Students will be required to carry out some experimental project in one of these fields. Reviews of specific literature, collection, analysis, and presentation of experimental data will be stressed. Designed for thesis credit.

Department of Range and Forestry

Professor V. A. Young,
Professors R. A. Darrow, O. E. Sperry; Associate Professors F. W. Gould, R. R. Rhodes; Assistant Professor W. J. Waldrip; Instructor D. L. Huss

102. Introduction to Range and Forestry. (1-0). Credit 1. II

A brief survey of the fields of forestry and range management including the history, resources, policies, organization, industries, employment, education and research pertaining to the respective professions. One field trip into the forest is required.

202. Range Plants. (2-3). Credit 3. I

Native forage plants of the ranges of the United States. Determination, distribution, ecology, and economic value, especially in Texas, are considered. Poisonous plants and range practices to avoid livestock losses are included. Prerequisite: Biology 102 or the equivalent.

203. Dendrology. (1-3). Credit 2. I

The identification, classification, group silvical characteristics, distribution, and values of the important trees of the hardwood group (Angiosperms); as well as the shrubs and other woody plants associated with woodlands and commercial forests. Prerequisite: Biology 102.

204. Dendrology. (1-3). Credit 2. II
The identification, classification, group silvical characteristics, distribution, and values of the important trees of the coniferous group (Gymosperms); as well as the shrubs and other woody plants associated with woodlands and commercial forests. Prerequisite: Biology 102.

301. Plant and Range Ecology. (2-3). Credit 3. II †
An analysis of habitat factors as they influence plant growth. Attention is given plant succession, competition, distribution, and detailed methods of studying and mapping vegetation. Prerequisite: Biology 102.

303. Agrostology. (2-3). Credit 3. I, II †
A fundamental study of grasses, especially those of economic importance in Texas. A study of the characteristics of the various genera and species of grasses, their identification, distribution, propagation, improvement, and management with particular reference to their use and value in Texas ranges and pastures. Prerequisite: Biology 102 or equivalent.

304. Range Management. (2-3). Credit 3. I †
A technical course dealing with problems met in managing native range lands, including a study of grazing regions, and the problems of each; revegetation of range lands; maintenance of production; utilization of range forage; and range livestock management as it affects vegetation. Field trips. Prerequisites: Range and Forestry 301, 303.

307. Elementary Forestry. (2-3). Credit 3. I
A general survey of the field of forestry, with identification of the principal trees of this section, log tree and stand measurement; grazing as applied to forestry, the elementary forest operations and practice. Relation of forestry to allied phases of agriculture and functions of forestry in land-use planning.

308. Farm Forestry. (2-3). Credit 3. II
Management of farm woodlands and woodlots for the production of fuel, posts, and merchantable products; seasoning, preservation, and use of wood products; windbreak and shelterbelt planting forestry in relation to grazing and economics of agriculture. Field trips.

309. Silvics and Silviculture. (2-3). Credit 3. I
A study of the factors of site, their influence on tree growth and reciprocal effect on site; silvicultural cutting systems, cultural operations, and the silvicultural characteristics of the more important commercial species of the South and Southwest. Field trips. Prerequisite: Range and Forestry 307 or 308.

310. Forest Products and Utilization. (2-2). Credit 3. II
Utilization of the products of farm woodlots, woodlands, and commercial forests; the manufacture and utilization of lumber, timber, and other wooden products, including mechanical properties, lumber grades, timber fasteners, and the use of glues. Also the identification of certain woods important in agricultural and commercial enterprises of the South and Southwest. Field trips.

311. Management of Range Resources. (2-3). Credit 3. II
A general course for students majoring in veterinary medicine, emphasizing identification of poisonous species, physiology of plant responses to grazing, control of noxious plants, grazing systems, and range management practices for soil conservation.

401. Range Improvement and Maintenance. (2-3). Credit 3. I, II
A general course for students not majoring in range management. A study of native forage and poisonous plants on the ranges of Texas. Evaluation and analysis of range lands, grazing systems, livestock handling problems, physiology of plant responses to grazing and range management. Especial emphasis on Texas conditions. Field trips.

408. Range Problems. Credit 1 to 3. I, II, S †
Individual study and research upon a selected range problem approved by instructor.

409. Advanced Range Management. (2-3). Credit 3. II †
A technical course dealing with the more advanced problems in managing native range lands. Special attention will be given to the study of the development of the range industry, cost of production, range land utilization, organization of cattle, sheep, and goat industry; and range condition classes. Field trips. Prerequisite: Range and Forestry 304 or 401 with approval of instructor.

411. Field Range Management. Credit 2 or 3. S †
A semi-technical summer field course in which emphasis is placed upon identification of important range plants; determination of vegetation types, subtypes, forage utilization values, range condition classes, mapping; brush eradication and control, and proper distribution of livestock. A summer field course primarily for county agricultural agents and vocational agricultural teachers, others by approval of instructor.

412. Range Management Practices. (2-3). Credit 3. I, II
Emphasis is placed on range condition classes as related to the management of grazing lands. Studies are made of successional trends, range and ranch management plans, techniques of evaluation and economic principles associated with the handling of livestock on the range. Prerequisite: Range and Forestry 401 or equivalent with approval of instructor.

FOR GRADUATES

605. Range Research Methods. Credit 2. I
A study of research methods in range management and related subjects. A review of scientific investigation in the field and analysis of results. Prerequisite: Graduate majors in range and forestry.

606. Range Economics. (2-0). Credit 2. II
Range management practices, land utilization, and ranch operation as they affect economics of livestock industry and the nation. Prerequisite: Graduate majors and minors in range and forestry.

607. Vegetation Influences. (3-0). Credit 3. I
Interrelationships between ecological factors and vegetation, influence of forest and range vegetation on watershed management and soil conservation. Field trips to be arranged. Prerequisite: Range and Forestry 301. (Offered in 1957-58 and in alternate years thereafter.)

609. Plant and Range Ecology. (2-3). Credit 3. II
A detailed study of plant communities, successions, and the effect of various degrees of utilization in vegetation types and edaphic factors. Prerequisite: Range and Forestry 301 or equivalent. (Offered in 1956-57 and in alternate years thereafter.)

610. Range Grasses and Grasslands. (2-3). Credit 3. II
A study of range grasses as applied to utilization and sustained production. The ecological characteristics and geographical features of the native grasslands. Ecological principles as applied to range problems. Individual problems to be assigned. Prerequisites: Range and Forestry 301, 303; approval of Head of Department.

611. Control of Noxious Range Plants. (3-0). Credit 3. I
An advanced study of native and naturalized noxious and poisonous plants on Texas ranges that are detrimental to good management practices. Their distribution, reproduction, dissemination, and methods and practices of control will be stressed in relation to conservation and economic importance. Field trips to be arranged. (Offered in 1956-57 and in alternate years thereafter.)

612. Range Management Practices, Policies, and Administration. (3-0). Credit 3. I
Advanced studies dealing with technical range management problems, social and economic background of legislation, and policies developed in the acquisition and administration of national, state, and private range properties, Field trips to be arranged. Prerequisite: Range and Forestry 409 or equivalent. (Offered in 1957-58 and in alternate years thereafter.)

681. Seminar. (1-0). Credit 1 each semester. I, II
Current scientific work in range management and related subjects in American and foreign fields. Prerequisite: Majors and minors in range and forestry.

685. Problems. Credit 1 to 4 each semester. I, II, S
A course designed for investigations not included in the student's research for thesis or dissertation. Problems may be selected in applied ecology, range management, or forestry. Lectures, conferences, field work, reports. Prerequisite: Graduate majors or minors in range and forestry.

691. Research. Credit 1 or more each semester. I, II, S
Research for thesis or dissertation. Prerequisite: Graduate major in range and forestry.

Religious Education

(See page 67)

Department of Veterinary Anatomy

Professor J. H. Milliff;
Assistant Professors L. W. Gibbs, A. A. Price

301. Anatomy. (0-9). Credit 3. I
The osteology, dentition, and arthrology of the domestic animals and topographical dissection of the dog.

302. Anatomy. (0-9). Credit 3. II
Topographical dissection of the cow and a comparative study of the horse, cat, and pig. Prerequisite: Veterinary Anatomy 301.

303. Histology. (2-6). Credit 4. I
A microscopic study of the basic tissues and of the organs, excluding the organs of reproduction.

304. Embryology. (3-3). Credit 4. II
A microscopic study of the reproductive organs of the domestic animals, and of serial sections of chick and pig embryos. Prerequisites: Veterinary Anatomy 301, 303.

306. Neuroanatomy. (0-6). Credit 2. II †
Gross, developmental, and microscopic anatomy of the nervous system. Prerequisite: Veterinary Anatomy 303.

501. Surgical Anatomy. (0-6). Credit 2. I †
The anatomy of the areas of surgical and clinical importance in the domestic animals. Prerequisite: Veterinary Anatomy 302.

FOR GRADUATES

601. Veterinary Anatomy. (1-3). Credit 2 each semester. I, II
The gross, developmental, and microscopic structure of the anatomical systems of domestic animals. Prerequisites: Veterinary Anatomy 306; approval of Head of Department.

681. Seminar. (1-0). Credit 1. S
The review and discussion of current scientific work in anatomy and related subjects. Prerequisite: Graduate major or minor in veterinary anatomy.

685. Problems. Credit 1 to 4 each semester. I, II, S
Problems in either gross or microscopic anatomy along lines to be chosen by the individual. Prerequisites: Veterinary Anatomy 306; approval of the Head of the Department.

691. Research. Credit 1 or more each semester. I, II, S
Original research on a selected thesis problem in anatomy. Prerequisite: Graduate major in veterinary anatomy.

Department of Veterinary Medicine and Surgery

Professor A. A. Lenert,
Professors W. C. Banks, H. E. Redmond, C. W. Schulz; Assistant Professor F. C. Neal; Instructors J. P. Davis, P. L. Hubert, W. M. Romane, G. S. Trevino; Lecturers W. W. Armistead, Dean of Veterinary Medicine; R. J. Beamer, I. B. Boughton

411. History of Veterinary Medicine. (1-0). Credit 1. I, II
History of the development of veterinary medicine from the earliest known veterinary writings—approximately 2000 B.C. to the present.

416. General Surgery. (1-0). Credit 1. II
Principles of unsoundnesses and horseshoeing. Prerequisite: Veterinary Anatomy 302.

511. Non-Infectious Diseases of Large Animals. (3-0). Credit 3. I
Lectures and demonstrations on physical diagnosis; diseases of the digestive, circulatory. respiratory, urinary organs; nervous system; and the skin of large animals. Prerequisites: Veterinary Pathology 444; Veterinary Physiology and Pharmacology 529 or registration therein.

512. Radiology. (2-0). Credit 2. II
Fundamentals of veterinary radiography, fluoroscopy, x-ray and radioisotope therapy with interpretation of radiographs and fluoroscopic examinations and essential protection from radiation. Prerequisites: Veterinary Microbiology 436; Veterinary Pathology 444.

513. Non-Infectious Diseases of Small Animals. (3-0). Credit 3. I
Non-infectious and nutritional diseases, obstetrics, pediatrics, and geriatrics of small animals, fur-bearing animals, and laboratory animals. Prerequisites: Veterinary Pathology 444; Veterinary Physiology and Pharmacology 529 or registration therein.

514. Infectious Diseases of Small Animals. (2-0). Credit 2. II
A study of the bacterial, rickettsial, viral, and protozoan diseases of small animals. Prerequisite: Veterinary Medicine and Surgery 513.

515. General Surgery. (4-0). Credit 4. I
The principles of dentistry, surgery, and anesthesia of domestic animals. Prerequisites: Veterinary Pathology 444; Veterinary Medicine and Surgery 416.

516. Operative Surgery of Large Animals. (2-2). Credit 3. II
Surgical diseases and special surgery of large animals. Surgical exercises are required. Prerequisite: Veterinary Medicine and Surgery 515.

519. Clinics. (0-4). Credit 1. I
Clinical orientation, restraint, administration of medicine, physical examination, methods of collecting specimens for laboratory purposes. Prerequisites: Veterinary Medicine and Surgery 513 and 515 or registration therein.

520. Clinical Seminar. (0-4). Credit 1. II
Presentation and discussion of clinical cases. Prerequisite: Veterinary Medicine and Surgery 519.

521. Reproductive Diseases. (2-0). Credit 2. I
A consideration of prevention and treatment of diseases incident to or affecting breeding, conception, gestation, parturition, and postparturient convalescence of common domestic animals; prevention and treatment of diseases of the new born. Prerequisite: Veterinary Physiology and Pharmacology 529 or registration therein.

524. Operative Surgery of Small Animals. (1-2). Credit 2. II
Surgical procedures in small animals, including orthopedics. Surgical exercises are required. Prerequisite: Veterinary Medicine and Surgery 515.

526. Obstetrics. (2-0). Credit 2. II
Castration and spaying of farm animals, physiology of parturition, mechanics of obstetrical operations; theory and technique of artificial insemination. Prerequisite: Veterinary Medicine and Surgery 521.

561. Clinical Laboratory Diagnosis. (0-2). Credit 1. I †
Instruction in routine laboratory procedures including hematology, urine analysis, radiography, and radiation therapy. Prerequisites: Veterinary Medicine and Surgery 520; Veterinary Microbiology 436.

562. Clinical Laboratory Diagnosis. (0-2). Credit 1. II
Continuation of Veterinary Medicine and Surgery 561. Prerequisite: Veterinary Medicine and Surgery 561.

563. Ambulatory Clinic. (0-4). Credit 1. I
Under the supervision of an instructor, students are taken on calls to private farms or College herds for training and experience in the diagnosis and treatment of animal diseases under actual farm and ranch conditions. Prerequisite: Veterinary Medicine and Surgery 520.

564. Ambulatory Clinic. (0-4). Credit 1. II
Continuation of Veterinary Medicine and Surgery 563. Prerequisite: Veterinary Mediine and Surgery 563.

565. Large Animal Clinic. (1-7). Credit 3. I
Students are required to assume full responsibility for the diagnosis, care, and treatment of patients assigned under the supervision of instructors. All species of large animals are utilized. Lectures on hospital management and large animal practice and promotion are included. Prerequisite: Veterinary Medicine and Surgery 520.

566. Large Animal Clinic. (0-7). Credit 2. II
Continuation of Veterinary Medicine and Surgery 565. Prerequisite: Veterinary Medicine and Surgery 565.

567. Small Animal Clinic. (1-7). Credit 3. I
Students are required to assume full responsibility for the diagnosis, care, and treatment of patients assigned under the supervision of instructors. Detailed studies of hospital planning, practice management, and promotion and veterinary ethics are included. Prerequisite: Veterinary Medicine and Surgery 520.

568. Small Animal Clinic. (0-7). Credit 2. II
Continuation of Veterinary Medicine and Surgery 567. Prerequisite: Veterinary Medicine and Surgery 567.

569. Veterinary Clinics. (0-6). Credit 2. S
Veterinary clinics. Prerequisite: Veterinary Medicine and Surgery 520.

FOR GRADUATES

603. Veterinary Surgery. Credit 1 to 8 each semester. I, II
Special surgery of large or small animals. Prerequisite: Degree of Doctor of Veterinary Medicine or appropriate specialized training.

685. Problems. Credit 1 to 8 each semester. I, II
Original investigations of problems in the field of surgery, therapeutics, or radiology. Prerequisite: Degree of Doctor of Veterinary Medicine or appropriate specialized training.

691. Research. Credit 1 or more each semester. I, II
Research for thesis.

Department of Veterinary Microbiology

Professor J. P. Delaplane;
Professor F. P. Jaggi; Associate Professor L. C. Grumbles;
Assistant Professors D. E. Davis, P. F. Jungerman

334. Poultry Diseases. (2-2). Credit 3. II
Poultry sanitation and diseases. Prevention and control of environmental, nutritional, parasitic, and contagious diseases. Prerequisites: Biology 206; Veterinary Physiology and Pharmacology 323.

435. Microbiology and Immunology. (3-4). Credit 4. I
The principles of microbiology and immunology. Emphasis is placed on the general morphology, physiology, and immunologic reactions of microorganisms important in veterinary medicine. Special attention is given to the biologics in the diagnosis and treatment of infectious diseases. Prerequisites: Second year classification in veterinary medicine.

436. Pathogenic Microbiology. (3-3). Credit 4. II
A study of the general staining procedures, cultural methods and media preparation for bacteria; and the morphology, cultural characteristics, and pathogenicity of microorganisms which produce diseases in domestic animals and man. Prerequisite: Veterinary Microbiology 435.

491. Animal Hygiene. (2-2). Credit 3. I, II
This course deals with livestock sanitation and the prevention, control, and eradication of diseases of farm and ranch animals. Prerequisites: Biology 206; Veterinary Physiology and Pharmacology 323; senior classification in agriculture.

533. Food Hygiene. (1-2). Credit 2. I
The inspection of foods of animal origin with special emphasis on milk; laws, ordinances, and regulations governing animal food products including sanitary requirements and animal diseases. Prerequisite: Junior classification in veterinary medicine.

536. Infectious Diseases of Large Animals. (5-0). Credit 5. II
A study of the bacterial, rickettsial, viral, and protozoal diseases of farm and ranch animals (bovine, equine, ovine, caprine, and porcine). Public health aspects of the various intertransmissible diseases of animal and man are stressed. Prerequisite: Junior classification in veterinary medicine.

591. Food Hygiene. (2-2). Credit 3. I
A continuation of Veterinary Microbiology 533 with special emphasis on meat. Prerequisite: Senior classification in veterinary medicine.

592. Public Health. (2-2). Credit 3. II
The relation of the veterinarian and veterinary problems to public health. Prerequisite: Veterinary Microbiology 591.

595. Poultry Diseases. (2-2). Credit 3. I
The pathology of diseases of poultry will be considered from clinical, pathological, microbiological, and parasitological standpoints. Prevention, control, and treatment will also be given consideration. Prerequisite: Senior classification in veterinary medicine.

596. Poultry Diagnosis. (0-2). Credit 1. II
Clinical laboratory diagnosis of poultry diseases. Prerequisite: Veterinary Microbiology 595.

FOR GRADUATES

601. Food Hygiene. (3-4). Credit 4. I
The study of causes and evidence of spoilage, and the detection of adulterants in fresh, canned, and cured foods of animal origin. Prerequisite: Veterinary Microbiology 591 or 592.

643. Veterinary Microbiology. (3-4). Credit 4. I, II
A study of the pathogenic microorganisms; their cultural and biological characteristics and pathogenicity.

646. Avian Virus Diseases. Credit 1 to 4. I, II
A study of the viral diseases of poultry including methods of isolation and identification of the causative agents. Practice consists of conducting post mortem examinations and special diagnostic procedures on birds received daily for necropsy. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

647. Veterinary Virology. Credit 1 to 4. I, II
A detailed study of virus infections in animals, including types of infections, mode of transmission, intracellular pathology, epidemiology, isolation and identification of the inciting agents. Practice includes tissue cultivation, animal inoculations, and diagnostic tests. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

648. Veterinary Mycology. Credit 1 to 4. II
A study of actinomycetes, yeasts, and molds that are pathogenic to man and animals; the morphology, cultural characteristics, pathogenicity and identification. Practice consists of exercises in cultural methods, morphological characteristics, biochemical reactions and diagnosis. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

685. Problems. Credit 1 to 4 each semester. I, II
Problems course in microbiology, virology, hygiene, and hematology. Prerequisite: Degree of Doctor of Veterinary Medicine. (May be taken for undergraduate credit with permission of the Head of the Department.)

691. Research. Credit 1 to 8. I, II
An original problem in veterinary microbiology. This research to be reported by a thesis as partial requirement for the Master of Science degree. Prerequisite: Admission to candidacy for Master of Science degree.

Department of Veterinary Parasitology

Professor R. D. Turk;
Assistant Professor S. M. Gaafar

481. Parasites of Domestic Animals. (2-2). Credit 3. I
Internal parasites of domestic animals. Symptoms, diagnosis, treatment, control and eradication of parasitic diseases are emphasized. Practice consists of laboratory and diagnostic methods used in parasitology. Fresh and preserved material obtained from the field, clinics, and necropsies are utilized. Prerequisite: Veterinary Anatomy 302.

482. Parasites of Domestic Animals. (2-2). Credit 3. II
Internal parasites of farm, pet, and fur-bearing animals. Attention is given to symptoms, diagnosis, treatment, control, and eradication of parasitic diseases. Practice consists of laboratory and diagnostic methods used in parasitology; the pathology of parasitism. Fresh and preserved material obtained from the field, clinics, and necropsies are utilized in the laboratory. Prerequisite: Veterinary Parasitology 481.

487. Parasites of Farm Animals and Poultry. (2-2). Credit 3. II, S †
A study of some of the more important internal and external parasites of domestic animals and poultry. The life cycles, pathogenicity and economic and public health aspects will be stressed with suggested methods for control. Open to agricultural students. Prerequisite: Senior classification.

585. Clinical Parasitology. (0-2). Credit 1. I
The protozoan and external parasites of domestic animals. Diagnosis, prevention, treatment, and control of parasitic diseases are emphasized. Practice consists of laboratory and diagnostic methods used in parasitology. Fresh and preserved material from the field, clinic, and necropsies are utilized. Prerequisite: Veterinary Parasitology 481.

586. Clinical Parasitology. (0-2). Credit 1. II
Diagnosis of parasitic diseases including physical examination of patients and such laboratory procedures as are indicated. Prerequisite: Veterinary Medicine and Surgery 519.

FOR GRADUATES

601. Parasitology. Credit 1 to 4 each semester. I
A detailed study of the more important helminth parasites of domestic animals, including their identification, distribution, and life history. Prerequisite: Veterinary Parasitology 586 or the equivalent.

685. Problems. Credit 1 to 4 each semester. I, II, S
Special problems concerned with the parasites of domestic animals or poultry. Prerequisites: Veterinary Parasitology 601 or the equivalent; approval of the instructor.

691. Research Credit 1 or more each semester. I, II, S
Research for thesis.

Department of Veterinary Pathology

Professor H. A. Smith
Professor I. B. Boughton; Associate Professor C. H. Bridges; Assistant Professor F. T. Lynd

443. General Pathology. (4-3). Credit 5. I
The elementary disease processes and their causes, including a study of the gross and minute appearance of the diseased tissue. Such processes as inflammation, necrosis, gangrene, atrophy, hypertrophy, ulceration, the various degenerations, infiltrations, pigmentations, and tumor formations are considered. Practice consists of the microscopic study of these processes and instruction in laboratory technique. Prerequisites: Veterinary Anatomy 302, 304.

444. Special Pathology. (5-3). Credit 6. II
Lectures on special pathology of organs and systems. Infectious and non-infectious diseases are considered. The mechanism of development of lesions and their relationship to clinical symptoms are emphasized. Lectures are illustrated liberally with color slides. Laboratory work consists of studies in gross and microscopic pathology. Prerequisite: Veterinary Pathology 443.

445. Problems in Pathology. Credit 1 to 4 each semester. I, II, S

An elective course for undergraduates who wish to supplement the standard required courses. Problems can be assigned in gross or microscopic pathology or in pathological technique. Prerequisites: Veterinary Pathology 443; approval of the instructor.

447. General Principles of Pathology. (2-2). Credit 3. I, S †

A study of the mechanisms of disease as encountered in the higher mammalian species. The course deals with the causes and pathogenesis of the various types of disease, the reactions of the body against them, and certain abstract principles governing their treatment. Open to non-medical students. Lectures and demonstrations. Prerequisites: Six hours of biological sciences; junior classification.

577. Applied Pathology. (0-2). Credit 1. I

Pathology as directly applied to clinical cases and problems, including necropsies. Prerequisite: Veterinary Pathology 444.

578. Applied Pathology. (0-2). Credit 1. II

Pathology as applied directly to clinical cases and problems, including necropsies. Prerequisite: Veterinary Pathology 444.

FOR GRADUATES

643. Gross Pathology. Credit 1 to 6. I, II, S

The student studies gross pathological changes at the necropsies performed daily. He then follows selected tissues through suitable histopathological techniques and corrects his gross diagnoses in the light of the microscopic findings. Confirmatory bacteriologic methods are utilized where indicated. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

644. Locomotor and Skeletal Diseases. Credit 1 or 2. I, S

The changes taking place in diseased bones, joints, and muscles are studied with respect to their nature and probable causes, and with special reference to lameness of the horse. Frequent use is made of the unsurpassed Mark Francis Collection of Bone and Joint Pathology. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

645. Neoplastic Diseases. Credit 1 to 8. I, II, S

Theoretical, histopathological, and clinical aspects of neoplasms. Diagnosis of neoplastic and related conditions in all species. Prerequisite: Degree of Doctor of Veterinary Medicine or the equivalent.

646. Nutritional Diseases. Credit 2 to 4. II

Gross and microscopic tissue changes to be found in experimentally produced nutritional deficiencies are considered in comparison with clinically encountered deficiencies and with other conditions from which they must be differentiated. Prerequisite: Degree of Doctor of Veterinary Medicine or other suitable preparation.

647. Metabolic Diseases. Credit 1 or 2. S

The pathology of diseases due to major disorders of metabolism, nonnutritional and non-infectious. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

648. Reproductive Diseases. Credit 1 to 4. S

Theoretical and practical pathology of gross and microscopic lesions in the reproductive organs with especial reference to bovine sterility. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

650. Neuropathology of Animals. Credit 1 to 4. I, S

In addition to the study and interpretation of gross and microscopic lesions of the central and peripheral nervous systems, major attention is

given in theory and in practice to the special laboratory techniques necessary to demonstrate such lesions. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

658. Pathological Technique. Credit 1 to 6. I, II, S
The art and science of preparing animal tissues, fluids, and exudates for microscopic or other special examination. Enrollment is limited to the number who can be accommodated in the routine of the departmental laboratory. Prerequisite: A fair knowledge of general chemistry.

659. Sheep Diseases. Credit 1 to 4. I
The pathology, etiology, and symptomatology of the economically important diseases affecting sheep in all of the major sheep-producing countries of the world. Prerequisite: Degree of Doctor of Veterinary Medicine or the equivalent.

691. Research. Credit 1 or more each semester. I, II, S
Research to be reported by the writing of a thesis or dissertation as a partial requirement for the Master of Science or Doctor of Philosophy degree.

Department of Veterinary Physiology and Pharmacology

Professor P. W. Burns;
Associate Professor R. H. Davis Jr.; Assistant Professor E. D. McMurry;
R. O. Berry, Professor of Animal Husbandry, Lecturer on
Physiology of Reproduction

323. Physiology of Farm Animals. (2-2). Credit 3. I, II
A consideration of physiology and anatomy essential to an understanding of diseases of farm animals. For students in agriculture. Prerequisite: Chemistry 231.

326. Physiology. (4-3). Credit 5. II
Introduction to physiology. Dynamics of nerve and muscle. Functions of the circulatory and respiratory systems. Renal function and body fluids. Mechanisms of digestion, absorption, and excretion. Prerequisites: Biochemistry and Nutrition 312; Veterinary Anatomy 301, 303, registration in 302, 304, 306.

427. Physiology. (2-6). Credit 4. I
Metabolism and energy exchange. Minerals and vitamins. Functions of the nervous, endocrine, and reproductive systems. Milk secretion and growth. Prerequisite: Veterinary Physiology and Pharmacology 326.

428. Pharmacology. (3-0). Credit 3. II
Pharmacologic principles; central nervous system depressants and stimulants; local anesthetics; autonomic drugs; skeletal muscle relaxants; antiallergics. Prerequisite: Veterinary Physiology and Pharmacology 427.

529. Pharmacology. (2-3). Credit 3. I
Cardiovascular drugs; agents affecting blood formation and coagulation; blood derivatives and plasma substitutes; diuretics; locally-acting drugs; gastrointestinal agents; drugs used in metabolic disorders, hormones; local and systemic anti-infectives; parasiticides. Practice consists of the study of the action of drugs on experimental animals. Prerequisite: Veterinary Physiology and Pharmacology 428.

530. Toxicology. (2-2). Credit 3. II
Occurrence, symptoms, lesions, treatment, prevention, and management of poisoning by inorganic and organic poisons. Clinical manifestations, lesions and management of animals affected by poisonous plants. Practice consists of actions and treatment of poisons in experimental animals; chemical detection of some of the more common inorganic and organic poisons. Prerequisite: Veterinary Physiology and Pharmacology 529.

573. Pharmacy. (0-2). Credit 1. I
Chemical, pharmaceutic, and biologic assay methods; preparing, compounding, and dispensing medicines. Prerequisite: Veterinary Physiology and Pharmacology 529.

574. Pharmacy. (0-2). Credit 1. II
A continuation of Veterinary Physiology and Pharmacology 573. Prerequisite: Veterinary Physiology and Pharmacology 573.

FOR GRADUATES

601, 602. Animal Physiology. (3-3). Credit 4 each semester. I, II
Recent phases of physiology; modern experimental methods. The work is arranged to suit the needs of the student and in harmony with his previous training. Prerequisite: Basic courses in morphology and organic chemistry.

605, 606. Poisonous Plants. (3-3). Credit 4 each semester. I, II
Original investigations and detailed studies of poisons or poisonous plants and their effects on domestic animals. Prerequisite: Veterinary Physiology and Pharmacology 530.

607, 608. Veterinary Pharmacology. (3-3). Credit 4 each semester. I, II
Modern methods of research in pharmacology and pharmaceutical processes. Original research in studying the actions and uses of drugs. Prerequisites: Veterinary Physiology and Pharmacology 428, 529.

611, 612. Veterinary Physiology. (3-3). Credit 4 each semester. I, II
A detailed study of specific phases of physiology of domestic animals. Prerequisites: Veterinary Anatomy 303, 304; Veterinary Physiology and Pharmacology 428.

685. Problems. Credit 1 to 4 each semester. I, II, S
Problems in physiology, pharmacology, or toxicology. Prerequisite: Degree of Doctor of Veterinary Medicine or appropriate specialized training.

Department of Wildlife Management

Professor W. B. Davis;
Assistant Professors R. J. Baldauf, K. L. Dixon, O. C. Wallmo

201. Wildlife Conservation and Management. (3-0). Credit 3. I, II
An introduction to the wildlife and fishery resources of the United States with special reference to Texas. The importance of plants and animals in our economic and cultural life. An account of what has happened to North American wildlife with consideration of specific plans and methods for its rehabilitation, maintenance, and increase.

300. Field Studies. Credit 3. S
Wildlife survey of selected areas. Studies of plant-animal interrelationships, birds, mammals, and other native vertebrates; experience in collecting and preparing study skins of birds, mammals, reptiles, and amphibians. Prerequisite: Junior classification or approval of Head of Department.

311. Ichthyology. (Fresh Water). (2-3). Credit 3. I †
This course is designed to familiarize the student with the fresh-water fishes of the world. The approach to the subject matter will be mainly systematic, but the evolution, ecology, life history and economy of the more important species will be treated. The fresh-water fishes of Texas will be emphasized and the practice will consist of the identification of 75-100 fish. Prerequisite: Biology 107.

312. Ichthyology. (Marine). (2-3). Credit 3. II †
A study of the marine fishes of the world, emphasizing fishes of Texas. Life history, ecology, distribution, evolution, and economic values of important

species will be treated. Prerequisite: Biology 107. (Offered in 1957-58 and in alternate years thereafter.)

315. Herpetology. (2-2). Credit 3. II †
An introduction to the study of the structure, adaptation, classification, distribution, and economic importance of amphibians and reptiles. Prerequisite: Biology 107.

316. Field Herpetology. (0-3). Credit 1. II
Field work involving the collection and preservation of herpetological specimens; natural history; ecological relations. Prerequisites: Wildlife Management 315 or registration therein.

400. Fisheries Survey. Credit 4. S
A field course. Attention will be given to the life histories, ecology, and propagation of fishes important for sporting and food purposes. Distribution, identification, and field techniques. Prerequisite: Junior classification or approval of Head of Department.

401. General Mammalogy. (2-2). Credit 3. I †
Study of the structure, classification, and economic relations of mammals. Foundation for wildlife management, also for museum work. Prerequisite: Biology 107.

402. General Ornithology. (2-2). Credit 3. II †
Introduction to the study of birds, their structure, classification, geographic distribution, ecologic relations, and economic status. Foundation for wildlife management, also for museum work. Prerequisite: Biology 107.

403. Animal Ecology. (2-3). Credit 3. I †
Composition, structure, and energy relationships of plant-animal communities. The interaction of physical and biotic factors as they affect population levels and community development. Application of ecological principles to some current land use practices. Prerequisite: Range and Forestry 301.

408. Techniques of Wildlife Management. (2-3). Credit 3. II †
Methods and techniques in maintaining and increasing desirable wildlife and regulating population generally, with emphasis on practical aspects. Use of natural vegetation, the place and methods of census, restocking, game preserves, predatory animal control, provision of food and cover, farmer-sportsman relations, significance of succession, and other ecologic concepts to game management and related enterprises. Prerequisite: Senior classification in wildlife management or approval of instructor.

410. Conservation and Management of Fishes. (3-0). Credit 3. II
Basic knowledge from ichthyology, biology of fishes, and limnology is related to the applied aspects of fresh water and marine fishery science. Emphasis is placed on methods of fish culture, habitat and population manipulation, disease and parasites of fishes and fundamentals of farm pond management.

417. Biology of Fishes. (2-2). Credit 3. I †
Treats the biology of fishes, including respiration, sense organs, feeding habits, breeding habits, anatomy, and adaptations to the environment. Emphasis will be placed upon the various physiological and morphological features of fishes, particularly as they relate to problems of distribution, populations, and management in Texas. Prerequisite: Biology 107. (Offered in 1957-58 and in alternate years thereafter.)

490. Wildlife Problems. Credit 1 to 3. I, II, S
Individual study and research on a selected problem approved by the instructor. Prerequisite: Senior classification.

FOR GRADUATES

601, 602. Vertebrate Systematics. (1-6). Credit 3 each semester. I, II
The theory and practice of taxonomy as applied to vertebrates. Laboratory consists of individual problems on classification and distribution of selected groups of vertebrates; problems in nomenclature of birds, mammals, fishes and reptiles, based on Texas Cooperative Wildlife Collection. Survey of the literature of vertebrate taxonomy as related to the group selected; a study of vertebrate material from the systematic standpoint. Prerequisites: Wildlife Management 311, 315, 401, or 402, depending on group selected. (Offered in 1956-57 and in alternate years thereafter.)

603. Vertebrate Ecology. (1-6). Credit 3. II
The ecology and life histories of vertebrates with special reference to birds and mammals. The role of native vertebrates in relation to range, forest, and farm problems. Consideration will be given to community and environmental relations. Prerequisite: Wildlife Management 403 or equivalent. (Offered in 1956-57 and in alternate years thereafter.)

608. Techniques of Wildlife Management. (2-0). Credit 2. II
Special techniques and current development in wildlife management practices. Prerequisite: Wildlife Management 408 or equivalent. (Offered in 1956-57 and in alternate years thereafter.)

609. Wildlife Research Methods. (2-0). Credit 2. I
A study of research methods as applied to wildlife management. (Offered in 1956-57 and in alternate years thereafter.)

681. Seminar. (1-0). Credit 1 each semester. I, II
Important current developments in the wildlife field with special reference to the literature. Prerequisite: Senior or graduate classification.

685. Problems. Credit 2 to 6 each semester. I, II, S
Credit to be adjusted in accordance with requirements of each individual case.

691. Research. Credit 1 or more each semester. I, II, S
Original research on selected wildlife problem to be used in thesis or dissertation.

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