

TEXAS A&M UNIVERSITY

*Moody College
of Marine Sciences
and
Maritime Resources
1977-1978*

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TABLE OF CONTENTS

The Texas A&M University System	2
Academic Calendar	6
Moody College	9
Texas Maritime Academy	11
Department of Marine Sciences	12
Galveston Coastal Zone Laboratory	13
General Information	
Admission	14
Degree Information	20
Financial Information	24
Student Services	28
Student Activities	32
Degree Program	
Marine Biology	34
Marine Engineering	36
Marine Sciences	38
Marine Transportation	40
Maritime Systems Engineering	43
Course Descriptions	45
Faculty	73

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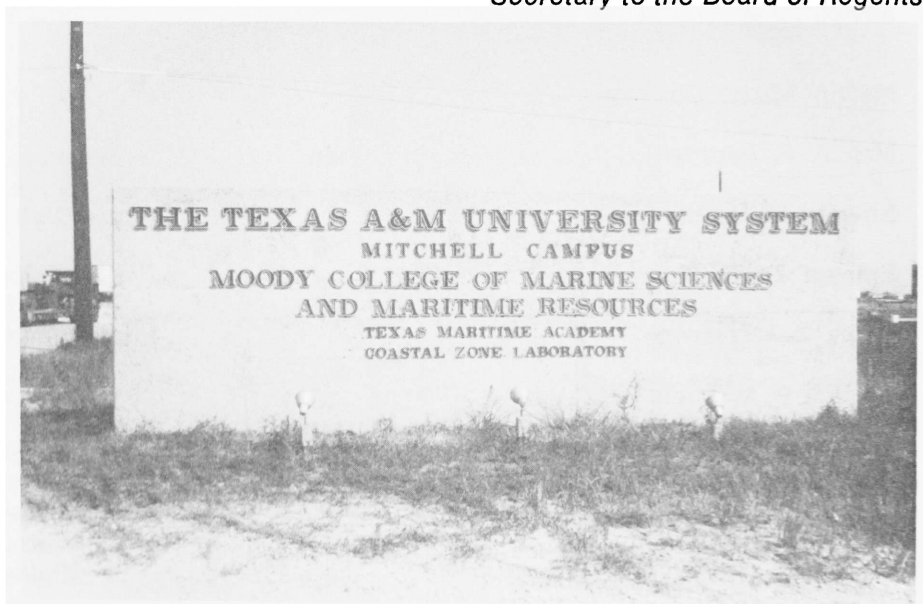
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MOODY COLLEGE OF MARINE SCIENCES
AND MARITIME RESOURCES**

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Department of Marine Sciences

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**THE ACADEMIC CALENDAR
FOR 1977-78**

Summer Session 1977

May 30	Monday. Orientation for new students.
May 31	Tuesday. Registration for the first term.
June 1	Wednesday. Beginning of classes. Summer cruise period begins.
June 3	Friday. Last day for enrolling in the University for the first term and for adding new courses.
June 6	Monday. Last day for dropping courses with no record.
June 11	Saturday, T/S TEXAS CLIPPER departs.
June 12-13	Sunday-Monday, Registration Conference for Fall Semester 1977.
June 17	Friday. Last day for dropping courses with no penalty.
July 4	Monday. Independence Day Holiday.
July 5	Tuesday. Last day for first term classes. Beginning of final examinations, 7 p.m.
July 6	Wednesday. Last day for the first term final examinations.
July 7	Thursday. Registration for the second term.
July 8	Friday. Beginning of classes. All final grades due, 10 a.m.
July 12	Tuesday. Last day for enrolling in the University for the second term and for adding new courses.
July 13	Wednesday. Last day for dropping courses with no record.
July 17-18	Sunday-Monday, Registration Conference for Fall Semester 1977.
July 26	Tuesday. Last day for dropping courses with no penalty.
August 7	Sunday, T/S TEXAS CLIPPER returns.
August 9	Tuesday. Grades for graduating students due, 10 a.m.
August 11	Thursday. Last day of second term classes. Beginning of final examinations, 7 p.m.
August 12	Friday. Last day of second term final examinations.
August 13	Saturday. Commencement for First and Second Term graduating students.
August 15	Monday. All final grades due, 10 a.m.

REGULAR SESSION

Fall Semester 1977

August 23-26	Tuesday through Friday. Delayed registration, adds and drops.
August 29	Monday. Beginning of Fall Semester classes.
September 2	Friday. Last day for enrolling in the University for the Fall Semester or for adding new courses.
September 13	Tuesday. Last day for dropping courses with no record.
October 17	Monday. Mid-semester grade reports.
October 24	Monday. Last day for dropping courses without penalty.
November 24-27	Thursday-Sunday inclusive. Thanksgiving Holidays.
December 5	Monday. Grades for graduating students due, 10 a.m.
December 9	Friday. Last day of Fall Semester classes.
December 10	Saturday. Commencement.
December 12	Monday. First day of Fall Semester examinations.
December 16	Friday. Last day of Fall Semester examinations.
December 17	Saturday. All final grades dues, 5 p.m.

Spring Semester 1978

January 11-13	Wednesday through Friday. Delayed registration, adds and drops.
January 16	Monday. Beginning of Spring Semester classes.
January 20	Friday. Last day for enrolling in the University for the Spring Semester or for adding new courses.
January 31	Tuesday. Last day for dropping courses with no record.
March 6	Monday. Mid-semester grade reports.
March 11-19	Week of Spring recess.
March 20	Monday. Last day for dropping courses without penalty.
May 1	Monday. Grades for graduating students due, 10 a.m.
May 5	Friday. Last day of Spring Semester Classes. Commencement.
May 6	Saturday. Commencement and Final Review.
May 8	Monday. First day of Spring Semester examinations.
May 12	Friday. Last day of Spring Semester examinations.
May 15	Monday. All final grades due, 10 a.m.

Summer Session 1978

June 5	Monday. Orientation for new students.
June 6	Tuesday. Registration for the first term.
June 7	Wednesday. Beginning of classes.
June 9	Friday. Last day for enrolling in the University for the first term and for adding new courses.
June 12	Monday. Last day for dropping courses with no record.
June 23	Friday. Last day for dropping courses with no penalty.
July 4	Tuesday. Independence Day Holiday.
July 11	Tuesday. Last day for first term classes. Beginning of final examinations, 7 p.m.
July 12	Wednesday. Last day for the first term final examinations.
July 13	Thursday. Registration for the second term.
July 14	Friday. Beginning of classes. All final grades due, 10 a.m.
July 18	Tuesday. Last day for enrolling in the University for the second term and for adding new courses.
July 19	Wednesday. Last day for dropping courses with no record.
August 4	Friday. Last day for dropping courses with no penalty.
August 15	Tuesday. Grades for graduating students due, 10 a.m.
August 17	Thursday. Last day of second term classes. Beginning of final examinations, 7 p.m.
August 18	Friday. Last day of second term final examinations.
August 19	Saturday. Commencement for First and Second Term graduating students.
August 21	Monday. All final grades due, 10 a.m.



MOODY COLLEGE

Moody College of Marine Sciences and Maritime Resources is located in Galveston. Its purpose, in conjunction with other colleges and programs of Texas A&M University, is to provide academic instruction and extension services as well as to conduct research commensurate with the increasing importance of marine affairs to coastal Texas. Moody College also coordinates all of the University's programs in the Galveston area.

Moody College, created in September of 1971, consists of the Department of Marine Sciences, the Texas Maritime Academy, and the Galveston Coastal Zone Laboratory. Presently comprised of five marine degree programs, the undergraduate curricula of the College will be expanded in the future to cover the full spectrum of marine subjects. The degree programs offered are four-year courses of study leading to the Bachelor of Science degree from Texas A&M University with majors in Marine Biology, Marine Engineering, Marine Sciences, Marine Transportation, and Maritime Systems Engineering. All programs, excepting Maritime Systems Engineering, offer directly, or as an option, training leading to a U.S. Coast Guard license as a Third Mate or as a Third Assistant Engineer. In addition, course options are offered in: Marine Transportation in Marketing and Management; and Maritime Systems Engineering in Ocean Engineering, Coastal Structures, and Hydromechanics.

Classes are held on Mitchell Campus, Pelican Island, as well as at Fort Crockett on Galveston Island. The **T/S Texas Clipper**, training ship of the Academy, serves the cadets as a floating classroom, laboratory, and dormitory for annual summer training cruise. During the regular school year, the ship provides valuable dockside laboratory facilities for practical aspects of the maritime curricula. The 15,000 ton converted cargo/passenger liner is berthed at Pelican Island, except for the summer cruise period, where it may be visited on Saturday and Sunday afternoons.

The location of the College in Galveston affords students an opportunity to utilize facilities of the maritime industry ashore and afloat as well as to benefit from field research and instruction in the bay, estuarine and nearshore waters.

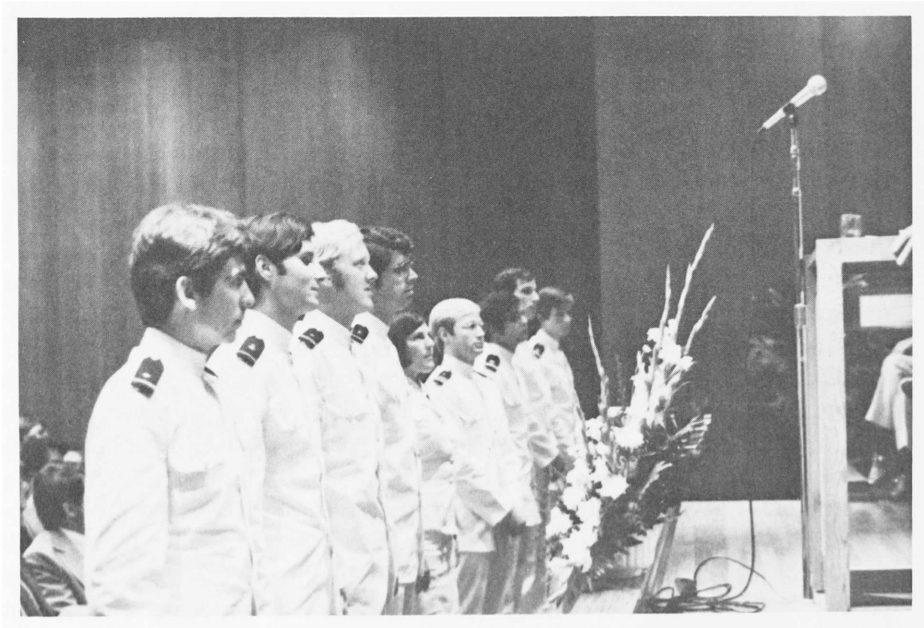
ACCREDITATION

Moody College of Marine Sciences and Maritime Resources is fully accredited by the Southern Association of Colleges and Schools and meets all of the academic standards and requirements of Texas A&M University.

LIBRARY FACILITIES

Moody College of Marine Sciences and Maritime Resources maintains a library on the Mitchell Campus. Periodicals and books are supportive of the marine degree programs offered at the College. However, to supplement its specialized holdings an overnight delivery service is maintained with the Texas A&M University library in College Station.

The holdings in College Station number more than 1,000,000 volumes and more than 30,000 serial titles. In addition to principal research collections, designation as a federal depository assures access to publications and documents of the U.S. government.



TEXAS MARITIME ACADEMY

Texas Maritime Academy, one of five state maritime academies in the nation, is operated as an academic division of Moody College of Marine Sciences and Maritime Resources of Texas A&M University.

The Academy was created in 1962 under an agreement between the State of Texas and the United States Maritime Administration. Texas A&M University, acting for the State, receives federal support for the Academy in the form of a training ship, annual appropriations for ship maintenance, \$75,000 per year in operating funds for the Academy's programs and a subsidy provision of \$50 per month each for a total of 140 eligible cadets.

The programs of Texas Maritime Academy, Marine Engineering and Marine Transportation, as well as the Department of Marine Sciences programs in Marine Biology and Marine Sciences, have options to provide preparation for students to become merchant marine officers, with U.S. Coast Guard licensing. License option students must complete three training cruises for a total of six months at sea for eligibility for the Coast Guard licensing. They may qualify as Third Mates (Marine Transportation, Marine Biology, and Marine Sciences) or Third Assistant Engineers (Marine Engineering). License option students are required to join the Corps of Cadets of Texas Maritime Academy. Non-license students may join the Corps, but are not required to do so.

The United States Merchant Marine is comprised of all privately-owned American flag vessels, including ocean-going ships and the smaller craft concerned with work in local rivers, harbors and coastal areas, as well as the personnel required to operate the vessels and support activities. Merchant marine officers are responsible for the safe operation of the merchant vessels. Following training or experience requirements and the successful passing of a written examination of the U.S. Coast Guard a license as an officer is issued.

After graduation and licensing, the new third mate or third assistant engineer may join a ship as a fully qualified junior officer. He or she will be responsible for the safe navigation of the vessel, loading and discharging of cargo, vessel maintenance and shipboard safety as a third mate or as a third assistant engineer, be responsible for maintenance and operation of all machinery aboard ship. The latter includes propulsion machinery, auxiliary machinery, electrical systems, refrigeration machinery and air-conditioning systems.

SUMMER SCHOOL AT SEA

Recent high school graduates who enroll in Texas A&M University as freshmen may earn their first six college semester hours aboard the **T/S Texas Clipper** during the annual summer training cruise of Texas Maritime Academy. As new Academy cadets, they choose two courses for six semester hours credit from offerings in English, history, and mathematics. In addition to daily classes, they also are responsible for assisting the ship's crew in maintaining and operating the vessel during the training cruise. These "prep cadets" also assist with food services and maintain their quarters.

For students interested in marine engineering, first-hand experience with the ship's operation and power plants is available. For those interested in marine transportation, there is opportunity to work on the bridge or on deck under the supervision of a licensed merchant marine officer. The program also allows the potential merchant marine officer to determine if his or her initial attraction to the sea is one that can be directed toward a career in the maritime service through the college curricula.

While it is hoped that Summer School at Sea participants will continue their collegiate careers at Moody College or elsewhere in The Texas A&M University System, their college credits may be transferable to other colleges and universities as they choose.

DEPARTMENT OF MARINE SCIENCES

The Department of Marine Sciences directs the degree programs of Marine Biology, Marine Sciences and Maritime Systems Engineering. The license option also is available in the Marine Sciences and Marine Biology programs whereby a student may become eligible for licensing by the U.S. Coast Guard as a deck officer in the merchant marine. Maritime Systems Engineering options include hydromechanics, ocean engineering, and coastal structures.

The Department of Marine Sciences, presently housed at Texas A&M University's Fort Crockett facility on Galveston Island, is devoted to year-round research and instruction, both graduate and undergraduate, in various disciplines related to the marine sciences.

Graduate work in Biology and Wildlife and Fisheries Sciences may be conducted on the Galveston campus. For information concerning admissions to these graduate programs, contact the Head, Department of Marine Sciences in Galveston or either the Head, Department of Biology or Head, Department of Wildlife and Fisheries Sciences in College Station.

GALVESTON COASTAL ZONE LABORATORY

The Coastal Zone Laboratory is the third component of Moody College of Marine Sciences and Maritime Resources and serves as its research arm. Short-term research pertinent to the Galveston coastal area and applied research in ocean, bay and estuarine systems are conducted at the Coastal Zone Laboratory. Research activities have included oyster mariculture, use of offshore oil rigs for oceanographic engineering, distribution of Blue crab in experimental temperature gradients, development of a pilot oyster hatchery, studies of shrimp, and other biological surveys. Agencies initiating research have included Houston Lighting and Power Company; National Science Foundation; National Maritime Research Center; Health, Education and Welfare; Bureau of Land Management; National Sea Grant Program; U.S. Army Corps of Engineers; Natural Gas Pipeline Co., of America; and National Marine Fisheries Service.



GENERAL INFORMATION

Students enrolled in the Moody College of Texas A&M University follow the same University requirements for graduation as students enrolled on the College Station campus. These requirements are detailed in the Texas A&M University Catalog. Students are advised to study these requirements as well as the publication, University Regulations, which concerns others aspects of student life.

ADMISSION

UNDERGRADUATE ADMISSION

Admission to Texas A&M University and any of its sponsored programs is open to qualified individuals regardless of race, color, religion, sex, national origin or educationally unrelated handicaps. Applicants for admission to Moody College for Galveston residence are welcome at any time. Those who meet the standards will be admitted as long as space is available, until the last day for enrollment during the session requested.

Applications for admission to Moody College of Marine Sciences and Maritime Resources should be addressed to the Office of Admissions, Texas A&M University, College Station, Texas 77843. Completed application forms, to be submitted to the Office of Admissions, must be accompanied by transcripts of credit, if the applicant is entering directly from high school. A student who desires to transfer from another college or university must submit two complete official transcripts from each college or university attended.

REQUIREMENTS

To be admitted to Texas A&M University, an applicant must have graduated from a properly accredited secondary school. In addition, the applicant must have satisfactorily completed certain high school subjects and made an acceptable score on the Scholastic Aptitude Test.

The unit requirements for admission to the University are designed to insure adequate preparation for the various curricula offered by the University. To give deserved recognition to proven ability as reflected by high academic achievement, students may enter the University even though they have not completed all the required high school subjects as listed below. Applicants who rank in the highest quarter of their class and score a minimum total score on the CEEB Scholastic Aptitude Test of 1000 may be granted admission with credit deficiencies.

ENTRANCE CREDITS

The sixteen acceptable entrance credits or 49 quarter units which a student should have for admission (with exceptions indicated where applicable) are as follows:

Subject	Credit Required		Remarks
	Quarter Units	Units	
English	12	4	Two units or 6 quarter units in a single foreign language may be substituted for one unit or 3 quarter units in English.
Social Science	8	2½	
Mathematics:			
Algebra	6	2	
Geometry	3	1	
Science	6	2	It is preferred that these two units or 6 quarter units include biology, chemistry, or physics.
Electives	14	4½	Recommended from the following subject areas: foreign languages, mathematics, science, social science, speech. Not more than three units or 9 quarter units in vocational subjects may be submitted as electives. Applicants for admission to engineering, mathematics, and science are strongly advised to include at least ½ unit or 2 quarter units electives in advanced mathematics.
TOTAL	49	16	



APPLICATION FOR ADMISSION TO TEXAS MARITIME ACADEMY

In addition to the normal requirements for admission, a student seeking to enroll in Texas Maritime Academy must satisfy additional criteria. If the student wishes to enroll in the Federal Subsidy license oriented program, he or she must be a citizen of the United States and must pass a physical examination under U.S. Coast Guard specifications. The physical requirements for a deck officer cadet include uncorrected vision of at least 20/100 in both eyes correctable to at least 20/20 in one eye and 20/40 in the other; for an engineer the corrected vision must be at least 20/30 in one eye and 20/50 in the other. The color sense will be tested by means of a pseudoisochromatic plate test, but any applicant who fails this test will be eligible if he or she can pass the "Williams" lantern test or equivalent. The examination for acceptance as United States Maritime Service cadets cannot be given before enrollment. The examination has no bearing on enrollment in curricula which do not include the license option as non-subsidy students have no restriction with regard to physical fitness.

TESTS REQUIRED OF NEW STUDENTS

Texas A&M University requires certain College Entrance Examination Board (CEEB) tests as a part of its admission procedures for those applicants seeking admission to their first semester of college or university work. Results of these tests are to be used for admission, counseling, and placement purposes. The following tests will be required: Scholastic Aptitude Test (SAT), English Composition Achievement Test, and Mathematics Achievement Test (Level I or II). The College Entrance Examination Board offers these examinations at conveniently located testing centers throughout the United States and in major cities of many foreign countries. Testing dates, locations, and fees required are described in an information bulletin which may be obtained by writing to the College Entrance Examination Board, Box 592, Princeton, N.J., 08540.

The University will accept scores on either Mathematics Test, Level I or the Mathematics Test, Level II. However, most students will be expected to take the Mathematics Test, Level I. Students interested in taking the Mathematics Test, Level II, should do so only after careful study of the College Entrance Examination Board Publication, "Achievement Tests" and a conference with the high school counselor or mathematics teacher.

The minimum test score requirements for admission for applicants who have never attended another college or university are stated in terms of a total score on the College Entrance Examination Board's

Scholastic Aptitude Test. This total score is the sum of the Verbal and Mathematical scores reported by the College Board. The following test score requirements are effective for entering freshmen:

Standing in High School Graduating Class	Minimum Total Score Acceptable for Admission
Highest Quarter	800
Second Quarter	800
Third Quarter	900
Fourth Quarter	1000

Summer Conferences: Several two-day conferences will be conducted during the summer months on the Galveston campus of Moody College for applicants who have qualified for admission to the fall semester as beginning freshmen. At these counseling sessions, the CEEB test scores will be interpreted to each student, and additional tests in chemistry, reading, and other areas will be administered.

Steps in Applying for Admission to Moody College of Texas A&M

1. **Application for Admission:** Write to the Office of Admissions, Texas A&M University, College Station, Texas 77843 to obtain an application. Applications are also available at High School/College nights.

2. **Testing:** Arrange through high school counselor to take the Scholastic Aptitude Test (SAT), English Composition Achievement Test and Mathematics Achievement Test of the College Entrance Examination Board (CEEB). Designate that the scores be sent to Texas A&M. It is recommended that the SAT be scheduled in the latter part of the junior year or early part of the senior year. The achievement tests are used for counseling and placement purposes and should be taken by January of the senior year. Students are admitted on the basis of specified courses taken in high school, class rank and SAT score, but they must submit the results of the achievement tests before they can attend a Summer Registration Conference.

3. **Transcripts:** Ask the high school counselor or registrar to forward an official transcript to the Office of Admissions. This transcript must reflect grades complete through six semesters or nine quarters of high school work. The transcript should also reflect the rank in class and the list of courses which will be completed during the senior year. To be considered official, a transcript must bear an original signature of a school official and/or the school seal.

There are two periods when a high school student may apply for admission to Texas A&M. Those students who score 1000 on the SAT and rank in the top quarter of their class may submit their application and supporting credentials at the end of their junior year under the Early Decision program. Letters of acceptance are mailed to those who meet the admission requirements as soon as the applications are processed.

Students who do not meet the requirements for Early Decision should submit their applications after October 1 and notifications will be sent beginning November 15. Acceptance to the University is conditional until the student has satisfactorily completed the courses in progress for the senior year and graduated from high school.

EARLY DECISION PROGRAM

In order to recognize and reward superior academic performance, Texas A&M has instituted an early decision program that permits a student to apply for admission after completion of the junior year of high school. To be eligible for this program students must rank in the highest quarter of their class and score at least 1000 on the SAT. Students who desire to apply under these provisions may submit their application for admission at the completion of their junior year of high school. A list of courses they will be taking during their senior year must be included with the transcript. Acceptance will be conditional until the student has satisfactorily completed the courses in progress for the senior year and graduated from high school.

EARLY ADMISSION

Students who have a superior high school record and wish to enter higher education before graduating from high school may apply for admission under the following program.

Students who wish to enroll as full time students at the completion of their junior year must have a superior academic record, complete the prescribed 16 credits or 49 quarter units required of entering freshmen, rank in the top quarter of their class and score at least 1200 on the SAT, with at least 600 on the verbal section of the SAT. In addition, they must be recommended by their high school principal and counselor and have their parents' approval if under 18 years of age. Students must submit the results of the English composition and mathematics achievement tests. A personal interview with the Director of Admissions is also required. Further information may be obtained from the Director of Admissions.

TRANSFER STUDENTS

Admission may be granted to undergraduate students who have begun their work at other colleges or universities and who have satisfied the requirements as set forth below. An applicant may not disregard the academic record of any previous education received at another institution.

An applicant must be eligible to return to the institution from which the transfer is sought. Applicants must also submit a formal application for admission as well as two official transcripts of their record at each college or university previously attended. Except as further indicated below, the applicant must have achieved an

overall grade point ratio of 2.00 (C average) or better on the work attempted and must meet or surpass this same standard for each of the last two semesters of attendance, if in attendance two or more semesters. (A twelve-week summer session with a normal load of course work will be considered a full semester.)

A student who has attempted 18 semester hours or less must meet the entrance requirements for entering freshmen as well as the 2.00 standard indicated above. The high school record, college record, and the test results will be used to determine admission status. The results of either the CEEB Scholastic Aptitude and Achievement Test in Mathematics and English or the American College Testing Program (ACT) will be accepted in determining eligibility for admission as a transfer student.

On the basis of the credentials submitted, credit will be given for work completed satisfactorily at another properly accredited college or university so far as the work is equivalent in character and extent to similar work at Texas A&M University. Credits given by transfer are provisional and may be cancelled at any time if the student's work at the University is unsatisfactory.

Courses in a subject area which are more elementary than the beginning required courses in that same subject area of a student's chosen curriculum at this University will not apply toward satisfying the degree requirements of that curriculum.

INTERNATIONAL STUDENTS

If space is available, international students (non-U.S. citizens) with outstanding academic records may be considered for admission. For information about application deadlines, admissions criteria, English language proficiency and expenses, international students should request a copy of the brochure, "Information for Prospective International Students," from the Office of Admissions.

READMISSION OF STUDENTS

Any former student who has resigned, been dropped from the rolls or has not attended A&M for at least one full semester must fill out an Application for Readmission and submit it to the Office of Admissions. If the student has attended any other institutions since last enrolled at A&M, he or she should submit two official transcripts from EACH of these schools at the time of re-application.

SPECIAL ADMISSIONS

The Dean of Admissions and Records can, under extreme mitigating circumstances, waive the admissions requirements of a student who presents strong evidence of ability to succeed in the University.

ADMISSION BY INDIVIDUAL APPROVAL

Undergraduates who have not recently attended school and who cannot satisfy the entrance requirements in full may be admitted, subject to the following requirements:

1. They must make application on the official entrance blanks.
2. They must furnish evidence that their preparation is substantially equivalent to that required of other applicants and that they possess the ability and seriousness of purpose necessary to pursue their studies with profit to themselves and to the satisfaction of the University.

ADMISSION OF SPECIAL STUDENTS

A limited number of students may be admitted to the University as special students not candidates for a degree, subject to the following regulations:

1. Applicant must show good reason for not taking a regular course and must submit satisfactory evidence that they are prepared to profit by the special studies they wish to pursue.
2. Record of previous scholastic work must be submitted on the official entrance blanks and must be accompanied by a statement showing (1) experience; (2) a plan of study, enumerating the courses desired; and (3) the purpose or end expected to be accomplished by this study.

The University reserves the right to modify the curricula or withdraw any courses when it appears wise to do so. The policies and procedures in this catalog are currently in effect; however, the University reserves the right to make changes or modifications for good cause.

DEGREE INFORMATION

DEGREES OFFERED

The following degrees are offered through Moody College of Texas A&M for the satisfactory completion of resident study in the appropriate curriculum:

Bachelor of Science with a major in Marine Biology
Bachelor of Science with a major in Marine Engineering
Bachelor of Science with a major in Marine Sciences
Bachelor of Science with a major in Marine Transportation
Bachelor of Science with a major in Maritime Systems Engineering

REQUIREMENTS FOR A BACCALAUREATE DEGREE

The diploma of the University with the appropriate degree, will be granted to the student who has made formal application for the undergraduate degree and has satisfied the following requirements:

1. The student must complete, with at least a C average, one of the regular courses of study leading to a degree.

2. A curriculum leading to a baccalaureate degree shall contain a minimum of 128 credit hours. At the discretion of the student's department and academic dean, advanced ROTC courses may be used to satisfy curriculum requirements if the student has completed 124 hours excluding advanced ROTC courses.

3. The total number of grade points earned at this institution in courses must be at least twice the number of hours which he carried in courses at this institution. Grades of F or WF shall be included, except those grades and grades of D made in the freshman year or summer session preceding that year which are subsequently repeated at this university with a grade of C or better during the student's first four semesters. Grades of WP and Q shall be excluded. Grades in courses not applying to the degree may be waived by petition if approved by the academic dean and submitted to the Registrar. The waiver of grades in courses as indicated above will not affect a student's grade point ratio or entitlement to graduation with honors.

4. The total number of grade points earned at this institution in courses in the major department must be at least twice the number of hours which were carried at this institution in the major department. Grades of F and WF shall be included but grades of WP and Q shall be excluded. Grades in courses not applying to the degree may be waived by petition if approved by the academic dean and submitted to the Registrar.

5. 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.

6. The student must have settled all financial obligations to the University.

7. The student must be formally recommended for graduation by the Academic Council after consideration of his or her complete record.

8. The student is expected to be present in person at the graduation exercises, unless registered in absentia or excused by his or her academic dean.

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.

RESIDENCE REQUIREMENT:

The candidate must have completed a minimum of twelve semester hours in his major subject-matter field at this institution.

A student pursuing a baccalaureate degree at Texas A&M University may transfer from a two year college a maximum number of hours not to exceed six (6) more than the number required through the freshman and sophomore years of the chosen curriculum at Texas A&M University. Such courses will normally be restricted to those of the freshman and sophomore years.

Candidates for degrees in Moody College curricula will follow the following guidelines: For non-license curricula, 30 of the last 36 hours must be completed in Galveston, and for license curricula, the last two years must be spent in Galveston and in the Corps.

REQUIREMENT IN POLITICAL SCIENCE (GOVERNMENT) AND HISTORY: In order to meet the legal requirement for a baccalaureate degree or a lesser degree or academic certificate, all students must have at least six credit hours in Political Science (Government) and at least six credit hours in American History as described in detail in the following paragraphs. Students whose curricula require only three credit hours of Political Science are required to successfully complete three additional credit hours of Political Science plus one credit hour of elective if they do not elect at least three credit hours in Military, Air or Naval Science plus one elective hour.

Political Science (Government): One must have credit for six semester hours or its equivalent. Three of the six semester hours are to be in Political Science 206 (American National Government) and three semester hours in Political Science 207 (State and Local Government with emphasis on that of Texas). This requirement may also be met, in whole or in part, by equivalent course work satisfactorily completed at another accredited college or university.

Three hours of the Political Science requirement may be satisfied on the basis of equivalent work completed by a student in the program of an approved ROTC unit or three of the six-semester-hour requirement may be satisfied if the student meets the requirements to receive credit by examination on the basis of acceptable performance on an advanced placement examination or a comprehensive examination.

American History: One must have credit for six semester hours or its equivalent. Three of the six semester hours may be in Texas History and three semester hours in American History, or the entire six hours may be in American History. This requirement may also be met, in whole or in part, by equivalent course work satisfactorily completed at another accredited college or university.

Three hours of the requirement may be satisfied on the basis of equivalent work completed by a student in the program of an ap-

proved ROTC unit or three hours of the six-semester-hour requirement may be satisfied on the basis of acceptable performance on an advanced placement examination or a comprehensive examination.

APPLICATION FOR A DEGREE: During the semester or summer session in which the degree is to be conferred, a student must be officially registered in the University. 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. To obtain the necessary forms, the student must pay a diploma fee in the Fiscal Office and present his fee receipt to the Student Records Officer.

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

TWO DEGREES

A candidate for a second baccalaureate degree must have completed all the essential work of the second curriculum not covered in the first. In all such cases the total semester hours required must be at least 30 semester hours additional to the greater number required for either degree.

GRADUATION WITH HONORS

Students who have completed a minimum of sixty hours at Texas A&M are eligible for graduation with honors. The grade point ratio of transferred hours, combined with the A&M grade point ratio, must equal that required at Texas A&M for the appropriate category of honors. This combined average shall not permit the student to graduate with honors higher than that to which the student would be entitled, based on the Texas A&M grade point ratio only. Categories for Honors shall be designated as follows:

(1) Summa Cum Laude: A student may be graduated "Summa Cum Laude" with a grade point ratio of 3.750 or above.

(2) Magna Cum Laude: A student may be graduated "Magna Cum Laude" with a grade point ratio range of 3.500 through 3.749.

(3) Cum Laude: A student may be graduated "Cum Laude" with a grade point ratio range of 3.250 through 3.499.

FINANCIAL INFORMATION

EXPENSES

The Board of Regents of the Texas A&M University System, in recognizing the regional character of Texas Maritime Academy, has ruled that both in-state and out-of-state students pursuing the license option program and who are enrolled in the United States Maritime Service will pay tuition at the rate of \$5.00 per semester hour, with a \$60.00 per semester minimum. Students who are residents of the State of Texas and who are pursuing one of the non-license option programs will pay tuition at the rate of \$4.00 per semester hour (\$50.00 per semester minimum). Out-of-state students pursuing a non-license option will pay tuition at the rate of \$40.00 per semester hour.

Below is an estimate of expenses for students who are pursuing the license option program and are registered for 18 semester credit hours. It should also be noted that students who are participating in the Corps of Cadets program will have an initial outlay for uniforms of approximately \$200. All fees listed are strictly approximations and are subject to change because of economic conditions and/or legislative requirements.

	Fall Semester	Spring Semester	Summer Cruise
Tuition (\$5.00 semester hour)	\$ 90.00	\$ 90.00	\$ 60.00
Student Services	18.00	18.00	18.00
Board	426.00	426.00	426.00
I. D. Card	3.00		
Room	375.00	375.00	185.00
Cruise			310.00
Laundry			30.00
Total	\$912.00	\$909.00	\$1,029.00

Estimated expenses for resident students not following a license option program are approximately the same while non-resident students should add \$630/semester for out-of-state tuition charges. Of course, students not enrolled in a license option program will not be required to pay summer training cruise expenses.

EXPLANATION OF FEES

Room and Board

All Moody College students who are unmarried or not residing with parents in the Houston-Galveston area are required to live in campus housing and participate in the board plan. Rooms are for double occupancy and are furnished with beds, desks, chairs, wardrobes, and dressers. Students are expected to furnish pillows, blankets and linens.

Room Deposit

A deposit of \$65.00 is required to reserve a dormitory room. The deposit will be retained against damage and breakage. The deposit will be refunded upon request prior to July 31, for the fall semester and December 31, for the spring semester for those students not planning to re-enroll. Refunds will be made in accordance with the College policy for those students graduating or withdrawing from school, upon their request, after proper clearance is obtained.

Student Services

The student services fee finances recreational activities, student government, student publications and support of student organizations. Weekly movies, intramural athletic programs and social functions are also supported by this fee.

Identification Card

All students must have an identification card, used in registration procedures, collection of fees, cashing of checks, dining hall privileges, etc. Card fee is \$3.00.

Laboratory Fees

A fee ranging from \$2.00 to \$8.00 per semester is charged for most laboratory courses.

Parking Permit

All students driving motor vehicles must pay a \$5.00 fee for registration and parking on campus each semester and \$2.50 per summer session.

Textbooks and Supplies

The cost of textbooks and supplies is approximately \$200.00 for the combined fall and spring semester, but will vary depending upon the course of study and quality of supplies purchased. The College operates a book store with limited availability of texts and supplies.

Payments

Payments to the Fiscal Office may be by cashier's check, personal check, or money order payable to Texas A&M University. All checks and money orders are accepted subject to final payment.

Refunds

Refund of fees shall be made to students officially withdrawing according to the following withdrawal schedule:

**Tuition, Student Services Fee,
Laboratory Fee and Residence Hall Rent**
Fall or Spring Semester

Before the first week of class	100 percent
During the first week of class	80 percent
During the second week of class	60 percent
During the third week of class	40 percent
During the fourth week of class	20 percent
After the fourth week of class	None

Six-week Summer Term

Before the first week of class	100 percent
During the first week of class	60 percent
During the second week of class	20 percent
After the second week of class	None

Rent Fee: Refunds on room rent will not be made unless the room vacated is re-rented within 10 days to a student residing in other than University owned property. If the room is re-rented within this 10-day period to a student not residing in University owned property, refunds will be made in accordance with the above schedule.

Board Fee: Board fees are refundable in full prior to the first day of classes. After classes begin no refunds will be made except in case of official withdrawal at which time a pro-rata refund will be made computed on a daily basis.

In case of consecutive absence of 10 or more days due to illness of the student or member of his family or for some other unavoidable cause a pro-rata refund will be made computed on a daily basis.

Identification Card Fee: After the card is issued, this fee cannot be refunded.

Reductions

No reduction will be made in the charge for room or board in cases of entrance within ten (10) days after the opening of a semester, nor will a refund be made in case of withdrawal during the last ten (10) days of a semester.

Unpaid Check

If a check accepted by the Fiscal Office is returned unpaid, the writer of the check will be required to pay a penalty of \$5.00. The penalty increases to \$10.00, ten (10) days after the date of the first return. If the check is not redeemed within twenty (20) days after notice, the student may be suspended and the check may be turned over to the county attorney for collection.

Duplicate Receipts

Duplicate receipts for fees paid by the students will be issued on payment of \$1.00.

Day Students

Day students pay all specified fees and charges except room and board. Day student status may be obtained by written request to the Provost of the College.

Fee Exemptions

I. Statutory provisions — A student may qualify for legislative exemption from the payment of tuition and certain fees and charges as one of the following:

A. Exempted from tuition.

1. Highest ranking high school graduate.
2. Veterans who were citizens of Texas at the time they entered service and have resided in Texas for at least the period of 12 months before the date of registration and eligible dependents of Texas veterans who have resided in the State for at least 12 months immediately preceding the date of registration.
3. Dependent children of disabled or killed-on-duty firemen and peace officers.
4. Blind and deaf students.
5. A limited number of students from other nations of the Americas.
6. Firemen enrolled in fire sciences courses.
7. Children of prisoners of war or persons missing in action.

B. Exempted from lab fees.

1. Veterans who were citizens of Texas at the time they entered service and have resided in Texas for at least the period of 12 months before the date of registration and eligible dependents of Texas veterans who have resided in the State for at least 12 months immediately preceding the date of registration.
2. Dependent children of disabled or killed-on-duty firemen and peace officers.
3. Blind and deaf students.
4. Firemen enrolled in fire sciences courses.
5. Children of prisoners of war or persons missing in action.

C. Exempted from student fees.

1. Student services fee.
 - a. Blind and deaf students.
 - b. Children of prisoners of war or persons missing in action.
 - c. Dependent children of disabled or killed-on-duty firemen and peace officers.
2. General property deposit — blind and deaf students.

D. Room and Board.

All Moody College students in Galveston, are required, unless exempted, to live in campus housing and participate in the board plan. Students in non-license option programs who are married or who are residing with parents or guardians in the Houston/Galveston area, or who are active duty veterans of the U.S. Armed Services are generally exempted from the mandatory campus housing requirements. Other exemptions, based on special or unusual circumstances. Other exemptions, based on special or unusual circumstances, will be considered by the Provost of the College upon receipt of written request.

II. Board of Regent's provisions — The Board of Regents has provided certain exemptions from student fees in addition to statutory provisions:

Student services fee.

1. Full-time employees of The Texas A&M University System.
2. Students registered in absentia.

Claims for exemption from any charges and/or fees must be supported by evidence sufficient to enable the Registrar to verify the student's exempt status and to determine the duration of the exemption and the fees and charges to which it is applicable.

STUDENT SERVICES

SCHOLARSHIPS AND FINANCIAL AID

The TAMU Scholarship Program is administered by the Faculty Scholarships Committee. The overall program is designed to encourage and reward scholastic effort on the part of all students, to enable outstanding students to do their best work by removing financial handicaps, and to enable those who might be denied an education for financial reasons to secure an education at Texas A&M University.

In general, there are two types of grants-in-aid available: Valedictory Scholarships and Opportunity Awards — limited to entering freshmen, and scholarships designed for more advanced undergraduate students. Fellowships are also available for graduate students. Moody College students are eligible to participate fully in all Texas A&M University scholarship and financial assistance programs.

Valedictory Scholarship

This scholarship is offered to the valedictorian who graduates from a secondary school accredited by the Texas Education Agency and who qualifies for admission to the University. The successful applicant must earn the recognition by having the highest grade record in his or her graduating class and must be certified to the University through the Texas Education Agency.

A Valedictory Scholarship will exempt a recipient from payment of tuition during both semesters of the first long session immediately following graduation. When the circumstances of an individual case (usually military service) merit such action, this exemption may be granted by the University President for any one of the first four long sessions following graduation from high school.

The Opportunity Award Program for Entering Freshmen

This annual program provides approximately 400 four-year awards to high school graduates who are capable of outstanding scholastic achievement and who may need financial assistance to attend Texas A&M University.

Financial benefits range in value from \$400 to \$5,000 with recipients receiving from \$100 to \$1,250 each year for four years. Most awards are unrestricted as to course of study or degree objective.

Graduates of accredited high schools who have not attended another college or university and who are single are eligible to make application for an Opportunity Award Scholarship before February 1.

Applicants must satisfy the admission regulations of the University; make formal application on the forms provided by the University; have SAT-CEEB scores made available to the University by March 1; submit a Parents' Confidential Statement form to the College Scholarship Service; and submit a seven-semester high school transcript. Winners are selected on the basis of high school academic record; CEEB test scores; and evidence of initiative, leadership, and other traits of good character. The recipient must maintain a standard of scholastic achievement and personal conduct satisfactory to the Faculty Scholarships Committee in order for the award to be continued from semester to semester.

Application blanks are available upon request from the Student Records Officer, Moody College, P.O. Box 1675, Galveston, Texas 77553.

Scholarships for Advanced Undergraduate Students

Scholarships ranging in value from \$100 to \$1,000 are available to students already enrolled in the University. Some of these awards are limited to certain fields of study and to individuals who have attained a necessary academic classification, while others are unrestricted. Each year, recipients are chosen by the Faculty Scholarships Committee in May. The basis of selection is 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.

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 college.

There are also a limited number of college level scholarships awarded through the Scholarships and Awards Committee of Moody College. These awards are made possible through annual donations from organizations, such as the Women’s Propeller Clubs of Galveston and Sabine and the Women’s Organization of the Propeller Club of New Orleans.

Information regarding scholarships for advanced undergraduate students may be obtained from the Student Records Officer, Moody College, P.O. Box 1675, Galveston, Texas 77553.

Employment for Students

Part-time employment of students is coordinated by the Student Affairs Director. To become eligible for employment, a student must have been admitted to the University by the Dean of Admissions and have an accepted application on file with the Student Affairs Director.

College Work-Study Program

Texas A&M University participates in the College Work-Study Program authorized by the Economic Opportunity Act of 1964. This is a federally supported program, under which students are paid minimum wages or higher, may not work more than 20 hours per week, and are usually limited in the amount of wages they may earn throughout the academic year by their financial need.

To qualify for CWS, a student must be enrolled, be in good standing or accepted for enrollment, and have an established financial need based on the results of the Parents’ Confidential Statement or the Financial Aid Form.

Loan Funds

The University is participating in both the Hinson-Hazlewood College Student Loan program and the Federally Insured student loan program. Repayment on the loans begins after graduation. Applications for these loans must be submitted 60 days prior to the time of need. Inquiries should be addressed to the Student Records Officer, Moody College, P.O. Box 1675, Galveston, Texas 77553.

For students of the Texas Maritime Academy in the license program, the Superintendent’s Loan Fund also grants loans of up to \$500 to be repaid after graduation.

Other emergency loans are available to all enrolled students. A small service charge is made for these loans. Loan eligibility is based upon the student’s full-time enrollment status.

Vocational Rehabilitation Aid

The Texas Education Agency, through the Vocational Rehabilitation Program, offers assistance for tuition and required fees to certain students in Texas colleges and universities. Eligibility for such assistance is based on permanent physical disabilities.

Application should be made to the Texas Rehabilitation Commission, Room 309, YMCA Building, Texas A&M University, College Station, Texas 77843, or to the Texas Rehabilitation Commission, 1600 West 38th Street, Austin, Texas 77831.

COUNSELING

Counseling services are available through the office of the Student Affairs Director. Professional counselors are in residence and other university or community resources are available.

HOUSING

Campus facilities include a 240-bed dormitory. All students are required to live on-campus with the following exceptions: (1) married students; (2) students who live with a parent or guardian in the Galveston/Houston area; and (3) students who obtain day student permits from the Provost. Applications for on-campus housing can be obtained from the Campus Housing Officer. Assistance for off-campus housing can be obtained through the Student Affairs Director.

CAMPUS SECURITY

As a state institution on state property, security is provided by a resident college police department. This department, which is composed of commissioned Texas peace officers, is responsible for the protection of public and private property on campus and for maintaining the state and university laws and regulations.

All students and staff members who operate motor vehicles and/or bicycles on the campus are required to register their vehicles with the department within 48 hours after arrival on the campus. In addition, students in university housing must store personal firearms with the department for safekeeping. They may be checked out at any time by their owners.

The department operates the "Lost and Found" Office for the College.

Members of the college police department conduct safety meetings, drug abuse discussions, and engage in other educational activities when requested by recognized student groups.

HEALTH SERVICES

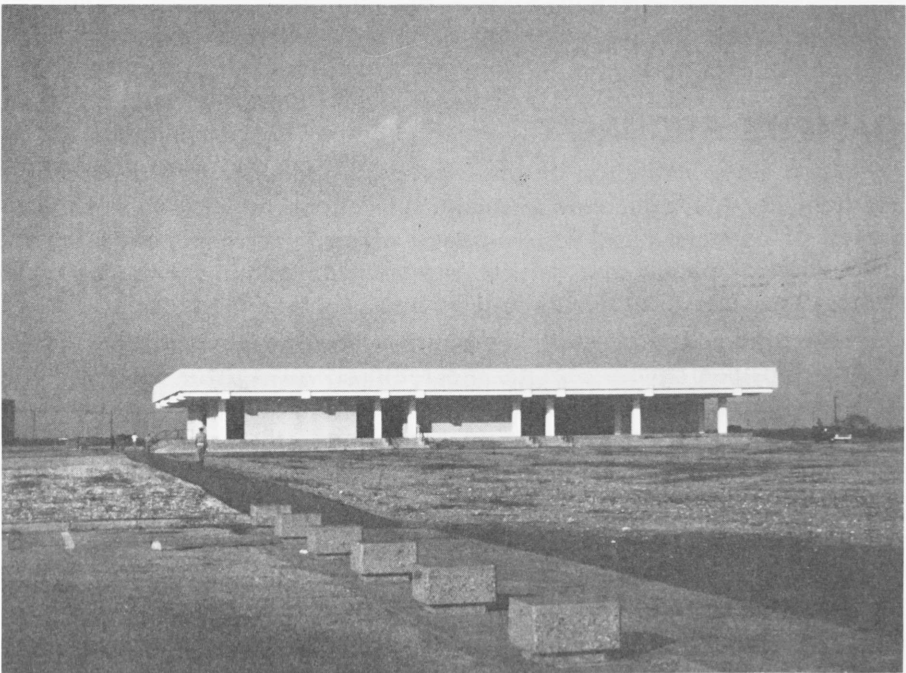
No health facilities or care is available except that TMA licensure students receive care through the U.S. Public Health Service. However, student health insurance is available. For further details, contact the Student Affairs Director.

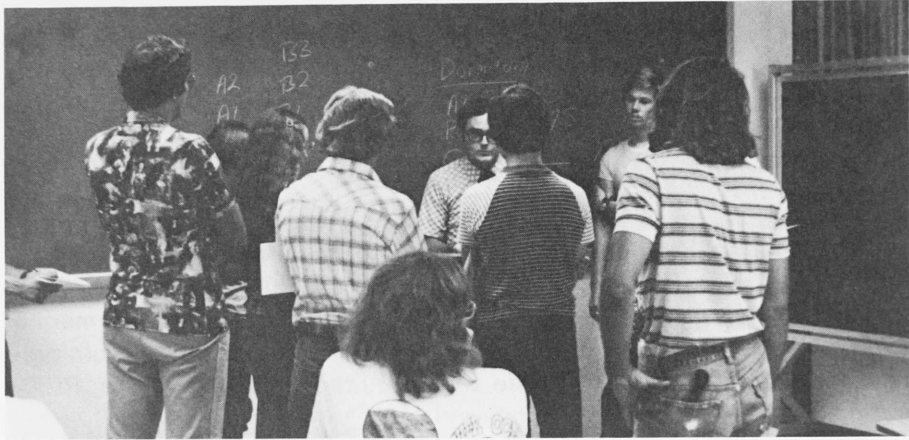
PLACEMENT OF GRADUATES

Moody College assists in the placement of its graduates and fulfillment of this program is a continuing interest of the faculty in each discipline. Active contact is maintained with prospective employers so that graduates will be directed to the best career opportunities.

STUDENT ACTIVITIES

The Student Activities Center contains dining facilities, a book store, conference rooms, a post office, student offices, a dark room, a game room, counselors' offices and other facilities.





CLUBS

Clubs on campus include: Aquarium Club, Table Tennis Club, Outdoor Sportsmen Club, Surfing Club and The Propeller Club-Port of Galveston. There is also a Diving Association and a Graduate Student Association.

STUDENT PUBLICATIONS

Students publish a weekly newsletter: **Channel Chatter**, a year-book: **The Voyager**, and a literary publication: **Seaspray**.

STUDENT GOVERNMENT

The evolving student government of Moody College is embodied in the Student Advisory Committee to the Provost. Members are elected each year on the basis of class and division. The College's seat in the Texas A&M University Student Senate is filled by a student elected from the college, at large.

The Student Advisory Committee serves as a direct communications link with the administration on student affairs. It also conducts many programs of service to the students such as assistance in voter registration.

ATHLETICS

The Intramural Program attempts to provide each student with the opportunity to participate in organized activities regularly according to time and interest. Teams are organized in flag football, basketball, softball, table tennis, and volleyball. Moody College also has an intercollegiate baseball team and a soccer team which competes in a local city league.

Texas A&M University is a member of the Southwest Conference, which includes nine universities.

The University intercollegiate program includes football, basketball, track, cross country, baseball, swimming, tennis, and golf. Student tickets to all University athletic events are available through the Student Activities Office.

DEGREE PROGRAMS

Curriculum in MARINE BIOLOGY (MARB)

The Marine Biology program leads to the Bachelor of Science degree in Marine Biology. The program is structured for training the student in biological disciplines concerned with coastal and marine environments. The program further provides a focus for marine biological education in the coastal zone with required field excursions. Preparation in the sciences is recommended.

In cooperation with the Department of Marine Transportation, Texas Maritime Academy, an option for U.S. Coast Guard license as Third Mate is offered. The license option student pursues the Marine Biology degree program but is a member of the Corps of Cadets. He or she must meet Academy qualifications. The student may additionally be eligible for a U.S. Naval Reserve Commission as Ensign upon graduation. Graduates would qualify for careers as licensed Third Mates aboard research vessels, exploration vessels and merchant ships, or they could elect to continue their studies in pursuit of a graduate degree.

FRESHMAN YEAR					
Fall Semester	(Th-Pr)	Cr	Spring Semester	(Th-Pr)	Cr
Biol. 113 Introductory Biology	(3-0)	3	Biol. 114 Introductory Biology	(3-0)	3
Biol. 123 Intro. Biology Lab	(0-3)	1	Biol. 124 Intro. Biology Lab	(0-3)	1
Chem. 101 Fund. of Chem. I	(3-0)	3	Chem. 102 Fund. of Chem. II	(3-0)	3
Chem. 111 Fund. of Chem. Lab I ..	(0-3)	1	Chem. 112 Fund. of Chem. Lab II ..	(0-3)	1
Engl. 103 Composition & Rhetoric ..	(3-0)	3	Engl. 104 Composition & Rhetoric ..	(3-0)	3
Math. 130 Mathematical Concepts – Pre-Calculus			Math. 230 Mathematical Concepts – Calculus		
or			or		
Math. 209 Calculus	(3-0)	3	Math. 210 Calculus	(3-0)	3
Naval Science or Elective		1	Naval Science or Elective		1
		<hr/> 15			<hr/> 15
SOPHOMORE YEAR					
Chem. 227 Organic Chemistry I ...	(3-0)	3	Chem. 228 Organic Chemistry II ...	(3-0)	3
Chem. 237 Organic Chem. Lab I ..	(0-3)	1	Chem. 238 Organic Chem. Lab II ..	(0-3)	1
C. S. 203 Intro. to Computing	(3-0)	3	Hist. 106 History of U. S.	(3-0)	3
Hist. 105 History of U.S.	(3-0)	3	Phys. 202 College Physics	(3-3)	4
Phys. 201 College Physics	(3-3)	4	Pol. S. 207 State and Local		
Pol. S. 206 American National Government	(3-0)	3	Government	(3-0)	3
Naval Science or Elective		1	Naval Science or Elective		1
		<hr/> 18			<hr/> 15
JUNIOR YEAR					
Biol. 351 Fundamentals of Microbiology	(3-4)	4	Econ. 203 Principles of Economics ..	(3-0)	3
Engl. 301 Technical Writing	(3-0)	3	Gen. 301 Genetics	(4-0)	4
Geol. 101 Physical Geology	(3-2)	4	Elective (General)*		5
MARS 435 Invert. Zoology	(3-3)	4	Elective (Social Science or Humanities)*		3
Elective (Social Science or Humanities)*		3			<hr/> 15
		<hr/> 18			

SENIOR YEAR			
MARB 310 Cell Biology(3-3)	4	MARB 420 Comparative Phys.(3-3)	4
MARB 481 Seminar in Marine Biology(1-0)	1	MARB 482 Seminar in Marine Biology(1-0)	1
MARB 485 Problems in Marine Biology(3-0)	3	MARS 450 Developmental Biology of Marine Organisms(3-3)	4
MARS 420 Marine Ecology(2-3)	3	Elective (Biology)*	3
Stat. 302 Statistical Methods(2-2)	3	Elective (Botany)*	4
Elective (Biology)*	3		
	17		16

*All electives must be chosen in consultation with, and approved by, the student's advisor.
Total Hours 129

Curriculum in MARINE BIOLOGY WITH A LICENSE OPTION

FRESHMAN YEAR					
Fall Semester	(Th-Pr)	Cr	Spring Semester	(Th-Pr)	Cr
Biol. 113 Introductory Biology(3-0)		3	Biol. 114 Introductory Biology(3-0)		3
Biol. 123 Introductory Biology Lab(0-3)		1	Biol. 124 Introductory Biology Lab(0-3)		1
Chem. 101 Fund. of Chem. I(3-0)		3	Chem. 102 Fund. of Chem. II(3-0)		3
Chem. 111 Fundamentals of Chem. Lab I(0-3)		1	Chem. 112 Fundamentals of Chem. Lab II(0-3)		1
Hist. 105 History of the U.S.(3-0)		3	Math. 230 Math Concepts/Calculus or		
Math. 130 Math. Concepts/Pre- Calculus or			Math. 210 Calculus(3-0)		3
Math. 209 Calculus(3-0)		3	NAUT 203 Seamanship I(2-3)		3
NAUT 103 Maritime Orientation and Lifesaving(2-3)		3	NAUT 204 Terrestrial Nav.(2-2)		3
		17			17

Summer Session
(Ten weeks at sea on the T/S TEXAS CLIPPER)
NAUT 200 Basic Communications, Navigation and Seamanship, Credit 4

SOPHOMORE YEAR			
Chem. 227 Organic Chemistry I(3-0)	3	Chem. 228 Organic Chemistry II ... (3-0)	3
Chem. 237 Organic Chemistry Lab I(0-3)	1	Chem. 238 Organic Chemistry Lab II(0-3)	1
Engl. 103 Comp. & Rhetoric(3-0)	3	Engl. 104 Composition & Rhetoric ..(3-0)	3
NAUT 201 Naval Architecture I(3-2)	4	NAUT 202 Naval Architecture II(3-0)	3
NAVS 112 Naval Ships Systems I ..(3-0)	3	NAUT 303 Celestial Navigation(2-3)	3
Phys. 201 College Physics(3-3)	4	Phys. 202 College Physics(3-3)	4
	18		17

Summer Session
(Ten weeks at sea on the T/S TEXAS CLIPPER)
NAUT 300 Intermediate Communications, Navigation and Seamanship, Credit 4

JUNIOR YEAR			
Biol. 351 Fund. of Microbiology(3-4)	4	Met. 302 Weather Reports/ Forecasting(3-0)	3
C.S. 203 Intro. to Computing(3-0)	3	MART 321 Maritime Law I(3-0)	3
MART 302 Marine Cargo Ops. I(3-3)	4	MART 406 Marine Cargo Ops II(2-2)	3
NAVS 316 Naval Ops. & Analysis ..(3-0)	3	NAUT 301 Seamanship II(2-3)	3
NAVS 411 Naval Organization & Management(3-0)	3	NAUT 304 Electronic Nav.(2-2)	3
	17	MARB 482 Seminar in Marine Biology(1-0)	1
			16

Summer Session
(Ten weeks at sea on the T/S TEXAS CLIPPER)
*Naut. 400 Advanced Communication, Navigation & Seamanship, Credit 4

SENIOR YEAR			
License Prep.(4-0)	R	Gen. 301 Genetics(4-0)	4
MARB 310 Cell Biology(3-3)	4	Hist. 106 History of United States ..(3-0)	3
MARS 435 Marine Invertebrate Zoology(3-3)	4	MARB 420 Comparative Physiology(3-3)	4
NAUT 302 Seamanship III(1-3)	2	MARS 450 Developmental Biology of Marine Organisms(3-3)	4
NAUT 404 Advanced Navigation(2-3)	3	NAVS 210 Naval Ships Systems II ..(3-0)	3
Pol. S. 206 American National Government(3-0)	3		
Stat. 302 Statistical Methods(2-2)	3		
	19		18

Total Hours - 151

Curriculum in MARINE ENGINEERING (MARE)

The Marine Engineering program leads to the Bachelor of Science degree in Marine Engineering and has a license option program whereby a student can qualify to sit for the U.S. Coast Guard license examination for Third Assistant Engineer, Steam and Motor Vessels, Oceans, Unlimited. Engineering theory and practice are coordinated by relating classroom study to the student's practical experience aboard the **Texas Clipper**, as well as by visits to ships and maritime industries in the Galveston-Houston port area.

Marine Engineering, closely related to mechanical engineering, emphasizes the design, operation and maintenance of maritime power plants and associated equipment. Thorough preparation in mathematics, sciences, and basic and applied engineering subjects is recommended for students pursuing this degree program.

FRESHMAN YEAR

Fall Semester	(Th-Pr)	Cr	Spring Semester	(Th-Pr)	Cr
Chem. 101 Fund. of Chem. I	(3-0)	3	Chem. 102 Fund. of Chem. II	(3-0)	3
Chem. 111 Fund. of Chem. Lab I	(0-3)	1	Chem. 112 Fund. of Chem. Lab II	(0-3)	1
E.D.G. 105 Engineering Graphics ..	(0-6)	2	E.D.G. 106 Engineering Design Graphics	(0-6)	2
Engr. 103 Composition & Rhetoric ..	(3-0)	3	Engr. 203 Intro. to Literature	(3-0)	3
MARE 101 Engineering Analysis	(0-3)	1	MARE 105 Engr. Mechanics I	(3-0)	3
Math. 104 Analytic Geometry	(3-0)	3	Math. 210 Calculus	(3-0)	3
Math. 209 Calculus	(3-0)	3	NAVS 112 Naval Ship Systems ¹ ...	(3-0)	3
16			18		

Summer Session

(Ten weeks at sea on the T/S TEXAS CLIPPER)
MARE 200 Basic Operations, Credit 4

SOPHOMORE YEAR

E.T. 309 Machine Prod. Tech.	(0-3)	1	E.T. 310 Machine Prod. Tech.	(0-3)	1
Hist. 105 History of the U.S.	(3-0)	3	Hist. 106 History of the U.S.	(3-0)	3
MARE 206 Engr. Mechanics II	(3-0)	3	MARE 207 Electricity & Magnetism	(3-2)	4
MARE 209 Mechanics of Materials .	(3-0)	3	MARE 303 Marine Thermodynamics	(3-0)	3
Math. 307 Calculus	(3-0)	3	MARE 310 Engr. Computation	(3-0)	3
Phys. 219 Electricity	(3-3)	4	Math. 308 Differential Equations	(3-0)	3
17			17		

Summer Session

(Ten weeks at sea on the T/S TEXAS CLIPPER)
MARE 300 Intermediate Operations, Credit 4

JUNIOR YEAR

Econ. 203 Principles of Economics	(3-0)	3	MARE 308 Electrical Machinery	(3-2)	4
MARE 210 Mar. Construction Mat.	(3-2)	4	MARE 410 Marine Power Plants	(2-2)	3
MARE 304 Marine Thermodynamics	(3-0)	3	M.E. 344 Fluid Mechanics	(3-0)	3
MARE 307 Electrical Circuits	(3-2)	4	Phys. 220 Modern Physics	(3-3)	4
Elective ²		3	Elective ²		3
17			17		

Summer Session
(Ten weeks at sea on the T/S TEXAS CLIPPER)
MARE 400 Advanced Operations, Credit 4

SENIOR YEAR

License Prep.(4-0)	R	MARE 412 Ship Struct. & Stability(3-0)	3
MARE 301 Fluid Mech. & Heat Trans.(3-0)	3	MARE 415 Intro. to MARE Systems Design(3-0)	3
MARE 411 Marine Mech. Design Tech.(3-0)	3	MARE 416 Engineering Lab(0-4)	1
MARE 414 Ship Automation(4-0)	4	Ocn. 401 Intro. to Oceanography(3-0)	3
Pol. S. 206 American Natl. Gov't.(3-0)	3	Technical Elective	3
Elective ²	3	Elective ²	3
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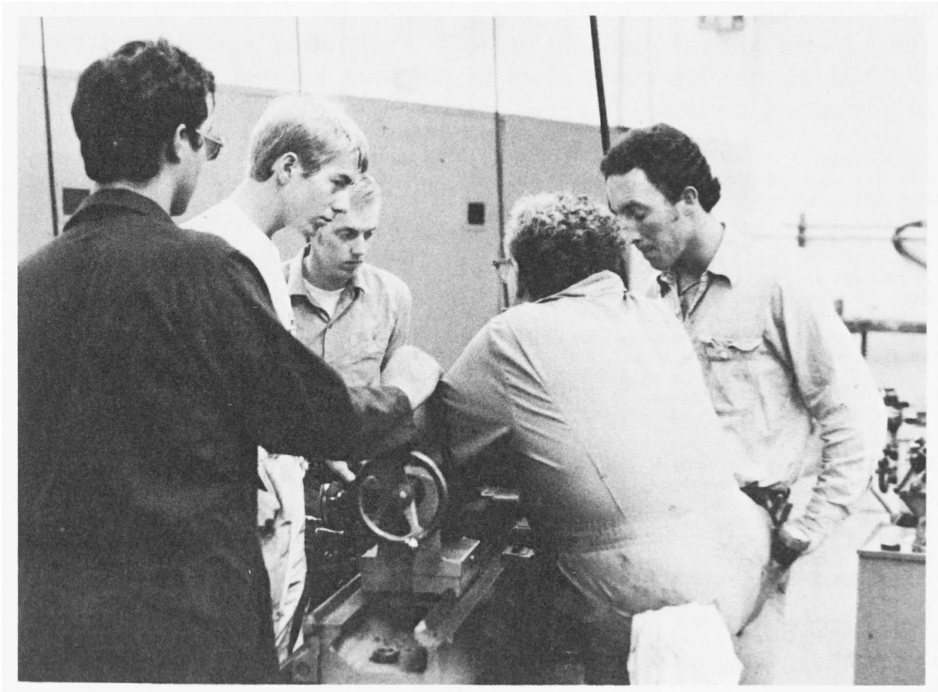
NOTES: 1. NAUT 103 for Coast Guard license candidates.

2. NAVS 210, 315, 316, and 411 for Coast Guard license candidates. If the Naval Science sequence is not elected, then one of these electives must be Pol. S. 207.

All electives must be chosen in consultation with, and approved by, the student's advisor.

Total hours: License Option 146

Non-License Option 134



Curriculum in MARINE SCIENCES (MARS)

The Marine Sciences program, with a generalist approach in science and humanities the first two years and a specialization in marine disciplines the last two years, leads to the Bachelor of Science degree in Marine Sciences. The program is designed to train students for employment in marine areas concerned with fisheries, biology, oceanography and ecology as well as employment as secondary school teachers of marine science subjects. Graduates may also engage in further study in biology, marine biology, marine fisheries, oceanography, marine and coastal ecology, and marine resources and coastal zone management.

In cooperation with the Department of Marine Transportation, Texas Maritime Academy, an option for U.S. Coast Guard license as Third Mate is offered. The license option student pursues the Marine Sciences degree program but is a member of the Corps of Cadets. He or she must meet Academy qualifications. The student may additionally be eligible for a U.S. Naval Reserve Commission as Ensign upon graduation. Graduates would qualify for careers as licensed Third Mates aboard research vessels, exploration vessels and merchant ships, or they could elect to continue their studies in pursuit of a graduate degree.

FRESHMAN YEAR

Fall Semester	(Th-Pr)	Cr	Spring Semester	(Th-Pr)	Cr
Biol. 113 Introductory Biology	(3-0)	3	Biol. 114 Introductory Biology	(3-0)	3
Biol. 123 Introductory Biology Lab	(0-3)	1	Biol. 124 Introductory Biology Lab	(0-3)	1
Chem. 101 Fund. of Chemistry I	(3-0)	3	Chem. 102 Fund. of Chem. II	(3-0)	3
Chem. 111 Fund. of Chemistry Lab I	(0-3)	1	Chem. 112 Fund. of Chemistry Lab. II	(0-3)	1
Engl. 103 Composition & Rhetoric	(3-0)	3	Engl. 104 Composition & Rhetoric	(3-0)	3
Math. 104 Analytic Geometry	(3-0)	3	Math. 209 Calculus	(3-0)	3
Naval Science or Elective		1	Naval Science or Elective		1
		<hr style="width: 50%; margin: 0 auto;"/> 15			<hr style="width: 50%; margin: 0 auto;"/> 15

SOPHOMORE YEAR

Chem. 227 Organic Chemistry I	(3-0)	3	Chem. 228 Organic Chemistry II ...	(3-0)	3
Chem. 237 Organic Chemistry Lab I	(0-3)	1	Chem. 238 Organic Chemistry Lab II	(0-3)	1
Hist. 105 History of U.S.	(3-0)	3	C. S. 203 Intro. to Computing	(3-0)	3
Math. 210 Calculus	(3-0)	3	Hist. 106 History of U.S.	(3-0)	3
Phys. 201 College Physics	(3-3)	4	Phys 202 College Physics	(3-3)	4
Pol. S. 206 American National Gov't	(3-0)	3	Pol. S. 207 State & Local Gov't. ..	(3-0)	3
Naval Science or Elective		1	Naval Science or Elective		1
		<hr style="width: 50%; margin: 0 auto;"/> 18			<hr style="width: 50%; margin: 0 auto;"/> 18

JUNIOR YEAR

Engl. 301 Technical Writing	(3-0)	3	Econ. 203 Principles of Economics	(3-0)	3
Geog. 210 Marine Geography	(3-0)	3	C.S. 204 Computers & Programming	(3-0)	3
Geol. 101 Physical Geol.	(3-2)	4	MARS 310 Field Methods	(1-6)	3
Elective*		6	MARS 440 Marine Biology	(3-3)	4
		<hr style="width: 50%; margin: 0 auto;"/> 16	Met. 301 Atmospheric Sciences	(3-0)	3
			Electives*		3
					<hr style="width: 50%; margin: 0 auto;"/> 19

SENIOR YEAR

MARS 375 Science of Fluids(3-0)	3	MARS 485 Problems in Marine Sciences(3-0)	3
MARS 420 Marine Ecology(2-3)	3	Ocn. 410 Intro. to Physical Ocn. ..(2-0)	2
MARS 481 Seminar in Marine Sciences(2-0)	1	Ocn. 430 Intro. to Geol. Ocn.(2-0)	2
Ocn. 440 Intro. to Chem. Ocn.(2-0)	2	Electives*	9
Stat. 302 Statistical Methods(2-2)	3		
Electives*	6		
	<hr/>		18
	18		

*All electives must be chosen in consultation with, and approved by, the student's advisor.
Total Hours – 135

**Curriculum in
MARINE SCIENCES WITH A LICENSE OPTION**

FRESHMAN YEAR

Fall Semester	(Th-Pr)	Cr	Spring Semester	(Th-Pr)	Cr
Biol. 113 Introductory Biology(3-0)		3	Biol. 114 Intro. Biol.(3-0)		3
Biol. 123 Introductory Biology Lab.(0-3)		1	Biol. 124 Intro. Biol. Lab(0-3)		1
Engl. 103 Composition & Rhetoric(3-0)		3	Engl. 104 Comp. & Rhetoric(3-0)		3
Hist. 105 Hist. of U.S.(3-0)		3	Math. 209 Calculus(3-0)		3
Math. 104 Analytic Geometry(3-0)		3	NAUT 203 Seamanship I(2-3)		3
NAUT 103 Orientation(2-3)		3	NAUT 204 Terrestrial Navigation(2-2)		3
		<hr/>			16
		16			16

Summer Session

(Ten weeks at sea on the T/S TEXAS CLIPPER)
NAUT 200 Basic Communication, Navigation & Seamanship, Credit 4

SOPHOMORE YEAR

Chem. 101 Fund. of Chem. I(3-0)	3	Chem. 102 Fund. of Chemistry II ..(3-0)	3
Chem. 111 Fund. of Chem. Lab I ..(0-3)	1	Chem. 112 Fund. of Chem. Lab. II ..(0-3)	1
Math. 210 Calculus(3-0)	3	C.S. 203 Intro. to Computing(3-0)	3
NAUT 210 Naval Architecture I(3-2)	4	NAUT 202 Naval Architecture II(3-0)	3
NAVS 112 Naval Ships Systems(3-0)	3	NAUT 303 Celestial Navigation(2-3)	3
Phys. 201 College Physics(3-3)	4	Phys. 202 College Physics(3-3)	4
			<hr/>
			18

Summer Session

(Ten weeks at sea on the T/S TEXAS CLIPPER)
NAUT 300 Intermediate Communication, Navigation & Seamanship, Credit 4

JUNIOR YEAR

Engl. 301 Technical Writing(3-0)	3	MARS 310 Field Methods in MARS (1-6)	3
Geol. 101 Physical Geology(3-2)	4	MART 321 Maritime Law I(3-0)	3
MART 302 Cargo I(3-3)	4	Met. 302 Weather Report/Forec.(3-0)	3
Pol. S. 206 Am. Nat'l. Gov't.(3-0)	3	NAUT 301 Seamanship II(2-3)	3
Stat. 302 Statistical Methods(2-2)	3	NAUT 304 Electronic Navigation(2-2)	3
		NAVS 316 Nav. Op. & Analysis(3-0)	3
			<hr/>
			17

Summer Session

(Ten weeks at sea on T/S TEXAS CLIPPER)
NAUT 400 Adv. Comm., Nav., & Seamanship -4
MARS 485 Problem in Marine Science -3

7

SENIOR YEAR

License Prep.(4-0)	R	Hist. 309 Am. Military Hist.(3-0)	3
MARS 420 Marine Ecology(2-3)	3	MARS 440 Marine Biology(3-3)	4
MARS 481 Seminar in Marine Science(2-0)	1	NAVS 210 Naval Ships Systems II ..(3-0)	3
MART 406 Cargo II(2-2)	3	NAVS 411 Organization & Mgmt. ..(3-0)	3
NAUT 302 Seamanship III(1-3)	2	Ocn. 410 Intro. to Physical Ocn.(2-0)	2
NAUT 404 The Navigator(2-3)	2	Ocn. 430 Intro. to Geol. Ocn.(2-0)	2
Ocn. 440 Intro. to Chem. Ocn.(2-0)	2		
			<hr/>
			14

Total Hours 148

Curriculum in
MARINE TRANSPORTATION
(MART)

The Marine Transportation Department provides a basic licensing and degree program for deck officer candidates, including option programs in marketing and management. The graduate with a Bachelor of Science degree in Marine Transportation will have completed a program that combines the humanities and sciences with marine subjects in order to meet the present and future needs of the maritime industry at sea and on shore.

Theory and practice are integrated by relating the scholastic efforts with the sea training periods on the **Texas Clipper**, and with visits to ships and maritime industries in the Galveston-Houston area. The student who successfully completes the license program will be qualified to sit for the U. S. Coast Guard license examination for a federal license as a Third Mate, Steam and Motor Vessels, Oceans, Unlimited.



Marine Transportation License Option

FRESHMAN YEAR					
Fall Semester	(Th-Pr)	Cr	Spring Semester	(Th-Pr)	Cr
Chem. 106 General Chemistry	(3-3)	4	Engl. 104 Comp. & Rhetoric	(3-0)	3
E.D.G. 105 Engineering Graphics	(0-6)	2	Mgmt. 105 Intro. to Business	(3-0)	3
Engl. 103 Comp. & Rhetoric	(3-0)	3	Math. 104 Analytic Geometry	(3-0)	3
MARE 101 Engineering Analysis	(0-3)	1	NAUT 203 Seamanship I	(2-3)	3
Math. 106 Plane & Spherical Trig.	(4-0)	4	NAUT 204 Terrestrial Navigation	(2-2)	3
NAUT 103 Mar. Orientation & Lifesaving	(2-3)	3	NAVS 112 Naval Ships Systems	(3-0)	3
					18
					17

Summer Session

(Ten weeks at sea on the T/S TEXAS CLIPPER)
NAUT 200 Basic Communication, Navigation & Seamanship, Credit 4

SOPHOMORE YEAR					
Econ. 203 Principles of Economics	(3-0)	3	Econ. 204 Principles of Economics	(3-0)	3
Hist. 105 History of the U.S.	(3-0)	3	Math. 210 Calculus	(3-0)	3
Math. 209 Calculus	(3-0)	3	NAUT 301 Seamanship II	(2-3)	3
*Met. 302 Weather Reports & Forecasting	(3-0)	3	NAUT 303 Celestial Navigation	(2-3)	3
Phys. 201 College Physics	(3-3)	4	Phys. 202 College Physics	(3-3)	4
					16
					16

Summer Session

(Ten weeks at sea on the T/S TEXAS CLIPPER)
*NAUT 300 Intermediate Communication, Navigation & Seamanship, Credit 4

JUNIOR YEAR					
Econ. 321 Interntl. Trade & Finance	(3-0)	3	MARE 310 Engr. Computations	(3-0)	3
Hist. 106 History of U.S.	(3-0)	3	MART 321 Maritime Law I	(3-0)	3
MART 301 Ocean Transportation I	(4-0)	4	MART 406 Marine Cargo Operations II	(2-2)	3
MART 302 Marine Cargo Operations I	(3-3)	4	NAUT 202 Naval Architecture I	(3-0)	3
NAUT 201 Naval Architecture I	(3-2)	4	NAUT 304 Electronic Navigation	(2-2)	3
					3
					18
					18

Summer Session

(Ten weeks at sea on the T/S TEXAS CLIPPER)
*NAUT 400 Advanced Communication, Navigation, & Seamanship, Credit 4

SENIOR YEAR					
License Prep.	(4-0)	R	B. Ana. 303 Statistical Methods	(3-3)	4
Engl. 301 Technical Writing	(3-0)	3	Econ. 485 Problems	(3-0)	3
MART 421 Maritime Law II	(3-0)	3	*NAVS 210 Naval Ships Systems II	(3-0)	3
NAUT 302 Seamanship III	(1-3)	2	*Ocn. 401 Intro. to Oceanography	(3-0)	3
*NAUT 404 The Navigator	(2-3)	3	Pol. S. 206 American National Government	(3-0)	3
*NAVS 411 Organization & Management	(3-0)	3			
					14
					16

Total Hours – 145

MARKETING AND MANAGEMENT OPTIONS

Those courses marked with an asterisk in the License Option program are replaced with Management or Marketing oriented courses under the respective option programs. Additionally, several courses not in the Management/Marketing area are required under these options.

The license and non-license option programs are identical in the Freshman year. In the Sophomore, Junior and Senior years, deletions and replacements occur.

Under both option programs, the following courses are deleted from the license program, and replaced as indicated.

Delete: Meteorology 302; Naval Science 210, 316, 411;
NAUT 300, 400, 404;
Oceanography 401. (Total 26 hrs.)

Add (Marketing): MKTG 321 – Marketing (3-0) 3
MKTG 322 – Consumer Behavior (3-0) 3
MKTG 344 – Physical Distribution Systems
(3-0) 3
MKTG 345 – Promotion Strategy (3-0) 3
MKTG 455 – Marketing Research (3-0) 3
Pol. S. 207 – State & Local Government
(3-0) 3
B. Ana. 304 – Business Cycles &
Measurements (3-0) 3
Total Hours: 21

Add (Management): MGMT 363 – Principles of Management
(3-0) 3
MGMT 211 – Legal and Social Environment
of Business (3-0) 3
MGMT 422 – Personnel Problems of
Industry (3-0) 3
MGMT 423 – Human Relations in
Business (3-0) 3
MGMT 460 – Management Systems &
Control (3-0) 3
MGMT 466 – Management Policy (3-0) 3
Pol. S. 207 – State & Local
Government (3-0) 3
B.Ana. 304 – Business Cycles &
Measurements (3-0) 3
Totals Hours: 24

It should be noted that factors of supply and demand will govern the offering of the Management and Marketing courses at Galveston. It may be necessary for some of the courses to be taken at College Station.

Curriculum in MARITIME SYSTEMS ENGINEERING (MASE)

The Maritime Systems Engineering curriculum concentrates on fundamental engineering design in combination with humanities, sciences and various marine subjects. A general core of courses in humanities, sciences, and engineering during the freshman and sophomore years provides a foundation for specialization in the options during the junior and senior years.

The program is aimed at training students for employment in any marine-oriented engineering field. Students are accepted as entering freshmen, or as transfers from engineering, math, or physical science programs at junior and community colleges. Some transfers are accepted from four-year institutions when the students desire to concentrate their education in the coastal zone.

With the proximity of the Ports of Galveston and Houston, there are field trips and guest lecturers from the local marine industries.

FRESHMAN YEAR					
Fall Semester	(Th-Pr)	Cr	Spring Semester	(Th-Pr)	Cr
Chem. 101 Fund. of Chem. I	(3-0)	3	Chem. 102 Fund. of Chem. II	(3-0)	3
Chem. 111 Fund. of Chem. Lab. I	(0-3)	1	Chem. 112 Fund. of Chem. Lab II	(0-3)	1
E.D.G. 105 Engineering Graphics ..	(0-6)	2	E.D.G. 106 Engineering Design Graphics	(0-6)	2
Engl. 103 Composition & Rhetoric ..	(3-0)	3	MARE 105 Engineering Mechanics I (Statics)	(3-0)	3
MARE 101 Engineering Analysis	(0-3)	1	Math. 210 Calculus	(3-0)	3
Math. 104 Analytic Geometry	(3-0)	3	MASE 100 Intro. to M.S. Engineering	(2-3)	3
Math. 209 Calculus	(3-0)	3	Naval Science or Elective		1
Naval Science or Elective		1			1
		17			16
SOPHOMORE YEAR					
Econ. 203 Principles of Econ.	(3-0)	3	MARE 210 Marine Construction Materials	(3-2)	4
MARE 206 Engineering Mechanics II Dynamics	(3-0)	3	MARE 303 Marine Thermodynamics	(3-0)	3
MARE 209 Mechanics of Materials	(3-0)	3	MARE 310 Engineering Computations	(3-0)	3
Math. 307 Calculus	(3-0)	3	Math. 308 Differential Equations ...	(3-0)	3
NAUT 201 Naval Architecture I	(3-2)	4	Phys. 219 Electricity	(3-3)	4
Naval Science or Elective		1	Naval Science or Elective		1
		17			18



JUNIOR YEAR

Engl. 203 Intro. to Literature(3-0)	3	C.E. 462 Hydromechanics(3-0)	3
Hist. 105 History of the U.S.(3-0)	3	Hist. 106 History of the U.S.(3-0)	3
Option Requirements*	13	Option Requirements*	12
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	19		18

SENIOR YEAR

Engl. 301 Technical Writing(3-0)	3	O.E. 401 Measurements in the Ocean(2-6)	4
O.E. 300 Dynamics of Waves and Structures(3-0)	3	Pol. S. 207 State & Local Government(3-0)	3
Pol. S. 206 American Government(3-0)	3	Option Requirements*	9
Option Requirements*	6		
	<hr/>		<hr/>
	15		16

Option Requirements – There are three options to the Maritime Systems Engineering Degree Program – Ocean Engineering, Coastal Structures, and Hydromechanics.
Total Hours – 136

It should be noted that the factors of supply and demand will govern the offering of specific courses and options at Galveston. It may be necessary for some of the courses to be taken at College Station.

OCEAN ENGINEERING OPTION REQUIREMENTS

C. E. 311 Fluid Dynamics(3-2)	4
C. E. 345 Theory of Structures(3-0)	3
C. E. 365 Soil Mechanics and Foundations(2-2)	3
Geol. 320 Geology for Civil Engineers(2-2)	3
MARE 307 Electrical Circuits(3-2)	4
Ocn. 410 Intro. to Physical Oceanography(2-0)	2
Ocn. 420 Intro. to Biological Oceanography(2-0)	2
Ocn. 430 Intro. to Geological Oceanography(2-0)	2
Ocn. 440 Intro. to Chemical Oceanography(2-0)	2
O.E. 400 Basic Coastal Engineering(3-0)	3
Science Elective (Biology)*	3
Elective (Social)*	3
Elective (Technical)*	6

40

COASTAL STRUCTURES OPTION REQUIREMENTS

C.E. 344 Reinforced Concrete Structures(2-3)	3
C.E. 345 Theory of Structures(3-0)	3
C.E. 346 Design of Members and Connections(2-3)	3
C. E. 365 Soil Mechanics and Foundations(2-2)	3
C. E. 435 Soil Engineering(2-3)	3
C.E. 483 Analysis and Design of Structures(2-3)	3
Geol. 320 Geology for Civil Engineers(2-2)	3
MARE 301 Heat Transfer(3-0)	3
MARE 412 Ship Structures and Stability(3-0)	3
M.E. 344 Fluid Mechanics(3-0)	3
M.E. 459 Mechanical Vibration(3-0)	3
Ocn. 401 Introduction to Oceanography(3-0)	3
Phys. 220 Modern Physics(3-3)	4

40

HYDROMECHANICS OPTION REQUIREMENTS

C.E. 311 Fluid Dynamics(3-2)	4
C.E. 336 Fluid Dynamics Lab(0-2)	1
E.E. 461 Electronic Instrumentation(2-3)	3
MARE 301 Heat Transfer(3-0)	3
MARE 307 Electrical Circuits(3-2)	4
Math. 311 Topics in Applied Math I(3-0)	3
Math. 312 Topics in Applied Math II(3-0)	3
M.M. 460 Introduction to Continuum Mechanics(3-0)	3
NAUT 202 Naval Architecture II(3-0)	3
Ocn. 410 Intro. to Physical Oceanography(2-0)	2
Phys. 220 Modern Physics(3-3)	4
Free Electives*	7

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*All electives must be chosen in consultation with, and approved by, the student's advisor.



COURSE DESCRIPTIONS

All undergraduate courses offered at 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.

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 16 weeks.

When courses are cross-listed, credit cannot be received for both courses.

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.

BIOLOGY

(Biol).

- 113. Introductory Biology (3-0). Credit 3.** Survey of structures and functions common to living forms in general. The course includes the principles of cell biology, regulation of growth and development, reproduction, evolution, and ecology. Laboratory (Biol. 123) is optional.
- 114. Introductory Biology (3-0). Credit 3.** Survey of major groups of living forms emphasizing their special structures and functions which enable them to exist. Survey includes prokaryotes, fungi, lower and higher plants, animals and man. Prerequisites: Biol. 113; 124 is optional.
- 123. Introductory Biology Laboratory (0-3). Credit 1.** Incorporates demonstrations and student participation covering study of rat and frog anatomy, and development and function of all major organs of body. Demonstrates principles of genetics and heredity. Effects of pollution and other environmental changes. Prerequisite: Biol. 113 or registration therein.
- 124. Introductory Biology Laboratory (0-3). Credit 1.** Laboratory supporting Biology 114. Prerequisite: Biol. 113.
- 351. Fundamentals of Microbiology. (3-4). Credit 4.** Basic microbiology; comparative morphology, taxonomy, pathogenesis, ecology, physiology of microorganisms. Prerequisites: Chem. 227, 237; three hours of biology; or approval of instructor.
- 485. Biological Problems Credit 1 to 4.** Problems in various phases of plant, animal and bacteriological science. Prerequisites: Junior classification; approval of ranking professor in field chosen.

BUSINESS ANALYSIS

(B.Ana.)

- 303. Statistical Methods (3-3). Credit 4.** The collection, tabulation and presentation of numerical data. A study of sampling, estimation of averages and variation, probability and error, hypothesis testing and correlation. Prerequisite: Math. 130.
- 304. Business Cycles and Business Measurement. (3-0). Credit 3.** Empirical and statistical study of economic fluctuations: business barometers and forecasting; statistical techniques for preparing individual organizational forecasts and long-range plans. Prerequisite: B.Ana. 303 or equivalent.
- 485. Problems. Credit 1 to 3 each semester.** Directed study of selected problems in an area of business analysis not covered in other courses. Prerequisite: Approval of Department Head.

CHEMISTRY

(Chem.)

- 101. Fundamentals of Chemistry I. (3-0). Credit 3.** Introduction to modern theories of chemical bonding; chemical reactions; states of matter; solutions and colloids; stoichiometry and equilibrium.
- 102. Fundamentals of Chemistry II. (3-0). Credit 3.** Theory and applications of oxidation-reduction systems; complex equilibria; descriptive inorganic and organic chemistry; introduction to chemical instrumentation; selected topics in biochemistry and nuclear chemistry. Prerequisites: Chem. 101.
- 106. General Chemistry (3-3). Credit 4.** Survey course in chemistry for students needing a cultural subject; not a basis for advanced work.
- 111. Fundamentals of Chemistry Laboratory I (0-3). Credit 1.** Introduction to methods and techniques of chemical experimentation with emphasis on qualitative and semi-quantitative procedures applied to investigative situations. Prerequisite: Chem. 101 or registration therein.
- 112. Fundamentals of Chemistry Laboratory II (0-3). Credit 1.** Introduction to analytical and synthetic methods and to quantitative techniques to both inorganic and organic compounds with emphasis on an investigative approach. Prerequisites: Chem. 101, 111; Chem. 102 or registration therein.
- 227. Organic Chemistry I (3-0). Credit 3.** Introduction to chemistry of compounds of carbon. Study of general principles and their application to various industrial and biological processes. Prerequisite: Chem. 102 or 104.
- 228. Organic Chemistry II (3-0). Credit 3.** Continuation of Chem. 227. Prerequisite: Chem. 227.
- 237. Organic Chemistry Laboratory I (0-3). Credit 1.** Operations and techniques of elementary organic chemistry laboratory. Preparation, reactions and properties of representative organic compounds. Prerequisite: Chem. 227 or registration therein.
- 238. Organic Chemistry Laboratory II (0-3). Credit 1.** Continuation of Chem. 237. Prerequisites: Chem. 228, 237 or registration therein.
- 383. Chemistry of Environmental Pollution. (3-0). Credit 3.** Chemical pollutants in the air, in water and on land: their generation, chemical reactivity, action on environment and disappearance through chemical mechanisms. Chemistry of existing pollution abatement. Prerequisite: Chem. 228 or equivalent.
- 485. Problems. Credit 1 or more.** Introduction to research, library, and laboratory work. Prerequisites: Senior classification; approval of Department Head.

CIVIL ENGINEERING

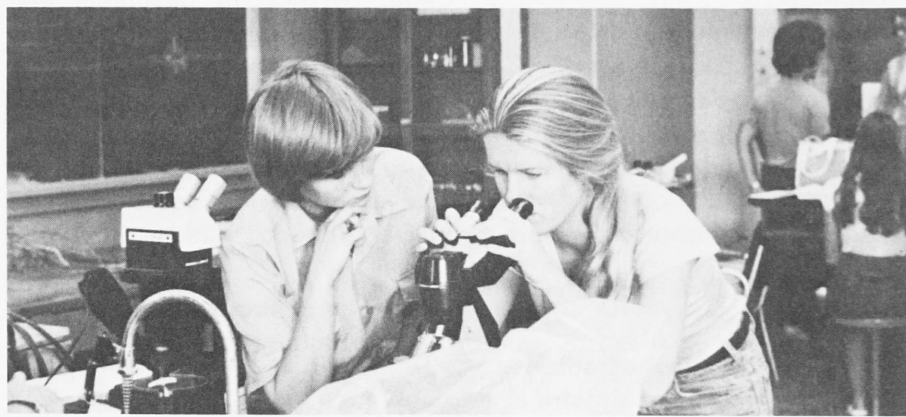
(C.E.)

- 311. Fluid Dynamics. (3-2). Credit 4.** Fluid properties; statics; kinematics; basic conservation principles of continuity, energy and momentum; similitude and hydraulic models; incompressible flow in pipes and open channels; fluid dynamic drag. Introduction to laboratory techniques, calibration principles, reports and fluid measurements. Prerequisites: Math 308 or equivalent; M.E. 213.
- 336. Fluid Dynamics Laboratory. (0-2). Credit 1.** Introduction to laboratory techniques, calibration principles, reports and fluid measurements. Determination of fluid properties. Visualization to types of flow. Experiments in closed conduit flow of air, water and oil. Fluid drag and turbomachinery tests. Open channel and gravity wave demonstrations. Prerequisite: C.E. 311.
- 344. Reinforced Concrete Structures. (2-3). Credit 3.** Analysis and design of reinforced concrete beams, columns, slabs, and footings using elastic and ultimate strength methods. Prerequisite: C.E. 345.
- 345. Theory of Structures. (3-0). Credit 3.** Introduction to structural engineering; loads, reactions, and force systems; reactions and forces in beams, three-hinged arches, and trussed structures; moment area method applications, moment distribution method of analyzing statically indeterminate structures, forces, and reactions in bents and portals; influence lines and criteria for moving loads. Prerequisite: C.E. 205.
- 346. Design of Members and Connections. (2-3). Credit 3.** Design of tension members, compression members, beams, riveted joints, and welded joints. Theory and practice as indicated in typical current specifications. Prerequisite: C.E. 345.
- 365. Soil Mechanics and Foundations. (2-2). Credit 3.** Introduction to soil mechanics and its application in civil and architectural engineering; origin, formation processes, and types of soils. Methods of exploration and soil testing required for design of various types of foundations, retaining walls, and other engineering structures. Prerequisites: For civil engineering students, C.E. 205, Geol. 320; for architectural construction students, Geol. 320.
- 435. Soil Engineering. (2-3). Credit 3.** Primarily a design course covering settlement, slope stability, bearing capacity of shallow and deep foundations, and earth pressure for retaining structures. This course can be considered a general course in soil engineering for graduate students not primarily interested in soil mechanics, but desiring additional training beyond the general undergraduate level. Prerequisites: C.E. 365; senior or graduate classification.

462. Hydromechanics. (3-0). Credit 3. Fundamental concepts of a fluid; properties, and state. Fluid kinematics; finite control volume applications of basic equations for steady and unsteady systems. Fundamental differential equations of continuity and motion, ideal fluids. Boundary layer concepts. Wall turbulence; boundary layers and conduits. Dynamic similitude. Transport analogies. Prerequisite: Aero. 301 or C.E. 311 or M.E. 344.

483. Analysis and Design of Structures. (2-3). Credit 3. 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. Prerequisites: C.E. 344, 346, 365.

485. Problems. Credit 1 to 3 each semester. Research and design problems of limited scope approved on an individual basis intended to promote independent study. Results of study presented in writing. Prerequisite: Approval of Department Head.



COMPUTING SCIENCE (C.S.)

201. Computer Programming for Engineers. (1-0). Credit 1. Programming using the FORTRAN language. Actual writing of typical programs and running them on the computer is emphasized.

203. Introduction to Computing. (3-0). Credit 3. Algorithms, programs, and computers. Basic programming and program structure. Data representation. Computer solution of numerical and non-numerical problems using a high-level programming language.

204. Computers and Programming. (3-0). Credit 3. Logical design and internal operation of a digital computer facilitated by use of System/360 assembly language. Prerequisite: C.S. 203.

485. Problems. Credit 1 to 3. Permits work on special project in computing science. Project must be approved by Department Head. Prerequisite: Senior classification.

ECONOMICS

(Econ.)

- 203. Principles of Economics. (3-0). Credit 3.** Elementary principles of economics; the economic problem, measurement and determination of national income, money and banking, theory of price. Prerequisite: Sophomore classification.
- 204. Principles of Economics. (3-0). Credit 3.** Analysis of economic aggregates, theory of production and of the firm, international economic relations and labor problems. Prerequisite: Econ. 203.
- 318. Economics of Labor. (3-0). Credit 3.** Study of the economics of the labor market: factors affecting the economy's demand for labor and the supply of labor; labor market problems such as unemployment and poverty; the economics of trade unions and collective bargaining. Prerequisite: Econ. 204.
- 321. International Trade and Finance. (3-0). Credit 3.** Theory of international trade, barriers to trade, balance of payments and foreign exchange analysis, current policy problems. Prerequisite: Econ. 204.
- 485. Problems Credit 1 to 3.** Research and design of specific problem areas approved on an individual basis with the intention of promoting independent study and to supplement existing course offerings. Results of study presented in writing. Prerequisite: Major or minor in economics; approval of Department Head.

ELECTRICAL ENGINEERING

(E.E.)

- 461. Electronic Instrumentation. (2-3). Credit 3.** A course for students who are not electrical engineering majors. Concerned with applications of electronic instruments to research problems in field of measurements and control systems. Prerequisites: Math. 308, Phys. 219.
- 485. Problems. Credit 1 to 3 each semester.** Problems of limited scope approved on individual basis intended to promote independent study. Results of study will be presented in writing, and an oral presentation to staff and students will be required. Prerequisites: Senior classification; approval of Department Head.

ENGINEERING DESIGN GRAPHICS

(E.D.G.)

- 105. Engineering Graphics (0-6). Credit 2.** Introduction to the graphical approach to the engineering design process as applied to elementary systems. Methods of graphical communications, working drawings, data analysis, technical reports, oral presentations. Introduction to team organization and creative problem solving.

- 106. Engineering Design Graphics (0-6). Credit 2.** Introduction to engineering design with emphasis on product development and team dynamics utilizing graphical methods and descriptive geometry. Special analysis of geometric elements, vectors, data analysis and graphical applications to a variety of engineering areas. Prerequisite: E.D.G. 105.
- 485. Problems. Credit 1 to 3 each semester.** Special problems to fit needs of individual students. Prerequisite: Approval of instructor.

ENGINEERING TECHNOLOGY (E.T.)

- 207. Industrial Materials and Manufacturing Processes. (2-3). Credit 3.** Comprehensive study of production, processing, and use of numerous raw materials of industry. Laboratory work consists of problems involving research and experimentation.
- 308. A Study of Modern Industry. (3-0). Credit 3.** Study of political, historical, and geographical factors, including location, machinery, power, raw materials, market, and labor which have direct influence upon development and distribution of industries. Specific studies of individual industries are made such as iron, steel, paper, automobile, petroleum, cement, leather, plastics, and textiles. Prerequisite: E.T. 207 or approval of Department Head.
- 309. Machine Production Techniques (0-3). Credit 1.** Lecture demonstrations and practice 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. Prerequisites: E.D.G. 105.
- 310. Machine Production Techniques (0-3). Credit 1.** Continuation of E.T. 309. Machining of metals with both standard and production machine tools. Manufacture of interchangeable parts, jigs, fixtures and fixed gauges. Prerequisite: E.T. 309.
- 326. Metals Technology. (2-3). Credit 3.** Design and construction of power machinery including development of plans for procedures, jigs, and fixtures; study of metallurgy, material and procedures of foundry; numerical control and advanced machine shop. Prerequisite: E.T. 207, E.T. 309.
- 429. Foremanship and Supervision. (3-0). Credit 3.** Study of supervisory duties and responsibilities in industrial organization and procedures for meeting these responsibilities. Prerequisite: Senior classification.

- 481. Seminar. (1-0). Credit 1.** Presentation of selected topics from current literature and related industrial operations in various technical areas. Films showing practical application of manufacturing and industrial processes. Lectures from industrial representatives. Prerequisite: Senior classification.
- 485. Problems. Credit 1 to 3.** Permits work in a special problem area on an individual basis with the intent of promoting independent reading, research, and study; to supplement existing course offerings or subjects not presently covered. Prerequisites: Senior classification and approval of Department Head.

ENGLISH

(Engl.)

- 103. Composition and Rhetoric (3-0). Credit 3.** Composition of short papers, with emphasis on sentence structure, paragraph development and paper organization. Analysis of expository prose.
- 104. Composition and Rhetoric (3-0). Credit 3.** Continuation of Engl. 103. More complex methods of paper development; investigative papers; readings in prose. Prerequisite: Engl. 103 or advanced standing.
- 203. Introduction to Literature (3-0). Credit 3.** Readings in following types: plays, stories, novels and poems, chiefly modern. Papers on readings. Prerequisite: Engl. 103 or advanced standing.
- 212. Shakespeare. (3-0). Credit 3.** Study of major plays of Shakespeare with lectures on his art, his language, and his cultural environment. Prerequisite: Completion of freshman program in English.
- 301. Technical Writing (3-0). Credit 3.** Advanced writing in technical, scientific and business fields; reports, proposals and other papers; correspondence. Prerequisite: Junior class standing.
- 412. Shakespeare. (3-0). Credit 3.** Analysis of plays, texts, language, dramatic theory; Shakespearean criticism and scholarship. Prerequisite: Engl. 212 or six hours of advanced literature courses.
- 485. Problems. Credit 1 to 3.** Readings for specific needs of major or minor in English; approval of Department Head.
- 489. Special Topics in ——. (3-0). Credit 3.** Study of selected topics in an identified area of English language and literature. May be repeated for credit.

GENETICS

(Gen.)

- 301. Genetics. (4-0). Credit 4.** Fundamental principles of genetics: physical basis of Mendelian inheritance, expression and interaction of genes, linkage, sex linkage, biochemical nature of genetic material and mutation. Prerequisite: Biol. 101 or 107.
- 485. Problems. Credit 1 to 4 each semester.** Special problems for advanced undergraduates permitting laboratory investigations of subject matter not included in established courses. Prerequisites: Gen. 301 or 310.

GEOGRAPHY

(Geog.)

- 201. Introduction to Human Geography. (3-0). Credit 3.** A systematic comparative survey of the like climatic regions of the world and their dissimilar cultural developments. The respective roles in human geography of physical environment, race, and culture.
- 210. Marine Geography (3-0). Credit 3.** Introduction to the physical and cultural patterns of the coastal zones of the world. Interrelationships between the physical forms and processes and the cultural patterns will be utilized to analyze the human use and abuse of the sea.
- 315. Geography of the Sea. (3-0). Credit 3.** Introduction to principal characteristics and problems of human use of the sea. Watercraft, exploration, fisheries, minerals, law of the sea, world shipping.
- 380. Workshop in Environmental Studies. (1-4). Credit 3.** The study, understanding, and solution of real man-environment problems based on principles learned in the classroom. Library, laboratory, and field work carried out by individuals and in groups; reports on work accomplished. May be repeated for credit as many as three times. Prerequisite: Approval of Department Head.
- 485. Problems. Credit 1 to 6 each semester.** Individually supervised research or advanced study on restricted areas not covered in regular courses. Prerequisite: Approval of Department Head.

GEOLOGY

(Geol.)

- 101. Physical Geology. (3-2). Credit 4.** General principles of physical geology; structure of the earth, origin of minerals and rocks, and geologic processes.
- 102. Historical Geology. (3-2). Credit 4.** Introduction to historical geology, including review of hypotheses of earth's origin, significance of fossils, origin and character of selected geologic formations, and development of North American continent. Prerequisite: Geol. 101 or 320.

- 203. Crystallography and Mineralogy. (2-6). Credit 4.** Crystallography and descriptive mineralogy. Sight recognition of crystal forms and of common minerals. Prerequisites: Chem. 102 or 104; Math. 104 or 121.
- 306. Stratigraphy and Sedimentation. (3-3). Credit 4.** Principles of stratigraphy and the origin, transportation, and deposition of sediments. Laboratory work in sampling, analyzing, and interpreting sedimentary rocks. Prerequisite: Geol. 245, 303.
- 320. Geology for Civil Engineers. (2-2). Credit 3.** Principles of dynamic and structural geology and study of common minerals and rocks with their relationships and applications to construction, foundations, and excavation. Prerequisite: Sophomore classification in civil engineering or architecture.
- 485. Problems. Credit 1 to 3 each semester.** Advanced problems in geology.

HISTORY

(Hist.)

- 105. History of the United States (3-0). Credit 3.** English colonization; Revolution, adoption of Constitution; growth of nationalism; cotton and slavery problem; war for Southern independence; Reconstruction.
- 106. History of the United States (3-0). Credit 3.** Since Reconstruction; new social and industrial problems; rise of progressive movement; United States emergence as world power; World War I; reaction and New Deal; World War II; contemporary America. Prerequisite: Hist. 105.
- 307. History of American Sea Power. (3-0). Credit 3.** Development of American sea power from the 18th Century to the present.
- 309. American Military History Since 1901. (3-0). Credit 3.** Intensive study of American military experience from colonial days to present, emphasizing causes, nature and effect of wars in which the United States has participated. Close attention given to effect of war on American history. Prerequisites: Hist. 106 or 206; Junior classification.
- 318. International Developments Since 1918. (3-0). Credit 3.** General survey of world politics since close of World War I. Particular attention given to problems and ideologies of great powers of Europe and to those factors and conditions which explain present political tendencies and policies.
- 485. Problems. Credit 1 to 3.** Seminar instruction in selected fields of History not covered in depth by other courses. Reports, extensive reading, and comprehensive final examination required. Prerequisite: Approval of Department Head.

MANAGEMENT

(Mgmt.)

- 105. Introduction to Business (3-0). Credit 3.** Provides overall picture of business operation; includes analysis of specialized fields within business organization; identifies role of business in modern society.
- 211. Legal & Social Environment of Business. (3-0). Credit 3.** Role of law in business and society. Legal reasoning, methods of interacting, social policy and legal institutions. Prerequisite: Sophomore classification.
- 363. The Organizing Process (3-0). Credit 3.** Theories and practices of organizing and managing business organizations and human resources to achieve production and human objectives in a complex, changing economy. Prerequisite: Junior classification.
- 422. Personnel Problems of Industry (3-0). Credit 3.** Relation of worker to his employer. Job finding and interviewing, occupational trends, functions and structure of personnel departments. Problems of contemporary industrial development. Prerequisite: Mgmt. 363.
- 423. Human Relations in Business (3-0). Credit 3.** Study of problems arising from association of people in work environments. Prerequisite: Psy. 107. Mgmt. 363.
- 460. Management Systems and Control (3-0). Credit 3.** A study of man-machine systems, with emphasis on the development and use of computer simulation models to provide planning and control information to management. Prerequisites: B.Ana. 317; Mgmt. 363.
- 466. Management Policy (3-0). Credit 3.** Policy problems of business organization. Integrates fields of marketing, finance, accounting, economics, law and insurance into decision making. Prerequisite: Mgmt. 363 and Senior classification in Business Administration.



MARINE BIOLOGY (MARB)

- 310. Introduction to Cell Biology. (3-3). Credit 4.** Introduction to the basic principles of cell structure and function. Molecular components of the cell, methods for study of the cell, structural bases of the cell cytoplasm and cytoplasmic organelles and their structure and function with particular emphasis on nucleus will be studied. Prerequisites: Biol. 113 or 114 and Chem. 228.
- 408. Biology of the Algae. (3-3). Credit 4.** Morphology, taxonomy, ecology, and phylogeny of the fresh water and marine algae. Prerequisite: Biol. 113 and Biol. 114 or approval of instructor. Cross-listed with Biology 408.
- 420. Comparative Physiology. (3-3). Credit 4.** A study of the principles of animal physiology. Vertebrates and invertebrates will be studied with particular emphasis on marine species. Basic concepts of osmotic and ionic regulation, excretion, respiration, metabolism, nervous integration, muscles, hormones and homeostasis will be considered. Prerequisites: 12 hours, biological sciences and Chem. 228.
- 481. Seminar in Marine Biology. (1-0). Credit 1.** Problem oriented discussion session — topics and reports selected for current relevance in marine biology, Prerequisite: approval of Department Head.
- 482. Seminar in Marine Biology. (1-0). Credit 1.** Problem oriented discussion session — topics and reports selected for current relevance in marine biology. Prerequisite: approval of Department Head.
- 485. Problems in Marine Biology. Credit 1 to 6 per semester.** Special topics and problems suited to analysis by individuals or small groups concerning aspects of marine biology. Prerequisite: approval of Department Head.

MARINE ENGINEERING (MARE)

- 101. Engineering Analysis. (0-3). Credit 1.** Methods available for solution of engineering problems. The slide rule, graphical techniques and digital computer techniques included.
- 105. Engineering Mechanics I. (3-0). Credit 3.** Basic concepts of force, mass, and acceleration are covered for particles and rigid bodies. Center of gravity, analysis of structures, friction, moments of inertia are stressed. Prerequisite: Math 210 or registration therein.
- 200. Basic Operations. Credit 4.** Represents practical application of student's classroom studies while at sea in training ship during sea training period. Student required to complete several projects relating to engineering plant of ship.
- 202. Introduction to Marine Engineering Operations. Credit 4.** Introduction to the various aspects of shipboard marine engineering operations during the summer training cruise for students not intending to obtain Coast Guard License. Prerequisite: NAVS 112.

- 203. Diesel Engine Technology. (2-2) Credit 3.** Basic principles of two and four-stroke cycle diesel engines; intake, scavenging and exhaust systems; injection systems; starting and reversing methods; cooling and lubricating systems; engine room layout in modern motor vessels.
- 206. Engineering Mechanics II. (3-0). Credit 3.** Dynamics; graphical & algebraic solutions of relative linear velocities and acceleration; kinetics; dynamics of translation and rotation; work; energy; impact; momentum. Prerequisite: MARE 105.
- 207. Electricity & Magnetism. (3-2). Credit 4.** Introduction to basic electricity, electric & magnetic circuits studied under D-C and A-C steady-state condition. Complex numbers, phasor algebra, and three-phase circuits introduced. Prerequisite: Math. 210.
- 209. Mechanics of Materials. (3-0). Credit 3.** Fundamental principles underlying analysis and design of machine members subjected to various combinations of loading. Emphasis given to theoretical and empirical basis for material specification formulas as found in United States Coast Guard Marine Engineering Regulations.
- 210. Marine Construction Materials. (3-2). Credit 4.** Analysis of properties of solid materials as related to marine engineering design and applications. Introduction to metallurgical processes. Prerequisite: Chem. 102.
- 216. Kinematic Drawing. (0-3). Credit 1.** Problems and drafting involving linkages, cams, centros, relative linear velocities, and relative acceleration. Prerequisite: MARE. 206 or registration therein.
- 300. Intermediate Operations. Credit 4.** Training program for second sea training period. Sea projects required of each student under supervision of officer-instructors. Lifeboat and safety training included.
- 301. Fluid Mechanics and Heat Transfer. (3-0). Credit 3.** Application of principles of fluid statics and dynamics to marine engineering problems. Study of fundamental laws relating to heat flow. Characteristics of pumps, topics in compressible flow.
- 303. Marine Thermodynamics. (3-0). Credit 3.** Energy concepts. First and second law of thermodynamics. Carnot and Rankine principles and reversible heat cycles. Properties and processes of vapors, vapor-power cycles and vapor refrigeration cycles.
- 304. Marine Thermodynamics. (3-0). Credit 3.** Properties and processes of perfect gases, gas compression cycles, gas power cycles, air refrigeration cycles, and processes involving mixture of gases and vapors.
- 305. Introduction to Marine Nuclear Engineering. (3-3). Credit 4.** Preparation for advanced work in nuclear propulsion in field of marine nuclear engineering. Basic nuclear physics, ship reactors, nuclear instrumentation and radiation health protection. Prerequisites: Physics 202 or 219; Math 210 or Math 122.

- 306. Marine Refrigeration and Air Conditioning. (2-2). Credit 3.** Theory and practice of mechanical refrigeration. Specific topics include; thermodynamics of Reverse Carnot cycle; vapor compression cycles; thermal, physical and chemical properties of refrigerants. Descriptions of shipboard ventilation and air conditioning.
- 307. Electrical Circuits. (3-2) Credit 4.** Study in fundamental electrical theory as it applies to understanding of behavior, mode of operation, applications, and maintenance of electrical equipment as used aboard ship. Measurements of circuit phenomena, including fundamental amplifiers and rectifiers. Prerequisites: Math 122; Phys. 219.
- 308. Electrical Machinery. (3-2). Credit 4.** Study of principal types of electrical machines aboard ship including their characteristics, applications, and control devices. Laboratory work includes actual operation and testing of electrical machinery and equipment of type installed aboard ships.
- 310. Engineering Computation. (3-0). Credit 3.** Techniques of problems solving using digital computers; concepts and properties of algorithms; solution of computational problems using algorithms defined by FORTRAN. Flow diagrams and program preparation. Prerequisite: Math. 210.
- 400. Advanced Operations. Credit 4.** Training program for third sea training period. At end of this period each student will have achieved knowledge and will have demonstrated his ability to take complete charge of modern marine power plant while underway at sea.
- 401. Nuclear Propulsion I. (3-0). Credit 3.** Study of reactor mechanics with emphasis placed on fluid hydraulics, reactor core design, reactor fuels and their properties, shielding, construction and operation of related auxiliary machinery.
- 403. Marine Steam and Gas Turbines. (2-2). Credit 3.** Analysis of gas turbine cycles, high speed gas flow, turbine and compressor kinematics and thermodynamics. Construction of marine steam turbines and their operating principles as applied to main propulsion and auxiliary use aboard ship. Reciprocating engines.
- 405. Steam Generators. (2-2). Credit 3.** Characteristics, historical development, and classification of marine boilers. Construction specifications of U.S. Coast Guard Marine Engineering Regulations. Principles of combustion and boiler heat balance when using fuel oil. Water conditioning and procedures in operation and maintenance.
- 407. Marine Electronics Technology. (3-2). Credit 4.** Study of the theory of operations and characteristics of electron devices and circuits with emphasis on marine applications. Prerequisites: MARE 307; Math. 308.

Nuclear Propulsion II. (2-2). Credit 3. Study of reactor controls and instrumentation including basic electronics, design, installation, and maintenance of various types of control systems. Survey of nuclear propulsion and marine industry. Advantage taken of shipboard nuclear facilities in Galveston area for practical field trips.

Marine Power Plants. (2-2). Credit 3. Discussion of the selection and application of systems for marine propulsion and auxiliary systems. Analysis of propulsion and auxiliary system requirements. Prerequisite: MARE 304.

Marine Mechanical Design Technology. (3-0). Credit 3. Analysis of the design and application of components in marine mechanical systems.

Ship Structures and Stability. (3-0). Credit 3. Introduction to naval architecture involved in ship design. Topics include geometry of the ship, evaluation of stability, motions in waves, and analysis of ships' structures. Prerequisite: MARE 209.

Ship Automation I. (4-0). Credit 4. Study of closed loop devices including electrical, hydraulic, and mechanical systems. Ship application of automation, both current and future. Survey of electronics, instrumentation, and control. Prerequisites: MARE 308; MARE 308.

Introduction to Marine Engineering Systems Design. (3-0). Credit 3. Application of systems engineering techniques in the solution of marine engineering problems regarding reliability, economic, and environmental considerations. Prerequisites: MARE 410.

Engineering Laboratory I. (0-4). Credit 1. Analysis of fundamentals of machinery dynamics, heat transfer, fluid friction losses in piping systems, steam nozzles. Steam reciprocating and diesel engines are studied. Prerequisite: Senior classification.

Engineering Laboratory II. (0-4). Credit 1. Performance analysis of turbine machinery, air conditioning systems, basic mechanical and pneumatic control systems. Prerequisite: Senior classification.

Fundamentals of Radiation Control. (3-0). Credit 3. Radiation control from the standpoint of protection, use of instrumentation, dosimetry, contamination control, waste disposal, radiation accidents and governmental regulations with emphasis on shipboard applications. Prerequisite: MARE 401.

Ship Automation II. (3-2). Credit 4. Continuation of MARE 414. Use of frequency response and S-plane methods in control systems design. Laboratory work includes simulation of control systems design. Prerequisites: MARE 407, 414.

Problems. Credit 1 to 4 each semester. Special problems in marine engineering not covered by any other course in the curriculum. Work may be in either theory or laboratory. Prerequisite: Approval of Department Head.

MARINE SCIENCES (MARS)

- 310. Field Methods in Marine Science. (1-6). Credit 3.** The field experience will focus primarily on the techniques of documenting collected materials, the methods of reconnaissance and the mapping of traverses in the major coastal environments. Sampling and recording techniques, interview procedures and the use of base maps and remotely sensed imagery will be introduced. Prerequisites: 15 hours of Marine Sciences or the equivalent.
- 311. Ichthyology. (2-3). Credit 3.** Designed to familiarize student with fresh-water and marine fishes. Subject will be mainly systematic, but evolution, ecology, life history, and economics of more important species will be treated. Prerequisite: Biol. 318 or W.F.S. 302. Cross-listed with W.F.S. 311.
- 312. Field Ichthyology. (1-6). Credit 3.** Field and laboratory studies on identification and ecology of fresh-water and marine fishes of Texas. Field trips required. Prerequisite: W.F.S. 311. Cross-listed with W.F.S. 312
- 320. Coastal Zone Environments. (3-0). Credit 3.** Genesis, description, classification, and geographical distribution of the major coastal zone environments and the processes responsible for both construction and destruction. The interactions of man with both "natural" and "modified" environments will be surveyed.
- 375. Science of Fluids. (3-0). Credit 3.** Classical fluid mechanics with emphasis on fundamental physical principles. Fluid statics, principles of fluid motion, frictionless flow, surface waves, viscous flows, turbulence, molecular basis of fluid mechanics. Prerequisite: Math. 210.
- 415. Invertebrate Fisheries. (2-2). Credit 3.** Study of the fisheries of invertebrates as opposed to invertebrate culture. History, present importance and future outlook of invertebrates in the fisheries of various countries. Emphasis on United States and Texas. Prerequisite: A course in invertebrate zoology. Cross-listed with W.F.S. 415.
- 418. Fisheries Population Dynamics. (2-2). Credit 3.** Study of recruitment, growth, natural mortality and exploitation of populations with emphasis on their implications to management of commercial fisheries. Prerequisites: Stat. 201 or 302; Math. 230; or approval of instructor. Cross-listed with W.F.S. 418.
- 420. Marine Ecology. (2-3). Credit 3.** Relationship between various marine environments and their inhabitants; intra and interspecific relationships between organisms; structure and function among marine communities. Laboratory emphasis is placed on study of living material and natural habitats in the Gulf of Mexico. Prerequisites: Biol. 114 and 124 or approval of instructor.

- 435. Invertebrate Zoology. (3-3). Credit 4.** General biology of marine invertebrate animals with special emphasis on morphology, evolution and systematics. Laboratory will stress the studies of local fauna. Prerequisites: Biol. 114 and 124 or approval of instructor. Cross-listed with Biol. 435.
- 440. Marine Biology. (3-3). Credit 4.** Introduction to biology of common organisms inhabiting bays, beaches, and near-shore oceanic waters, with special reference to Gulf of Mexico biota. Lectures, laboratory studies and field trips will emphasize classification, and economic aspects of marine organisms. Prerequisites: Biol. 113, 114, 123, 124 or equivalent; approval of instructor. Cross-listed with Biol. 440.
- 450. Developmental Biology of Marine Organisms. (3-3). Credit 4.** Principles of developmental biology and descriptive and analytical embryology of selected marine invertebrates and fishes. Prerequisites: Mar.S. 435 or Biol. 435.
- 481. Seminar. (1-0). Credit 1.** Problem oriented discussion session. Topics and reports selected for current relevance. Prerequisite: Approval of Department Head.
- 485. Problems. Credit 1 to 6 each semester.** Special topics and problems suited to analysis by individuals or small groups concerning aspects of marine sciences. Prerequisite: Approval of Department Head.
- 489. Selected Topics. (3-0). Credit 3.** Selected topics in an identified area of Marine Sciences. May be repeated once for credit. Prerequisite: Approval of Instructor.

MARINE TRANSPORTATION (MART)

- 301. Ocean Transportation I (4-0). Credit 4.** Concerned with shipping in world economy. Production of service, including shipping process, equipment, labor, conferences, rate-making, role of government. Buying of service by shipper, finance of shipping, international conventions and treaties.
- 302. Marine Cargo Operations I. (3-3). Credit 4.** Objectives and problems with break-bulk cargo handling during loading, discharging and in-transit carriage. Requirements of special refrigerated and dangerous cargos. Heavy lift operations with conventional cargo gear and its restraints. Cargo loss prevention, safety and related documentation, as well as log book entries. Modern cargo concepts – containerization, roll-on roll-off, LASH and others. Maximum cargo efficiency with relation to space, cargo gear, crew and labor costs. Practical cargo gear use and cargo observations during lab periods.

- 304. Ocean Transportation II. (3-0). Credit 3.** Covers marine insurance problems and cases and how they relate directly to a ship's officer. Hull, cargo and personal injury cases are examined from the officer and insurers point of view. Introduction to Admiralty Law and the court process for Seamen's rights and ship owner's privileges. Actual hearings and trials are observed to complete the background. Prerequisite: MART 301 or Approval of Department Head.
- 321. Maritime Law I. (3-0). Credit 3.** Provides a thorough foundation in basic laws governing vessel navigation — with particular emphasis on International and U.S. Inland Rules for the prevention of collision at sea, and the safety of life at sea convention. Prerequisite: NAUT 200.
- 402. Ocean Transportation III. (4-0). Credit 4.** Covers essential principles of Admiralty and Maritime Law, advanced principles of marine insurance. Takes up in detail standard forms and Institute Clauses. Attention paid to nuclear maritime insurance activities. Principles of International Law are discussed. Prerequisite: MART 304.
- 406. Marine Cargo Operations II. (2-2). Credit 3.** Principles and practice of bulk liquid and gas handling and carriage by water craft. Theoretical and practical problems involved in loading, stowing and discharging of petroleum, chemical, elevated temperature and cryogenic cargoes. Attention paid to marine pollution abatement, personnel safety and fire-fighting techniques and systems.
- 416. Port Operations, Administration and Economics. (3-0). Credit 3.** Concept of the port and methods of intermodal transfer are described. Port functions divided and analyzed along business lines — economics, management, finance, accounting and marketing. Case studies. Prerequisites: Econ. 321, Management 105, or approval of Department Head.
- 421. Maritime Law II. (3-0). Credit 3.** Essential principles of admiralty, general maritime and international law as applicable to the marine industry and ocean shipping. Discusses the evolution and state of the law concerning maritime liens, ship mortgages, rights of seaman and harbor workers, limitation of liability, bills of lading and cargo carriage, collision liability, general average, marine salvage, charter parties and international rights and responsibilities of ships and shipping.
- 481. Seminar. (0-2).Credit 1.** Problem oriented discussion session. Topics and reports selected for relevance to current problems. Prerequisite: Approval of Department Head.
- 485. Problems. Credit 1 to 4 each semester.** Directed study in problems in marine transportation not covered by other courses in the department. Prerequisite: Senior classification or approval of Department Head.

489. Special Topics in Marine Transportation. (3-0). Credit 3. Study of selected topics in an identified area of Marine Transportation and Nautical Science.

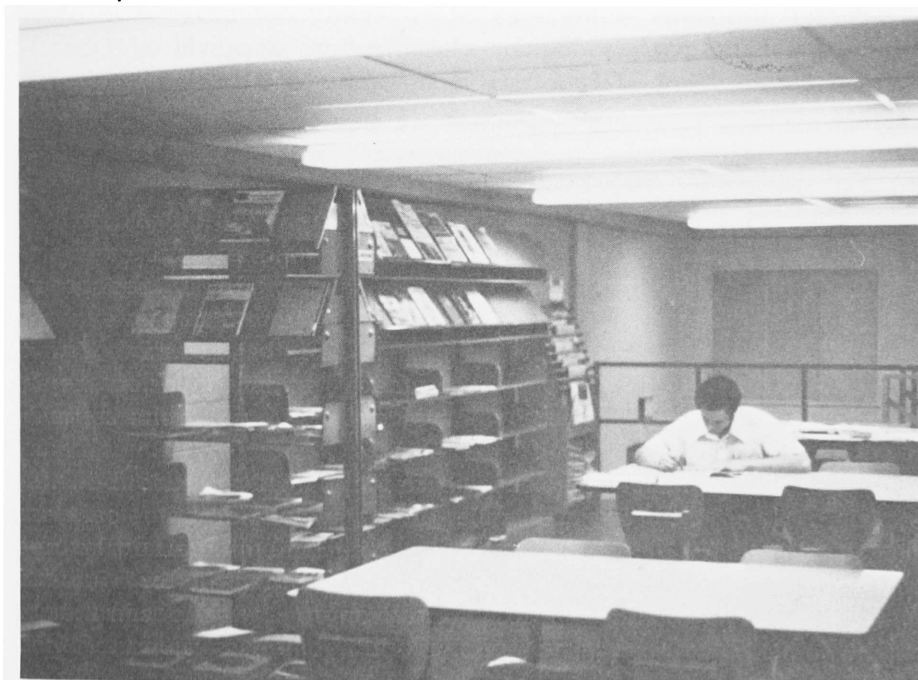
**MARITIME SYSTEMS ENGINEERING
(MASE)**

100. Introduction to Maritime Systems Engineering. (2-3). Credit 3. Activities and career opportunities in the ocean industry and maritime industry, including lectures, seminars, and field trips with emphasis on outside speakers and industry contact. Desalination, ocean mining, fish farming, pollution, pipelines, submersibles and habitats, fixed and floating platforms, highspeed marine transportation.

411. Advanced Hydrodynamics I. (3-0). Credit 3. Hydrodynamics of ship design, semi-submersible platforms, underwater pipelines, hydrofoils, etc. Prerequisite: C.E. 462.

412. Advanced Hydrodynamics II. (3-0). Credit 3. Continuation of MASE 411 with emphasis on design calculations. Prerequisite: MASE 411.

485. Problems in Maritime Systems Engineering. Credit 1 to 4 per semester. Directed study on selected current problems in the ocean and/or maritime industry. Offered to enable individuals or groups to undertake and complete with credit some specialized investigation not covered by other courses. Prerequisite: Approval of Department Head.



MARKETING

(Mktg.)

- 321. Marketing (3-0). Credit 3.** Study of institutions, processes, and problems involved in transferring goods from producers to consumers, with emphasis on economic and social aspects. Prerequisite: Econ. 204.
- 322. Consumer Behavior (3-0). Credit 3.** Acquaints student with individual and group behavior of people performing in consumer role. Behavioral science data employed to discuss and explain consumer behavior. Emphasis placed on integrating this data into current marketing practices. Prerequisite: Mktg. 321.
- 344. Physical Distribution Systems (3-0). Credit 3.** Considers role of retailers, wholesalers and producers in the physical distribution functions performed in the marketing channel. Prerequisite: Mktg. 321.
- 345. Promotion Strategy (3-0). Credit 3.** Emphasizes planning, executing and controlling of any demand-stimulation practices. Consideration given to advertising, personal selling, packaging, publicity, and sales promotion. Prerequisite: Mktg. 321.
- 445. Marketing Research (3-0). Credit 3.** Nature and uses of marketing research in business. Methods of collecting and interpreting marketing information and specific application to problems in marketing. Prerequisites: B.Ana. 303; Mktg. 321.
- 485. Problems. Credit 1 to 3 each semester.** Directed study on selected problems in the area of marketing not covered in other courses. Prerequisites: Senior classification; approval of Department Head; Mktg. 321; 2.0 GPR in major and university course work.



MATHEMATICS

(Math.)

- 104. Analytical Geometry (3-0). Credit 3.** Rectangular coordinates; equations and sets of points; lines, circles and other conic sections; polar coordinates; solid geometry; introduction to vectors and matrices.
- 106. Plane and Spherical Trigonometry (4-0). Credit 4.** Definitions of trigonometric functions; evaluation of functions of special angles; fundamental relations; solution of triangles; trigonometric reductions; angular measure; functions of composite angle; logarithms, inverse trigonometric functions; trigonometric equations; basic ideas and formulas of spherical trigonometry; solution of spherical triangles, application to terrestrial and astronomical triangles.
- 121. Analytic Geometry and Calculus. (4-0). Credit 4.** Rectangular coordinates, equations and sets of points. Lines, conic sections, functions, limits, derivatives of functions, applications, integration, areas and volumes by integration. Prerequisites: Math. 102 and 103, or satisfactory performance on a qualifying examination.
- 122. Calculus. (4-0). Credit 4.** Comprehensive study of integration; application of integration to moments, arc lengths, areas of surfaces of revolution, liquid pressure, and work; improper integrals; indeterminate forms. Prerequisite: Math. 121 or 209.
- 130. Mathematical Concepts – Pre-Calculus. (3-0). Credit 3.** Functions and their graphs. Analytic geometry; linear and quadratic functions, polynomial functions. Trigonometric functions. Exponents and logarithmic functions. Inverse trigonometric functions. Prerequisite: Math. 103 or high school trigonometry.
- 209. Calculus (3-0). Credit 3.** Variables, functions and limits. Derivatives and differentials for polynomials and applications. Integration of polynomials and applications. Differentiation of algebraic functions. Prerequisite: Math. 104.
- 210. Calculus (3-0). Credit 3.** Differentiation and integration involving transcendental functions together with applications. Improper integrals, approximate integration, indeterminate forms, mean value theorems. Prerequisite: Math. 209.
- 230. Mathematical Concepts – Calculus. (2-2). Credit 3.** Limits and continuity. Rates of change, slope. Differentiation: the derivative, maxima and minima, techniques. Integration of the definite and indefinite integral techniques. Curve fitting. Prerequisite: Math. 130 or equivalent.
- 307. Calculus (3-0). Credit 3.** Introduction to series; Taylor's series; partial differentiation; linear differential equations with constant coefficients; applications. Prerequisite: Math. 122 or 210.

- 308. Differential Equations (3-0). Credit 3.** Linear equations, solutions in series, solution using Laplace transforms, systems of differential equations, introduction to numerical methods, partial differential equations and boundary value problems. Fourier series. Prerequisite: Math. 122 or 210.
- 311. Topics in Applied Mathematics I. (3-0). Credit 3.** Matrices, determinants, systems of linear equations, eigen values, eigenvectors, diagonalization of symmetric matrices, exposure to numerical methods. Vector analysis, including normal derivative, gradient, divergence, curl, line and surface integrals, Gauss', Green's and Stokes' theorems. Prerequisite: Math. 307 or equivalent.
- 312. Topics in Applied Mathematics II. (3-0). Credit 3.** Fourier series, Gibbs' phenomon, Fourier integral and transform, orthogonal functions. Partial differential equations and boundary value problems, including Sturm-Liouville systems and applications to vibrating systems and heat flow. Prerequisite: Math. 308 or equivalent.
- 485. Problems. Credit 1 to 4.** Special problems in mathematics not covered by any other course in the curriculum. Work may be in either theory or laboratory. Prerequisite: Approval of Department Head.

MECHANICAL ENGINEERING

(M.E.)

- 344. Fluid Mechanics. (3-0). Credit 3.** Application of laws of statics, buoyancy, stability, energy, and momentum to behavior of ideal and real fluids. Study of dimensional analysis and similitude and their application to flow through ducts and piping. Dynamic lift and related problems. Prerequisites: C.S. 201; M.E. 213, 323 or 327.
- 459. Mechanical Vibrations. (3-0) Credit 3.** Basic theory of vibrating systems with single and multiple degrees of freedom and principles of transmission and isolation of vibrations. Prerequisites: C.S. 201; Math. 308; M.E. 213.
- 485. Advanced Problems in Mechanical Engineering. Credit 1 to 6.** Special problems in various phases of mechanical engineering assigned to individual students or to groups. Readings assigned and frequent consultations held. Prerequisites: Approval of Department Head; senior classification.

MECHANICS AND MATERIALS

(M.M.)

- 460. Introduction to Continuum Mechanics. (3-0). Credit 3.** Concentrates on the tensor formulation of the underlying physical and mathematical principles pertinent to continuous mass media. Special attention is directed toward solid mechanics and fluid mechanics and their interrelationships. Consideration is limited to Cartesian tensors. Prerequisite: Senior classification.

METEOROLOGY

(Met.)

- 301. Atmospheric Science. (3-0). Credit 3.** Structure, energy, and motions of the atmosphere; prediction; climate; applications; atmospheres of the other planets. Met. 301 and 600 may not both be taken for credit. Prerequisite: Approval of instructor.
- 302. Weather Reports and Forecasting. (3-0). Credit 3.** Global weather reporting, codes and data transmission, radio-facsimile weather maps. Features of circulation, synoptic weather analysis, avoiding storms at sea.

NAUTICAL SCIENCE

(NAUT)

- 103. Maritime Orientation & Lifesaving. (2-3). Credit 3.** Introduction to the maritime industry, the ships, the seaman and the purpose of the U. S. Merchant Marine. Shipboard nomenclature, cargoes, and recent trends in the marine industry. Practical lifeboat and lifesaving training for certification as Lifeboatman by the U.S. Coast Guard.
- 200. Basic Communications, Navigation, and Seamanship. Credit 4.** Practical application of student's classroom studies aboard training ship during first training cruise. Student completes basic projects in communications, navigation, seamanship and rules of the road.
- 201. Naval Architecture I. (3-2). Credit 4.** Description of ship as self-sustaining unit. Shipbuilding nomenclature and dimensions, types of construction and classification of merchant ships. Classification societies, shipbuilding materials and methods, and structural components of ship.
- 202. Naval Architecture II. (3-0). Credit 3.** Ship's lines drawing and form calculations; principles of flotation and buoyancy; inclining experiments, free liquids, transverse stability; motion of ships in waves, seaway and dynamic loads; ship structure tests.
- 203. Seamanship I. (2-3). Credit 3.** Intermediate lifeboat, lifesaving and firefighting procedures. Practical use in lab of manila lines, wire, splicing, knots, block and tackle, cargo gear, anchoring, mooring and steering gear operation. Introduction to the International Rules of the Road. Projects aboard merchant, research, and offshore oil vessels in the ports of Galveston and Texas City.
- 204. Terrestrial Navigation. (2-2). Credit 3.** Fundamentals of piloting, chart construction and development, aids to navigation, useful publications, principles of magnetism and the magnetic compass, great circle, mercator, and middle latitude sailing.
- 300. Intermediate Communications, Navigation, and Seamanship. Credit 4.** Practical application of student's classroom studies aboard training ship during second training cruise. Student completes intermediate projects in communications, navigation, seamanship and rules of the road. Thorough study made of U.S. Public Health requirements in first aid.

- 301. Seamanship II. (2-3). Credit 3.** Mechanical appliances aboard ship, accident prevention, vessel sanitation, Marine Inspection laws and regulations, Search and Rescue Procedures, communications.
- 302. Seamanship III. (1-3). Credit 2.** Principles and methods of propulsion and steering of ships. Ship handling in narrow channels and heavy seas, docking, undocking, mooring and towing are stressed.
- 303. Celestial Navigation. (2-3). Credit 3.** Study of the full range of celestial navigation. Survey of nautical astronomy, sight reduction, sextants, compass error determination, and solutions of the navigational triangle by various methods.
- 304. Electronic Navigation. (2-2). Credit 3.** Theory, operation, and application of marine electronic navigation aids and systems, including the marine gyro compass, radio direction finder, Loran, Omega, Decca, satellite, echo sounder, doppler and integrated navigation systems. Special emphasis on marine radar theory, operation and interpretation. Student examined for U.S. Coast Guard certification as "Radar Observer."
- 400. Advanced Communications, Navigation, and Seamanship. Credit 4.** Represents practical application of student's classroom studies aboard training ship during third training cruise. Student completes advanced projects in communications, navigation, seamanship and Rules of the Road.
- 401. Seamanship IV. (2-3). Credit 3.** Principles and methods of propulsion and steering of ships. Ship handling in narrow channels and heavy seas, docking, undocking, anchoring, mooring and towing are stressed. Also covered is the new equipment introduced into the industry in recent years.
- 404. The Navigator. (2-3). Credit 3.** Intensive, in-depth review of the principles of electronic, celestial and terrestrial navigation in preparation for the U.S. Coast Guard examination for Third Mate.

NAVAL SCIENCE (NAVS)

- 110. Introduction to Naval Science. (0-2). Credit 1.** A general introduction to seapower and the Naval service. The instruction places particular emphasis on the mission, organization, regulations, and broad warfare components of the Navy. Included is an overview of officer and enlisted rank and rating structures, procurement and recruitment, training and education, promotion and advancement, and retirement policies. This course also covers the basic tenets of naval courtesy and customs, discipline, naval leadership, and ship's nomenclature. The student is made cognizant of the major challenges facing today's naval officer especially in the areas of equal opportunity and drug/alcohol abuse.

- 112. Naval Ship Systems I. (3-0) Credit 3.** A course designed to familiarize students with the types, structure and purpose of naval ships. Ship compartmentation, propulsion systems, auxiliary power systems, interior communications, and ship control are included. Elements of ship design to achieve safe operations, and ship stability characteristics are examined.
- 210. Naval Ship Systems II. (3-0). Credit 3.** Provides an introduction to the theory and principles of operation of Naval Weapons systems, capabilities and limitations, theory of target acquisition, identification and tracking, trajectory principles, and basics of naval ordnance.
- 213. Seapower and Maritime Affairs. (0-2). Credit 1.** A course created on the premise that the student must develop his knowledge and interest in seapower and maritime affairs. This course is oriented toward the general concept of seapower (including the merchant marine), the role of various components of the Navy in supporting the Navy's mission, the implementation of seapower as an instrument of national policy, and a comparative study of U. S. and Soviet naval strategies.
- 315. Navigation. (2-3) Credit 3.** A comprehensive study of the theory, principles, and procedures of ship navigation. Topics include mathematical analysis, spherical triangulation and practical work involving sight reduction, sextants, publications, and course logs. Rules of the Road, lights, signals, and navigational aids, including inertial systems are also covered.
- 316. Naval Operations Analysis. (3-0). Credit 3.** A comprehensive study of the theory, principles, and procedures of ship movements and employment. Topics include communications, sonar-radar search and screening theory. Tactical formations and dispositions, relative motion, maneuvering board, and tactical plots are analyzed for force effectiveness and unity.
- 411. Principles of Naval Organization and Management. (3-0). Credit 3.** An introduction to the structure and principles of naval organization and management. Naval organization and management practices and the concepts that lie behind them are examined within the context of American social and industrial organizations and practices. This includes lines of command and control, organization for logistics, service and support, functions and services of major components of the Navy and Marine Corps, and shipboard organization. Emphasis is placed on management and leadership functions.
- 414. The Junior Naval Officer. (0-2). Credit 1.** This course gives the student a basic background in the duties and responsibilities of a junior officer's responsibilities in the area of training, counseling, and career development. The student becomes familiar with equal opportunity programs, the exemption program and drug/alcohol rehabilitation programs. Principles of leadership are reinforced through leadership case studies.

485. Problems. Credit 1 to 4. Directed study in problems in the field of naval science not covered by other courses in the department. Prerequisite: Senior classification and approval of department head.

OCEAN ENGINEERING (O.E.)

300. Dynamics of Waves and Structures. (3-0). Physical and mathematical fundamentals of ocean wave behavior and description. Introduction to concepts of linear structural dynamics and to the design of ocean structures. Prerequisites: C.E. 311, M.E. 213.

400. Basic Coastal Engineering. (3-0). Credit 3. Consideration of the natural coastal processes and engineering problems related to estuaries, bays and beaches. Prerequisite: C.E. 311.

401. Measurements in the Ocean. (2-6). Credit 4. Elements of measurement technique applied to the evaluation of oceanographic parameters of scientific and engineering interests. Prerequisites: O.E. 300, Phys. 219.

OCEANOGRAPHY (Ocn.)

401. Introduction to Oceanography (3-0). Credit 3. Subject matter survey. Discussion of interdisciplinary relationships between biological, physical, meteorological and engineering aspects of field. Prerequisites: approval of instructor; junior or senior classification; Math. 104 or 116.

410. Introduction to Physical Oceanography (2-0). Credit 2. Elements of the physics of the sea including descriptive aspects as well as cause and effect relations in respect to currents, thermal structure and waves. Intended for majors in the physical sciences or engineering. Prerequisites: Math. 122 or 210. Phys. 219.

420. Introduction to Biological Oceanography. (2-0). Credit 2. Biological aspects of the marine environment. Man's use of the sea and problems of productivity, pollution, and fouling and boring organisms. Prerequisite: Biol. 114; major in Ocean Engineering or approval of Department Head.

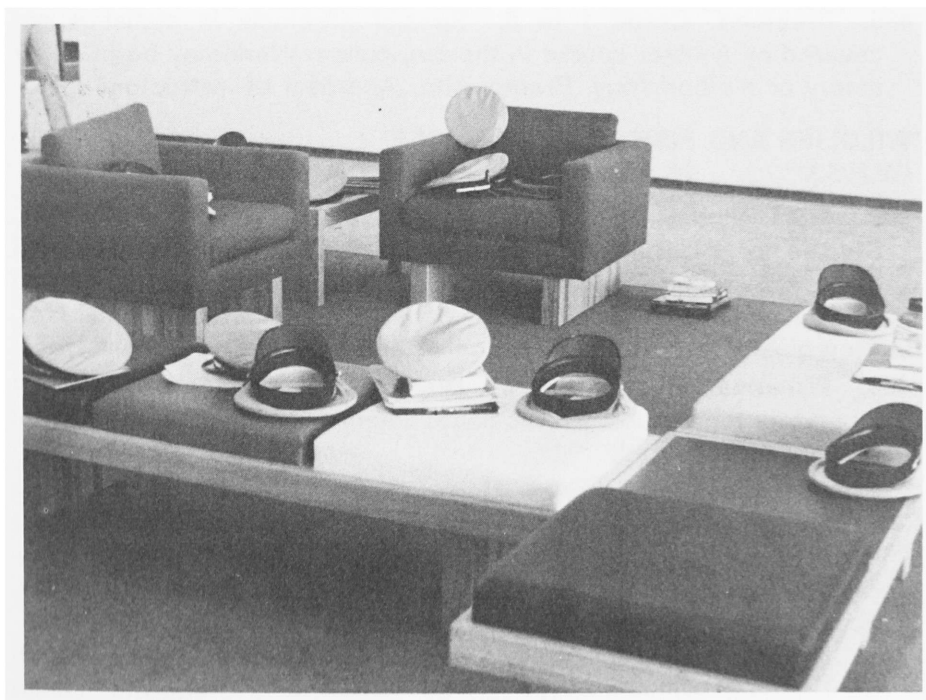
430. Introduction to Geological Oceanography (2-0). Credit 2. History of oceanography; physiographic provinces of the oceans, their origin and sediments; geological sampling techniques and geophysical methods; coasts and beaches, marine paleontology; global tectonics. Prerequisite: Geol. 205 or approval of instructor.

440. Introduction to Chemical Oceanography (2-0). Credit 2. Chemical aspects of the marine environment including organic and inorganic constituents, their origin and regulatory processes; primary productivity, the carbon dioxide system, nutrient cycles; stable and radioactive isotopes in the sea. Prerequisite: Chem. 102.

PHYSICS

(Phys.)

- 201. College Physics (3-3). Credit 4.** Fundamentals of classical mechanics, heat and sound. Prerequisite: Math. 103.
- 202. College Physics (3-3). Credit 4.** Continuation of Phys. 201. Fundamentals of classical electricity and light and introduction to contemporary physics. Prerequisite: Phys. 201.
- 218. Mechanics. (3-3). Credit 4.** Mechanics for students of the physical sciences. Prerequisite: Math. 121 or 209 or registration therein. Note: A special section designated as Physics 218A is taught each fall as the first course of a three semester sequence (218A, 219A, 221) in general physics.
- 219. Electricity (3-3) Credit 4.** Continuation of Phys. 218. Sound, light, electricity. Prerequisites: Math. 122 or 210 or registration therein; M.E. 112 or Phys. 218.
- 220. Modern Physics. (3-3). Credit 4.** Continuation of Phys. 219. Atomic, nuclear, solid-state physics. Prerequisites: E.E. 201 or Phys. 219; Math. 122 or 210.
- 485. Problems. Credit 1 to 4.** Special work in laboratory or theory to meet individual requirements in cases not covered by regular curriculum. Prerequisite: Approval of Department Head.



POLITICAL SCIENCE

(Pol.S.)

- 206. American National Government (3-0). Credit 3.** Survey of American national government, politics, and constitutional development.
- 207. State and Local Government (3-0). Credit 3.** Survey of state and local government and politics with special reference to the constitution and politics of Texas.
- 485. Problems. Credit 1 to 6 each semester.** Individual instruction in political science in selected aspects of political science not adequately covered by other courses, with stress on reports and wide reading in fields selected. Prerequisite: Approval of instructor prior to registration.

STATISTICS

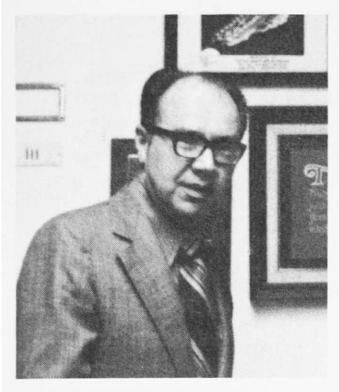
(Stat.)

- 302. Statistical Methods. (2-2). Credit 3.** Intended for undergraduate students in the biological sciences and agriculture (except agricultural economics). Nonmathematical introduction to concepts of random sampling and statistical inference; estimation and testing hypotheses of means and variances; analysis of variance; regression analysis; chi-square tests. Not to be used for graduate credit by statistics majors. Prerequisite: Math. 102.
- 485. Problems. Credit 1 to 6.** Special problems in statistics not covered by another course in the curriculum. Work may be in either theory or methodology. Prerequisite: Approval of instructor.

WILDLIFE AND FISHERIES SCIENCES

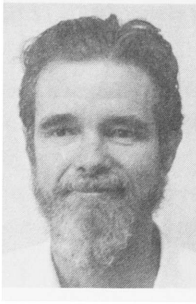
(W.F.S.)

- 300. Field Studies. Credit 3.** Wildlife survey of selected areas. Studies of plant-animal interrelationships, birds, mammals, and other native vertebrates. Experience in collecting and preparing study specimens of birds, mammals, reptiles, and amphibians. Prerequisite: Junior classification or approval of Department Head.
- 400. Fisheries Survey. Credit 4.** Distribution, identification, field and laboratory techniques. Prerequisite: Junior classification or approval of Department Head.
- 410. Principles of Fisheries Management. (2-2). Credit 3.** Basic knowledge from ichthyology, biology of fishes, and limnology related to applied aspects fresh water and marine fishery science. Emphasis placed on management techniques applicable to streams, ponds, reservoirs, estuaries and the oceans.
- 485. Wildlife Problems. Credit 1 to 3.** Individual study and research on selected problem approved by instructor. Prerequisite: Junior or senior classification.



CLAYTON, WILLIAM H., Provost, Moody College of Marine Sciences and Maritime Resources and Professor of Oceanography and Meteorology, (1954, 1971). B.S. Bucknell University, 1949; PhD. Texas A&M University, 1956.

RESIDENT FACULTY



ALDRICH, DAVID V., Associate Professor, Marine Sciences, Biology, Oceanography and Wildlife and Fisheries Sciences. (1966, 1969). A.B., Kenyon College, 1950; M.A., Rice University, 1952; Ph.D., 1957.



ARKISON, OWEN J., Instructor of Marine Engineering, (1973).



BLOZINSKI, ANTHONY P., Assistant Professor, General Academics, (1976). B.S., University of Seattle, 1962; M.S., Purdue University, 1968; Ph.D., Purdue, 1970.



BRADY, JOHN D., MMC, U.S.N., Instructor in Naval Science (1975).

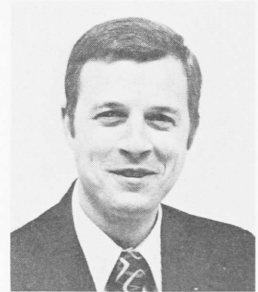
BROOME, LESUNDA ENGENE, Assistant Professor of General Academics (1974) B.S., Arlington State College; M.A., University of Texas at Arlington (1968), Ph.D. University of Houston (1975).



BUCK, LT. LOUIS., Associate Professor, Naval Science and Head of Department, (1974), B.S. U.S. Naval Academy, 1970.



CARTER, GEORGE H., III, Assistant Professor General Academics, (1972). Assistant Dean for Academic Affairs (1976). B.S. University of Southern Mississippi, 1963; M.S., 1969.



CLYBURN, JOHN, Instructor, General Academics, (1973). B.S. University of Texas, 1962; M.S., University of Houston, 1968.





CONGLETON, CAROL, Instructor, General Academics. (1974, 1975). B.A., 1968, M.A., 1970, North Texas State University.



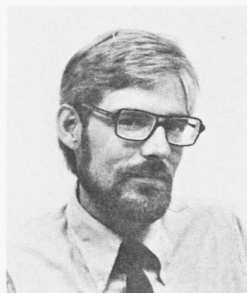
CURLEY, STEPHEN J., Assistant Professor, General Academics, (1973). B.A. Fordham University, 1968; Ph.D. Rice University, 1973.



DARST, MAURY, Lecturer, General Academics (1975). B.A., 1961 and M.S., 1963, Stephen F. Austin University.

DAVIS, HOWARD W., Lecturer, General Academics (1977). B.A., Stanford University, 1957; M.B.A., University of Texas at Austin, 1961; Ph.D., University of Texas at Austin, 1965.

DAVIS, RALPH G., Lecturer, Marine Engineering (1977). B.S., U.S. Naval Academy, 1954; M.S., Massachusetts Institute of Technology, 1960; M.B.A., George Washington University, 1970.



ESTES, ERNEST L., Assistant Professor, Marine Sciences (1976). B.S., Lawrence University, 1965; M.S. Duke University, 1967; Ph.D., University of North Carolina, 1971.



FOGEL, JAMES, Laboratory Instructor, General Academics (1977). B.A., University of Dallas at Irving, 1974.



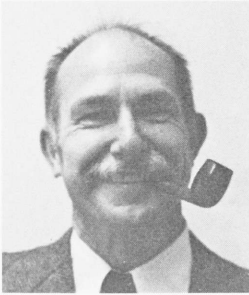
FUSELER, ELIZABETH A., Instructor, Library Science. (1975) A.B. William and Mary College, 1968; M.S. Drexel University, 1972.



FRENCH, DAVID M., Assistant Professor, Marine Engineering (1976). B.S., U.S. Merchant Marine Academy, 1963; M.S., 1969 and Ph.D., 1976, Texas A&M University.



GARCIA, SALVADORE R., Instructor, General Academics, (1972, 1974) B.A., University of Texas, 1969; M.Ed., Texas A&M University, 1974.



GATES, EDWARD T., Lecturer, Marine Sciences (1976). B.S.C.E., Louisiana Polytechnic Institute, 1957; M.S.C.E., The Cooper Union, 1969; Ph.D., Texas A&M University, 1976.

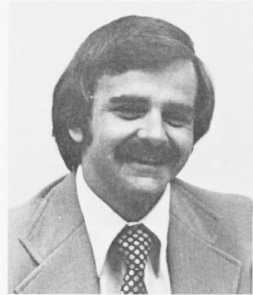


GENTINE, MARC R., Assistant Professor, Marine Transportation (1975). B.S., U.S. Merchant Marine Academy (1969); M.S. State University of New York Maritime College, 1974.

GRAVES, ROBERT E., Assistant Professor, General Academics, (1971). B.S. Quachita Baptist University, 1960; Ph.D., Baylor University, 1973.



GRIFFIN, LAWRENCE L., Assistant Professor, General Academics (1976). B.A., 1962; B.S., 1965 and Ph.D., 1972, University of Texas at Austin.



HARPER, DONALD, Assistant Professor, Marine Sciences (1975). B.S., University of Miami, 1963; M.S. Texas A&M University, 1966; Ph.D. Texas A&M University, 1970.



HOKANSON, J. A., Lecturer, General Academics (1977). B.A. and B.S.E.E., Rice University, 1966 and 1967; M.S. and Ph.D., University of Texas, Houston, 1973 and 1976.



HONEY, LT. RONALD, Assistant Professor, Naval Science (1977). B.S., Auburn University, 1972.

IRVING, A. J., Lecturer, Marine Sciences (1977). B.Sc. University of Sydney (Australia), 1967; Ph.D., Australian National University, 1972.

JACKSON, MICHAEL D., Lecturer, Marine Transportation (1975). B.S., U.S. Merchant Marine Academy, 1973.



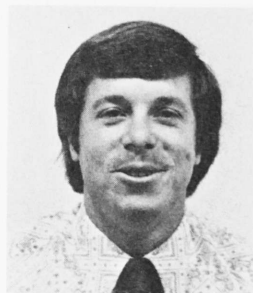
JOHNSON, THOMAS S., Assistant Professor, General Academics, (1974). B.A., Loyola University of Los Angeles, 1966; M.A., University of California at Los Angeles, 1969; Ph.D., University of Texas at Austin, 1973.

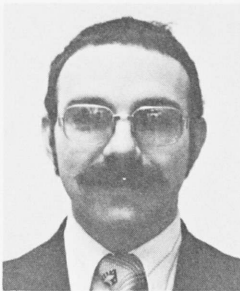
JUSTICE, J. V., Lecturer, General Academics (1977). B.A., 1966 and M.A., 1969, University of Texas at Austin.

LANDRY, ANDRE, Instructor, Marine Sciences (1976). B.S., Tulane University, 1968; M.S., 1971 and Ph.D., 1975, Texas A&M University.

LANE, JOHN M., Assistant Professor, Marine Transportation, (1969). B.S., State University of New York Maritime College, 1965.

LAWRENCE, ROGER D., Lecturer, General Academics (1976). B.S., Sam Houston State University, 1969; M.B.A., Texas A&M University, 1975.





LOFTIN, RICHARD B., Assistant Professor, General Academics (1976). B.S., Texas A&M University, 1970; M.A., 1973 and Ph.D., 1975, Rice University.



MANGUM, DOROTHEA P., Assistant Professor, Marine Sciences (1974) A.B., Baylor University, 1972; A.B., 1955; Ph.D., University of Arizona, 1965.

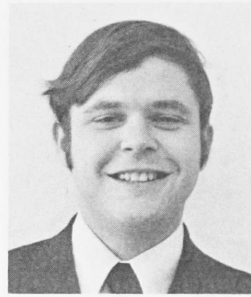


McCLOY, JAMES M., Associate Professor Marine Sciences, (1971, 1973). B.A., California State College at Los Angeles, 1961; Ph.D. Louisiana State University, 1969.



McMULLEN, WILLIAM T., Associate Professor, Marine Transportation and Head of Department, (1967, 1972). B.S., State University of New York Maritime College, 1964; M.B.A., University of Houston, 1973.

McVOY, LT. PETER, Assistant Professor,
Naval Science (1976). B.A., University of
Notre Dame, 1972.



MICKEY, CHARLES D., Assistant Professor,
General Academics, (1973, 1974). B.S.,
Trinity University, 1957; M.A., St. Mary's
University, 1966; Ph.D., Texas A&M Uni-
versity, 1973.



MOORE, JOHN A., Lecturer, Marine En-
gineering, (1965). B.S., Rose Polytechnic
Institute, 1934.



MOORE, SYLVIA M., Laboratory Instructor
(1975). B.S., San Diego State, 1955.

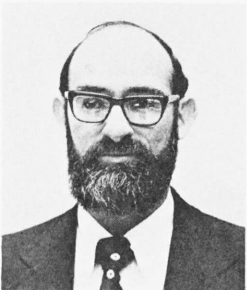




OGDEN, EDWARD G., Associate Professor, Marine Engineering and Head of Department. (1975). B.S., U.S. Naval Academy, 1955; M.S., Massachusetts Institute of Technology, 1961.



PARK, EDWARD T., Associate Professor, Marine Sciences, Biology, and Oceanography. (1969, 1973). B.S., Pusan Fisheries College (Korea), 1952; M.S., 1957; Ph.D., University of Washington, 1965.



PHILLIPS, R. E., Lecturer, General Academics (1976). B.A., Rice University, 1960; M.A., University of Houston, 1976.

POTH, L. J., Lecturer, Marine Sciences (1976). B.S., 1959 and M.S., 1960, Texas A&M University.

RAY, SAMMY M., Professor of Marine Sciences, Biology, Oceanography, and Wildlife Fisheries Sciences and Head of Department, (1959, 1972). B.S., Louisiana State University, 1942; M.S., Rice University, 1952; Ph.D., 1954.



ROSSI, D. J., Lecturer, General Academics (1976). B.A., 1970 and M.A., 1972, Texas A&M University.

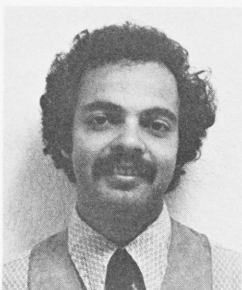


SCHERY, STEPHEN D., Assistant Professor, General Academics, (1974), B.S., Ohio State University, 1967; M.A., University of Arkansas, 1970; Ph.D., University of Colorado, 1973.



SCHWARZ, JOHN R., Assistant Professor, Marine Sciences, (1976). B.S., 1967 and Ph.D., 1972. Rensselaer Polytechnic Institute.

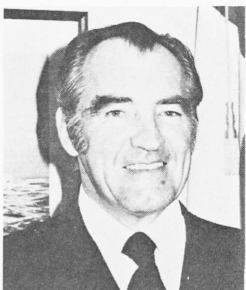




SCORZA, RICHARD, Lecturer, General Academics (1976). B.A., 1972 and M.A., 1974, University of Denver.



SCRUDATO, RONALD J., Associate Professor of Marine Sciences and Associate Director of Galveston Coastal Zone Laboratory (1975). B.S., Clemson University 1962; M.S., Tulane University, 1964; Ph.D., University of North Carolina (1969).

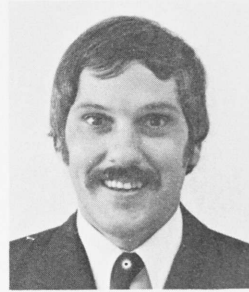


SMITH, JOHN W., RADM, USMS, Superintendent, Texas Maritime Academy; Professor of Marine Transportation, (1973). B.A., Washington College, 1942; M.S.I.A., George Washington University, 1973.

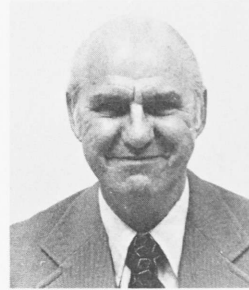


SMITH, M. M., Lecturer, General Academics (1976). B.A., University of Texas at Austin, 1957; M. Ed., Prairie View A&M University, 1975.

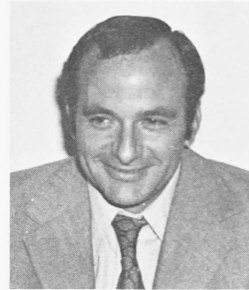
THRAILKILL, ROBERT L., Instructor, Marine Transportation (Galveston) (1975). B.S., Texas A&M University (1969).



TORMOLLAN, FRANCIS D., Associate Professor, Marine Engineering, (1964). B.S., University of Texas, 1955; M.S., 1957.



WARDLE, WILLIAM J., Assistant Professor of Marine Sciences and Assistant to the Provost (1973, 1976). B.S., Lynchburg College, 1963; M.S., Texas A&M University, 1970, Ph.D., 1974.



WILSON, WILLIAM B., Associate Professor of Marine Sciences, Biology, Oceanography, and Wildlife and Fisheries Sciences, (1967, 1970). B.S., Texas A&M University, 1948; M.S., 1950; Ph.D., 1966.





WYBRO, PIETER, Instructor, Marine Sciences, B.S.M.E., University of Virginia, 1971; M.S., University of Hawaii, 1976.

