TEXAS A&M UNIVERSITY

Moody College of Marine Sciences and Maritime Resources 1976-1977

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TEXAS AGRICULTURAL EXTENSION SERVICE

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TEXAS ENGINEERING EXTENSION SERVICE

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TARLETON STATE COLLEGE

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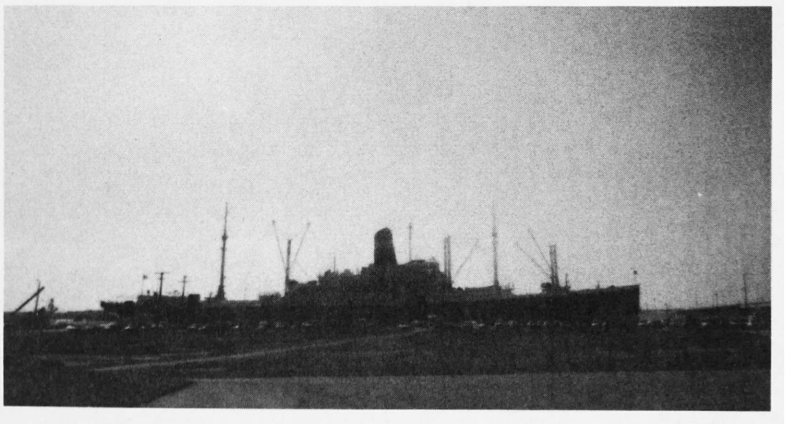
Department of Marine Sciences
Sammy M. Ray, Ph.D. ..... *Head*

Coastal Zone Laboratory
Ronald J. Scrudato, Ph.D. ..... *Associate Director*



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THE ACADEMIC CALENDAR FOR 1976-77

Spring Semester 1976

January 14-16	Wednesday through Friday. Delayed registration, adds and drops.
January 19	Monday. Beginning of Spring Semester classes, 8 a.m.
January 23	Friday. Last day for enrolling in the University for the Spring Semester or for adding new courses.
February 3	Tuesday. Last day for dropping courses with no record.
March 5	Friday. Last day for dropping courses without penalty.
March 8	Monday. Mid-semester grade reports.
March 12	Friday. Beginning of Spring recess, 5 p.m.
March 22	Monday. End of Spring recess, 8 a.m.
May 3	Monday. Grades for graduating students due, 10 a.m.
May 6	Thursday. Moody College Convocation.
May 7	Friday. End of Spring Semester classes, 5 p.m.; Commencement.
May 8	Saturday. Commencement and Final Review.
May 10	Monday. First day of Spring Semester examinations.
May 14	Friday. Last day of Spring Semester examinations.
May 17	Monday. All final grades dues, 10 a.m.

Summer Session 1976

May 31	Monday. Registration for the first term.
June 1	Tuesday. Beginning of classes, 8 a.m.
June 3	Thursday. Last day for enrolling in the University for the first term and for adding new courses.
June 4	Friday. Last day for dropping courses with no record.
June 6	Sunday. Texas Clipper sails on centennial cruise.
June 18	Friday. Last day for dropping courses without penalty.
July 5	Monday. Independence Day Holiday.
July 6	Tuesday. Last day for first term classes. Beginning of final examinations, 7 p.m.
July 7	Wednesday. Last day for the first term final examinations.
July 8	Thursday. Registration for the second term.
July 9	Friday. Beginning of classes, 8 a.m. All final grades due, 10 a.m.
July 13	Tuesday. Last day for enrolling in the University for the second term and for adding new courses.
July 14	Wednesday. Last day for dropping courses with no record.
July 29	Thursday. Last day for dropping courses without penalty.
August 1	Sunday. Clipper returns to Galveston.
August 10	Tuesday. Grades for graduating students due, 10 a.m.

August 12	Thursday. Last day of second term classes. Beginning of final examinations, 7 p.m.
August 13	Friday. Last day of second term final examinations. Commencement for First and Second Term graduating students.
August 16	Monday. All final grades due, 10 a.m.

Fall Semester 1976

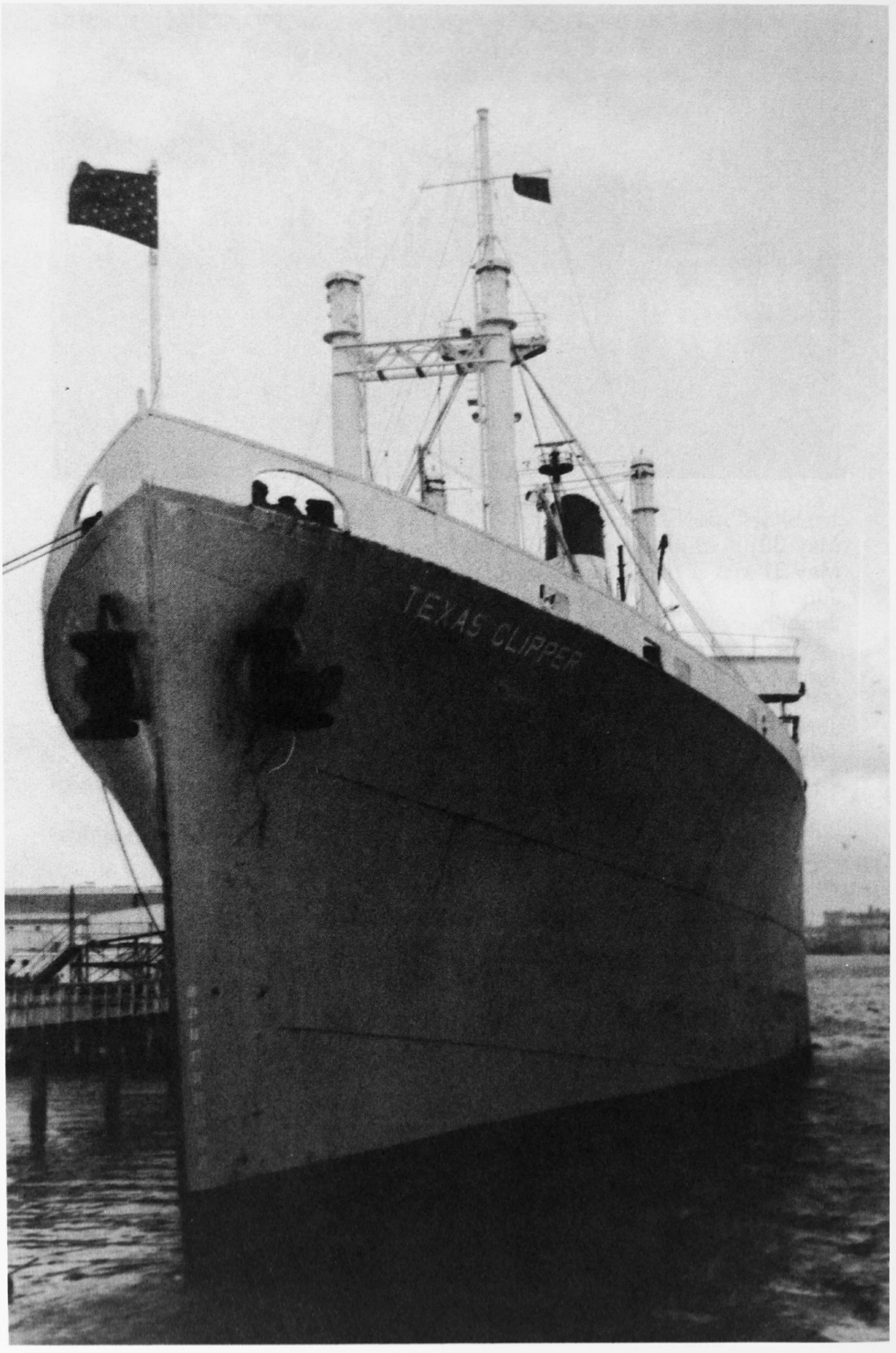
August 23-27	Monday through Friday. Delayed registration, adds and drops.
August 30	Monday. Beginning of Fall Semester classes, 8 a.m.
September 3	Friday. Last day for enrolling in the University for the Fall Semester or for adding new courses.
September 14	Tuesday. Last day for dropping courses with no record.
September 20-21	Monday, Tuesday. Maritime Seminar.
October 15	Friday. Last day for dropping courses without penalty.
October 18	Monday. Mid-semester grade reports.
November 25-28	Thursday-Sunday inclusive. Thanksgiving Holidays.
December 6	Monday. Grades for graduating students due, 10 a.m.
December 10	Friday. End of Fall Semester classes, 5 p.m.
December 11	Saturday. Commencement.
December 13	Monday. First day of Fall Semester examinations.
December 17	Friday. Last day of Fall Semester examinations.
December 18	Saturday. All final grades due, 5 p.m.

Spring Semester 1977

January 12-14	Wednesday through Friday. Delayed registration, adds and drops.
January 17	Monday. Beginning of Spring Semester classes, 8 a.m.
January 21	Friday. Last day for enrolling in the University for the Spring Semester or for adding new courses.
February 1	Tuesday. Last day for dropping courses with no record.
March 4	Friday. Last day for dropping courses without penalty.
March 7	Monday. Mid-semester grade reports.
March 11	Friday. Beginning of Spring recess, 5 p.m.
March 21	Monday. End of Spring recess, 8:00 a.m.
May 2	Monday. Grades for graduating students due, 10 a.m.
May 6	Friday. End of Spring Semester classes, 5 p.m.
May 7	Saturday. Commencement and Final Review.
May 9	Monday. First day of Spring Semester examinations.
May 13	Friday. Last day of Spring Semester examinations.
May 16	Monday. All final grades due, 10 a.m.

Summer Session 1977

May 30	Monday. Orientation for new students.
May 31	Tuesday. Registration for the first term.
June 1	Wednesday. Beginning of classes, 8 a.m.
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 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, 8 a.m. 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 26	Tuesday. Last day for dropping courses with no penalty.
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.


TEXAS CLIPPER

MOODY COLLEGE

The 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. All present degree programs lead to the Bachelor of Science degree from Texas A&M University.

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 students as classroom and dormitory both ashore and at sea. The 15,000 ton converted cargo/passenger liner is berthed at Pelican Island during the regular school year and is manned by cadets each summer on a training cruise. The ship may be visited on Saturday and Sunday afternoons on Pelican Island during the regular school year.

Facilities planned for completion in the fall of 1976 include dormitories, a physical plant and a student activities center.

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

Texas A&M University is fully accredited by the Southern Association of Colleges and Schools. As one of its components, the Moody College is accorded the same accreditation as other academic units of the University.

LIBRARY FACILITIES

The Moody College of Marine Sciences and Maritime Resources maintains a library on Pelican Island's 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 860,000 volumes and more than 13,500 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, the nation's fifth state maritime academy, operates academically as a 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 for a total of 140 eligible cadets.

The programs of Texas Maritime Academy, marine engineering and marine transportation, have an option 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 sciences) or third assistant engineers. 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.

Following 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. This includes propulsion machinery, auxiliary machinery, electrical systems, refrigeration machinery and air-conditioning systems.

Following a year of shipboard experience, the examination for a second mate's or second engineer's license may be taken; after serving a year as a "second," the young officer is qualified to sit for the chief mate's or first assistant engineer's license. The final step, after additional service and experience, is licensing as master or as chief engineer.

Texas Maritime Academy offers degee programs in marine engineering and marine transportation with the license option. There is also a license option program with a major in marine sciences.

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.

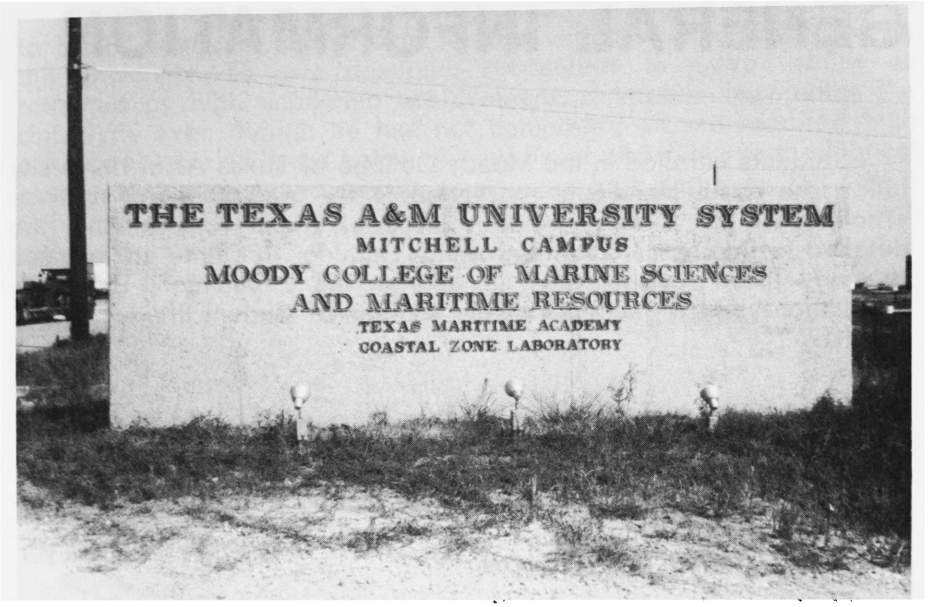
For those students interested in marine engineering, first-hand experience with the ship's operation and power plants is available. For those interested in marine transportation, there is opportunity to work on the bridge or on deck under the supervision of a licensed merchant marine officer. The program 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 program 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.



GALVESTON COASTAL ZONE LABORATORY

The Galveston 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 include Houston Lighting and Power Company; National Science Foundation; National Maritime Research Center; Health, Education and Welfare; Bureau of Land Management; and National Sea Grant Program.

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

Texas A&M University is a coeducational institution admitting all qualified applicants on an equal basis without regard to sex, race, creed, color or national origin.

Applications for admission 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 the 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 attempting to transfer from another college or university must have two complete official transcripts from each college or university attended.

An applicant must have graduated from a properly accredited secondary school with a minimum of sixteen units (credits) which are acceptable to the University for entrance purposes. Students who have a superior high school record and wish to enter higher education without graduating from high school may apply under the following conditions: present the desired 16 credits as outlined below, score at least 1100 on the SAT and rank in the highest quarter of their high school class. In addition to the above, they must be recommended by their high school principal. A personal interview with the Director of Admissions will be required prior to admission.

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, a student may enter the University even though he has not completed all the required high school subjects as listed below. An applicant who ranks in the highest quarter of his class and scores 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 which a student should have for admission (with exceptions indicated where applicable) are as follows:

Subject	Units of Credit Required	Remarks
English	4	Required of all students. Two units in a single foreign language may be substituted for one unit in English.
Social Science	2½	Required of all students.
Mathematics:		
Algebra	2	Required of all students.
Plane Geometry	1	Required of all students.
Science	2	Required of all students. It is preferred that these two units include biology, chemistry, or physics.
Electives	4½	Recommended from the following subject areas: Foreign languages, mathematics, science, social science, speech. Not more than three vocational units may be submitted as electives. Applicants for admission to the Moody College of Marine Sciences and Maritime Resources are strongly advised to include at least ½ unit elective in advanced mathematics.
Total	**16**	

TESTS REQUIRED OF NEW STUDENTS

Texas A&M University requires certain College Entrance Examination Board (CEEB) tests as part of its admission requirements for students entering college for the first time. Results of these tests are used for admission, counseling and placement purposes.

The following tests are required: Scholastic Aptitude Test (SAT), English Composition Achievement Test, Mathematics Achievement Test (Level I or II). CEEB offers these examinations at testing centers throughout the United States and in major cities of many foreign countries. Testing dates, locations, and fees are described in an information bulletin which may be obtained by writing the College Entrance Examination Board, Box 1025, Berkeley, Califoria 94701. The CEEB reporting number for the Moody College of Marine Sciences and Maritime Resources is R6835.

It is the applicant's responsibility to make arrangements for taking the examinations. Arrangements are to be made directly with the College Entrance Examination Board, not through Texas A&M University.

The minimum test scores 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 (SAT). As reported by the board, the total of the verbal and mathematical scores becomes a criterion for admission.

Entering freshmen must meet the following SAT minimums:

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

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 he has completed his junior year of high school. To be eligible for this program a student must rank in the highest quarter of his 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.

APPLICATION FOR ADMISSION TO TEXAS MARITIME ACADEMY

In addition to general admission requirements applicants who wish to participate in the federal subsidy license option program of the Texas Maritime Academy must be citizens of the United States and physically fit. The physical requirements for a deck 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 engineering cadet 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 pseudo-isochromatic plate test, but any applicant who fails this test will be eligible if he can pass the "Williams" lantern test or equivalent. Thirty five federal subsidies exist for eligible entering Texas Maritime Academy cadets each year.

License option students must also complete three training cruises, for a total of six months at sea, to be eligible to take Coast Guard examinations for Third Mate (Marine Sciences and Marine Transportation) or Third Assistant Engineer (Marine Engineering). License option candidates must join the Corps of Cadets of Texas Maritime Academy, and annually, 35 cadets are eligible for $50 per month federal subsidy for uniforms and textbooks. Non-license option students may choose to join the Corps but are not required to do so.

ADMISSION OF TRANSFER STUDENTS

Admission may be granted to undergraduate students who begin at other colleges and who meet admission requirements. Applicants may not disregard their academic record at any other institution.

Applicants must be eligible to return to the school from which they seek to transfer. Formal application must be made and submitted with two official transcripts from each school previously attended.

The applicants must achieve an overall grade point ratio of at least 2.00 (C average on a four point scale) and they must have surpassed that average for the most recent two semesters of attendance, if they have completed that much college work. (A 12-week summer session with a normal load of course work is considered a full semester).

Transfer applicants who have attempted 18 semester hours or less must achieve the 2.0 standard and also comply with requirements for entering freshmen. High school records, college records and test results will be used to determine admission status. Either the CEEB Scholastic Aptitude Test (SAT) or the American College Testing (ACT) program will be acceptable for determination of transfer admission status.

On the basis of credentials submitted, credit will be given for satisfactory work completed at another accredited institution, so far as the work completed is equivalent in character and extent to similar offerings of Texas A&M University. Transfer credits are provisional and may be cancelled at any time if the student's work at Texas A&M 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

All international students who are transferring from another college or university in the United States of America must have completed at least two semesters prior to transferring to Texas A&M in addition to the other requirements stated above. International students must also demonstrate a high degree of proficiency in the English language. Proof of this proficiency may be shown by scoring at least 500 for the fall semester or 550 for other semesters on the "Test of English as a Foreign Language" or by making at least a C average on six semester hours of regular college English work at an accredited college or university in the United States.

READMISSION OF FORMER STUDENTS

Any former student who has resigned, been dropped from the rolls, or has not attended Texas A&M for at least one full semester must fill out a Former Student Application for Readmission and submit it to the Office of Admissions. If the student has attended any other institutions since enrollment at Texas A&M, two official transcripts from each of these schools must be submitted when applying for readmission.

SPECIAL ADMISSIONS

ADMISSION BY INDIVIDUAL APPROVAL

An undergraduate applicant who has not recently attended school and who cannot satisfy the entrance requirements in full may be admitted, subject to the following requirements:

1. Make application on the official entrance blanks.
2. Furnish evidence that preparation is substantially equivalent to that required of other applicants and that he or she possesses the ability and seriousness of purpose necessary to pursue studies with profit and to the satisfaction of the University.

ADMISSION OF GRADUATE STUDENTS

To be admitted to the Graduate College (except under double registration), an applicant

1) must hold a baccalaureate degree from a college or university of recognized standing;
2) must show promise of ability to satisfactorily pursue advanced study and research;
3) must have had adequate preparation to enter graduate study in the chosen field;
4) must furnish two official transcripts of all college and university work; and
5) must submit with the application acceptable scores for the Aptitude Test of the Graduate Record Examination (GRE).

The GRE must be taken within five years of application to the Graduate College.

Scores made on the Graduate Record Examination more than five (5) calendar years prior to application for admission to the Graduate College may not be used to satisfy the GRE requirements. More complete information is provided in the Graduate College Catalog which is available through the Office of the Registrar, Texas A&M University, College Station, Texas 77843.

FINANCIAL INFORMATION

Regular Moody College students who are residents of the State of Texas will pay tuition at the rate of $4.00 per semester hour. Out-of-state students pay uition at the rate of $40.00 per hour.

License option students enrolled in the United States Maritime Service will pay tuition at $5.00 per semester hour wih a $50.00 per semester minimum. The Board of Regents of The Texas A&M University System, in recognizing the regional character of the Texas Maritime Academy, has ruled that both in-state and out-of-state students will pay this rate.

Below are expenses for regular Moody College students, based on an 18 hour semester load. All fees listed are strictly approximations in both charts below and are subject to change because of economic conditions and/or legislative requirements.

REGULAR STUDENT EXPENSES

	Spring Semester	Fall Semester
Tuition — Resident $4	$72	$72
Tuition — Out-of-state $40	720	720
Student Services	18	18
Identification Card	3	(Good for the year)
Parking Permit	5	5
Room and Board is approximately	800	800
Board only, for students off campus, available on a seven day basis	426	426

So, a resident student living on campus can expect expenses of approximately $900 while an out-of-state student living on campus can expect about $1,545. A resident student living off campus can expect university expenses of $98 while the out-of-state student living off campus would have $746.

LICENSE OPTION EXPENSES

	Fall Semester	Spring Semester	Summer
Tuition (5.00 sem. hour)	$90	$95	$60
Board	426	426	
Room (aboard **TEXAS CLIPPER**)	150	150	
Room (Dormitory (estimate)	375	375	
Student Services	18	18	
Indentification Card	3		
Parking	5	5	
Training Cruise			310
Laundry (Cruise Only)			30
Uniforms (approximately $200.)			

License option students living aboard the **CLIPPER** can expect expenses of $692 the first semester and $694. the second semester. License option students living in dormitories can expect expenses of $917 the first semester and $919 the second. The summer training cruise expense estimates are $400.

EXPLANATION OF FEES

Tuition

Resident tuition students other than Texas Maritime Academy License Option students pay $4.00 per semester hour, but the minimum total of the charge will not be less than $50.00 per semester.

Non-resident students, other than Texas Maritime Academy License Option students, pay $40.00 per semester hour.

Both resident and non-resident students of the Texas Maritime Academy License Option Program pay $5.00 per semester hour with a minimum of $60.00 per semester.

Former students who do not register when specified pay an additional fee of $4.00.

Room, Rent and Board

All Texas Maritime Academy License Option students are required to pay room and board. Room rent includes heat, light, and cleaning of the corridors, but not the rooms. Rooms are furnished with beds, mattresses, desks, chairs and dressers. Students are expected to furnish pillows, blankets and linens for quarters aboard ship.

Room Deposit

A deposit of $75.00 is required to reserve a dormitory room. When a student enrolls, $45.00 will be applied against the first semester room rent, $30.00 will be retained as a deposit against damage and breakage. Returning students will not be required to increase the deposit they have previously made. 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 clearance by the Provost's Office.

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 and other uses. Card fee is $3.00.

Laboratory Fees

A fee ranging from $2.00 to $8.00 is charged for each laboratory course per semester, with some exceptions in which no fee is charged.

Parking Permit

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

Textbooks and Supplies

The cost of textbooks and supplies are 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

Any student officially withdrawing (a) during the first week of classwork in a semester will receive an 80% (4/5) refund of tuition; (b) during the second week will receive a refund of 60% (3/5); (c) during the third week, he will receive a 40% (2/5) refund; (d) a final refund of 20% (1/5) is made at the end of the fourth week of class. After that time, no refund will be made. After fees are paid three weeks must elapse before refunds are made.

Students withdrawing from a laboratory course during the first week of classwork in a semester will receive a refund of 100% of the laboratory fee paid. After the first week of class, no refunds are made.

Students withdrawing officially from school during the first week of a semester will receive a refund of 100% of the student services fee. No other refund is made.

Board payment will not be refunded except when there is a consecutive absence of ten (10) days due to illness of the student, immediate family, or other unavoidable cause.

There will be no refund of room rent for students withdrawing or moving off campus after classes begin.

Reductions

No reduction will be made in the charge for room, rent 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 optional room rent and board.

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 tution.
      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. Students of other nations of the American Hemisphere.
      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 — No student is exempt unless he is not housed in campus housing or makes no use of board facilities.

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

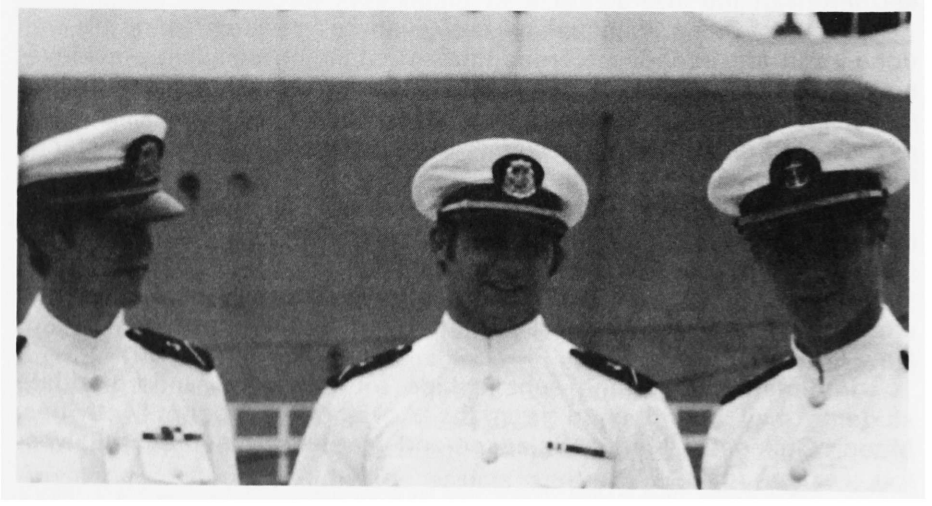
The TAMU Scholarship Program is administered by the Faculty Scholarships Committee. The overall program is designed to encourage and reward scholastic effort on the part of all students, to enable outstanding students to do their best work by removing financial handicaps, and to enable those who might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

In general, there are three types of grants-in-aid available: (1) Valedictory Scholarships and Opportunity Awards — limited to entering freshmen; (2) scholarships designed for more advanced undergraduate students; and (3) fellowships for graduate students. As a college of Texas A&M University, students at Moody College are eligible to participate fully in all of the 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 among all students, the highest grade record 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 $3,800 with recipients receiving from $100 to $750 each year for four years.

Most awards are unrestricted as to course of study or degree objective. Educational Opportunity Grants made available under the Higher Education Act of 1972 are also administered through this program.

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 Schoolarship.

Winners are selected by the College Scholarships and Awards Committee on the basis of the applicant's academic record in high school; College Entrance Examination Board test scores; evidence of initiative, leadership, and other traits of good character. In order for the award to be continued from semester to semester, the recipient must maintain a standard of scholastic achievement and personal conduct satisfactory to the Faculty Scholarships Committee.

Application blanks are made available upon request. Requests for additional information and application forms should be addressed to the Director, Student Financial Aid, Room 303, Y.M.C.A. Building, Texas A&M University, College Station, Texas 77843.

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 Advisor for Student Activities, Moody College of Marine Sciences and Maritime Resourecs, Galveston, Texas 77550.

Employment for Students

Part-time employment of students is coordinated by the Advisor for Student Activities. 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 Advisor for Student Activities.

Texas A&M University participates in the College Work-Study Program authorized by the Economic Opportunity Act of 1964.

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 Fiscal Officer, Moody College of Marine Sciences and Maritime Resources, Galveston, Texas 77550.

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 satisfactory record, and the amount of each loan depends upon the student's actual needs.

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

Limited specialized counseling of students is available upon request. Referral by university representatives, parents or other persons is also possible.

Personal and other problems will be handled in confidence by professional counselors. The Advisor for Student Activities may also call upon other resources of the University in helping students adjust to particular problems.

HOUSING

New campus facilities will be completed in the fall of 1976, to include dormitories, a physical plant and a student activities center. License option students are required to live on campus, taking both room and board. Regular students may live off campus but may pay board. The new student activities center will have food service facilities, for arrangement per meal or per semester.

With housing available on the **TEXAS CLIPPER** as well as in the dormitories, students may also choose to live in the community. The Advisor for Student Activities assists students in securing housing and/or finding roommates.

HEALTH SERVICES

No health facilities or care is available except that TMA license-option students receive care through the U.S. Public Health Service. However, student health insurance is available. For further details, contact the Advisor for Student Activities.

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.

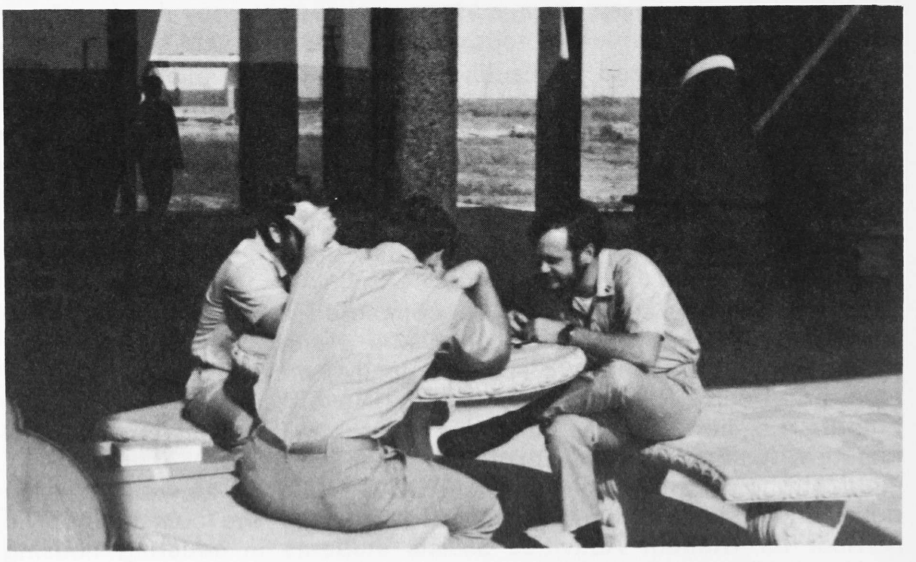
CAMPUS SECURITY

As a state institution on state property, security is maintained on Mitchell Campus by the College police deparment. The are responsible for the protection of all public and private property on the campus, and for the maintenance of state laws and university laws and regulations. Personnel are commissioned peace officers of Texas, trained to conduct their operations in a manner which merits the respect and confidence of the College and its community.

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 also operates the "Lost and Found" Office for the College.

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



STUDENT ACTIVITIES

CLUBS

Chartered clubs on campus include: Marine Sciences, Outdoor Sportsmen, Surfing, Yacht Club and The Propeller Club.

STUDENT PUBLICATIONS

Students publish a weekly newsletter: **Channel Chatter** as well as a yearbook: **The Voyager.**

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.

INTRAMURAL 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, volleyball, soccer and baseball.

Texas A&M University is a member of the Southwest Conference, which includes nine leading universities — the University of Texas, Texas A&M University, Baylor University, Rice University, Texas Christian University, Southern Methodist University, the University of Arkansas, Texas Tech University, and the University of Houston.

The intercollegiate program includes football, basketball, track, cross country, baseball, swimming, tennis, and golf. The Texas Aggies wear the university's colors, maroon and white. Student tickets to all University athletic events are available through the Advisor for Student Activities.

DEGREE PROGRAMS

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.

CURRICULUM IN MARINE BIOLOGY

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	
Biol. 113 Intro. Biology	(3-0)	3	Biol. 114 Intro. 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 and Rhetoric	(3-0)	3	Engl. 104 Composition and Rhetoric	(3-0) 3
Math 130 Mathematical Concepts Pre-Cal or Math 209 Calculus	(3-0)	3	Math 230 Mathematical or Math 210 Calculus	(3-0) 3
Naval Science or Elective		1	Naval Science or Elective	1
		15		15

SOPHOMORE

First Semester			Second Semester	
Chem. 227 Organic Chem. I	(3-0)	3	Chem. 228 Organic Chem. 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 the U.S.	(3-0) 3
Hist. 105 History of the 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 Gov't.	(3-0) 3
Pol.S. 206 Am. Nat. Gov't.	(3-0)	3	Naval Science or Elective	1
Naval Science or Elective		1		
		18		15

JUNIOR YEAR

First Semester	(Th-Pr)	Cr	Second Semester	
Biol. 351 Fund. 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. 205 Physical Geology	(3-2)	4	Elective (General)*	5
Mar.S. 435 Marine Invertebrate Zoology	(3-3)	4	Elective (Social Science or Humanities)*	3
Elective (Social Science				
Elective (Social Science or Humanities)*		3		
		18		15

SENIOR YEAR

First Semester			Second Semester	
Mar.B. Intro. Cell Biology	(3-3)	4	Mar.B. 420 Comparative Physiology	(3-3) 4
Mar.B. 481 Seminar in Marine Biology	(1-0)	1	Mar.B. 482 Seminar in Marine Biology	(1-0) 1
Mar.B. 485 Problems in Marine Biology	(3-0)	3	Mar.S.450 Devel. Brol. or Marine Organ.	(3-3) 3
Stat. 302 Statistical Methods	(2-2)	3	Elective (Biology)*	3
Mar.S. 420 Marine Ecology	(2-3)	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

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 marine power plants and associated equipment. Thorough preparation in mathematics, sciences, and basic and applied engineering subjects is recommended for students pursuing this degree program.

CURRICULUM IN MARINE ENGINEERING
(MARE)

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second 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 Engr. Design Graphics	(0-6)	2
Engl. 103 Composition & Rhetoric	(3-0)	3	Engl. 203 Intro. to Literature	(3-0)	3
Mar.E. 101 Engineering Analysis	(0-3)	1	Mar.E. 105 Engineering Mechanics I	(3-0)	3
Math. 104 Analytic Geometry	(3-0)	3	Math. 210 Calculus	(3-0)	3
Math. 209 Calculus	(3-0)	3	N.S. 112 Naval Ship Systems I	(3-0)	3
		16			18

SOPHOMORE YEAR

Summer Session I

(Ten weeks at sea on T/S TEXAS CLIPPER)

Mar.E. 200 Basic Operations, Credit 4

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

JUNIOR YEAR

Summer Session II

(Ten weeks at sea on T/S TEXAS CLIPPER)

Mar.E. 300 Intermediate Operations, Credit 4

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

SENIOR YEAR

Summer Session III

(Ten weeks at sea on T/S TEXAS CLIPPER)

Mar.E. 400 Advanced Operations, Credit 4

Mar.E. 301 Fluid Mech. & Heat Trans	(3-0)	3	Mar. E. 412 Ship Struct. & Stability	(3-0)	3
Mar.E. 411 Marine Mech. Design Tech	(3-0)	3	Mar.E. 415 Intro. to Mar.E. Systems Design	(3-0)	3
Mar.E. 414 Ship Automation	(4-0)	4	Mar.E. 416 Engineering Lab	(0-4)	1
Pol.S. 206 American Natl. Govt.	(3-0)	3	Ocn. 401 Intro. to Oceanography	(3-0)	3
Elective		3	Technical Elective		3
			Elective		3
		16			16

NOTES: 1. Naut. 103 for Coast Guard License Candidates.
Students not electing to take Naval Science must take Political Science 207.
2. All electives must be chosen in consultation with, and approved by the student's advisor.

Total credit hours: License Option 146
Non-License Option 134

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.

CURRICULUM IN MARINE SCIENCES
(MARS)

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester		Cr
Biol. 113 Intro. Biology	(3-0)	3	Biol. 114 Intro. 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 and Rhetoric	(3-0)	3	Engl. 104 Composition and 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
		15			15

SOPHOMORE YEAR

First Semester		Cr	Second Semester		Cr
Chem. 227 Organic Chem. I	(3-0)	3	Chem. 228 Organic Chem. II	(3-0)	3
Chem. 237 Organic Chem. Lab I	(0-3)	1	Chem. 238 Organic Chem. Lab II	(0-3)	1
Hist. 105 History of the U.S.	(3-0)	3	C.S. 203 Intro. to Computing	(3-0)	3
Math. 210 Calculus	(3-0)	3	Hist. 106 History of the U.S.	(3-0)	3
Phys. 201 College Physics	(3-3)	4	Phys. 202 College Physics	(3-3)	4
Pol.S. 206 Am. Nat. 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
		18			18

JUNIOR YEAR

First Semester	(Th-Pr)	Cr	Second Semester		Cr
Engl. 301 Technical Writing	(3-0)	3	Biol. 440 Marine Biology	(3-3)	4
Geog. 210 Marine Geography	(3-0)	3	C.S. 204 Computers & Programming	(3-0)	3
Geol. 205 Physical Geology	(3-2)	4	Econ. 203 Principals of Econ.	(3-0)	3
Electives (General)*		6	Mar.S. 310 Field Methods	(1-6)	3
			Met. 301 Atmospheric Sciences	(3-0)	3
		16	Electives (General)*		3
					19

SENIOR YEAR

First Semester		Second Semester	
Mar.S. 375 Science of Fluids ....(3-0)	3	Mar.S. 485 Problems in Mar.S. ....(3-0)	3
Mar.S. 420 Marine Ecology .....(2-3)	3	Ocn. 410 Intro. to Phys. Ocn. .....(2-0)	2
Mar.S. 481 Seminar in Mar.S. ....(1-0)	1	Ocn. 430 Intro. to Geol. Ocn. .....(2-0)	2
Ocn. 440 Intro. to Chem. Ocn. ....(2-0)	2	Electives (General)*	9
Stat. 302 Statistical Methods .....(2-2)	3		16
Electives (General)*	6		
	18		

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

MARINE SCIENCES WITH A LICENSE OPTION (MARSL)

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	
Biol. 113 Intro. Biology .....(3-0)		3	Biol. 114 Intro. Biology .....(3-0)	3
Biol. 123 Intro. Biology Lab .....(0-3)		1	Biol. 124 Intro. Biology Lab .....(0-3)	1
Engl. 103 Composition & Rhetoric (3-0)		3	Engl. 104 Composition & Rhetoric (3-0)	3
Hist. 105 History of the 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 .....(3-0)		3	Naut. 204 Terrestrial Navigation ...(2-2)	3
		16		16

SUMMER SESSION
(Ten weeks at sea on T/S TEXAS CLIPPER)
Naut. 200 Basic Communication, Navigation & Seamanship
Credit 4

SOPHOMORE YEAR

First Semester		Second Semester	
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
Math. 210 Calculus .....(3-0)	3	C.S. 203 Intro. to Computing .....(3-0)	3
Naut. 201 Naval Architecture I ....(3-2)	4	Naut. 202 Naval Architecture II ....(3-0)	3
N.S. 112 Naval Ship Systems .....(3-0)	3	Naut. 303 Celestial Navigation ....(2-3)	3
Phys. 201 College Physics .....(3-3)	4	Phys. 202 College Physics	4
	18		17

SUMMER SESSION
(Ten weeks at sea on T/S TEXAS CLIPPER)
Naut. 300 Intermediate Communication, Navigation & Seamanship
Credit 4

JUNIOR YEAR

First Semester	(Th-Pr)	Cr	Second Semester	
Engl. 301 Technical Writing .....(3-0)		3	Mar.S. 310 Field Methods .....(1-6)	3
Geol. 205 Physical Geology .....(3-2)		4	Mar.T. 321 Maritime Law I .....(3-0)	3
Mar.T. 302 Cargo I .....(3-3)		4	Met. 302 Weather Report/Forecst. (3-0)	3
Pol.S. 206 Am. Nat. 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
		17	N.S. 316 Nav. Op. and Analysis ...(3-0)	3
				18

SUMMER SESSION
(Ten weeks at sea on T/S TEXAS CLIPPER)
Naut. 400 Adv. Comm., Nav., & Seamanship 4
Mar.S. 485 Problem in Marine Science 3
7

SENIOR YEAR

First Semester		Second Semester	
Mar.S. 420 Marine Ecology .....(2-3)	3	Biol. 440 Marine Biology .....(3-3)	4
Mar.S. 481 Seminar in Mar.S. .....(1-0)	1	Hist. 309 Am. Military History .....(3-0)	3
Mar.T. 406 Cargo II .....(2-2)	3	N.S. 411 Organization & Mgmt. ....(3-0)	3
Naut. 302 Seamanship III .....(1-3)	2	N.S. 412 Weapons .....(3-0)	3
Naut. 404 The Navigator .....(2-3)	3	Ocn. 410 Intro. to Phys. Ocn. .....(2-0)	2
Ocn. 440 Intro. to Chem. Ocn. ...(2-0)	2	Ocn. 430 Intro. to Geol. Ocn. .....(2-0)	2
	14		17

Total Hours – 148

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 port 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.

CURRICULUM IN MARINE TRANSPORTATION (MART)

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second Semester	(Th-Pr)	Cr
Chem. 106 General Chemistry	(3-3)	4	Engl. 104 Composition & Rhetoric	(3-0)	3
E.D.G. 105 Engineering Graphics	(0-6)	2	Mgmt. 105 Intro. to Business	(3-0)	3
Engl. 103 Composition & Phetoric	(3-0)	3	Math. 106 Plane & Spherical Trig	(4-0)	4
Mar.E. 101 Engineering Analysis	(0-3)	1	Naut. 203 Seamanship I	(2-3)	3
Math. 104 Analytic Geometry	(3-0)	3	Naut. 204 Terrestrial Navigation	(2-2)	3
Naut. 103 Mar. Orientation	(2-3)	3	N.S. 112 Naval Ships Systems	(3-0)	3
		16			19

SOPHOMORE YEAR

Summer Session I
(Ten weeks at sea on T/S TEXAS CLIPPER)
*Naut. 200 Basic Communication, Navigation, and Seamanship
Credit 4

Econ. 203 Principles of Econ.	(3-0)	3	Econ. 204 Principles of Econ.	(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 Rept/Fore	(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

JUNIOR YEAR

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

Econ. 321 Intl. Trade & Finance	(3-0)	3	Mar.E. 310 Engr. Computations	(3-0)	3
Hist. 106 History of the U.S.	(3-0)	3	Mar.T. 321 Maritime Law I	(3-0)	3
Mar. T. 301 Ocean Transportation I	(4-0)	4	Mar. T. 406 Marine Cargo Op. II	(2-2)	3
Mar.T. 302 Marine Cargo Op. I	(3-3)	4	Naut. 202 Naval Architecture II	(3-0)	3
Naut. 201 Naval Architecture I	(3-2)	4	Naut. 304 Electronic Navigation	(2-2)	3
			*N.S. 316 Naval Op. & Analysis	(3-0)	3
		18			18

SENIOR YEAR

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

Engl. 301 Technical Writing	(3-0)	3	B.Ana. 303 Statistical Methods	(3-3)	4
Mar.T. 421 Maritime Law II	(3-0)	3	Mar.T. 416	(3-0)	3
Naut. 302 Seamanship III	(1-3)	2	*N.S. 412 Weapons	(3-0)	3
*Naut. 404 The Navigator	(2-3)	3	*Ocn. 401 Intro. to Oceanography	(3-0)	3
*N.S. 411 Organization & Mgmt.	(3-0)	3	Pol.S. 206 American Natl. Govt.	(3-0)	3
		14			16

Total credit 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 year, 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 316, 411, 412; 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. 445 — Marketing Research (3-0) 3
Pol.S. 207 — State & Local Govt. (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. 459 — Management Problems (3-0) 3
or
MGMT. 460 — Mgmt. Systems & Control (3-0) 3
MGMT. 466 — Management Policy (3-0) 3
Pol.S. 207 — State & Local Gov't. (3-0) 3
BANA. 304 — Business Cycles & Measurements (3-0) 3
Total Hours: 27

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

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.

MARITIME SYSTEMS ENGINEERING

(MASE)

FRESHMAN YEAR

First Semester	(Th-Pr)	Cr	Second 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 Engr. Design Graphics	(0-6)	2
Engl. 103 Composition & Rhetoric	(3-0)	3	Mar. E. 105 Engineering Mech. I (Statics)	(3-0)	3
Mar.E. 101 Engineering Analysis	(0-3)	1			
Math. 104 Analytic Geometry	(3-0)	3	Math. 210 Calculus	(3-0)	3
Math. 209 Calculus	(3-0)	3	M.S.E. 100 Intro. to M.S. Engr.	(2-3)	3
Naval Science or Elective		1	Naval Science or Elective		1
		17			16

SOPHOMORE YEAR

Econ. 203 Principles of Econ.	(3-0)	3	Mar. E. 210 Marine Constr. Mtrls.	(2-2)	3
Mar.E. 206 Engineering Mechanics II (Dynamics)	(3-0)	3	Mar.E. 303 Marine Thermodynamics	(3-0)	3
			Mar.E. 310 Engr. Computations	(3-0)	3
Mar.E. 209 Mech. of Materials	(3-0)	3	Math. 308 Differential Equations	(3-0)	3
Mar. E. 219 Strength of Mtrls. Lab.	(0-2)	1	Phys. 219 Electricity	(3-3)	4
Math. 307 Calculus	(3-0)	3	Naval Science or Elective		1
Naut. 201 Naval Architecture I	(3-2)	4			
Naval Science or Elective		1			17
		18			

JUNIOR YEAR

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

SENIOR YEAR

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

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

OCEAN ENGINEERING OPTION REQUIREMENTS

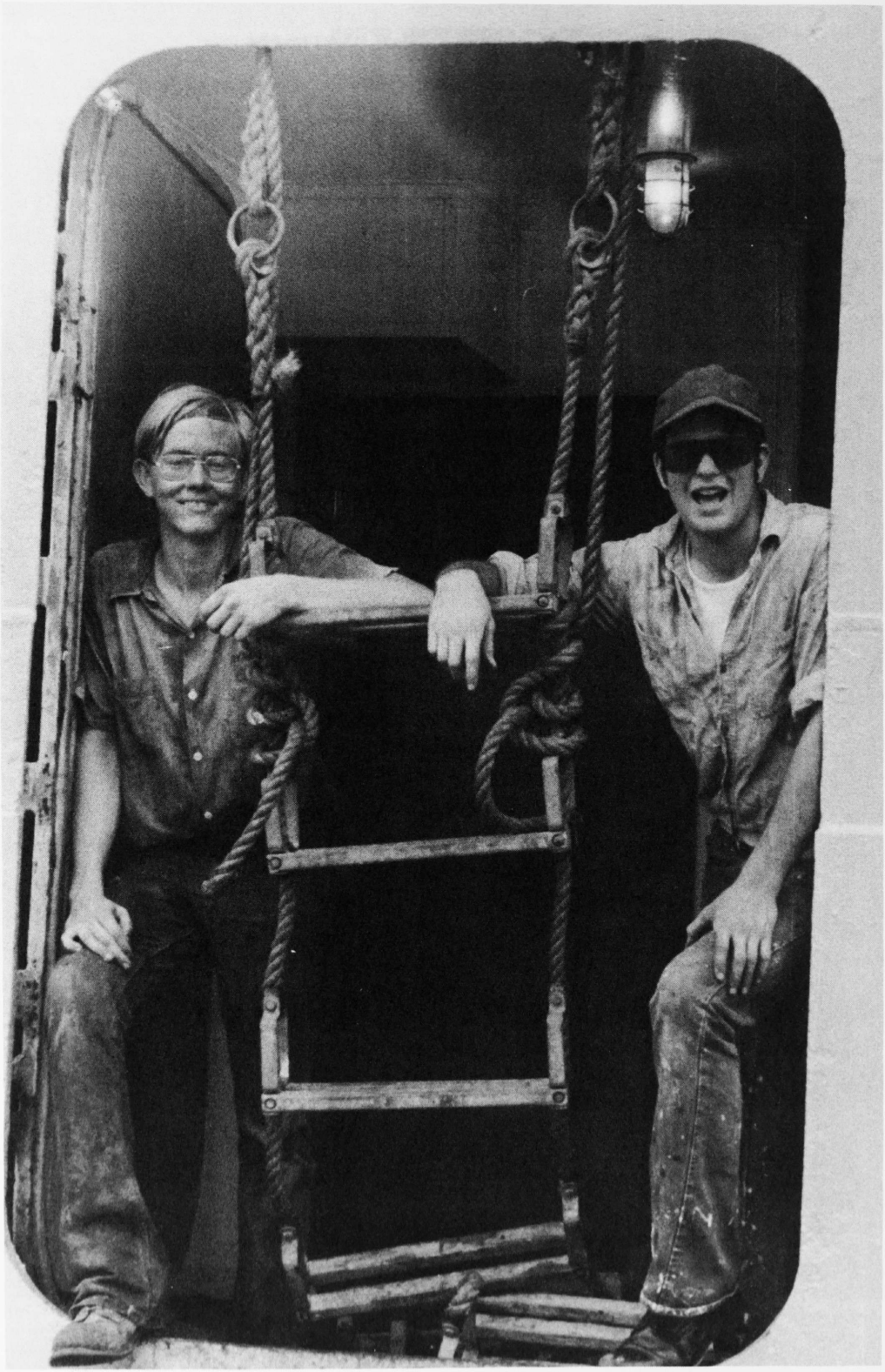
C.E. 311 Fluid Dynamics .....(3-2)	4
C.E. 345 Theory of Structures .....(3-0)	3
C.E. 365 Soil Mechanics and Foundations .....(2-2)	3
Geol. 320 Geol. for Civil Engrs. ...(2-2)	3
Ocn. 410 Intro. to Phys. Ocn. .....(2-0)	2
Ocn. 420 Intro. to Biol. Ocn. .....(2-0)	2
Ocn. 430 Intro. to Geol. Ocn. .....(2-0)	2
Ocn. 440 Intro. to Chem. Ocn. ....(2-0)	2
O.E. 400 Basic Coastal Engr. .....(3-0)	3
Mar.E. 307 Electrical Circuits .....(3-2)	4
Science Elective (Biology)	3
Elective (Social)	3
Elective (Technical)	6
Free Electives	4
	44

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
Mar.E. 301 Heat Transfer .....(3-0)	3
Mar.E. 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. 401 Intro. to Phys. Ocn. .....(2-0)	2
Phys. 220 Modern Physics .....(3-3	4
Free Electives	11
	44

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 Geol. for Civil Engr. ...(2-2)	3
Mar.E. 301 Heat Transfer .....(3-0)	3
Mar.E. 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 Intro. to Oceanography ..(3-0)	3
Phys. 220 Modern Physics .....(3-3)	4
Free Electives	4
	44



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.

435. Advanced Invertebrate Zoology (3-3). Credit 4. Morphology, taxonomy, biology, and phylogeny of invertebrate animals. Prerequisites: Biol. 114 and 124 or approval of instructor. See also Marine Sciences 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, distribution, history, ecology, physiology, mutualism, predation, major community types and economic aspects of marine organisms. Prerequisities: Biol. 113, 114, 123, 124 or equivalent; 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 Method (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.

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; elected 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 (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 (0-3). Credit 1. Continuation of Chem. 237. Prerequisites: Chem. 228, 237 or registration therein.

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 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.

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.

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.

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.

ENGINEERING DESIGN GRAPHICS (E.D.G.)

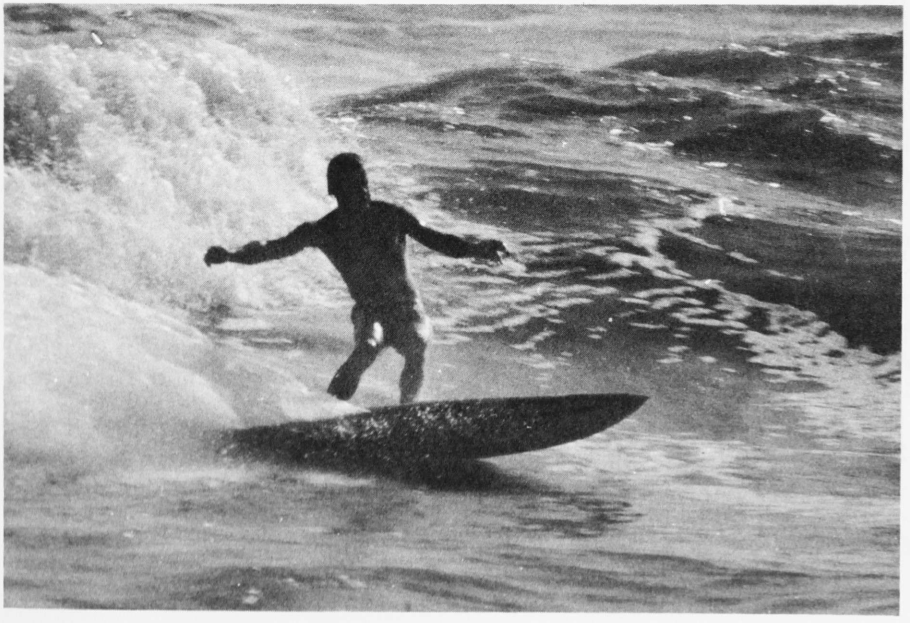
105. Engineering Graphics (0-6). Credit 2. Introduction to the graphical approach to the engineering design process as applied to elementary systems. Methods of graphical communications, working drawings, data analysis, technical reports, oral presentations. Introduction to team organization and creative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

ENGINEERING TECHNOLOGY (E.T.)

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.



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.

301. Technical Writing (3-0). Credit 3. Advanced writing in technical, scientific and business fields; reports, proposals and other papers; correspondence. Prerequisite: Engl. 103 or advanced standing.

GENETICS
(Gen.)

301. Genetics. (4-0). Credit 4. Fundamental principles of genetics: physical basis of Mendelian inheritance, expression and interaction of genes, linkage, six linkage, biochemical nature of genetic material and mutation. Prerequisite: Biol. 101 or 107.

GEOGRAPHY
(Geog.)

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.

GEOLOGY
(Geol.)

205. Physical Geology (3-2). Credit 4. General principles of physical geology; structure of the earth, origin of minerals and rocks and geologic processes.

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.

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.

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.

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. Prorequisite: 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. Prerequisities: 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: Senior classification in Business Administration; Mgmt. 363 and Senior classification in Business Administration.

MARINE BIOLOGY
(Mar.B.)

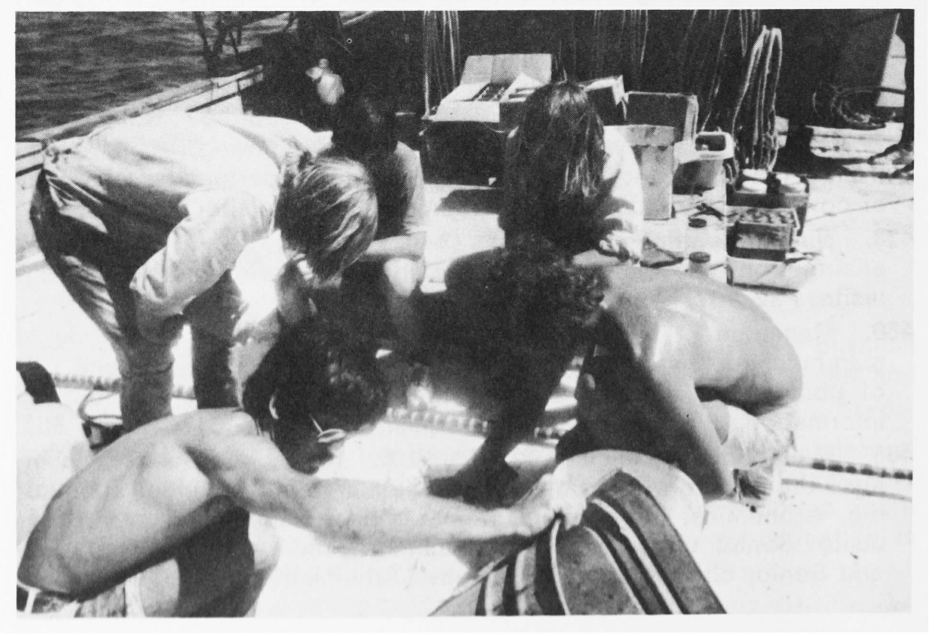
310. Introduction to Cell Biology (3-3). Credit 4. Introduction to the basis principles of cell structure and function. Molecular components of the cell, methods for study of the cell, structural bases of the cell cytoplasm and cytoplasmic organelles and their structure and function with particular emphasis on nucleus will be studied. Prerequisites: Biol. 113 or 114 and Chem. 228.

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. (1-6). Credit 1 to 6. Special topics and problems suited to analysis by individuals or small groups concerning aspects of marine biology. Prerequisite: approval of Department Head.



MARINE ENGINEERING
(Mar.E.)

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. Prerequisites: Math. 210. or registration therein.

200. Basic Operations Credit 4. Represents practical application of student's classroom studies aboard 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 U.S. Coast Guard license. Prerequisite: N.S. 112.

203. Diesel Engine Technology. (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.

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: Mar.E. 105.

207. Electricity & Magnetism (3-2). Credit 4. Introduction to basic electricity, electric & magnetic circuits studies under d.c. and a.c. steady state condition. Complex numbers, phasor algebra, and three-phase circuit 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 U.S.C.G. 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 of 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. Prerequisites: Mar.E. 206 or registration therein.

300. Intermediate Operations Credit 4. S. 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 of 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 applicable to understanding of behavior, mode of operation, uses and maintenance of equipment aboard ship. Measurements of circuit phenomenona, including fundamental amplifiers and rectifiers. Prerequisite: Math 122, Phys. 219.

308. Electrical Machinery (3-2). Credit 4. Study of principle types of electrical machines aboard ship including their characteristics, applications and control devices. Laboratory work includes actual operation and testing of machinery and equipment aboard ships.

310. Engineering Computation (3-0). Credit 3. Techniques of problem solving using digital computers; concepts and properties of algorithms; solution for 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. During this period each student will learn how to operate 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.

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.

Marine Electronics Technology (3-2). Credit 4. Study of the ory of operations and characteristics of electron devices and :uits with emphasis on marine applications.

Nuclear Propulsion II (2-2). Credit 3. Study of reactor controls l instrumentation including basic electronics, design, installation l maintenance of various types of control systems. Survey of lear propulsion and marine industry. Field trips to shipyard lear facilities in Galveston area.

Marine Power Plants (2-2). Credit 3. Discussion of the selection l application of systems for marine propulsion and auxiliary tems. Analysis of system requirements. Prerequisites: Mar.E. 304.

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

Ship Structures and Stability (3-0). Credit 3. An introduction ıaval architecture. Topics include geometry of the ship, evalua- ı of stability, motions in waves and a study of ship structures. requisite: Mar.E. 209.

Ship Automation (4-0). Credit 4. Study of closed loop devices uding electrical, hydraulic and mechanical systems. Ship applica- ı of automation, current and future. Survey of electron devices, rumentation and control. Prerequisites: Mar.E. 308; Math. 308.

Introduction to Marine Engineering Systems Design (3-0). Credit Application of systems engineering techniques in the solution narine engineering problems regarding reliability, economic and ironmental considerations. Prerequisite: Mar.E. 410.

Engineering Laboratory I. (O-4). Credit 1. Analysis of funda- ıtals of machinery dynamics, heat transfer, fluid friction losses ›iping systems, steam nozzles. Steam reciprocating and diesel ines are studied. Prerequisite: Senior classification.

Engineering Laboratory II (0-4). Credit 1. Performance analysis turbine machinery, air conditioning systems, basic electrome- nical and pneumatic control systems. Prerequisite: Senior class- ation.

Fundamentals of Radiation Control. (3-0). Credit 3. Radiation trol from the standpoint of protection, use of instrumentation, imetry, contamination control, waste disposal, radiation accidents governmental regulations with emphasis on shipboard applica- ıs. Prerequisite: Mar.E. 401.

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

Problems Credit 1 to 4 each semester. Special problems in ine engineering not covered by any other course in the curricu- . Work may be in either theory or laboratory. Prerequisite: Ap- val of Department Head.

MARINE SCIENCES
(Mar.S.)

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.

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.

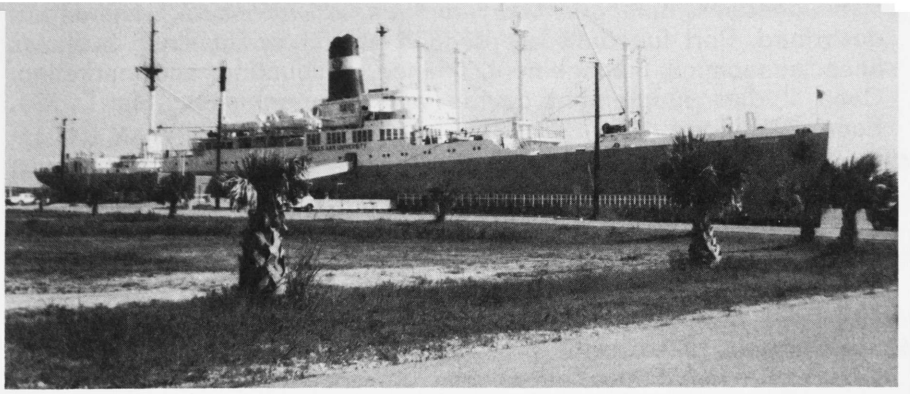
420. Marine Ecology. (2-3). Credit 3. Relationship between various marine environments and their inhabitants; intra and interspecific relationships between organisms; structure and function among marine communities. Laboratory emphasis is placed on study of living material and natural habitats in the Gulf of Mexico. Prerequisites: Biol. 114 and 124 or approval of instructor.

435. Marine 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.

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. Prerequisites: 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. Prerequisites: Approval of Department Head.



MARINE TRANSPORATION
(Mar. T.)

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 goverment. Buying of services by shipper, finance of shipping, international conventions and treaties.

302. Marine Cargo Operations I (3-3). Credit 4. Essential requirements and problems in stowage and carriage of general and dry bulk cargoes. Theoretical and practical problems in receiving, stowing securing, transporting and discharging all types of cargoes. Laboratory work consists of field trips to ships and various maritime installations.

304. Ocean Transportation II (3-0). Credit 3. Concerned with carriage of goods under bills of lading and charter parties. Terminal management and operation and types of carriers. Pertinent sections of American and British shipping laws are thoroughly studied. Prerequisite: Mar.T. 301.

321. Maritime Law I (3-0). Credit 3. Provides a thorough foundation in the basic laws governing ship operations. Intensive study of the international and inland rules of the road for the prevention of collision at sea; safety of life at sea convention; and U.S. laws and regulations for merchant seamen. 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: Mar.T. 304.

406. Marine Cargo Operations II (2-2). Credit 3. Stowage of special cargoes (bulk, liquid, refrigerated and dangerous cargoes), ship's papers, entry and clearance procedures are covered. Laboratory work consists of field trips to different types of ships and studying their methods of handling cargo.

416. Port Operations, Administration and Economics (3-0). Credit 3. The concept of the port and methods of intermodal transfer are described. Port functions are divided and analyzed along business lines: economics, management, finance, accounting, and marketing. Case studies supplement course work. Prerequisites: Mar.T. 304, Econ. 321, Mgmt. 105.

421. Maritime Law II (3-0). Credit 3. Provides the essential principles of admiralty and maritime law. A thorough study of collision law with emphasis on case histories. Analysis of maritime cases as reviewed by the U.S. Supreme Court in marine insurance, rights of seamen, maritime liens, ship mortgages, salvage and the limitation of liability. Prerequisites: Mar.T. 321.

481. Seminar. (02). Credit 1. Problem oriented discussion session. Topics and reports selected for relevance to current problems. Prerequisite: Approval of Department Head.

485. Problems each semester. Credit 1 to 4. Directed study in problems in the field of marine transportation not covered by other courses in department. Prerequisites: Senior classification or approval of Department Head.

MARITIME SYSTEMS ENGINEERING
(M.S.E.)

100. Introduction to Maritime Systems Engineering. (2-3). Credit 3. Activies 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.

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. Behaviorial 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.

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.

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 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 Loplace transforms, systems of differential equations, introduction to numerical methods, partial differential equations and boundary value problems. Fourier series. Prerequisite: Math. 122 or 210.

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. Sudy of dimensional analysis and similitude and their application to flow through ducts and piping. Dynamic lift and related 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.

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 and Lifesaving (2-3). Credit 3. Survey of maritime industry and its trends, with emphasis on opportunities; the seaman's environment and customs of the sea; basic nomenclature and lifesaving.

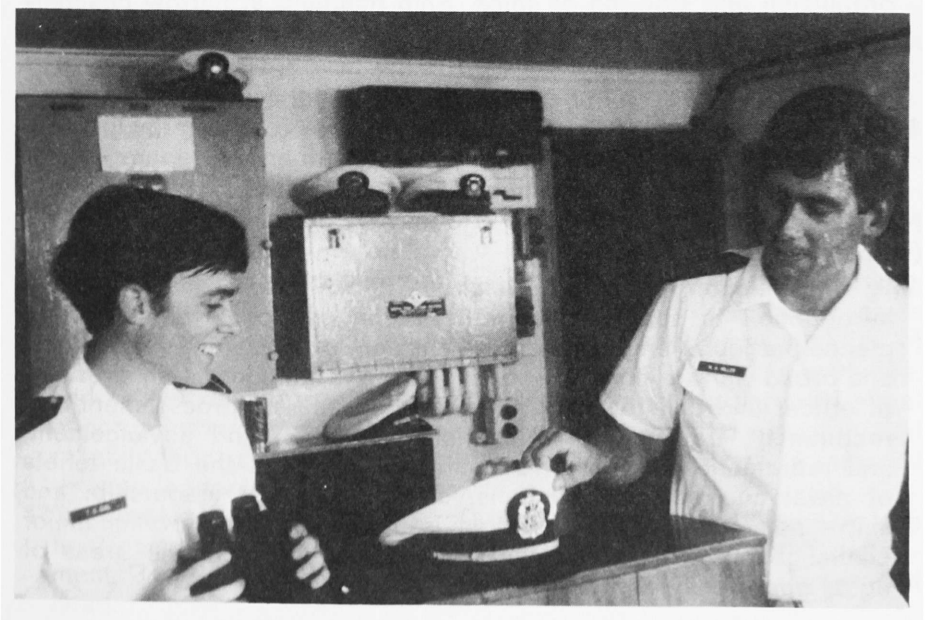
200. Basic Communications, Navigation, and Seamanship Credit 4. Practical application of student's classroom studies aboard training ship during first training cruise. Student completes basic project in communications, navigation, seamanship and rules of the road.

201. Naval Architecture (3-2). Credit 4. Description of the 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 the 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. Art of handling small boats under oars, sail, and power. Lifeboat launching and equipment, construction and types of boats. Application of ground tackle, knotting and splicing, blocks and tackle. Communications practice, rules of the road.

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 on shipboard, heavy lifts, accident prevention. Marine inspection laws and communications.

302. Seamanship III (1-3). Credit 2. Intermediate projects in communications and rules of the road. Thorough study made of U.S. Public Health requirements in ship sanitation. Marine inspection rules for safety at sea and rules and regulations 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 marine gyro compass, radio direction finder, Loran, Omega, and Decca. 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 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 and 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. Review of the principles of electronic, celestial, and terrestrial navigation in preparation for the U.S. Coast Guard examination for Third Mate.

NAVAL SCIENCE
(N.S.)

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 desig familiarize students with the types, structure and purpose o ships. Ship compartmentation, propulsion systems, auxiliary systems, interior communications, and ship control are in Elements of ship design to achieve safe operations, and ship s characteristics are examined.

210. Naval Ship Systems II. (3-0). Credit 3. Provides an in tion to the theory and principles of operation of Naval W systems, capabilities and limitations, theory of target acqu identification and tracking, trajectory principles, and basics o ordance.

213. Seapower and Maritime Affairs. (0-2). Credit 1. A on the premise that the student must develop his knowled interest in seapower and maritime affairs. This course is o toward the general concept of seapower (including the m marine), the role of various components of the Navy in sup the Navy's mission, the implementation of seapower as an inst of national policy, and a comparative study of U. S. and naval strategies.

315. Navigation. (2-3) Credit 3. A comprehensive study theory, principles, and procedures of ship navigation. Topics i mathematical analysis, spherical triangulation and practica involving sight reduction, sextants, publications, and cours Rules of the Road, lights, signals, and navigational aids, in inertial systems are also covered.

316. Naval Operations Analysis. (3-0). Credit 3. A compre study of the theory, principles, and procedures of ship mov and employment. Topics include communications, sonar-radar and screening theory. Tactical formations and dispositions, motion, maneuvering board, and tactical plots are analyz force effectiveness and unity.

411. Principles of Naval Organization and Management. (3-0). 3. An introduction to the structure and principles of naval zation and management. Naval organization and managemen tives and the concepts that lie behind them are examined the context of American social and industrial organizatio practices. This includes lines of command and control, orgar for logistics, service and support, functions and services o components of the Navy and Marine Corps, and shipboard or tion. Emphasis is placed on management and leadership fur

412. The Junior Naval Officer. (0-2). Credit 1. This course the student a basic background in the duties and responsibil a junior officer's responsibilities in the area of training, cour and career development. The student becomes familiar with opportunity programs, the exemption program and drug/ rehabilitation programs. Principles of leadership are rein through leadership case studies.

485. Problems. Credit 1 to 3. Directed study in problems field of naval science not covered by other courses in the ment. Prerequisite: Senior classification and approval of dep 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.

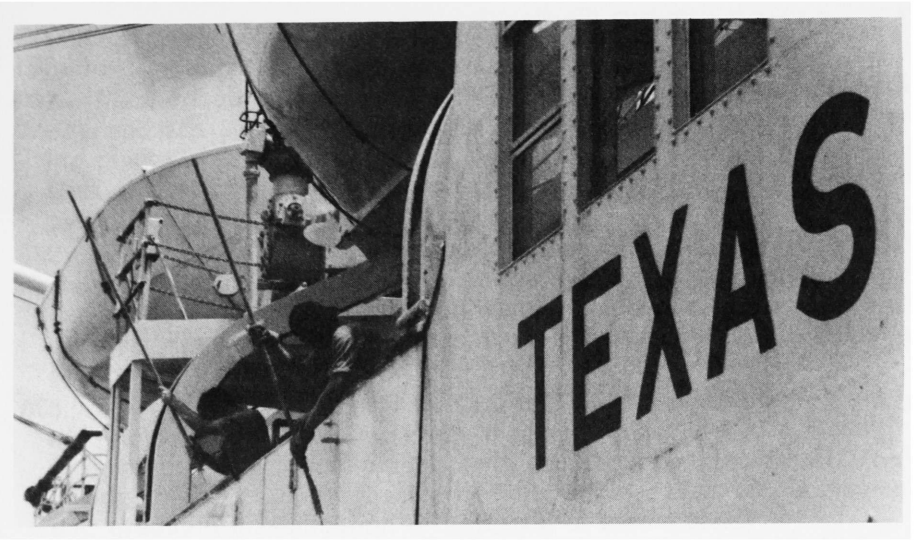
PHYSICS (Phys.)

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.

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.



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.

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 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.

WILDLIFE AND FISHERIES SCIENCE
(W.F.S.)

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.

400. Fisheries Survey Credit 4. Distribution, identification, field and laboratory techniques. Prerequisite: Junior classification or approval of Department Head.

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.

485. Wildlife Problems Credit 1 to 3. Individual study and research on selected problem approved by instructor. Prerequisite: Junior or senior classification.

COURSE DESCRIPTIONS
(Graduate)

BIOLOGY
(Biol.)

637. Marine Botany (2-6). Credit 4. Systematics, morphology, ecology, and economics of marine plants including the algae and flowering plants of North American coasts, particularly those around the Gulf of Mexico and along the Texas coast. Prerequisite: Graduate classification in biology or related science.

662. Biology of The Mollusca (3-3). Credit 4. Classification, life history, morphology, physiology, ecology, diseases, parasites, predators and competitors of molluscs, with special reference to oysters. Prerequisite: B.S. degree in biology or related fields of approval of instructor.

663. Biology of Crustacea (3-3). Credit 4. Classification, life history, morphology, physiology, ecology, diseases, parasites, and predators of crustaceans. Economic aspects of crustaceans considered. Study of original literature emphasized. Prerequisites: Biol. 435 or equivalent; graduate classification or approval of instructor.

665. Invertebrate Zoology (3-3). Credit 4. Morphology, taxonomy, biology, phylogeny of invertebrate animals, including an individaul project. Special attention to invertebrates (not including insects) of interest to entomologists, wildlife students, and oceanographers, including economic forms. Prerequisite: Six hours of zoology.

685. Problems Credit 1 to 6 each semester. Limited investigations in fields other than those chosen for thesis or dissertation.

691. Research Credit 1 or more each semester. Research for thesis or dissertation. Prerequisite: approval of ranking professor in field chosen.

CIVIL ENGINEERING
(C.E.)

603. Stream Quality (3-0). Credit 3. Physical, chemical, radiological and biological properties of streams, impoundments, reservoirs and estuaries and the interrelationships of these properties; local, state, regional and federal water quality standards, legal aspects of water pollution control; quality criteria for beneficial uses of water, evaluation of critical problems. Prerequisite: Graduate standing in engineering or approval of instructor.

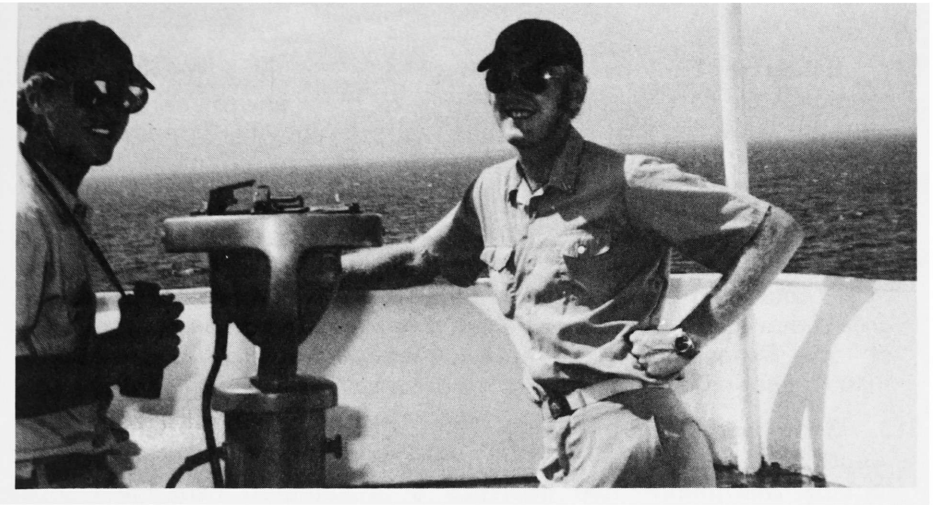
675. Coastal Engineering I (3-0). Credit 3. Review of small amplitude and finite amplitude wave theories and applications to engineering problems. Wave forces on coastal structures. Wave run-up on uniform and composite beaches. Design of seawalls and breakwaters. Prerequisite: Approval of instructor.

676. Ocean Engineering (3-0). Credit 3. Review of wave and tide theories, wind and ocean current forces; storm surge; ocean survey equipment; diffusion processes and marine outfall design; ocean mooring; oil spill containment and collection. Prerequisite: Approval of instructor.

677. Coastal Engineering II (3-0). Credit 3. Applications of wave theories to engineering problems; tidal dynamics; sediment transportation along the coast and in estuaries; dredging; coastal and estuarine models. Prerequisite: C.E. 675 or approval of instructor.

678. Hydromechanics (3-0). Credit 3. Continuity; stream and potential functions; irrotational flow; Laplace, Euler and Navier-Stokes equations; standard patterns of flow; conformal transformations; Schwarz-Cristoffel theorem; vortex motion; gravity wave theory. Prerequisite: Approval of instructor.

685. Problems Credit 1 to 6 each semester. Enables majors in coastal and ocean engineering to undertake work on special topics of current importance. Typical subject matter has been areas of advanced fluid dynamics mathematical modeling, ship motion in restricted waterways, dynamics of semi-submersible drilling rigs, statistical fluid mechanics, experimental techniques using hot film anemometrys and ocean applications of fluidics technology.



GEOGRAPHY
(Geog.)

627. Coastal Geomorphology. (3-0). Credit 3. Description, geographical distribution, and evolution of coastal landforms. Emphasis on glacio-eustatic imprint and on landforms of Louisiana and Texas coasts. Floodplain development, terrace chronology, and evolution of estuaries, marshlands, and beaches. Man and coastal envionments. Prerequisite: Three hours of advanced geology of physical geography or approval of instructor.

OCEANOGRAPHY
(Ocn.)

623. Marine Zooplankton (2-3). Credit 3. Detailed examination of selected aspects of biological oceanography with particular reference to the zooplankton of the Gulf of Mexico and Caribbean. Prereqisite: Ocn. 620 or equivalent.

624. Marine Phytoplankton (2-3). Credit 3. Detailed studies of phytoplankton with emphasis on physical and chemical factors which affect plankton production. Study of phyloplankton-zooplankton sampling problems. Prerequisite: Ocn. 620 or equivalent.

685. Problems Credit 1 to 4 each semester. Special topics to suit small group requirements. Deals with problems not within thesis research and not covered by any other course in established curriculum. Prerequisite: General prerequisites for oceanography.

691. Research Credit 1 or more each semester. For thesis or dissertation. Topic subject to approval of Department Head.

VETERINARY MICROBIOLOGY
(V.Mi.)

660. Diseases of Marine Invertebrates (4-0). Credit 4. Response of invertebrates to noninfectious and infectious agents. Subject oriented and phylogenetic within each category. Prerequisites: 12 hours of biological science, including at least 3 hours of histology or microtechniques and approval of instructor.

WILDLIFE AND FISHERIES SCIENCES (W.F.S.)

611. Estuarine Ecology (3-3). Credit 4. Principles governing the relationships of estuarine organisms to their environment. Special attention devoted to such areas as productivity, adaptations to environment, community structure and factors affecting the distribution and abundance of biota. Prerequisites: Invertebrate zoology and ichthyology or approval of instructor.

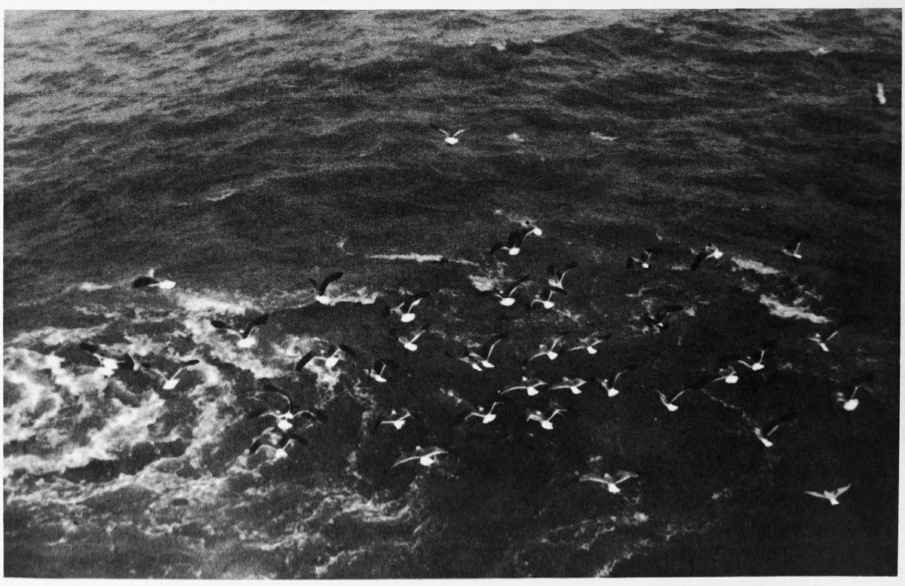
612. Marine Ichthyology (2-3). Credit 3. Classification of marine fishes including a survey of shallow water forms of the Galveston area. Local and one distant field trip in Texas. Emphasis on habitats of local fishes, how to make a collection and use it for reports. Visual recognition of fishes and the use of keys.

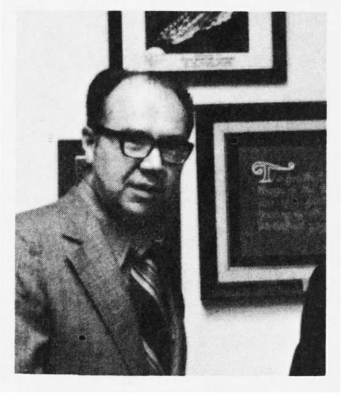
613. Shore and Estuarine Fishes (0-9). Credit 3. Collection, sorting, identification of fishes and preparation to enter a permanent collection. Distribution and myristics of a selected fish. Field trips include a 4-day field trip to the south Texas coast and a spring field trip to shallow water habitats in the eastern Gulf of Mexico.

615. Mariculture (3-3. Environmental, physiological, behavioral, and economic having economic importance. Practices employed in various parts of the world to increase sustained yields of fishes, molluscs, and crustaceans. Prerequisites: Ichthyology and invertebrate zoology or approval of instructor.

685. Problems Credit 2 to 6 each semester. Special studies with credit adjusted for each problem.

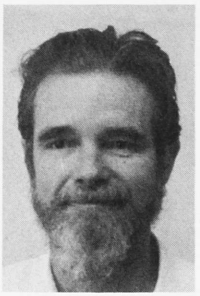
691. Research Credit 1 or more each semester. For thesis or dissertation on selected wildlife problem.



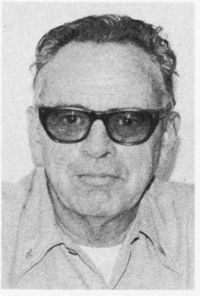


CLAYTON, WILLIAM H., Provost, Moody College of Marine Sciences and Maritime Resources and Professor of Oceanography and Meteorology, (1954, 1971). B.S. Bucknell University, 1949; PhD. Texas A&M University, 1956.

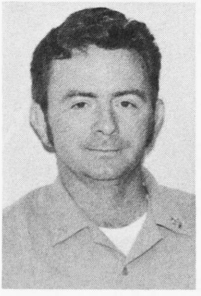
RESIDENT FACULTY



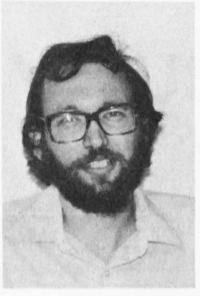
ALDRICH, DAVID V., Associate Professor of Marine Sciences, Biology, Oceanography and Wildlife and Fisheries Sciences. (1966, 1969). A.B., Kenyon College, 1950; M.A., Rice University, 1952; Ph.D., 1957.



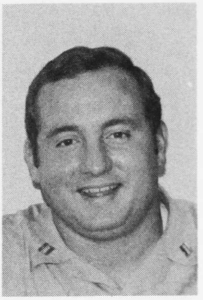
ARKISON, OWEN J., Instructor of Marine Engineering, (1973).



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

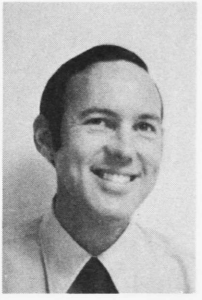


BROOME, LESUNDA EUGENE, Instructor in General Academics (1974) B.S., Arlington State College; M.A., University of Texas at Arlington (1968), Ph.D. University of Houston (1975).



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

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



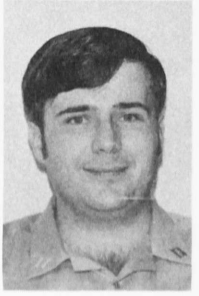
CLYBURN, JOHN, Instructor of General Academics, (1973). B.S. University of Texas, 1962; M.S., University of Houston, 1968.

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

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

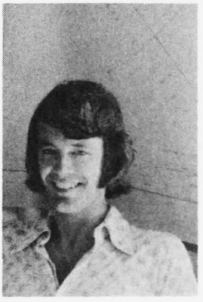
FUSELER, ELIZABETH A., Instructor in Library Science. (1975) A.B. William and Mary College, 1968; M.S. Drexel University, 1972.

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

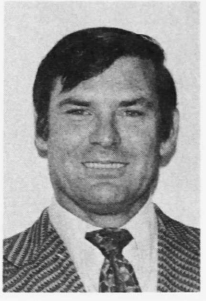


GENTINE, MARC R., Assistant Professor of Marine Transportation (1975). B.S., U.S. Merchant Marine Academy (1969); M.S. State University of New York Maritime College, 1974.

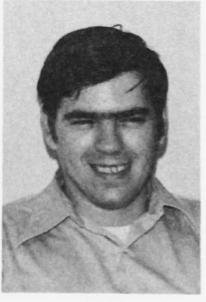
GRAVES, ROBERT E., Assistant Professor of General Academics, (1971). B.S. Ouachita Baptist University, 1960; Ph.D., Baylor University, 1973.



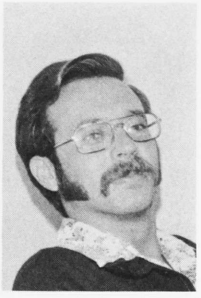
HARPER, DONALD, Assistant Professor of Marine Sciences (1975). B.S., University of Miami, 1963; M.S. Texas A&M University, 1966; Ph.D. Texas A&M University, 1970.



HATLEY, JIMMIE D., Associate Professor and Director of Physical Plant, (1968, 1975). B. S. East Texas State University, 1959; M.Ed., Southwest Texas State University, 1962; Ed. D., Texas A&M University, 1969.



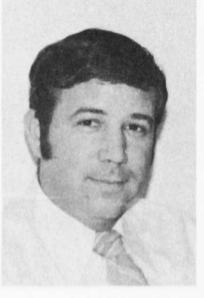
HOFFMAN, CHARLES B., Lecturer of General Academics, (1975), B.S., Lamar University, 1966, M.S. Louisiana State University, 1968.



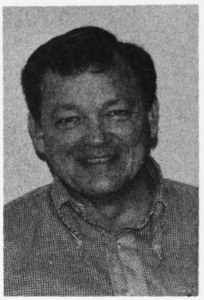
JOHNSON, THOMAS S., Assistant Professor of General Academics, (1974). B.A., Loyola University of Los Angeles, 1966; M.A., University of California at Los Angeles, 1969; Ph.D., University of Texas at Austin, 1973.

KISTLER, ERNEST L., Associate Professor of Marine Sciences and Engineering, (1972). B.S., University of Texas, 1955; M.S., 1957; Ph.D., Rice University, 1969.

KUHL, JEAN E., Instructor of Library Science, Department of Marine Sciences; (1973). B.A., Sam Houston State College, 1951; M.L.S. University of Texas, 1971.

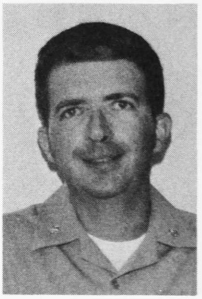


LANE, JOHN M., Assistant Professor of Marine Transportation, (1969). B.S., State University of New York Maritime College, 1965.



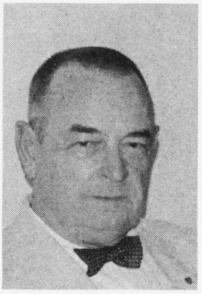
McCLOY, JAMES M., Associate Professor of Marine Sciences, (1971, 1973), Head Department of General Academics, (1976). B.A., California State College at Los Angeles, 1961; Ph.D. Louisiana State University, 1969.

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

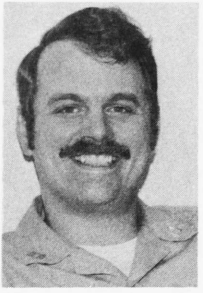


McMULLEN, WILLIAM T., Assistant Professor of Marine Transportation and Head of Department, (1967, 1972). B.S., State University of New York Maritime College, 1964; M.B.A., University of Houston, 1973.

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



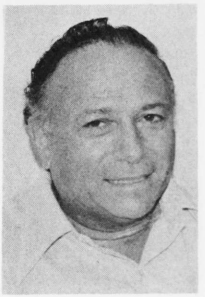
MOORE, JOHN A., Lecturer in Marine Engineering, (1965). B.S., Rose Polytechnic Institute, 1934.



MURRAY, Lt. Ronald J., U.S.N., Assistant Professor of Naval Science, (1974), B.S. U.S. Naval Academy, 1970.

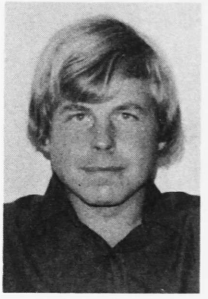
OGDEN, EDWARD G., Associate Professor of Marine Engineering and Head, Department of Marine Engineering 1975). B.S., U.S. Naval Academy 1955; M.S., Massachusetts Institute of Technology 1961.

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

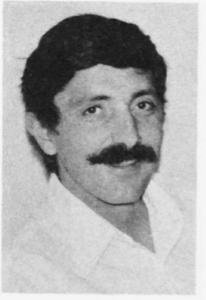


RAY, SAMMY M., Professor of Marine Sciences, Biology, Oceanography, and Wildlife Fisheries Sciences and Head of Department, (1959, 1972). B.S., Louisiana State University, 1942; M.S., Rice University, 1952; Ph.D., 1954.

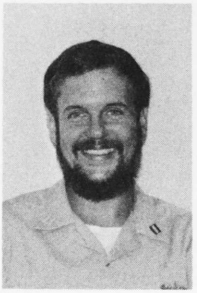
SALAS, JOSE J., GMGC, U.S.N., Instructor of Naval Science, (1974).



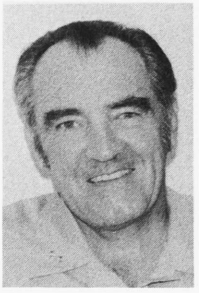
SCHERY, STEPHEN D., Assistant Professor of General Academics, (1974), B.S., Ohio State University, 1967; M.A., University of Arkansas, 1970; Ph.D., University of Colorado, 1973.



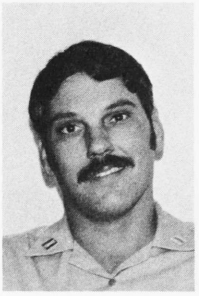
SCRUDATO, RONALD J., Associate Professor of Marine Sciences and Associate Director of Galveston Coastal Zone Laboratory (1975). B.S., Clemson University 1962; M.S., Tulane University, 1964; Ph.D., University of North Carolina (1969).



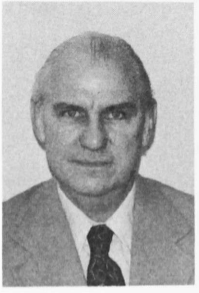
SHAFFER, JOHN N., Jr., Assistant Professor of Naval Science, (1974). B.S., United States Naval Academy, 1970.



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.

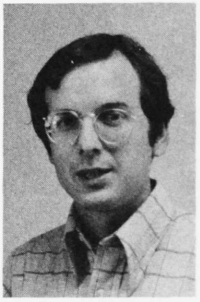


THRAILKILL, ROBERT L., Instructor of Marine Transportation (Galveston) (1975). B.S., Texas A&M University (1969).



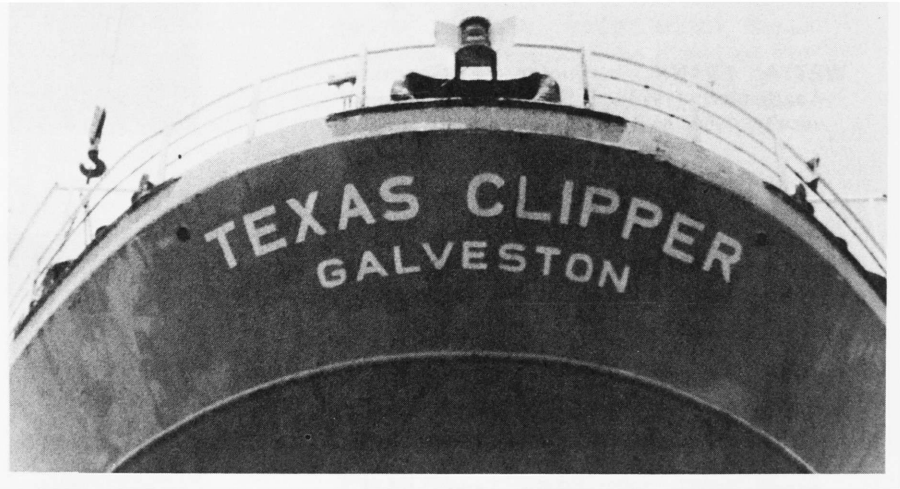
TORMOLLAN, FRANCIS D., Associate Professor of Marine Engineering, (1964). B.S., University of Texas, 1955; M.S., 1957.

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.



WETTA, FRANK, Instructor of General Academics, (1973). B.S., St. Louis University, 1964; M.S., 1965.

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.


TEXAS CLIPPER
GALVESTON