

Texas A&M University at Galveston



1981-82 Catalog

**TEXAS A&M UNIVERSITY
AT GALVESTON
1981-1982
CATALOG**

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**THE ACADEMIC CALENDAR
FOR 1981-82**

Summer Session 1981

June 1	Monday. Registration for the first term.
June 2	Tuesday. Beginning of first term classes.
June 4	Thursday. Last day for enrolling in the University for the first term and for adding new courses.
June 5	Friday. Last day for dropping courses with no record.
June 6	Saturday. T/S TEXAS CLIPPER departs on summer cruise.
June 12	Friday. Last day for dropping courses with no penalty. (Q-drop). Deadline for applying for graduate and undergraduate degrees to be awarded in August for students completing degree requirements in July.
July 3	Friday. Independence Day holiday.
July 7	Tuesday. Last day for first term classes. Beginning of final examinations.
July 8	Wednesday. Last day for the first term final examinations.
July 9	Thursday. Registration for the second term.
July 10	Friday. Beginning of second term classes.
July 14	Tuesday. Last day for enrolling in the University for the second term and for adding new courses.
July 15	Wednesday. Last day for dropping courses with no record.
July 22	Wednesday. Last day for dropping courses with no penalty (Q-drop). Deadline for applying for graduate and undergraduate degrees to be awarded in August for students completing degree requirements in August.
August 9	Sunday. T/S TEXAS CLIPPER returns from summer cruise.
August 13	Thursday. Last day of second term classes. Beginning of final examinations.
August 14	Friday. Last day for second term final examinations.
August 15	Saturday. Commencement for first and second term graduating students.

**REGULAR SESSION
Fall Semester 1981**

August 24-28	Monday through Friday. Delayed registration, adds and drops.
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August 31	Monday. Beginning of Fall semester classes.
September 4	Friday. Last day for enrolling in the University for the Fall semester and for adding new courses.
September 11	Friday. Deadline for applying for undergraduate degrees to be awarded in December.
September 15	Tuesday. Last day for dropping courses with no record.
October 2	Friday. Last day for dropping courses with no penalty (Q-drop).
October 19	Monday. Midsemester grade reports.
November 26-29	Thursday through Sunday, inclusive. Thanksgiving Holidays.
December 11	Friday. Last day of Fall semester classes. Commencement.
December 12	Saturday. Commencement.
December 14	Monday. First day of Fall semester examinations.
December 18	Friday. Last day of Fall semester examinations.

Spring Semester 1982

January 13-15	Wednesday through Friday. Delayed registration, adds and drops.
January 18	Monday. Beginning of Spring semester classes.
January 22	Friday. Last day for enrolling in the University for the Spring semester and for adding new courses.
February 2	Tuesday. Last day for dropping courses with no record.
February 5	Friday. Deadline for applying for undergraduate degrees to be awarded in May.
February 19	Friday. Last day for dropping courses with no penalty (Q-drop).
March 8	Monday. Midsemester grade reports.
March 15-21	Monday through Sunday, inclusive. Spring Recess.
May 7	Friday. Last day of Spring semester classes. Commencement and Convocation.
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.

Summer Session 1982

May 31	Monday. Registration for the first term.
June 1	Tuesday. Beginning of first term classes.
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 5	Saturday. T/S TEXAS CLIPPER departs on summer cruise.

June 11	Friday. Last day for dropping courses with no penalty (Q-drop). Deadline for applying for graduate and undergraduate degrees to be awarded in August for students completing degree requirements in July.
July 5	Monday. Independence day Holiday.
July 6	Tuesday. Last day of first term classes. Beginning of final examinations, 7 p.m.
July 7	Wednesday. Last day for first term final examinations.
July 8	Thursday. Registration for the second term.
July 9	Friday. Beginning of second term classes.
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 16	Friday. Deadline for applying for undergraduate degrees to be awarded in August for students completing degree requirements in August.
July 21	Wednesday. Last day for dropping courses with no penalty (Q-drop).
August 1	Sunday. T/S TEXAS CLIPPER returns from summer cruise.
August 12	Thursday. Last day of second term classes. Beginning of final examinations.
August 13	Friday. Last day of second term final examinations.
August 14	Saturday. Commencement for first and second term graduating students.

TEXAS A&M UNIVERSITY AT GALVESTON

Texas A&M University at Galveston is the marine and maritime component of The Texas A&M University System. The University provides academic instruction in six marine and maritime-related degree programs leading to Bachelor of Science degrees from Texas A&M University. In conjunction with the formal academic instruction, an active program of research and extension service is conducted throughout the University. Texas A&M University at Galveston also coordinates all of the Texas A&M University academic programs in the Galveston area and, with Coordinating Board approval, is authorized to teach Texas A&M University courses.

The University consists of the Moody College of Marine Technology, the Texas Maritime College, and Coastal Zone Laboratory. The degree programs offered are four-year courses of study with majors in Marine Biology, Marine Engineering, Marine Sciences, Marine Transportation, Maritime Administration and Maritime Systems Engineering. All programs, except Maritime Administration and Maritime Systems Engineering, offer directly, or as an option, training leading to qualification for a U.S. Coast Guard license as a Third Mate or Third Assistant Engineer.

Classes are held at the Mitchell Campus on Pelican Island, as well as at the Fort Crockett Campus on Galveston Island. The training ship, T/S TEXAS CLIPPER, serves as a floating classroom, laboratory, and dormitory for the annual summer training cruise of the U.S. Maritime Service cadets. During the regular school year, the ship is berthed at Pelican Island and provides valuable dockside laboratory facilities for instruction in the practical aspects of the maritime curricula.

The location of the University in Galveston affords students the opportunity to utilize facilities of the local maritime and marine industries both ashore and afloat as well as to benefit from the active programs of field research and instruction in the nearby bay, estuarine and nearshore waters.

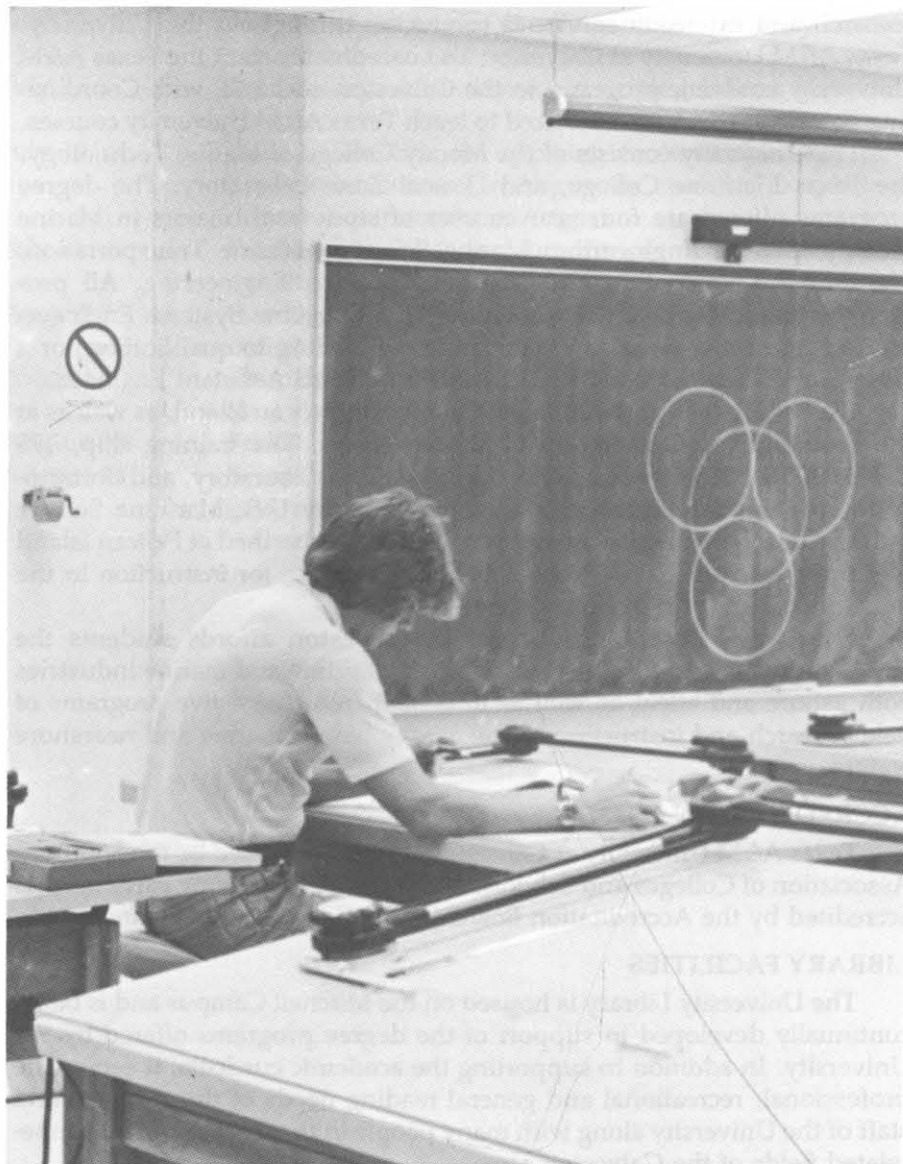
ACCREDITATION

Texas A&M University at Galveston is fully accredited by the Southern Association of Colleges and Schools. The Marine Engineering curriculum is accredited by the Accreditation Board for Engineering and Technology.

LIBRARY FACILITIES

The University Library is housed on the Mitchell Campus and is being continually developed in support of the degree programs offered by the University. In addition to supporting the academic curricula, it serves the professional, recreational and general reading needs of the students and staff of the University along with many people in the marine and maritime-related fields of the Galveston area.

The Texas A&M University at Galveston Library holds 25,000 volumes and has access to over 20,000 relevant volumes at the University of Texas Medical Branch and the National Marine Fisheries Service in Galveston. The proximity of these special collections provides students and staff with access to a wide range of periodical literature in the fields of science and technology. In addition, the Library is a member of the AMIGOS Bibliographic Council, which provides the user with access to material throughout the Southwest. The Library will soon have computer-based bibliographic search capability.



TEXAS MARITIME COLLEGE

The Texas Maritime College, one of five state maritime educational institutions, is a college of Texas A&M University at Galveston. The College was created in 1962 through an agreement between the State of Texas and the United States Maritime Administration. Federal support for the College is provided in the form of a training ship, annual appropriations for ship maintenance, \$100,000 a year in operating funds for the College's programs and a uniform, textbook, and subsistence allowance of \$100 per month currently provided to approximately 140 eligible U.S.M.S. cadets.

The Texas Maritime College administers degree programs in Marine Engineering, Marine Transportation and Maritime Administration. The programs in Marine Engineering and Marine Transportation, as well as those in Marine Biology and Marine Science administered by the Moody College of Marine Technology, offer, in addition to a rigorous academic program, professional training toward the qualification for U.S. Coast Guard licensing as merchant marine officers. These license-option students must complete four years of academic training as well as three two-month training cruises to be eligible for Coast Guard licensing. Those students in the Marine Transportation, Marine Biology and Marine Sciences license-option degree programs may qualify as Third Mates while license-option students in Marine Engineering may qualify as Third Assistant Engineers. In addition, the student may be eligible for a U.S. Naval Reserve commission as an Ensign or U.S. Coast Guard Reserve direct commission upon graduation. License-option students are required to join the Corps of Cadets at Texas A&M University at Galveston, as United States Maritime Service Cadets. Following completion of academic and training requirements, and the successful completion of a license qualifying examination administered by the U.S. Coast Guard within ninety days of graduation, a license as a merchant marine officer may be issued.

After graduation and licensing, the new Third Mate or Third Assistant Engineer may join a ship as a fully qualified junior officer. Third Mates are responsible for the safe navigation of the vessel, loading and discharging of cargo, vessel maintenance and shipboard safety. Third Assistant Engineers are responsible for maintenance and operation of all machinery aboard ship including propulsion, auxiliary and refrigeration machinery, in addition to the electrical and air-conditioning systems.

SUMMER SCHOOL AT SEA

The Summer School at Sea program permits recent high school graduates to enroll at Texas A&M University at Galveston as freshmen and earn their first six semester hours of college credit during the annual summer training cruise of the **T/S TEXAS CLIPPER**. In this program the new students are allowed to choose two three-semester hour courses from



MOODY COLLEGE OF MARINE TECHNOLOGY

The Moody College of Marine Technology directs degree programs in Marine Biology, Marine Sciences and Maritime Systems Engineering. In addition to academic instruction, the Marine Sciences and Marine Biology programs offer, as an option, professional training leading toward qualification for U.S. Coast Guard licensing as a deck officer in the merchant marine. (See sections on TEXAS MARITIME COLLEGE and APPLICATION FOR ADMISSION TO U.S. MARITIME SERVICE CADET PROGRAM for discussion of eligibility and training requirements.) Maritime Systems Engineering options include hydromechanics, ocean engineering, and coastal structures. Supporting courses for the University's various degree programs are offered through the Department of General Academics.

Graduate work in Biology and Wildlife and Fisheries Sciences is conducted at the Galveston campus. For information concerning admissions to these graduate programs, contact the Coordinator of Graduate Programs in Galveston or the Head, Department of Biology, or Head, Department of Wildlife and Fisheries Sciences, at Texas A&M University in College Station.

COASTAL ZONE LABORATORY

The Coastal Zone Laboratory coordinates the research, advisory and extension activities of the University. Research activities have included oyster mariculture, use of offshore oil rigs for oceanographic engineering, distribution of blue crabs in experimental temperature gradients, development of a pilot oyster hatchery, and various shrimp studies. Currently, research being conducted includes nearshore water and sediment process dynamics, analysis of water-related fatalities in the coastal zone, oyster mortality, geochemical analysis of sedimentation in Galveston Bay, microbiological and zoological studies of continental shelf waters and seabed, marine education, and environmental impacts associated with construction of a liquified natural gas port facility.

Extension activities are currently carried out through the Marine Radar Simulator Training Facility, operated by the Center for Marine Training and Safety, and the Oil Spill and Hazardous Material School operated by the Texas Engineering Extension Service. The Radar Simulator Training Facility offers courses leading to both original certification and recertification for shipboard radar observers.

offerings in English, history and mathematics. In addition to daily classes, they are also responsible for assisting the ship's crew in maintaining and operating the **TEXAS CLIPPER**, assisting with food services, and maintaining their quarters during the training cruise.

For students interested in Marine Engineering, first-hand experience with operation of the ship's power plants is available. For those interested in Marine Transportation, there is an 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 through the University curricula toward a career in the maritime service.

While it is hoped the Summer School at Sea participants will continue their collegiate careers at Texas A&M University at Galveston or elsewhere in The Texas A&M University System, the academic credits earned during the summer cruise should be transferable to other colleges and universities which they may attend.

GENERAL INFORMATION

While every effort has been made to make this catalog as complete and accurate as possible, it should be noted that changes may occur at any time in requirements, deadlines, fees, curricula and the courses listed. Any given course might not be offered in the announced semester because of insufficient enrollment, limited resources, or for administrative reasons.

Students enrolled in Texas A&M University at Galveston adhere to the same academic requirements as students enrolled at Texas A&M University. These requirements are also detailed in the Texas A&M University Catalog. Students are advised to study these requirements as well as the Texas A&M University at Galveston Regulations which concern other aspects of student life.

ADMISSION

UNDERGRADUATE ADMISSION

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

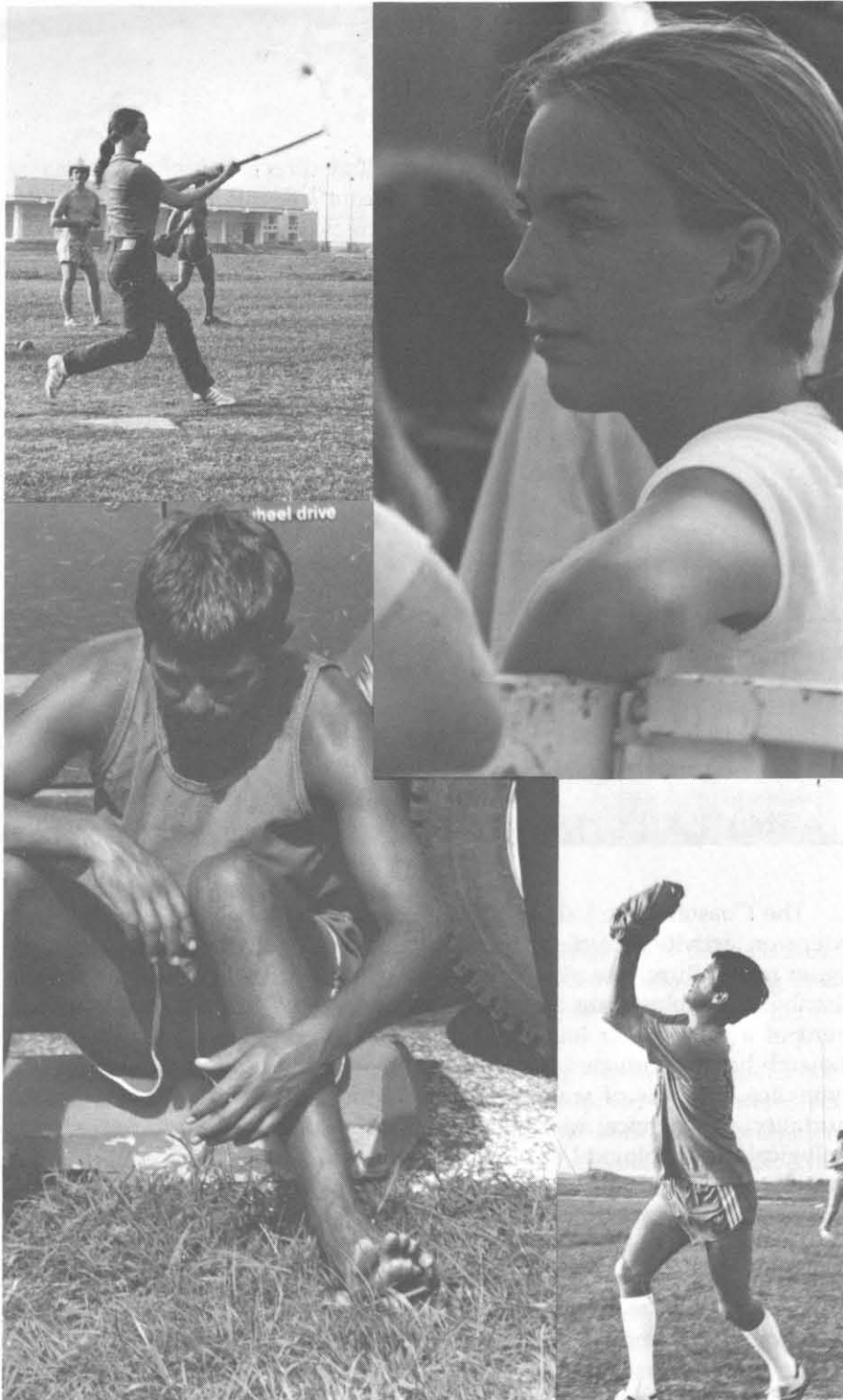
Applications for admission to Texas A&M University at Galveston should be addressed to the Office of Admissions, Texas A&M University, College Station, Texas 77843. Completed application forms must be accompanied by transcripts of credit if the applicant is entering directly from high school. A student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

REQUIREMENTS

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

REQUIRED HIGH SCHOOL CREDITS

The unit requirements for admission to the University are designed to insure adequate preparation for the various curricula offered by the University. To give deserved recognition to proven ability as reflected by high academic achievement, students may enter the University even though



they have not completed all the required high school subjects as listed below. Applicants who rank in the highest quarter of their class and score a minimum total score of 1000 on the College Board's Scholastic Aptitude Test may be granted admission with credit deficiencies.

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

Subject	Credit Required Units	Remarks
English	4	Two units in a single foreign language may be substituted for one unit or 3 quarter units in English.
Social Science	2½	
Mathematics:		
Algebra	2	
Geometry	1	
Science	2	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 units in vocational subjects may be submitted as electives. Applicants for admission to engineering, mathematics, and science are strongly advised to include at least ½ unit electives in advanced mathematics.
TOTAL	16	

APPLICATION FOR ADMISSION TO U.S. MARITIME SERVICE CADET PROGRAM

In addition to the normal requirements for admission, a student seeking to enroll in a license-option curriculum as a U.S. Maritime Service Cadet must satisfy additional criteria. He or she must be a citizen of the United States and must pass a physical examination as specified by the U.S. Coast Guard. Candidates must be mentally and physically sound. The vision requirements for a deck officer cadet include uncorrected vision of at least 20/100 in both eyes correctable to at least 20/20 in one eye and 20/40 in the other. For an engineering officer 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 pseudoisochromatic plate test, but any applicant who fails this test will be eligible if he or she can pass the "Farnsworth" lantern test or equivalent. Engineering officer candidates must be able to identify colors of red, green, blue and yellow. The examination for acceptance as a United States Maritime Service Cadet cannot be given before enrollment. The examination has no bearing on enrollment in curricula which do not include the license-option.

The U.S. Maritime Administration requires that candidates must agree in writing to apply before graduation for a commission as Ensign in the U.S. Naval Reserve (Inactive) and to accept the commission if offered.

THE NAVAL RESERVE COMMISSION

The Navy's interest in State Maritime Colleges stems from the National defense requirement for an adequate merchant marine, manned by well-trained officers who possess an understanding of naval procedures, so that merchant vessels are capable of operating with the Navy in time of peace, national emergency, or war. The Navy provides active duty officers and Chief Petty officers to instruct cadets in Naval Science and administer the Reserve Commissioning Programs.

Specific requirements for the 16×5 Reserve Commissioning Program are listed below.

16×5 PROGRAM

Cadets under this program receive a reserve commission as a restricted line officer. They must fulfill these obligations:

- (1) Sail on their license at sea for at least four months each two consecutive anniversary years.
- (2) Complete two weeks of active duty for training in the Navy annually.
- (3) Maintain commission for 6 years.

Active duty may be requested under this program and cadets also have the option to apply for an active duty commission in the Coast Guard.

THE U.S. COAST GUARD COMMISSION

The U.S. Coast Guard MARGRAD program offers licensed graduates of the State Maritime Colleges the opportunity to apply for direct commissions involving extended active duty in the Coast Guard Reserve. Applications may be initiated either during a cadet's final year prior to graduation or after graduation provided the age requirements are met.

Some specific requirements of the MARGRAD program are:

- (1) Age: As of July 1 of the year of commissioning an applicant must be between 21 and 26 for appointment as ensign and between 21 and 27 for appointment as lieutenant (junior grade).
- (2) Education: Must be a graduate of a State or Federal maritime college.
- (3) Experience and professional qualifications: (a) Must hold a Third Mate's or Third Assistant Engineer's license to apply for the grade of ensign. (b) In addition to (a) above, applicants for appointment to grade of lieutenant (junior grade) must have served one or more years onboard vessels of the United States in the capacity of licensed officers.
- (4) Must be a citizen of the United States.
- (5) Must be physically qualified.

TESTS REQUIRED OF NEW STUDENTS

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

The University will accept scores on either Mathematics Test: Level I or Level II. Students interested in taking the Mathematics Test, Level II, should do so only after careful study of the College Board Publication, 'Achievement Tests,' and a conference with a high school counselor or mathematics teacher.

The minimum test score requirements for admission for applicants who have never attended another college or university are stated in terms of a total score on the College Board's Scholastic Aptitude Test. This total score is the sum of the Verbal and Mathematical scores reported by the College Board.

Standing in High School Graduating Class	Minimum Total Score Acceptable for Admission
Top 10%	No minimum
Highest Quarter	800
Second Quarter	800
Third Quarter	900
Fourth Quarter	1000

Orientation Conferences: Prior to the Fall and Spring Semesters, orientation conferences are conducted for all new students including transfer students. During these conferences students meet with individual advisors, register for classes, receive academic and student life briefings, and may, if qualified, take placement examinations.

Steps in Applying for Admission to Texas A&M University at Galveston

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

2. **Testing:** Arrange through a high school counselor to take the Scholastic Aptitude Test (SAT), English Composition Achievement Test and Mathematics Achievement Test of the College Board. Designate that the scores be sent to Texas A&M University (Code 6003). It is recommended that the SAT be scheduled in the latter part of the junior year or early part of the senior year. The achievement tests are used for counseling and placement purposes and should be taken by January of the senior year.

Students are admitted on the basis of specified courses taken in high school, class rank, SAT score, and achievement tests.

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

There are two periods when a high school student may apply for admission to Texas A&M University at Galveston and Texas A&M. Those students who score 1000 on the SAT and rank in the top quarter of their class may submit their application and supporting credentials at the end of their junior year under the Early Decision Program. Letters of acceptance are mailed to those who meet the admission requirements as soon as the applications are processed. Students who do not meet the requirements for Early Decision should submit their applications after October 1 and notifications will be sent beginning November 15.

Acceptance to Texas A&M University at Galveston or Texas A&M University is conditional until the student has satisfactorily completed the courses in progress for the senior year and graduated from high school. Application for on-campus housing may be made after completion of the junior year in high school. Please refer to that section of this catalog for more information.

EARLY DECISION PROGRAM

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

EARLY ADMISSION

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

Students who wish to enroll as full time students at the completion of their junior year must have a superior academic record, complete the

prescribed 16 credits required of entering freshmen, rank in the top quarter of their class and score at least 1200 on the SAT, with at least 600 on the verbal section of the SAT. In addition, they must be recommended by their high school principal and counselor and have their parents' approval if under 18 years of age. Students must submit the results of the English composition and mathematics achievement tests. A personal interview with the Director of Admissions is also required. Further information may be obtained from the Director of Admissions.

TRANSFER STUDENTS

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

An applicant must be eligible to return to the institution from which the transfer is sought. Applicants must also submit a formal application for admission as well as two official transcripts of their record at each college or university previously attended as early as possible. This material should be sent to Office of Admissions and Records, Texas A&M University, College Station, Texas 77843. The applicant must have achieved an overall grade point ratio of 2.00 (C average) or better on the work attempted and must meet or surpass this same standard for each of the last two semesters of attendance, if in attendance two or more semesters. A twelve-week summer session with a normal load of course work will be considered a full semester.

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

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

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

INTERNATIONAL STUDENTS

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

The application deadline for international students is June 15 for the fall semester, November 1 for the spring semester and March 15 for the summer session.

READMISSION OF STUDENTS

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

Refer to the section "Transfer Students" for entrance requirements.

SPECIAL ADMISSIONS

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

ADMISSION BY INDIVIDUAL APPROVAL

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

1. They must submit a completed application for admission.
2. They must furnish evidence that their preparation is substantially equivalent to that required of other applicants and that they possess the ability and seriousness of purpose necessary to pursue their studies with profit to themselves and to the satisfaction of the University.

ADMISSION OF SPECIAL STUDENTS

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

1. Applicant must show good reason for not taking a regular degree and must submit satisfactory evidence that they are prepared to profit by the special studies they wish to pursue.

2. Record of previous scholastic work must be submitted on the official entrance blanks and must be accompanied by a statement showing (1) experience; (2) a plan of study enumerating the courses desired, and (3) the purpose or end expected to be accomplished by this study.

DEGREE INFORMATION

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

DEGREES OFFERED

The following degrees are offered by Texas A&M University for the satisfactory completion of resident study in the appropriate curriculum at Texas A&M University at Galveston:

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

REQUIREMENTS FOR A BACCALAUREATE DEGREE

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

1. The student must complete, with at least a C average, one of the regular courses of study leading to a degree.
2. A curriculum leading to a baccalaureate degree shall contain a minimum of 128 credit hours. At the discretion of the student's department and academic dean, advanced ROTC courses may be used to satisfy curriculum requirements if the student has completed 124 hours excluding advanced ROTC courses.
3. The total number of grade points earned at Texas A&M University at Galveston and Texas A&M University in courses must be at least twice the number of hours which were carried in courses at these institutions. Grades of F or WF shall be included, except those grades and grades of D made in the freshman year or summer session preceding that year which

are subsequently repeated at either Texas A&M University at Galveston or Texas A&M with a grade of C or better during the student's first four semesters. Grades of WP and Q shall be excluded. Grades in courses not applying to the degree may be waived by petition if approved by the academic dean and submitted to the Registrar. The waiver of grades in courses as indicated above will not affect a student's grade point ratio or entitlement to graduation with honors.

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

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

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

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

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

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

RESIDENCE REQUIREMENT:

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

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

Candidates for degrees in Texas A&M University at Galveston curricula will follow these guidelines: For non-license curricula, 30 of the last 36 hours must be completed in Galveston; and for license curricula, the last two years of the three-year training requirement must be spent in Galveston and in the Corps of Cadets.

REQUIREMENT IN POLITICAL SCIENCE (GOVERNMENT) AND HISTORY: In order to meet the legal requirement for a baccalaureate degree or a lesser degree or academic certificate, all students must have at least six credit hours in Political Science (Government) and at least six

credit hours in American History as described in detail in the following paragraphs. Students whose curricula require only three credit hours of Political Science are required to successfully complete three additional credit hours of Political Science plus one credit hour of elective if they do not elect at least three credit hours in Military, Air or Naval Science plus one elective hour.

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

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

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

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

APPLICATION FOR A DEGREE: During the semester or summer session in which the degree is to be conferred, a student must be officially registered in the University. Formal application for degrees must be submitted to the Registrar, on forms provided for that purpose, not later than 90 days prior to the end of the semester, or 30 days prior to the end of the summer term in which the student expects to complete requirements for graduation. To obtain the necessary forms, the student must pay a diploma fee in the Fiscal Office and present the fee receipt to the Student Records Officer.

In order to be a candidate for a degree at the end of a semester or summer term, a student at the beginning of that semester or term must be registered for the courses necessary to complete the requirements of the curriculum.

TWO DEGREES

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

GRADUATION WITH HONORS

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

- A. For students whose degrees are conferred prior to May, 1982:
 - (1) Summa Cum Laude: A student may be graduated "Summa Cum Laude" with a grade point ratio of 3.750 or above.
 - (2) Magna Cum Laude: a student may be graduated "Magna Cum Laude" with a grade point ratio range of 3.500 through 3.749.
 - (3) Cum Laude: A student may be graduated "Cum Laude" with a grade point ratio range of 3.250 through 3.499.
- B. For students whose degrees are conferred in May, 1982 and thereafter:
 - (1) Summa Cum Laude: A student may be graduated "Summa Cum Laude" with a grade point ratio of 3.900 or above.
 - (2) Magna Cum Laude: A student may be graduated "Magna Cum Laude" with a grade point ratio range of 3.700 through 3.899.
 - (3) Cum Laude: A student may be graduated "Cum Laude" with a grade point ratio range of 3.500 through 3.699.



FINANCIAL INFORMATION

EXPENSES

The expenses for a regular session of nine months will vary with the individual concerned and with the course of study pursued. In the case of new students, the total cost should range between \$3,000.00 and \$3,900.00. In general these amounts include three types of expenditures: fees payable to the University Fiscal Department, textbooks and supplies, and incidental expenses which are estimated in the range of \$600.00 to \$1500.00, depending on the individual concerned. Non-resident students, other than those pursuing a license-option curriculum, should increase these estimated expenses by \$1,100.00 to cover non-resident tuition fees.

PAYMENTS

Payments to the Fiscal Department may be in the form of cash, cashier's check, personal check, or money order payable to Texas A&M University at Galveston. All checks and money orders are accepted subject to final payment.

FEES

The fees set out herein for the session of 1981-82 are strictly approximations and are subject to change because of economic conditions and/or legislative requirements. The fees listed below are for all students except those in license-option curricula. The fees are based on a resident student registered for fifteen semester credit hours during the Fall and Spring semesters and six credit hours during a term of the Summer Session.

	Fall Semester	Spring Semester	Summer Term (6 Weeks)
Tuition (see explanation of fees)	60.00	60.00	25.00
Student Services	33.00	33.00	16.50
Room	600.00	600.00	225.00
Board	640.50	640.50	230.00
Room Deposit	100.00		
Identification Card	3.00		1.00**
Building Use Fees	45.00	45.00	18.00
	<u>\$1,481.50</u>	<u>\$1,378.50</u>	<u>\$515.50</u>

The estimated fees based on eighteen hours for students in a license-option curriculum are shown below:

	Fall Semester	Spring Semester	Summer Cruise
Tuition (see explanation of fees)	90.00	90.00	60.00
Student Services	33.00	33.00	17.60*
Room	600.00	600.00	280.00
Board	640.50	640.50	610.00
Room Deposit	100.00		
Identification Card	3.00		1.00**
Cruise Fee			425.00
Building Use Fee	54.00	54.00	12.00
	<u>\$1,520.50</u>	<u>\$1,417.50</u>	<u>\$1,405.60</u>

*Student Services Fee \$4.40/hour for summer cruise.

**Applies to summer students not enrolled during the Fall and Spring Semesters.

EXPLANATION OF FEES

Tuition

Resident students pay four dollars (\$4.00) per semester credit hour, but the total of such charges shall be not less than fifty dollars (\$50.00) per semester or twenty-five dollars (\$25.00) per summer term.

Non-resident and alien students pay forty dollars (\$40.00) per semester credit hour.

Students enrolled in the license option curricula, whether resident or non-resident, pay five dollars (\$5.00) per semester credit hour, but the total of such charge shall be no less than sixty dollars (\$60.00) per semester and sixty dollars (\$60.00) for the summer cruise.

Students who in any semester register (including payment of fees) after the beginning of classes pay an additional ten dollar (\$10.00) fee.

Student Services

The student service fee is required of all students at the rate of \$2.75 per semester credit hour (not to exceed \$33.00) per semester (or \$16.50 per summer term). The student service fee for students on the summer cruise of the T/S **Texas Clipper** is \$4.40 per semester credit hour (not to exceed \$26.40). Student service fees finance recreational activities, student government, student publications, student organizations, weekly movies, intramural athletic programs, and social activities.

Room Rent, Board

All Texas A&M University at Galveston students who are pursuing a license-option program or who are unmarried and not residing with parents in the Galveston area are required to live in campus housing and participate in the board plan, if campus housing is available. Rooms are for double occupancy and are furnished with beds, desks, chairs, wardrobes, and dressers. Students are expected to furnish pillows, blankets, and linens. Active duty veterans of the United States armed services are generally exempt from the mandatory campus housing and board requirements. Other exceptions based on special circumstances will be considered upon written request to the President of the University through the Housing Office.

Room Deposit

A deposit of \$100.00 is required to apply for a room in a residence hall. This fee will be retained as a deposit against damage or late cancellation, or to keep the application on active file. A reservation may be cancelled and deposit refunded upon written request prior to July 1 for the Fall Semester, December 1 for the Spring Semester, May 10 for the First Summer Session, and June 20 for the Second Summer Session. Any cancellation after the above dates will result in forfeiture of the deposit. A refund may be made in accordance with the University policy for a student graduating or withdrawing from school, upon request, after clearance by the Student Affairs Office.

Seniority in campus housing and on the residence hall waiting list will be based upon the date of receipt of the room deposit; however, the deposit does not guarantee assignment to on-campus housing.

Identification Card

All students must have an identification card. This card is used in registration procedures, collection of fees, cashing of checks, for dining hall privileges, etc. Replacement cards will be issued upon payment of \$6.00 fee.

Laboratory Fees

A laboratory fee ranging from \$2.00 to \$8.00 is charged for each laboratory course each semester.

Parking Permit

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

OTHER EXPENSES

Textbooks and Supplies: The cost of textbooks and supplies will vary with the quality of items purchased and with the course of study to be pursued. Students can expect to pay an amount ranging between \$250.00 and \$300.00. These amounts are estimates for the combined Fall and Spring

Semesters. Expenses for the Summer Session should amount to approximately one-half of the above estimates.

Uniforms: License-option students must purchase uniforms with initial outfitting estimated at \$450.00-\$550.00.

Other Items: The University operates a store for the purpose of supplying necessary articles to students. The store carries textbooks, stationery, drawing instruments, toilet articles, and other supplies. All merchandise is sold at the usual retail prices prevailing in the area.

EXEMPTIONS

Certain students in the following classifications are exempt from paying tuition and some of the required fees by action of the State of Texas and The Texas A&M System Board of Regents. Specific eligibility requirements under these provisions can be obtained from the Student Records Office.

Dependent children of disabled or killed-on-duty firemen and peace officers and firemen who are enrolled in Fire Science courses are exempt from paying tuition and laboratory fees.

Blind and Deaf students who are eligible for the rehabilitation services of the State Commission for the Blind and/or Division of Vocational Rehabilitation of the Texas Education Agency are exempt from the above fees.

Certain veterans (and dependents of veterans who died in active service) who have exhausted their Federal Veterans Educational benefits and are Texas citizens and were honorably discharged from World War I, World War II, Korean War or the "Cold War" which began on termination of the Korean war are exempt from paying tuition and laboratory fees. Orphans of members of the Texas National Guard and the Texas Air National Guard killed since January 1, 1946, while on active duty either in the service of their state or the United States may also be eligible under this provision.

The State Board of Education will certify 235 students from other nations in the American Hemisphere to be exempt from paying tuition at institutions of higher learning in the State of Texas.

Full-time Texas A&M University System employees and students registered in absentia will be required to pay only tuition and laboratory fees.

REFUNDS

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

Tuition, Student Services Fee, Laboratory Fee and Residence Hall Rent

Fall or Spring Semester

Prior to the first class day	100 percent
During the first five class days	80 percent
During the second five class days	70 percent
During the third five class days	50 percent
During the fourth five class days	25 percent
After the fourth five class days	None

Six-week Summer Term

Prior to the first class day	100 percent
During the first, second, or third class day	80 percent
During the fourth, fifth, or sixth class day	50 percent
Seventh day of class and thereafter	None

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

Board Fee: Board fees are refundable in full *prior* to the first day of classes. Refunds will be made only in case of official withdrawal at which time a *pro-rata* refund will be made computed on a daily basis.

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

Yearbook Fee: Yearbook fees are refundable in full during the semester in which payment is made. Thereafter no refunds will be made on cancelled orders. Yearbooks must be picked up during the academic year in which they are published.

Students who will not be on campus when the yearbooks are published, usually by September 1, must pay a mailing and handling fee. Yearbooks will not be held, nor will they be mailed without the necessary fees having been paid.

Refunds will not be made on books not picked up within one semester of the publication date.

REDUCTIONS

No reduction will be made in the charge of room rent and board in case of entrance within ten days after the opening of a semester or summer term, nor will a refund be made in case of withdrawal during the last ten days of a semester, or summer term, or the last days for which payment is made.

UNPAID CHECK

If a check accepted by the Fiscal Department is returned unpaid by the bank on which it is drawn, the person presenting it will be required to pay a penalty of \$10.00. The penalty increases to \$25.00 fifteen days after the date of the first notice and the student may be dropped from the rolls of the University. In addition, the check may be turned over to the District Attorney for prosecution. A student dropped from the rolls of the University for failure to redeem an unpaid check within the grace period is eligible for reinstatement after payment of penalties, a \$50.00 reinstatement fee and redemption of the check.

DAY STUDENTS

Day students pay all specified fees and charges except board (optional) and room rent.



STUDENT AFFAIRS

The Office of Student Affairs coordinates the student life programs and activities of Texas A&M University at Galveston. Information is available from this office concerning new student orientation, veterans affairs, international students, counseling services, housing, financial aid, health services, student activities, student employment, and graduate placement.

FINANCIAL AID

The awarding of student financial assistance from Texas A&M University at Galveston is based upon need. In addition, an aid applicant must be enrolled as at least a half-time student and be in good academic standing. Students who are on either scholastic or conduct probation are ineligible to participate in the various aid programs.

To obtain an impartial and objective analysis of need, the University utilizes the College Scholarship Service. Therefore, all applicants for student financial aid are required to file a Financial Aid Form (FAF) including FAF Supplement with the College Scholarship Service. The Financial Aid Form can be obtained from high school counselors or the University Financial Aid Office. Aid applicants are also required to apply for the Basic Educational Opportunity Grant (BEOG) which is a federal grant program. Applicants may apply for the BEOG by checking the appropriate section on the Financial Aid Form.

Student Part-Time Employment

The Student Affairs Office is the coordinator for student part-time employment, both off and on campus.

Students solicit their employment through job leads provided by the Student Affairs Office or through their own initiative. Employment counseling is available to those students who have not had previous job seeking experience.

Student employees of the University are paid on an approved University wage scale. Student employees are paid every two weeks along with regular University employees, but are not entitled to fringe benefits. Students on scholastic probation are not eligible for employment with the University.

College Work-Study Program.

This federally subsidized program, within fund limitations, provides part-time employment for U.S. citizens and permanent residents who have an established financial need and desire campus employment.

To qualify for the College Work-Study Program, a student must have submitted a financial aid form to the College Scholarship Service, have financial need, be enrolled or accepted for enrollment and be making satisfactory academic progress if enrolled. Students who attend the University only during the summer sessions are not eligible for this program.

CWS students are paid on an approved University wage scale, may not work more than 20 hours per week, and are not entitled to fringe benefits.

Loan Funds

Texas A&M University at Galveston participates in the Hinson-Hazlewood College Student Loan program, Federally Insured and the national Direct Student Loan programs. Repayment periods on these loans usually begin 6 months after graduation. Applications for these loans must be submitted 90 days prior to the time when the funds are needed. Inquiries should be addressed to the Director of Student Financial Aid.

The Director of Student Financial Aid also administers other short-term loan funds for enrolled students. These funds are reserved to meet emergency needs and in most cases must be paid back in the semester in which they are loaned.

Valedictory Scholarships

These scholarships consist of exemption of tuition during the student's freshman year at Texas A&M University at Galveston and are offered to the highest ranking graduate (valedictorian) from each accredited high school in Texas. To receive this award, the valedictorian must be certified to the University through the Texas Education Agency, and the recipient's initial enrollment must be in this University. No formal application is required. Qualified students may obtain a certificate authorizing exemption from paying tuition from the Student Financial Aid Officer at the beginning of the fall semester.

COUNSELING

Counseling services are available through the Office of Student Affairs. Students with educational, career, and personal concerns are invited to visit with the counselors. Aptitude and achievement testing and interest and personality inventories are available along with professional interpretation. In addition, referral for the use of specialized community resources will be coordinated upon the student's requests.

HOUSING

Texas A&M University at Galveston has limited on-campus housing in modern student dormitories and aboard the T/S Texas Clipper. Rooms are assigned in accordance with the date on which the housing application and room deposit are received in the Fiscal Office, Texas A&M University at Galveston. All license-option students and, with certain specific exceptions, all other single students are required to live on-campus. Permission to live off-campus may be granted on a semester basis only when on-campus housing is not available. Students living on campus are required to purchase the board plan for meals.

Since license-option students are required to live on campus, students will be able to pursue a license-option only if campus housing is available

for them. To be considered for a housing assignment, students who elect a license-option program of study must apply for housing *and* notify the University of their intent to study a license-option program prior to July 15. A failure to receive campus housing does not preclude students from enrolling in the degree program of their choice but simply restricts participation in license-option programs until campus housing is available.

Due to shortages in both on- and off-campus housing, it is recommended that housing applications be submitted early. In the event that on-campus housing is not available, information concerning off-campus housing will be provided upon request.

STUDENT ACTIVITIES

A wide variety of student activities are coordinated through the Student Affairs Office in the Northern Student Center. The Northern Student Center contains dining facilities, a book store, conference rooms, a post office, student offices, a dark room, a game room, counselors' offices, and other facilities. Adjacent to the Northern Student Center are the swimming pool, tennis courts and other outdoor recreational facilities.

Clubs

Clubs on campus include: Aquarium Club, American Society of Mechanical Engineers, Sailing Club, B-2 Club, Dive Association, Outdoor Sportsmen Club, Propeller Club-Port of Galveston, Emergency Care Team, Dungeons and Dragons, Dormitory Association, and Graduate Student Association.

Student Publications

Students publish a weekly newsletter, *Channel Chatter*; a yearbook, *The Voyager*; and a literary publication, *Seaspray*.

Student Government

The evolving student government of Texas A&M University at Galveston is embodied in the Student Advisory Committee to the President. This Committee serves as a direct communications link to the administration on student affairs. Members are elected each year.

Athletics

The Intramural Program attempts to provide each student with the opportunity to participate regularly in organized activities. Teams are organized in flag football, basketball, softball, table tennis, and volleyball. Texas A&M University at Galveston also has an intercollegiate soccer team which competes in a local city league.

Corps of Cadets

Students who elect to pursue one of the University degree programs leading to a United States Maritime Service License are required to join the University's Corps of Cadets. The objective of the Corps Life Program is to provide a learning laboratory for the development of leadership and management skills and the self-discipline demanded of merchant marine

officers. Current Cadet Corps policies provide for the organization of the cadets into a paramilitary unit, watch standing and training requirements, room and ship maintenance responsibilities, and special cadet discipline procedures. Cadets wear prescribed uniforms during the regular school semesters and during the required summer training cruises. Questions concerning Corps Life should be addressed to the Corps Advisor within the Office of Student Affairs who functions as the principal administrator and advisor to the Cadet Corps.

CAMPUS POLICE

The Texas A&M University at Galveston Police Office is located in the Central Services Building at the southeast corner of the campus, near the small-boat berthing area. It is the agency responsible for the security and protection of all public and private property on the campus and for the enforcement on campus of all state laws and University Regulations. The personnel are all commissioned Peace Officers of Texas, carefully selected and trained to carry out their duties and conduct their operation so as to maintain the respect and confidence of the University community.

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

The department operates the "Lost and Found" office for the University.

Members of the University Police Department conduct safety meetings, drug abuse discussions, and engage in other educational activities when requested by recognized student groups.





DEGREE PROGRAMS

Curriculum in MARINE BIOLOGY (MARB)

This program offers training in the biology of coastal and marine environments. It is structured to provide the student with not only a strong basis of formal academic instruction, but also considerable hands-on field and collection experience by taking advantage of the coastal location of the University. A strong preparation in the sciences is recommended.

FRESHMAN YEAR

Fall Semester	(Th-Pr)	Cr	Spring Semester	(Th-Pr)	Cr
Biol. 113 Introductory Biology	(3-0)	3	Biol. 114 Introductory Biology	(3-0)	3
Biol. 123 Intro. Biology Lab	(0-3)	1	Biol. 124 Intro. Biology Lab	(0-3)	1
Chem. 101 Fund. of Chem. I	(3-0)	3	Chem. 102 Fund. of Chem. II	(3-0)	3
Chem. 111 Fund. of Chem. Lab I	(0-3)	1	Chem. 112 Fund. of Chem. Lab II	(0-3)	1
Engl. 103 Composition & Rhetoric	(3-0)	3	Engl. 104 Composition & Rhetoric	(3-0)	3
Hist. 105 History of U.S.	(3-0)	3	Hist. 106 History of U.S.	(3-0)	3
Math. 130 Pre-Calculus	(3-0)	3	Math. 230 Calculus	(3-0)	3
Naval Science or Elective*		1	Naval Science or Elective*		1
		18			18

SOPHOMORE YEAR

Chem. 227 Organic Chemistry I	(3-0)	3	Chem. 228 Organic Chemistry II	(3-0)	3
Chem. 237 Organic Chem. Lab	(0-3)	1	Chem. 238 Organic Chem. Lab	(0-3)	1
C.S. 203 Intro. to Computing	(3-0)	3	MARB 315 Natural History of		
Gen. 301 Genetics	(4-0)	4	Vertebrates	(2-3)	3
Phys. 201 College Physics	(3-3)	4	Phys. 202 College Physics	(3-3)	4
Pol. S. 206 American National			Pol. S. 207 State & Local		
Government	(3-0)	3	Government	(3-0)	3
Naval Science or Elective*		1	Elective (General)*		2
		19	Naval Science or Elective*		1
					17

JUNIOR YEAR

Engl. 301 Technical Writing	(3-0)	3	Biol. 351 Fundamentals of		
Geol. 101 Principles of Geology	(3-2)	4	Microbiology	(3-4)	4
MARB 311 Ichthyology	(2-3)	3	Econ. 203 Principles of Economics	(3-0)	3
Stat. 302 Statistical Methods	(2-2)	3	MARB 425 Marine Ecology	(2-3)	3
Elective (Biology)*		3	Elective (General)*		3
		16	Elective (Social Science or		
			Humanities)*		3
					16

SENIOR YEAR

MARB 310 Cell Biology	(3-3)	4	MARB 408 Biology of Algae	(3-3)	4
MARB 435 Invertebrate Zoology	(3-3)	4	MARB 420 Comparative Physiology ..	(3-3)	4
MARB 481 Seminar in Marine			MARB 450 Developmental Biology ..	(3-3)	4
Biology	(1-0)	1	MARB 481 Seminar in Marine		
Elective (Botany)*		4	Biology	(1-0)	1
Elective (Social Science or			Elective (General)*		3
Humanities)*		3			16
		16			

*All electives must be chosen in consultation with, and approval by, the student's advisor.
Total Hours — 136

Curriculum in MARINE BIOLOGY WITH A LICENSE OPTION

This option leading toward qualification for U.S. Coast Guard licensing is available to U.S. Maritime Service cadets in the Marine Biology program. The student who successfully completes the license program will be qualified to sit for the U.S. Coast Guard license examination for a license as a Third Mate, Steam and Motor Vessels, Oceans, Unlimited.

FRESHMAN YEAR

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

SUMMER SESSION

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

SOPHOMORE YEAR

Chem. 227 Organic Chemistry I.....	(3-0)	3	Chem. 228 Organic Chemistry II.....	(3-0)	3
Chem. 237 Organic Chem. Lab.....	(0-3)	1	Chem. 238 Organic Chem. Lab.....	(0-3)	1
Engl. 103 Composition & Rhetoric.....	(3-0)	3	Engl. 104 Composition & Rhetoric.....	(3-0)	3
NAUT 201 Naval Architecture I.....	(3-2)	4	NAUT 202 Naval Architecture II.....	(3-0)	3
N.S. 200 Naval Science for the Merchant Marine Officer I.....	(3-0)	3	NAUT 303 Celestial Navigation.....	(2-3)	3
Phys. 201 College Physics.....	(3-3)	4	Phys. 202 College Physics.....	(3-3)	4
		<u>18</u>			<u>17</u>

SUMMER SESSION

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

JUNIOR YEAR

C.S. 203 Intro. to Computing.....	(3-0)	3	MARS 310 Field Methods in Marine Science.....	(1-6)	3
Gen. 301 Genetics.....	(4-0)	4	MART 321 Maritime Law I.....	(3-0)	3
MARB 311 Ichthyology.....	(2-3)	3	MART 406 Marine Cargo Ops II.....	(2-2)	3
MART 302 Marine Cargo Ops. I.....	(3-3)	4	Met. 302 Weather Reports/ Forecasting.....	(3-0)	3
N.S. 300 Naval Science for the Merchant Marine Officer II.....	(3-0)	3	NAUT 301 Seamanship II.....	(2-3)	3
		<u>17</u>	NAUT 304 Electronic Nav.....	(2-2)	3
			MARB 482 Seminar in Marine Biology.....	(1-0)	1
					<u>19</u>

SUMMER SESSION

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

SENIOR YEAR

License Prep.....	(4-0)	R	Biol. 351 Fundamentals of Microbiology.....	(3-4)	4
MARB 310 Cell Biology.....	(3-3)	4	Hist. 106 History of United States.....	(3-0)	3
MARB 435 Marine Invertebrate Zoology.....	(3-3)	4	MARB 420 Comparative Physiology.....	(3-3)	4
NAUT 302 Seamanship III.....	(1-3)	2	MARB 450 Developmental Biology of Marine Organisms.....	(3-3)	4
NAUT 404 The Navigator.....	(2-3)	3			<u>15</u>
Pol. S. 206 American National Government.....	(3-0)	3			
Stat. 302 Statistical Methods.....	(2-2)	3			
		<u>19</u>			

NOTE: The license option in the Marine Biology curriculum is open only to U.S. Maritime Service cadets.
Total Hours — 151

Curriculum in MARINE ENGINEERING (MARE)

The Marine Engineering program emphasizes the theory, design, operation and maintenance of maritime power plants and associated equipment. Engineering theory and practice are coordinated by relating classroom study to the student's practical experience aboard the T/S TEXAS CLIPPER. Thorough preparation in mathematics, sciences and basic and applied engineering subjects is recommended for students pursuing this degree program.

An option leading toward U.S. Coast Guard licensing is available to U.S. Maritime Service cadets through the Marine Engineering curriculum. The student who successfully completes the license program will be qualified to sit for the U.S. Coast Guard license examination for a license as a Third Assistant Engineer, Steam and Motor Vessels, Unlimited Horsepower.

FRESHMAN YEAR

Fall Semester	(Th-Pr)	Cr	Spring Semester	(Th-Pr)	Cr
Chem. 101 Fund. of Chem. I.....	(3-0)	3	Chem. 102 Fund. of Chem. II.....	(3-0)	3
Chem. 111 Fund. of Chem. Lab I.....	(0-3)	1	Chem. 112 Fund. of Chem. Lab II.....	(0-3)	1
E.D.G. 105 Engineering Graphics.....	(0-6)	2	E.D.G. 106 Engineering Design Graphics.....	(0-6)	2
Engl. 103 Composition & Rhetoric.....	(3-0)	3	Engl. 203 Intro to Literature.....	(3-0)	3
MARE 101 Engineering Analysis.....	(0-3)	1	Math. 152 Eng. Math II.....	(3-2)	4
Math. 151 Eng. Math I.....	(3-2)	4	Phys. 218 Mechanics.....	(3-3)	4
NAUT 103 Mar. Orientation & Lifesaving.....	(2-3)	3			<u>17</u>
		<u>17</u>			

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

SOPHOMORE YEAR

E.T. 180 Machine Prod. Tech. (0-3)	1	E.T. 280 Machine Prod. Tech. (0-3)	1
Hist. 105 History of the U.S. (3-0)	3	MARE 206 Engineering Mechanics II. (3-0)	3
MARE 105 Engineering Mechanics I .. (3-0)	3	MARE 207 Electricity & Magnetism (3-2)	4
Math. 253 Engineering Math III (3-2)	4	MARE 209 Mechanics of Materials (3-0)	3
Phys. 219 Electricity (3-3)	4	MARE 303 Marine Thermodynamics (3-0)	3
Pol. S. 206 American Nat'l Gov't (3-0)	3	Math 308 Differential Equations (3-0)	3
	<u>18</u>		<u>17</u>

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

JUNIOR YEAR

Econ. 203 Principles of Economics (3-0)	3	Engl. 301 Tech. Writing. (3-0)	3
MARE 210 Marine Construction Materials (3-2)	4	MARE 305 Intro. to Marine Nuclear Engineering (3-3)	4
MARE 304 Marine Thermodynamics (3-0)	3	MARE 308 Electrical Machinery (3-2)	4
MARE 307 Electrical Circuits (3-2)	4	MARE 412 Ship Structures and Stability (3-0)	3
MARE 310 Engineering Computation (3-0)	3	M.E. 344 Fluid Mechanics. (3-0)	3
	<u>17</u>		<u>17</u>

SUMMER SESSION
(Ten weeks at sea in the T/S TEXAS CLIPPER)
MARE 400 Advanced Operations, Credit 4

SENIOR YEAR

MARE 301 Heat Transfer (3-0)	3	Hist. 106 History of the U.S. (3-0)	3
MARE 411 Marine Mechanical Design Technology (3-0)	3	MARE 410 Marine Power Plants. (2-2)	3
MARE 414 Ship Automation I. (4-0)	4	MARE 415 Intro. to Maine Engineering Systems Design (3-0)	3
Elective (Social Science or Humanities)	3	MARE 416 Engineering Lab I (0-4)	1
Elective ¹	3	Technical Elective	3
	<u>16</u>	Elective ¹	3
			<u>16</u>

NOTE: 1. N.S. 200 and 300 must be taken by Coast Guard license option candidates. Non-license students must take Pol. S. 207.

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

The license option of the Marine Engineering curriculum is open only to U.S. Maritime Service cadets.

Total hours: License Option — 147

Non-License Option — 135

**Curriculum in
MARINE SCIENCES
(MARS)**

This program takes advantage of the coastal location of the University to provide the student with extensive hands-on experience in addition to a solid base of formal academic instruction in the science of the coastal, estuarine, and marine environments. This curriculum emphasizes mathematics, life sciences, physical sciences and earth sciences.

FRESHMAN YEAR

Fall Semester	(Th-Pr)	Cr	Spring Semester	(Th-Pr)	Cr
Biol. 113 Introductory Biology	(3-0)	3	Biol. 114 Introductory Biology	(3-0)	3
Biol. 123 Introductory Biology Lab	(0-3)	1	Biol. 124 Introductory Biology Lab	(0-3)	1
Chem. 101 Fund. of Chemistry I	(3-0)	3	Chem. 102 Fund. of Chem. II	(3-0)	3
Chem. 111 Fund. of Chemistry Lab I	(0-3)	1	Chem. 112 Fund. of Chemistry Lab. II	(0-3)	1
Engl. 103 Composition & Rhetoric.	(3-0)	3	Engl. 104 Composition & Rhetoric.	(3-0)	3
Math 151 Engr. Math. I.	(3-2)	4	Math. 152 Engr. Math. II	(3-2)	4
Naval Science or Elective**		1	Naval Science or Elective**		1
		<u>16</u>			<u>16</u>

SOPHOMORE YEAR

Chem. 227 Organic Chemistry I	(3-0)	3	Chem. 228 Organic Chemistry II.	(3-0)	3
Chem. 237 Organic Chemistry Lab	(0-3)	1	Chem. 238 Organic Chemistry Lab	(0-3)	1
Hist. 105 History of U.S.	(3-0)	3	C.S. 203 Intro. to Computing	(3-0)	3
Math. 253 Engr. Math. III.	(3-2)	4	Hist. 106 History of U.S.	(3-0)	3
Phys. 218 Mechanics	(3-3)	4	Phys. 219 Electricity	(3-3)	4
Pol. S. 206 American Nat'l 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
		<u>19</u>			<u>18</u>

JUNIOR YEAR

Econ. 203 Prin. of Economics	(3-0)	3	Computer Science Elective**		3
Engl. 301 Technical Writing	(3-0)	3	MARS 310 Field Methods.	(1-6)	3
Geog. 210 Marine Geography	(3-0)	3	MARS 440 Marine Biology	(3-3)	4
Geol. 101 Prin. of Geol.	(3-2)	4	Met. 302 Weather Reports and Forecasting.	(3-0)	3
Stat. 302 Statistical Methods	(2-2)	3	Ocn. 401 Intro. Oceanography	(3-0)	3
		<u>16</u>	Electives**		3
					<u>19</u>

SENIOR YEAR

MARS 481 Seminar in Marine Sciences.	(1-0)	1	MARS 485 Problems in Marine Sciences.	(3-0)	3
MASE 375 Science of Fluids.	(3-0)	3	MARS Options*	(3-0)	3
MARS Options*	(3-0)	3	Electives**		9
Electives**		9			<u>15</u>
		<u>16</u>			

Total Hours — 135

*MARS Option course must be chosen from: MARS 410, MARS 420, or MARS 430.

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

Curriculum in MARINE SCIENCES WITH A LICENSE OPTION

This option leading toward a U.S. Coast Guard license is available to U.S. Maritime Service cadets in the Marine Sciences program. The student who successfully completes the license program will be qualified to sit for the U.S. Coast Guard license examination for a license as a Third Mate, Steam and Motor Vessels, Oceans, Unlimited.

FRESHMAN YEAR

Fall Semester	(Th-Pr)	Cr	Spring Semester	(Th-Pr)	Cr
Biol. 113 Introductory Biology	(3-0)	3	Biol. 114 Intro. Biology	(3-0)	3
Biol. 123 Introductory Biology Lab	(0-3)	1	Biol. 124 Intro. Biol. Lab	(0-3)	1
Engl. 103 Composition & Rhetoric	(3-0)	3	Engl. 104 Composition & Rhetoric	(3-0)	3
Hist. 105 Hist. of U.S.	(3-0)	3	Math. 152 Engr. Math. II	(3-2)	4
Math. 151 Engr. Math. I	(3-2)	4	NAUT 203 Seamanship I	(2-3)	3
NAUT 103 Mar. Orientation & Lifesaving	(2-3)	3	NAUT 204 Terrestrial Navigation	(2-2)	3
		<u>17</u>			<u>17</u>

SUMMER SESSION

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

SOPHOMORE YEAR

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. 253 Engr. Math. III	(3-2)	4	C.S. 203 Intro. to Computing	(3-0)	3
NAUT 210 Naval Architecture I	(3-2)	4	NAUT 202 Naval Architecture II	(3-0)	3
N.S. 200 Naval Science For Merchant Marine Officer I	(3-0)	3	NAUT 303 Celestial Navigation	(2-3)	3
Phys. 218 Mechanics	(3-3)	4	Phys. 219 Electricity	(3-3)	4
		<u>19</u>			<u>17</u>

SUMMER SESSION

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

JUNIOR YEAR

Engl. 301 Technical Writing	(3-0)	3	MART 321 Maritime Law I	(3-0)	3
Geol. 101 Prin. of Geology	(3-2)	4	NAUT 301 Seamanship II	(2-3)	3
MART 302 Cargo I	(3-3)	4	NAUT 304 Electronic Navigation	(2-2)	3
Pol. S. 206 Am. Nat'l. Gov't	(3-0)	3	N.S. 300 Naval Science For Merchant Marine Officer II	(3-0)	3
Stat. 302 Statistical Methods	(2-2)	3	Ocn. 401 Intro. Oceanography	(3-0)	3
		<u>17</u>			<u>15</u>

SUMMER SESSION

(Ten weeks at sea in T/S TEXAS CLIPPER)
NAUT 400 Advanced Communications, Navigation & Seamanship, Credit 4
MARS 485 Problems in Marine Sciences, Credit 3

SENIOR YEAR

License Prep.	(4-0)	R	Hist. 106 History of U.S.	(3-0)	3
MARS 481 Sem. in Marine Sciences	(1-0)	1	MARS 310 Field Methods in MARS	(1-6)	3
MART 406 Cargo II	(2-2)	3	MARS 440 Marine Biology	(3-3)	4
NAUT 302 Seamanship III	(1-3)	2	Met. 302 Weather Reports and Forecasting	(3-0)	3
NAUT 404 The Navigator	(2-3)	3	MARS Options*	(3-0)	3
MARS Options*	(3-0)	3			
Elective**		3			16
		<u>15</u>			

NOTE: The license option in the Marine Sciences curriculum is open only to U.S. Maritime Service cadets.
Total Hours — 148

*MARS Option course must be chosen from: MARS 410, MARS 420, or MARS 430.

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

Curriculum in MARINE TRANSPORTATION (MART)

This program combines studies in the humanities and sciences with instruction and training in maritime disciplines to provide the U.S. Maritime Service cadet with a broad-based education. The student who successfully completes the license program will be qualified to sit for the U.S. Coast Guard license examination for a license as a Third Mate, Steam and Motor Vessels, Oceans, Unlimited.

FRESHMAN YEAR

Fall Semester	(Th-Pr)	Cr	Spring Semester	(Th-Pr)	Cr
Chem. 106 General Chemistry	(3-0)	3	Engl. 104 Comp. & Rhetoric	(3-0)	3
Chem. 116 Gen. Chem. Lab	(0-3)	1	Mgmt. 105 Intro. to Business	(3-0)	3
E.D.G. 105 Eng. Graphics	(0-6)	2	Math. 151 Eng. Math. I	(3-2)	4
Engl. 103 Composition & Rhetoric	(3-0)	3	NAUT 203 Seamanship I	(2-3)	3
Math. 106 Plane & Spher. Trig	(4-0)	4	NAUT 204 Terrestrial Navig.	(2-2)	3
NAUT 103 Mar. Orientation & Lifesaving	(2-3)	3			16
		<u>16</u>			

SUMMER SESSION

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

SOPHOMORE YEAR

Econ. 203 Principles of Economics	(3-0)	3	Econ. 204 Principles of Econ.	(3-0)	3
Hist. 105 Hist. of the U.S.	(3-0)	3	NAUT 301 Seamanship II	(2-3)	3
Math. 152 Eng. Math. II	(3-2)	4	NAUT 303 Celestial Navig.	(2-3)	3
Met. 302 Weather Reports & Forecasting	(3-0)	3	N.S. 200 Naval Science for the Merchant Marine Officer I	(3-0)	3
Phys. 201 College Physics	(3-3)	4	Phys. 202 College Physics	(3-3)	4
		<u>17</u>			<u>16</u>

SUMMER SESSION

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

JUNIOR YEAR

Econ. 321 International Trade & Finance	(3-0)	3	C.S. 203 Intro. to Computing	(3-0)	3
Hist. 106 History of the U.S.	(3-0)	3	MART 321 Maritime Law I	(3-0)	3
MART 301 Ocean Trans. I	(4-0)	4	MART 406 Marine Cargo Ops. II	(2-2)	3
MART 302 Marine Cargo Ops. 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
		18	N.S. 300 Naval Science for the Merchant Marine Officer II	(3-0)	3
					18

SUMMER SESSION

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

SENIOR YEAR

License Prep	(4-0)	R	B. Ana. 303 Statistical Methods	(3-3)	4
MART 421 Maritime Law II	(3-0)	3	Engl. 301 Technical Writing	(3-0)	3
NAUT 302 Seamanship III	(1-3)	2	MART 416 Port Operations Administration & Econ.	(3-0)	3
NAUT 404 The Navigator		3	MART 481 Seminar	(0-2)	1
Pol. S. 206 American National Government	(3-0)	3	Ocn. 401 Intro. to Oceanography	(3-0)	3
Elective**		3	Elective**		3
		14			17

**Electives must be chosen in consultation with, and approved by, the student's Faculty Advisor.

TOTAL HOURS: 144

Curriculum in MARITIME ADMINISTRATION (MARA)

This curriculum, administered by the Department of Marine Transportation, is designed to prepare the graduate for administrative work in marine and maritime industries and/or governmental organizations involved in coastal, marine, and maritime activities. The curriculum provides a strong foundation in management, finance, business analysis, accounting, and economics. This business and administrative curriculum integrates with courses that specialize in marine and maritime activities such as port operations, brokerage and chartering, maritime law, and inland waterways.

FRESHMAN YEAR

Fall Semester	(Th-Pr)	Cr	Spring Semester	(Th-Pr)	Cr
Engl. 103 Composition & Rhetoric	(3-0)	3	Engl. 104 Composition & Rhetoric	(3-0)	3
Hist. 105 History of U.S.	(3-0)	3	Hist. 106 History of U.S.	(3-0)	3
Math. 130 Mathematical Concepts — Precalculus	(3-0)	3	Math. 230 Mathematical Concepts — Calculus	(2-2)	3
NAUT 103 Maritime Orientation and Lifesaving	(2-3)	3	NAUT 201 Naval Architecture	(3-2)	4
Naval Science or Elective*		1	Naval Science or Elective*		1
Elective (Natural Science)**		4	Elective (Natural Science)**		4
		17			18

SOPHOMORE YEAR

Acct. 229 Intro. Accounting	(3-0)	3	Acct. 230 Intro. Accounting	(3-0)	3
B. Ana. 303 Statistical Methods	(3-3)	4	B. Ana. 305 Advanced Business Analysis	(2-2)	3
C.S. 203 Intro. To Computing	(3-0)	3	Econ. 204 Principles of Economics	(3-0)	3
Econ. 203 Principles of Economics	(3-0)	3	Engl. 301 Tech. Writing	(3-0)	3
Pol. S. 206 American National Government	(3-0)	3	MARA 212 Business Law	(3-0)	3
Naval Science or Elective*		1	Pol. S. 207 State and Local Government	(3-0)	3
		17	Naval Science or Elective*		1
					19

JUNIOR YEAR

B. Ana. 317 Business Problem Programming	(2-2)	3	B. Ana. 304 Bus. Cycles and Bus. Mgmt.	(3-0)	3
Econ. 311 Money and Banking	(3-0)	3	B. Ana. 369 Operations Management	(3-0)	3
MARA 363 The Organizing Process	(3-0)	3	Econ. 321 International Trade and Finance	(3-0)	3
MART 301 Ocean Transportation I	(4-0)	4	Fin. 341 Business Finance	(3-0)	3
MKTG 321 Marketing	(3-0)	3	MARA 401 Brokerage & Chartering	(3-0)	3
		16	MART 304 Ocean Transportation II	(3-0)	3
					18

SENIOR YEAR

B. Ana. 424 Economics of Transportation	(3-0)	3	B. Ana. 459 Mgmt. Problems	(3-0)	3
Fin. 434 Managerial Finance I	(3-0)	3	Econ. 412 Public Finance	(3-0)	3
MARA 402 Inland Waterways	(3-0)	3	Fin. 435 Managerial Finance II	(3-0)	3
MARA 422 Personnel Mgmt.	(3-0)	3	Fin. 445 Funding International Business	(3-0)	3
MARA 460 Mgmt. Systems and Control	(3-0)	3	MARA 466 Mgmt. Policy	(3-0)	3
MART 421 Maritime Law II	(3-0)	3	MART 416 Port Ops., Admin. and Econ.	(3-0)	3
		18			18

Total Hours — 141

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

**Natural science electives must be chosen from sequential introductory courses in biology, chemistry, or physics.

Curriculum in MARITIME SYSTEMS ENGINEERING (MASE)

The Maritime Systems Engineering curriculum concentrates on fundamental engineering design in combination with humanities, sciences, and various marine subjects. A general core of courses in humanities, sciences, and engineering during the freshman and sophomore years provides a foundation for specialization in one of the options during the junior and senior years. The program is designed to prepare students for work or further study in any marine-oriented engineering field. A thorough preparation in mathematics, sciences and basic and applied engineering subjects is recommended for students pursuing this degree program.

FRESHMAN YEAR

Fall Semester	(Th-Pr)	Cr	Spring Semester	(Th-Pr)	Cr
Chem. 101 Fund. of Chem. I.....	(3-0)	3	Chem. 102 Fund. of Chem. II.....	(3-0)	3
Chem. 111 Fund. of Chem. I Lab.....	(0-3)	1	Chem. 112 Fund. of Chem. II Lab.....	(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	Math 152 Eng. Math II.....	(3-2)	4
MARE 101 Engineering Analysis.....	(0-3)	1	MASE 100 Intro. to M.S. Eng.....	(2-3)	3
Math. 151 Engineering Math I.....	(3-2)	4	Phys. 218 Mechanics.....	(3-3)	4
Naval Science or Elective*		1	Naval Science or Elective*		1
		15			18

SOPHOMORE YEAR

Econ. 203 Principles of Econ.....	(3-0)	3	Engl. 203 Intro. to Literature.....	(3-0)	3
Hist. 105 History of the U.S.....	(3-0)	3	MARE 206 Eng. Mechanics II.....	(3-0)	3
MARE 105 Eng. Mechanics I.....	(3-0)	3	MARE 209 Mech. of Materials.....	(3-0)	3
Math. 253 Eng. Math III.....	(3-2)	4	MARE 303 Marine Thermodynamics.....	(3-0)	3
NAUT 201 Naval Architecture I.....	(3-2)	4	MARE 310 Eng. Computations.....	(3-0)	3
Naval Science or Elective*		1	Math. 308 Differential Equations.....	(3-0)	3
		18	Naval Science or Elective*		1
					19

JUNIOR YEAR

MARE 210 Mar. Const. Materials.....	(3-2)	4	C. E. 462 Hydromechanics.....	(3-0)	3
Phys. 219 Electricity.....	(3-3)	4	Hist. 106 History of the U.S.....	(3-0)	3
Option Requirements**.....		10	Option Requirements**.....		12
		18			18

SENIOR YEAR

Engl. 301 Technical Writing.....	(3-0)	3	O.E. 401 Measurements in the Ocean.....	(3-0)	3
O.E. 300 Dynamics of Waves and Structures I.....	(3-0)	3	O.E. 410 Measurements in the Ocean Lab.....	(0-3)	1
Pol. S. 206 American Nat'l Gov't.....	(3-0)	3	Pol. S. 207 State & Local Gov't.....	(3-0)	3
Option Requirements*.....		6	Option Requirements**.....		9
		15			16

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

**Option Requirements — There are three options to the Maritime Systems Engineering Degree Program: Ocean Engineering, Coastal Structures and Hydromechanics.

Total Hours — 137

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

OCEAN ENGINEERING OPTION REQUIREMENTS

C.E. 311 Fluid Dynamics.....	(3-0)	3
C.E. 345 Theory of Structures.....	(0-3)	3
C.E. 365 Intro. to Geotechnical Eng.....	(2-2)	3
Geol. 320 Geology for Civil Eng.....	(2-2)	3
MARE 207 Electrical Circuits.....	(3-2)	4
MARS 410 Phys. Proc. in the Mar. Environ.....	(3-0)	3
MARS 430 Geol. Proc. in the Mar. Environ.....	(3-0)	3
Ocn. 401 Intro. to Ocn.....	(3-0)	3
O.E. 400 Basic Coastal Eng.....	(3-0)	3
Science Elective (Biology)*.....		3
Elective (Social)*.....		3
Elective (Technical)*.....		3
		37

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 Structural Steel Design.....	(2-3)	3
C.E. 365 Intro. to Geotechnical Eng.....	(2-2)	3
C.E. 435 Geotechnical Eng. Design.....	(2-3)	3
C.E. 483 Analysis and Design of Structures.....	(2-3)	3
Geol. 320 Geology for Civil Engrs.....	(2-2)	3
MARE 301 Heat Transfer.....	(3-0)	3
MARE 412 Ship Structures and Stability.....	(3-0)	3
M.E. 344 Fluid Mechanics.....	(3-0)	3
M.E. 459 Mechanical Vibration.....	(3-0)	3
Phys. 220 Modern Physics.....	(3-0)	3
Phys. 230 Modern Physics Lab.....	(0-3)	1
		37

HYDROMECHANICS OPTION REQUIREMENTS

C.E. 311 Fluid Dynamics.....	(3-0)	3
C.E. 336 Fluid Dynamics Lab.....	(0-2)	1
E.E. 461 Electronic Instrumentation.....	(2-3)	3
MARE 301 Heat Transfer.....	(3-0)	3
MARE 207 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 Intro. to Contin. Mech.....	(3-0)	3
NAUT 202 Naval Architecture II.....	(3-0)	3
MARS 410 Phys. Proc. in the Mar. Environ.....	(3-0)	3
Ocn. 401 Intro. to Ocn.....	(3-0)	3
Phys. 220 Modern Physics.....	(3-0)	3
Phys. 230 Modern Physics Lab.....	(0-3)	1
Electives*.....		1
		37

COURSE DESCRIPTIONS

All undergraduate courses offered at the University are described on the following pages and are listed by departments, arranged alphabetically.

The course numbering scheme is as follows:

100 to 199, courses primarily open to freshmen.

200 to 299, courses primarily open to sophomores.

300 to 399, courses primarily open to juniors.

400 to 499, courses primarily open to seniors.

Figures in parentheses following the number of the courses indicate the clock hours per week devoted to theory and practice, respectively. Theory includes recitations and lectures; practice includes work done in the laboratory, shop, drawing room or field. The unit of credit is the semester hour, which involves one hour of theory, or from two to four hours of practice per week for one semester of 16 weeks.

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

Any course may be withdrawn from the session offerings in case the number of registrations is too small to justify the offering of the course.

ACCOUNTING

(Acct.)

229. Introductory Accounting. (3-0). Credit 3. Analysis, recording and reporting of business transactions; partnership and corporation accounting; analysis and use of financial statements. Prerequisite: Major in business administration or approval of department head.

230. Introductory Accounting. (3-0). Credit 3. Continuation of Acct. 229. Use of budgets; introduction to cost accounting; cost control techniques and methods of measuring performance. Prerequisite: Acct. 229.

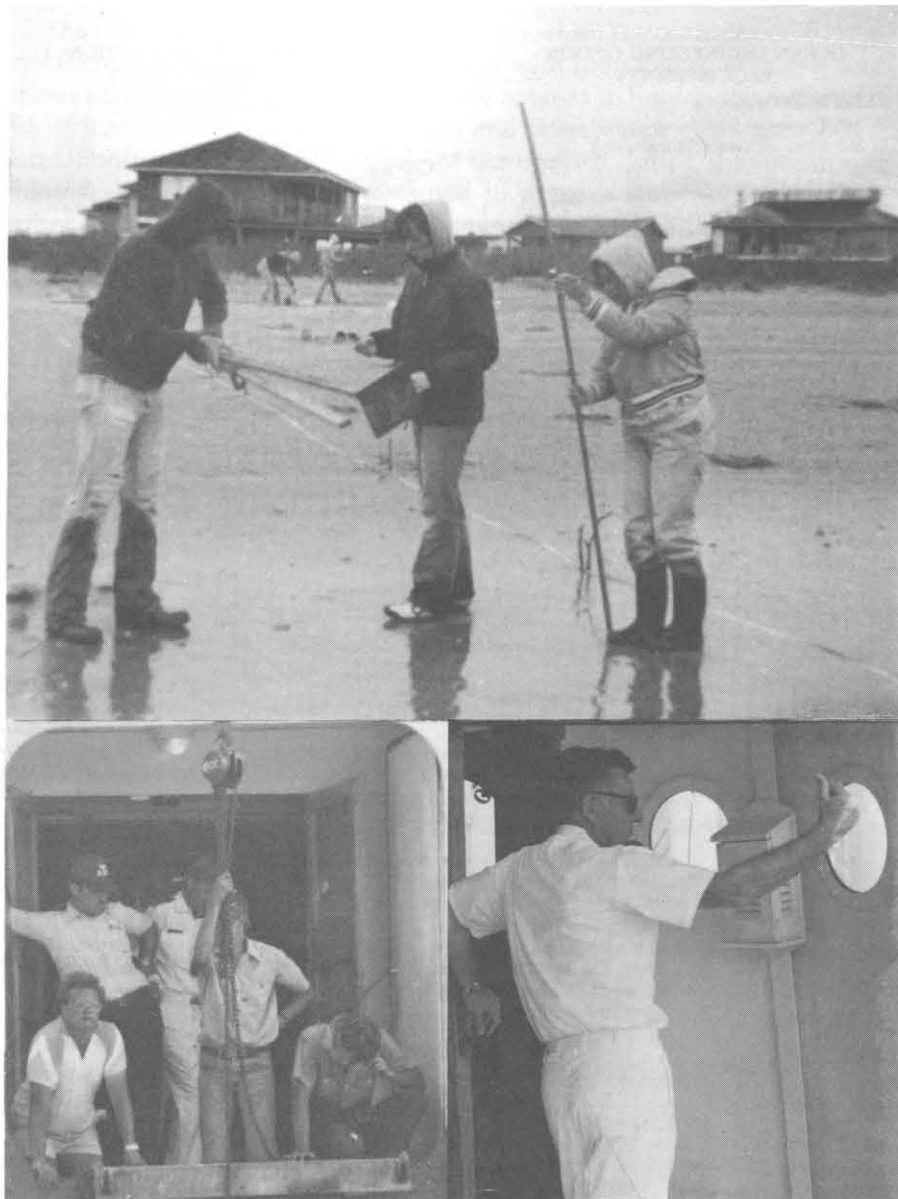
BIOLOGY

(Biol.)

113. Introductory Biology. (3-0). Credit 3. Survey of structures and functions common to living forms in general. 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; their special structures and functions which enable them to exist. Prokaryotes, fungi, lower and higher plants, animals and humans. Laboratory (Biol. 124) is optional. Prerequisite: Biol. 113.

123. Introductory Biology Laboratory. (0-3). Credit 1. Laboratory supporting Biol. 113. Prerequisite: Biol. 113 or registration therein.



- 124. Introductory Biology Laboratory. (0-3). Credit 1.** Laboratory supporting Biol. 114. Prerequisite: Biol. 113.
- 351. Fundamentals of Microbiology. (3-4). Credit 4.** Basic microbiology; comparative morphology, taxonomy, pathogenesis, ecology, variation, physiology of microorganisms. Prerequisites: Chem. 227, 237; three hours of biology; or approval of instructor.
- 485. Biological Problems. Credit 1 to 4.** Problems in various phases of plant, animal and bacteriological science. Prerequisites: Junior classification; approval of ranking professor in field chosen.

BUSINESS ANALYSIS

(B.Ana.)

- 303. Statistical Methods (3-3). Credit 4.** Collection, tabulation and presentation of numerical data. Sampling, estimation of averages and variation, probability and error, hypothesis testing and correlation. Prerequisite: Math. 230.
- 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. Prerequisites: B.Ana. 303 or equivalent.
- 305. Advanced Business Analysis. (2-2). Credit 3.** Selected topics in statistical analysis, emphasizing practical applications to functional problems in accounting, finance, marketing and management. Applications of existing computer programs minimize computations. Prerequisite: B.Ana. 217 or equivalent and B.Ana. 303 or equivalent.
- 317. Business Problem Programming. (2-2). Credit 3.** Combination of programming and systems analysis in problem definition and solution with FORTRAN programming. Case problems will be analyzed and programmed in the functional fields of business. Prerequisites: B.Ana. 217, 303, or approval of instructor.
- 364. Operations Management. (3-0). Credit 3.** Concepts, issues and techniques used to plan, analyze and control systems of production. Operational programs in producing goods and services. Prerequisites: B.Ana. 217, and 303.
- 424. Economics of Transportation. (3-0). Credit 3.** Historical development, structure, function and regulation of highway, rail, water, pipeline, and air transportation systems. Application of economic concepts and principles to transportation development and operations. Prerequisite: Econ. 204.
- 459. Management Problems. (3-0). Credit 3.** The application of quantitative decision-making techniques to management decision problems. Primary emphasis on the planning, analysis and control of operating systems in organizational settings. Prerequisite: B.Ana. 364.

- 485. Problems. Credit 1 to 3 each semester.** Directed study of selected problems in an area of business analysis not covered in other courses. Prerequisite: Approval of department head.

CHEMISTRY (Chem.)

- 101. Fundamentals of Chemistry I. (3-0). Credit 3.** Introduction to modern theories of chemical bonding; chemical reactions; states of matter; solutions and colloids; stoichiometry and equilibrium. Prerequisite: Chem. 111 or registration therein.
- 102. Fundamentals of Chemistry II. (3-0). Credit 3.** Theory and applications of oxidation-reduction systems; complex equilibria; descriptive inorganic and organic chemistry; introduction to chemical instrumentation; selected topics in biochemistry and nuclear chemistry. Prerequisites: Chem. 101, 111, and 112 or registration therein.
- 106. Chemical Perspectives. (3-0). Credit 3.** Structure of atoms, the periodic chart and principles of chemical bonding. Compounds are discussed, relating their use to everyday life. Not intended for those who plan to pursue advanced work in the sciences. Prerequisite: Chem. 116 or registration therein.
- 111. Fundamentals of Chemistry Laboratory I. (0-3). Credit 1.** Introduction to methods and techniques of chemical experimentation; 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.
- 116. Chemical Perspectives Laboratory. (0-3). Credit 1.** Introduction to chemical laboratory work with experiments to show the applications of chemistry to everyday life. Prerequisite: Chem. 106 or registration therein.
- 227. Organic Chemistry I. (3-0). Credit 3.** Introduction to chemistry of compounds of carbon. General principles and their application to various industrial and biological processes. Prerequisite: Chem. 102 or 104 or equivalent.
- 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. Prerequisites: Chem. 112 or 114; Chem. 227 or registration therein.

- 238. Organic Chemistry Laboratory. (0-3). Credit 1.** Continuation of Chem. 237. Prerequisites: Chem. 237; Chem. 228 or registration therein.
- 383. Chemistry of Environmental Pollution. (3-0). Credit 3.** Chemical pollutants in the air, in water and on land: their generation, chemical reactivity, action on environment and disappearance through chemical mechanisms. Chemistry of existing pollution abatement. Prerequisite: Chem. 228 or equivalent.
- 485. Problems. Credit 1 or more.** Introduction to research, library and laboratory work. Prerequisites: Senior classification; approval of department head.

CIVIL ENGINEERING (C.E.)

- 311. Fluid Dynamics. (3-0). Credit 3.** Fluid properties; statics; kinematics; basic conservation principles of continuity, energy and momentum; similitude and hydraulic models; incompressible flow in pipes; fluid dynamic drag. Prerequisite: M.E. 211 or 213 or equivalent.
- 336. Fluid Dynamics Laboratory. (0-2). Credit 1.** Introduction to laboratory techniques, calibration principles, reports and fluid measurements. Determination of fluid properties. Visualization of 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 or registration therein.
- 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.** Structural engineering — functions of structure, design loads, reactions and force systems. Analysis of statically determinate structures; beams, trusses and arches. Methods of determining deflections of structures. Influence lines and criteria for moving loads. Analysis of indeterminate structures; continuous beams and frames. Prerequisite: C.E. 205.
- 346. Structural Steel Design. (2-3). Credit 3.** Materials, types of members and typical arrangements. Design of tension members, compression members, beams and beam columns. Design of bolted connections and welded connections. Theory and practice as indicated in typical current specifications. Prerequisite: C.E. 345.
- 365. Introduction to Geotechnical Engineering. (2-2). Credit 3.** Physical properties of soils, classification systems, soil exploration, permeability, consolidation, compaction and shear strength. Laboratory tests conducted to determine the physical and engineering soil properties needed for application in geotechnical engineering design. Prerequisite: Geol. 320.

- 435. Geotechnical Engineering Design. (2-3). Credit 3.** Prediction of settlement, analysis of the stability of slopes, prediction of bearing capacity of shallow and deep foundations, and determination of each pressures acting on retaining structures. Geotechnical engineering design for undergraduates and for graduate students not primarily interested in the geotechnical field, but desiring additional beyond the introductory undergraduate level. Prerequisite: C.E. 365.
- 462. Hydromechanics. (3-0). Credit 3.** Kinematics of fluids. Dynamics of frictionless incompressible flow. Irrotational flow. Streamlines and stream function. Vorticity. Flow of viscous fluid; Cartesian tensors, Navier-Stokes equation and its solution, flow with low Reynolds number. Two-dimensional laminar boundary layers. Turbulent flow. Prerequisites: Aero. 301 or C.E. 311 or M.E. 344, and Math. 308.
- 483. Analysis and Design of Structures. (2-3). Credit 3.** Overall procedure of analysis and design; functions, loads, layouts of force systems; analysis, design drafting, specifications, cost comparisons and maintenance as applied to typical simple bridge and building structures. Prerequisites: C.E. 344, 346, 365.
- 485. Problems. Credit 1 to 3 each semester.** Research and design problems of limited scope approved on an individual basis intended to promote independent study. Results of study presented in writing. Prerequisite: Approval of department head.

COMPUTING SCIENCE (C.S.)

- 201. Computer Programming for Engineers. (1-0). Credit 1.** Programming using the FORTRAN language. Actual writing of typical programs and running them on the computer.
- 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.
- 485. Problems. Credit 1 to 3.** Permits work on special project in computing science. Project must be approved by department head. Prerequisite: Senior classification.

ECONOMICS (Econ.)

- 203. Principles of Economics. (3-0). Credit 3.** Elementary principles of economics; the economic problem, measurement and determination of national income, money and banking, theory of price. Prerequisite: Sophomore classification.
- 204. Principles of Economics. (3-0). Credit 3.** Analysis of economic aggregates, theory of production and of the firm, international economic relations and labor problems. Prerequisite: Econ. 203.

- 311. Money and Banking. (3-0). Credit 3.** Fundamental principles of money, credit and banking and their exemplification in modern currency and banking history. Prerequisite: Econ. 204.
- 318. Economics of Labor. (3-0). Credit 3.** Economics of the labor market: factors affecting the economy's demand for labor and the supply of labor; labor market problems such as unemployment and poverty; the economics of trade unions and collective bargaining. Prerequisite: Econ. 204.
- 321. International Trade and Finance. (3-0). Credit 3.** Theory of international trade, barriers to trade, balance of payments and foreign exchange analysis, current policy problems. Prerequisite: Econ. 204.
- 412. Public Finance. (3-0). Credit 3.** Economic role of governments, with emphasis on the choice of public sector output in a democracy and the effects of various taxes on resource allocation and income distribution. 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: Approval of department head.
- 489. Special Topics in Credit 1 to 4.** Selected topics in an identified area of economics. Prerequisite: Approval of department head.

ELECTRICAL ENGINEERING (E.E)

- 461. Electronic Instrumentation. (2-3). Credit 3.** For non-electrical engineering majors. Applications of electronic instruments to research problems in field of measurements and control systems. Prerequisites: Math. 308; Phys. 219.
- 485. Problems. Credit 1 to 3 each semester.** Problems of limited scope approved on individual basis intended to promote independent study. Results of study will be presented in writing, and an oral presentation to staff and students will be required. Prerequisites: Senior classification; approval of department head.

ENGINEERING DESIGN GRAPHICS (E.D.G.)

- 105. Engineering Graphics. (0-6). Credit 2.** Introduction to the graphical approach to the engineering design process as applied to elementary systems. Methods of graphical communications, working drawings, data analysis, technical reports, oral presentations. Introduction to team organization and creative problem solving.
- 106. Engineering Design Graphics. (0-6). Credit 2.** Introduction to engineering design; product development and team dynamics using graphical methods and descriptive geometry. Spatial analysis of geometric

elements, vectors, data analysis and graphical applications to a variety of engineering areas. Prerequisite: E.D.G. 105.

- 485. Problems. Credit 1 to 3 each semester.** Special problems to fit needs of individual students. Prerequisite: Approval of instructor.

ENGINEERING TECHNOLOGY (E.T.)

- 180. 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. Prerequisite: E.D.G. 105.
- 207. Industrial Materials and Manufacturing Processes. (2-3). Credit 3.** Production, processing and use of numerous raw materials of industry. Laboratory work consists of problems involving exercises related to classroom instruction.
- 280. Machine Production Techniques. (0-3). Credit 1.** Continuation of E.T.180. Machining of metals with both standard and production machine tools. Manufacture of interchangeable parts, jigs, fixtures and fixed gauges. Prerequisite: E.T. 180.
- 308. A Study of Modern Industry. (3-0). Credit 3.** Historical development and current factors influencing industrial products and their usage, including financial and geographic factors, machinery, power, raw materials, markets and labor which have a direct influence upon the development, distribution and use of industrial goods. Specific studies of representative industries, including iron, steel and other metals, Machine tool, automobile, transportation, chemical, petroleum, rubber and building materials. Prerequisite: E.T. 207 or approval of department head.
- 326. Metals Technology. (2-3). Credit 3.** Metalworking processes — foundry and numerical control of machine tools. Foundry industry and introduction to numerical control of machine tools. Theoretical concepts and practical laboratory activities. Prerequisites: E.T. 207, 309, 310.
- 429. Foremanship and Supervision. (3-0). Credit 3.** Supervisory duties and responsibilities in industrial organization and procedures for meeting these responsibilities. Prerequisite: Senior classification.
- 481. Seminar. (1-0). Credit 1.** Presentation of selected topics from current literature and related industrial operations in various technical areas. Films showing practical application of manufacturing and industrial processes. Lectures from industrial representatives. Prerequisite: Senior classification.
- 485. Problems. Credit 1 to 3 each semester.** Permits work in a special problem area on an individual basis with the intent of promoting independent reading, research and study; to supplement existing course

offerings or subjects not presently covered. Prerequisites: Senior classification and approval of department head.

ENGLISH (Engl.)

- 103. Composition and Rhetoric. (3-0). Credit 3.** Composition of short papers; 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 of Literature. (3-0). Credit 3.** Reading of literature: plays, stories, novels and poems, chiefly modern; practice in literary analysis and interpretation. Prerequisite: Completion of freshman writing requirement.
- 212. Shakespeare. (3-0). Credit 3.** Major plays of Shakespeare with lectures on his art, his language and his cultural environment. Prerequisite: Completion of freshman writing requirement.
- 301. Technical Writing. (3-0). Credit 3.** Advanced writing in technical, scientific and business fields; reports, proposals and other papers; correspondence. Prerequisite: Junior classification in major or approval of instructor.
- 335. Literature of the Sea. (3-0). Credit 3.** Significance of the sea in fictional and factual accounts, such as novels, short stories, poems, and narratives of sailors and seafaring life. Prerequisite: Completion of freshman writing requirement.
- 412. Shakespeare. (3-0). Credit 3.** Analysis of plays, texts, language, dramatic theory; Shakespearean criticism and scholarship. Prerequisite: Completion of student's sophomore program in English.
- 485. Problems. Credit 1 to 3.** Readings for specific needs of major or minor in English. Prerequisite: Approval of department head.
- 489. Special Topics in... Credit 1 to 4.** Selected topics in an identified area of English language and literature. May be repeated for credit. Prerequisite: Approval of instructor.

FINANCE (Fin.)

- 341. Business Finance. (3-0). Credit 3.** Financial practices and financial management of modern business corporations; cash flow, planning, procurement of funds, management of long-term funds and working capital. Prerequisites: Econ. 203 and Acct. 229 or equivalent.
- 434. Managerial Finance I. (3-0). Credit 3.** Concerned with the managerial problems of financial managers with emphasis on financial analysis,

current asset management, capital budgeting and capital structure. Prerequisite: Fin. 341.

- 435. Managerial Finance II. (3-0). Credit 3.** Case studies in the administration of the financial affairs of business enterprises. Emphasis on working capital management, capital expenditure analysis, capital structure, and mergers and acquisitions. Prerequisite: Fin. 434.
- 445. Funding International Business. (3-0). Credit 3.** Analysis of international business transactions, sources of funding, relation to international financial institutions and capital instruments. Relates international business funding to national and commercial development. Prerequisites: Econ. 311, Fin. 341.

GENERAL ACADEMICS (GACD)

- GACD 311. Library Resources: The Library and Learning. (1-2). Credit 2.** Designed to acquaint the student with the university library and its resources and to develop research skills at the upper level. Emphasis placed on specialized reference tools.
- GACD 315. Information Sources in Marine Sciences. (2-0). Credit 2.** An in-depth study of scientific information sources. Designed to develop skill in question formulation, abstracting and scientific literature searching.

GENETICS (Gen.)

- 301. Genetics. (4-0). Credit 4.** Fundamental principles of genetics: physical basis of Mendelian inheritance, expression and interaction of genes, linkage, sex linkage, biochemical nature of genetic material and mutation. Prerequisites: Biol. 101, 107 or 114 and sophomore classification.
- 485. Problems. Credit 1 to 4 each semester.** Special problems for advanced undergraduates permitting laboratory investigations of subject matter not included in established courses. Prerequisites: Gen. 301 or 310 and approval of instructor or department head.

GEOGRAPHY (Geog.)

- 201. Introduction to Human Geography. (3-0). Credit 3.** Comparative survey of the major cultural regions of the world and their dissimilar development. Processes of innovation, diffusion and adaptation with regard to changing relationships between people and their environment.
- 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 used to analyze the human use and abuse of the sea.

- 315. Geography of the Sea. (3-0). Credit 3.** Introduction to principal characteristics and problems of human use of the sea. Watercraft, exploration, fisheries, minerals, law of the sea, world shipping.
- 380. Workshop in Environmental Studies. (1-2 to 8). Credit 2 to 6.** Study, understanding and solution of real human environment problems based on principles learned in the classroom. Library, laboratory and field work carried out by individuals and in groups; reports on work accomplished. May be repeated for credit as many as three times. Prerequisite: Approval of department head.
- 485. Problems. Credit 1 or more each semester.** Individually supervised research or advanced study on restricted areas not covered in regular courses. Prerequisite: Approval of department head.

GEOLOGY (Geol.)

- 101. Principles of Geology. (3-2). Credit 4.** General principles of physical geology; structure of the earth, origin of minerals and rocks and geologic processes; synthesis of geologic ideas and introduction to geologic practice. This course does not involve rigorous mathematical or chemical treatment of the subjects but may be used for fulfillment of laboratory science requirements.
- 106. Historical Geology. (3-2). Credit 4.** Introduction to historical geology; review of hypothesis of earth's origin, significance of fossils, origin and character of selected geologic formations, and development of North American continent. Prerequisite: Geol. 101, 104 or 320 or approval of department head.
- 203. Crystallography and Mineralogy. (2-6). Credit 4.** Crystallography and descriptive mineralogy. Sight recognition of crystal forms and of common minerals. Prerequisites: Chem. 102 or 104. Math. 121 or 151.
- 306. Stratigraphy and Sedimentation. (3-3). Credit 4.** Principles of stratigraphy and study of environments of deposition. Laboratory work in sampling, analyzing and interpreting sedimentary rocks. Field trips required. Prerequisites: Geol. 245, 303.
- 320. Geology for Civil Engineers. (2-2). Credit 3.** Principles of physical geology; common minerals and rocks with their relationships and applications to construction, foundations and excavation. Prerequisite: Sophomore classification.
- 485. Problems. Credit 1 or more each semester.** Advanced problems in geology. Prerequisite: Approval of department head.

HISTORY (Hist.)

- 105. History of the United States. (3-0). Credit 3.** English colonization; Revolution; adoption of Constitution; growth of nationalism and sectionalism; cotton and slavery problem; Civil War; reconstruction.





- 106. History of the United States. (3-0). Credit 3.** Since reconstruction; new social and industrial problems; rise of progressivism; United States emergence as world power; World War I; reaction and New Deal, World War II; contemporary America.
- 442. History of American Sea Power. (3-0). Credit 3.** Development of American sea power from the 18th century to the present.
- 444. American Military History Since 1901. (3-0). Credit 3.** Intensive study of American military experience from 1901 to present; causes, nature and effect of wars in which the United States has participated. Close attention given to effect of war on American history.
- 464. International Developments Since 1918. (3-0). Credit 3.** General survey of world politics since close of World War I. Problems and ideologies of great powers of Europe and those factors and conditions which explain present political tendencies and policies.
- 485. Problems. Credit 1 to 3.** Instruction in selected fields of history not covered in depth by other courses. Reports and extensive reading required. Prerequisite: Approval of department head.
- 489. Special Topics in... Credit 1 to 4.** Study of selected topics in an identified area of history.

MANAGEMENT (Mgmt.)

- 105. Introduction to Business. (3-0). Credit 3.** Over-all picture of business operation; includes analysis of specialized fields within business organizations; identifies role of business in modern society. American business system; legal environment; forms of business ownership; organizational structures; human resource management; labor-management relations; marketing, accounting, production, logistics, and financial functions. Limited to students in freshman or sophomore classification.
- 211. Legal and Social Environment of Business. (3-0). Credit 3.** Role of law in business and society; government regulations of business. Legal reasoning; sources of law; social policy and legal institutions; anti-trust; security regulations; consumer protection; environmental laws; worker health and safety; employment discrimination and other laws affecting business. Cross-listed with MARA 211. Prerequisite: Sophomore classification.
- 363. The Organizing Process. (3-0). Credit 3.** Management as an academic discipline is defined and its evolution sketched. Goal setting; planning, controlling and decision-making; models for thinking about organizations; organization design; organization change; models for understanding individual behavior; job performance and job satisfaction; interpersonal behavior, motivation and leadership, behavior in work groups; and careers in management. Cross-listed with MARA 363. Prerequisite: Junior classification.

422. Personnel Management. (3-0). Credit 3. Relationship of the personnel function to the whole organization; manpower planning; recruitment; selection including employment application, interviewing, testing, reference checks, probationary period; placement; separation; compensation; training; performance appraisal; labor relations; and safety. Cross listed with MARA 422. Prerequisite: Mgmt. 363 or approval of instructor.

460. Management Systems and Control. (3-0). Credit 3. Applications of management planning and control techniques to complex organizational problems and management decision making tasks; socio-technical work systems and human-machine systems; basic systems theory and concepts; basic control theory and concepts; systems design process; systems analysis techniques such as simulation models and sensitivity analysis; information technology and management information systems; program and project management; special-purpose planning and control systems. Cross-listed with MARA 460. Prerequisites: B.Ana. 317, 364 and Mgmt. 363 or approval of instructor.

466. Management Policy. (3-0). Credit 3. Policy problems of business organizations; top management problem-solving and decision-making; planning; appraising the business environment; the firm's financial, human and physical resources; forecasting, developing objectives and strategies, evaluating alternatives; implementing strategies; measuring results; profitably and social responsibility. Use of case analysis. Cross-listed with MARA 466. Prerequisites: Mgmt. 363 and senior classification in business administration.

489. Special Topics in... Credit 1 to 4. Selected area in management. Consult the professor offering a particular special topics course for details. May be repeated for credit. Prerequisite: Approval of instructor.

MARINE BIOLOGY (MARB)

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

311. Ichthyology. (2-3). Credit 3. Freshwater and marine fishes. Subject will be mainly systematic, but evolution, ecology, life history and economics of more important species will be treated. Prerequisites: Biol. 318, MARB 315, or W.F.S. 302 or equivalent.

312. Field Ichthyology. (1-6). Credit 3. Field and laboratory studies on identification and ecology of freshwater and marine fishes of Texas. Field trips required. Prerequisite: MARB 311.

315. Natural History of the Vertebrates. (2-3). Credit 3. Natural history of fishes, amphibians, reptiles, birds and mammals, with emphasis on coastal Texas vertebrates. Prerequisites: Biol. 114 and Biol. 124 or approval of instructor.

320. Marine Food Chains. (2-3). Credit 3. Examination of basic food chain concepts, including ecosystem roles, trophic levels and structure, energy and energy flows, and biogeochemical cycles. Methods of marine food chain analysis are considered in detail as well as exemplary marine food chain studies reported in the literature. Prerequisites: Biol. 114 and 124 and junior classification or approval of instructor.

408. Biology of the Algae. (3-3). Credit 4. Morphology, taxonomy, ecology and phylogeny of the freshwater and marine algae. Prerequisites: Biol. 113 and 114 or approval of instructor.

410. Animal Behavior. (2-3). Credit 3. Examination of ethological concepts. Discussion of the development, genetics, physiology and evolution of animal behavior patterns involved in reproduction, territoriality, aggression, communication, population dispersion, sociality and sociobiology of invertebrates and vertebrates. Prerequisites: Biol. 114 and 124 or approval of instructor.

415. Invertebrate Fisheries. (2-2). Credit 3. 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.

418. Fisheries Population Dynamics. (2-2). Credit 3. Recruitment, growth, natural mortality and exploitation of populations; implications to management of commercial fisheries. Prerequisites: Stat. 201 or 302; Math. 230; or approval of instructor.

420. Comparative Physiology. (3-3). Credit 4. 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. Prerequisites: 12 hours of biological sciences; Chem. 228.

425. 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.

430. Coastal Plant Ecology. (3-3). Credit 4. Study of the identification, distribution, production, and ecological importance of estuarine, coastal marsh, and dune vascular plants; the interaction of plants with their abiotic and biotic environments; and techniques of vegetation manage-

ment and evaluation. Prerequisites: Biol. 113 and 114 or approval of instructor.

- 435. Invertebrate Zoology. (3-3). Credit 4.** General biology of marine invertebrate animals; morphology, evolution and systematics. Laboratory will stress the studies of local fauna. Prerequisites: Biol. 114 and 124 and junior classification in Marine Biology, or approval of instructor.
- 445. Principles of Fisheries Management. (2-2). Credit 3.** Basic knowledge from ichthyology, biology of fishes and limnology related to applied aspects of freshwater and marine fishery science. Management techniques applicable to streams, ponds, reservoirs, estuaries, and the oceans.
- 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. Prerequisite: MARB 435 or Biol. 435.
- 481. Seminar in Marine Biology. (1-0). Credit 1.** Problem oriented discussion session — topics and reports selected for current relevance in marine biology. May be repeated once only for credit. Prerequisite: Approval of department head.
- 485. Problems in Marine Biology. Credit 1 to 6 per semester.** Special topics and problems suited to analysis by individuals or small groups concerning aspects of marine biology. Prerequisite: Approval of department head.
- 489. Special Topics in . . . Credit 1 to 4.** Selected topics in identified areas of marine biology. Prerequisite: Approval of instructor.

MARINE ENGINEERING (MARE)

- 101. Engineering Analysis. (0-3). Credit 1.** Methods available for solution of engineering problems. Introduction to numerical analysis, FORTRAN, use of hand-held calculators.
- 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. Prerequisite: Math 152 or registration therein.
- 200. Basic Operations. Credit 4.** Practical application of student's classroom studies while at sea in training ship during sea-training period. Student required to complete several projects relating to engineering plant of ship. Prerequisite: NAUT 103.
- 202. Introduction to Marine Engineering Operations. Credit 4.** Introduction to the various aspects of shipboard marine engineering operations during the summer training cruise for students not intending to obtain Coast Guard License. Prerequisite: NAUT 103.

- 203. Diesel Engine Technology. (2-2). Credit 3.** Basic principles of two and four-stroke cycle diesel engines; intake, scavenging and exhaust systems; injection systems; starting and reversing methods; cooling and lubricating systems; engine room layout in modern motor vessels.
- 206. Engineering Mechanics II. (3-0). Credit 3.** Dynamics; graphical and algebraic solutions of relative linear velocities and acceleration; kinetics; dynamics of translation and rotation; work; energy; impact; momentum. Prerequisite: MARE 105.
- 207. Electricity and Magnetism. (3-2). Credit 4.** Introduction to basic electricity, electric and magnetic circuits studied under DC and AC steady-state condition. Complex numbers, phasor algebra, complex impedance and three-phase circuits introduced. Practice includes measurement of circuit phenomena. Prerequisite: Math. 253; Phys. 219.
- 209. Mechanics of Materials. (3-0). Credit 3.** Fundamental principles underlying analysis and design of machine members subjected to various combinations of loading. Theoretical and empirical basis for material specification formulas as found in United States Coast Guard Marine Engineering Regulations. Prerequisite: MARE 105.
- 210. Marine Construction Materials. (3-2). Credit 4.** Analysis of properties of solid materials as related to marine engineering design and applications. Introduction to metallurgical processes. Prerequisites: Chem. 102; MARE 209.
- 216. Kinematic Drawing. (0-3). Credit 1.** Problems and drafting involving linkages, cams, centros, relative linear velocities and relative acceleration. Prerequisite: MARE 206 or registration therein.
- 300. Intermediate Operations. Credit 4.** Training program for second sea training period. Sea projects required of each student under supervision of officer-instructors. Lifeboat and safety training.
- 301. Heat Transfer. (3-0). Credit 3.** Conduction, convection and radiation separately and in combination. Steady and unsteady states, mathematical treatments, graphical and numerical solutions, dimensional analysis. Prerequisites: Math. 308; M.E. 344 (concurrent registration); MARE 303.
- 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. Prerequisite: MARE 206.
- 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. Prerequisite: MARE 303.
- 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: Phys. 219; Math. 152; MARE 303.

- 306. Marine Refrigeration and Air Conditioning. (2-2). Credit 3.** Theory and practice of mechanical refrigeration. Thermodynamics of Reverse Carnot cycle; vapor compression cycles; thermal, physical and chemical properties of refrigerants. Descriptions of shipboard ventilation and air conditioning.
- 307. Electrical Circuits. (3-2). Credit 4.** Steady-state and transient response studied by classical methods and by behavior of the impedance function. Principles of electronics and elementary amplifiers are introduced. Prerequisites: MARE 207; Math. 308.
- 308. Electrical Machinery. (3-2). Credit 4.** Principle types of direct-current and alternating-current electrical machines, including their characteristics, application, and central device. Operation and testing of electrical machinery and transformers. Prerequisite: MARE 207.
- 310. Engineering Computation. (3-0). Credit 3.** Techniques of problems solving using digital computers; concepts and properties of algorithms; solution of computational problems using algorithms defined by FORTRAN. Flow diagrams and program preparation. Prerequisites: Math. 152; MARE 101.
- 400. Advanced Operations. Credit 4.** Training program for third sea training period. At end of this period each student will have achieved knowledge and will have demonstrated the ability to take complete charge of a modern marine power plant while underway at sea.
- 401. Nuclear Propulsion I. (3-0). Credit 3.** Reactor mechanics; fluid hydraulics, reactor core design, reactor fuels and their properties, shielding, construction and operation of related auxiliary machinery.
- 403. Marine Steam and Gas Turbines. (2-2). Credit 3.** Analysis of gas turbine cycles, high speed gas flow, turbine and compressor kinematics and thermodynamics. Construction of marine steam turbines and their operating principles as applied to main propulsion and auxiliary use aboard ship. Reciprocating engines.
- 405. Steam Generators. (2-2). Credit 3.** Characteristics, historical development and classification of marine boilers. Construction specifications of U.S. Coast Guard Marine Engineering Regulations. Principles of combustion and boiler heat balance when using fuel oil. Water conditioning and procedures in operation and maintenance.
- 407. Marine Electronics Technology. (3-2). Credit 4.** The theory of operations and characteristics of electron devices and circuits; marine applications. Prerequisites: MARE 307; Math. 308.
- 408. Nuclear Propulsion II. (2-2). Credit 3.** Reactor controls and instrumentation; basic electronics, design, installation and maintenance of various types of control systems. Survey of nuclear propulsion and marine industry. Advantage taken of shipyard nuclear facilities in Galveston area for practical field trips.
- 410. Marine Power Plants. (2-2). Credit 3.** Selection and application of systems for marine propulsion and auxiliary systems. Analysis of propulsion and auxiliary system requirements. Prerequisite: MARE 301, 304; M.E. 344.
- 411. Marine Mechanical Design Technology. (3-0). Credit 3.** Analysis of the design and application of components in marine mechanical systems. Prerequisites: MARE 206, 209.
- 412. Ship Structures and Stability. (3-0). Credit 3.** Introduction to the naval architecture involved in ship design. Geometry of the ship, evaluation of stability, motions in waves and a study of ships' structures. Prerequisites: MARE 209; M.E. 344 or registration therein.
- 414. Ship Automation I. (4-0). Credit 4.** Linear servomechanism theory including transformation mathematics (Laplace transformation), the transfer function feedback, stability analysis and graphical techniques. Prerequisite: MARE 307.
- 415. Introduction to Marine Engineering Systems Design. (3-0). Credit 3.** Application of systems engineering techniques in the solution of marine engineering problems regarding reliability, economic and environmental considerations. Prerequisite: MARE 410 (concurrent registration).
- 416. Engineering Laboratory I. (0-4). Credit 1.** Analysis of fundamentals of machinery dynamics, heat transfer, fluid friction losses in piping systems, steam nozzles. Steam reciprocating and diesel engines. Prerequisite: Senior classification.
- 417. Engineering Laboratory II. (0-4). Credit 1.** Performance analysis of turbine machinery, air conditioning systems, basic electro-mechanical and pneumatic control systems. Prerequisite: Senior classification.
- 418. Fundamentals of Radiation Control. (3-0). Credit 3.** Radiation control from the standpoint of protection, use of instrumentation, dosimetry, contamination control, waste disposal, radiation accidents and governmental regulations; shipboard applications. Prerequisite: MARE 401.
- 420. Ship Automation II. (3-2). Credit 4.** Continuation of MARE 414. Use of frequency response and S-plane methods in control systems design. Laboratory work includes simulation of control systems design. Prerequisites: MARE 407, 414.
- 485. Problems. Credit 1 to 4 each semester.** Special problems in marine engineering not covered by any other course in the curriculum. Work may be in either theory or laboratory. Prerequisite: Approval of department head.

MARINE SCIENCES (MARS)

- 310. Field Methods in Marine Science. (1-6). Credit 3.** 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. Prerequisite: 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.
- 330. Petroleum Geology. (3-0). Credit 3.** Origin, migration, and accumulation of petroleum. Reservoir rock, traps, accumulation and conditions, and subsurface methods. Prerequisite: Geol. 101 or equivalent; Approval of instructor.
- 340. Geochemistry. (3-0). Credit 3.** Chemical principles and processes that govern the behavior of geologic materials. Silica and carbonate low temperature equilibrium and kinetics. Prerequisites: Chem 101, 102; Geol. 101, or consent of instructor.
- 350. Basic Programming. (3-0). Credit 3.** Introduction to "Basic" as a programming language; algorithms, storage, conditional clauses, arrays matrices, functions, character strings, routines and subroutines. Prerequisite: Consent of instructor.
- 360. Biochemistry. (3-0). Credit 3.** Aspects of biochemistry; molecular structures and molecular aspects of biochemical reactions under physiological conditions. Prerequisites: Biol. 114, Chem. 228, or Chem. 227 and consent of instructor.
- 370. Chemistry of Marine Natural Products (3-0). Credit 3.** Introduction to organic compounds of known molecular structure that are derived from marine plants and animals; the techniques for isolating and identifying these compounds, and for studying their physiological and pharmacological activity. Prerequisite CHEM 228.
- 410. Introduction to Physical Oceanography. (3-0). Credit 3.** Introduction to physical processes in the marine system. Measurement techniques and instrumentation, wave and current dynamics, thermal structures. Prerequisites: Math 152 or equivalent, Physics 219 or equivalent, or consent of instructor.
- 420. Introduction to Chemical Oceanography. (3-0). Credit 3.** Introduction to chemical processes in the marine system; organic and inorganic reactions; productivity; nutrient cycles, chemical compositions, formation of chemical sediments. Prerequisite: Chem. 102, or consent of instructor.
- 430. Introduction to Geological Oceanography. (3-0). Credit 3.** Introduction to geological processes in the marine system: Physiographic provinces, origin and evolution of basins, shelves, slopes, and beaches. Geological sampling and geophysical methods; coastal beach and estuarine processes. Prerequisites: Geol. 101 or consent of instructor.

- 450. Electrical and Physical Measurements. (2-3). Credit 3.** Study of basic instrumentation pertinent to Marine Sciences and Biology as well as simple circuit design and digital electronics. Laboratory emphasizes spectroscopy, environmental measurements, and basic oceanographic measurements. Prerequisites: Chem 102, Phys 202, Math 230 or 151.
- 440. Marine Biology. (3-3). Credit 4.** Introduction to biology of common organisms inhabiting bays, beaches and near-shore oceanic waters, with special reference to Gulf of Mexico biota. Lectures, laboratory studies and field trips will emphasize classification and economic aspects of marine organisms. Prerequisites: Biol. 113, 114, 123, 124 or equivalent; approval of instructor.
- 481. Seminar. (1-0). Credit 1.** Problem oriented discussion session. Topics and reports selected for current relevance. May be repeated once only for credit. Prerequisite: Approval of department head.
- 485. Problems. Credit 1 to 6 each semester.** Special topics and problems suited to analysis by individuals or small groups concerning aspects of marine sciences. Prerequisite: Approval of department head.
- 489. Special Topics in... Credit 1 to 4.** Selected topics in an identified area of marine sciences. Prerequisite: Approval of instructor.

MARINE TRANSPORTATION (MART)

- 301. Ocean Transportation I. (4-0). Credit 4.** Shipping in world economy. Production of service; shipping process, equipment, labor, conferences, rate-making, role of government. Buying of service by shipper, finance of shipping, international conventions and treaties.
- 302. Marine Cargo Operations I. (3-3). Credit 4.** Objectives and problems with break-bulk cargo handling during loading, discharging and in-transit carriage. Requirements of special refrigerated and dangerous cargos. Heavy lift operations with conventional cargo gear and its restraints. Cargo loss prevention, safety and related documentation, as well as log book entries, Modern cargo concepts — containerization, roll-on roll-off, LASH and others. Maximum cargo efficiency with relation to space, cargo gear, crew and labor costs. Practical cargo gear use and cargo observations during lab periods.
- 304. Ocean Transportation II. (3-0). Credit 3.** Marine insurance problems and cases and how they relate directly to a ship's officer. Hull, cargo and personal injury cases are examined from the officer's and insurers' points of view. Introduction to Admiralty Law and the court process for seamen's rights and ship owner's privileges. Actual hearings and trials are observed to complete the background. Prerequisite: MART 301 or approval of department head.

- 321. Maritime Law I. (3-0). Credit 3.** Basic laws governing vessel navigation; International and U.S. Inland Rules for the prevention of collision at sea, and the safety of life at sea convention. Prerequisite: NAUT 200.
- 402. Ocean Transportation III. (4-0). Credit 4.** Essential principles of Admiralty and Maritime Law, advanced principles of marine insurance. Standard forms and Institute Clauses. Nuclear maritime insurance activities. Principles of International Law. Prerequisite: MART 304.
- 406. Marine Cargo Operations II. (2-2). Credit 3.** Principles and practice of bulk liquid and gas handling and carriage by water craft. Theoretical and practical problems involved in loading, stowing and discharging of petroleum, chemical, elevated temperature and cryogenic cargoes. Marine pollution abatement, personnel safety and fire-fighting techniques and systems.
- 416. Port Operations, Administration and Economics. (3-0). Credit 3.** Concept of the port and methods of intermodal transfer. Port functions divided and analyzed along business lines — economics, management, finance, accounting and marketing. Case studies. Prerequisite: Econ. 321; Mgmt. 105; or approval of department head.
- 421. Maritime Law II. (3-0). Credit 3.** Essential principles of admiralty, general maritime and international law as applicable to the marine industry and ocean shipping. Evolution and state of the law concerning maritime liens, ship mortgages, rights of seamen and harbor workers, limitation of liability, bills of lading and cargo carriage, collision liability, general average, marine salvage, charter parties and international rights and responsibilities of ships and shipping.
- 481. Seminar. (0-2). Credit 1.** Problem oriented discussion session. Topics and reports selected for relevance to current problems. Prerequisite: Approval of department head.
- 485. Problems. Credit 1 to 4 each semester.** Directed study in problems in marine transportation not covered by other courses in the department. Prerequisite: Senior classification or approval of department head.
- 489. Special Topics in Marine Transportation. Credit 1 to 3.** Selected topics in an identified area of marine transportation and nautical science. Prerequisite: Approval of instructor.

MARITIME ADMINISTRATION (MARA)

- 211 Legal and Social Environment of Business. (3-0). Credit 3.** Role of law in business and society; government regulations of business. Legal reasoning; sources of law; social policy and legal institutions; antitrust; security regulations; consumer protection; environmental laws; worker health and safety; employment discrimination and other laws affecting business. Cross-listed with Mgmt. 211. Prerequisite: Sophomore classification.

- 212. Business Law. (3-0). Credit 3.** Legal principles affecting managerial decisions including: contract law, agency, law of business entities, inclusive of partnership, limited partnership and corporation; creditors' rights, debtor protection; and the Uniform Commercial Code, with particular emphasis on negotiable instruments and sales. Prerequisite: Sophomore classification.
- 363. The Organizing Process. (3-0). Credit 3.** Management as an academic discipline is defined and its evolution sketched. Goal setting; planning, controlling and decision-making; models for thinking about organizations; organization design; organization change; models for understanding individual behavior; job performance and job satisfaction; interpersonal behavior, motivation and leadership, behavior in work groups; and careers in management. Prerequisite: Junior classification. Cross-listed with Mgmt. 363.
- 401. Brokerage and Chartering. (3-0). Credit 3.** Operational and legal environment of ship brokerage and chartering; responsibilities of owner and charterer under various charter forms; American, British and Canadian acts governing charters and bills of lading; rules and regulations concerning loading and discharging. Prerequisite: Senior classification or approval of department head.
- 402. Inland Waterways. (3-0). Credit 3.** Development of inland waterways of the U.S. and federal policies relating to them. Port and terminal development, competition with other transportation forms, manpower, rates, environmental concerns and the impact of waterway systems on regional economies. Prerequisite: Senior classification or approval of department head.
- 422. Personnel Management. (3-0). Credit 3.** Relationship of the personnel function to the whole organization; manpower planning; recruitment; selection including employment application, interviewing, testing, reference checks, probationary period; placement; separation; compensation; training; performance appraisal; labor relations; and safety. Prerequisite: MARA 363 or approval of instructor. Cross-listed with Mgmt. 422.
- 460. Management Systems and Control. (3-0). Credit 3.** Applications of management planning and control techniques to complex organizational problems and management decision-making tasks; socio-technical work systems and human-machine systems; basic systems theory and concepts; basic control theory concepts; systems design process; systems analysis techniques such as simulation models and sensitivity analysis; information technology and management information systems; program and project management; and special-purpose planning and control systems. Prerequisite: MARA 363 or approval of instructor. Cross-listed with Mgmt. 460.
- 466. Management Policy. (3-0). Credit 3.** Policy problems of business organizations; top management problem-solving and decision-making;

planning; appraising the business environment; the firm's financial, human and physical resources; forecasting, developing objectives and strategies; evaluating alternatives; implementing strategies; measuring results; profitability and social responsibility. Use of case analysis. Prerequisites: MARA 363 and senior classification. Cross-listed with Mgmt. 466.

MARITIME SYSTEMS ENGINEERING (MASE)

- 100. Introduction to Maritime Systems Engineering. (2-3). Credit 3.** Activities and career opportunities in the ocean and maritime industries; lectures, seminars and field trips; outside speakers and industry contact. Desalination, ocean mining, fish farming, pollution, pipelines, submersibles and habitats, fixed and floating platforms, high-speed marine transportation.
- 375. Science of Fluids. (3-0). Credit 3.** Classical fluid mechanics; fundamental physical principles. Fluid statics, principles of fluid motion, frictionless flow, surface waves, viscous flows, turbulence, molecular basis of fluid mechanics. Prerequisite: Math. 253.
- 411. Advanced Hydrodynamics I. (3-0). Credit 3.** Hydrodynamics of ship design, semi-submersible platforms, underwater pipelines, hydrofoils, etc. Prerequisite: C.E. 462.
- 412. Advanced Hydrodynamics II. (3-0). Credit 3.** Continuation of MASE 411 with emphasis on design calculations. Prerequisite: MASE 411.
- 485. Problems in Maritime Systems Engineering. Credit 1 to 4 per semester.** Directed study on selected current problems in the ocean and/or maritime industry. Offered to enable individuals or groups to undertake and complete with credit some specialized investigation not covered by other courses. Prerequisite: Approval of department head.
- 489. Special Topics in . . . Credit 1 to 4.** Selected topics in identified areas of maritime systems engineering. Prerequisite: Approval of instructor.

MARKETING (Mktg.)

- 321. Marketing. (3-0). Credit 3.** Institutions, processes and problems involved in transferring goods from producers to consumers on economic and social aspects. Prerequisite: Econ. 204 or approval of instructor.



- 322. Consumer Behavior. (3-0). Credit 3.** Individual and group behavior of people performing in consumer role. Behavioral science data employed to discuss and explain consumer behavior; integrating this data into current marketing practices. Prerequisite: Mktg. 321.
- 344. Physical Distribution Systems. (3-0). Credit 3.** 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.** Planning, executing and controlling of any demand-stimulation practices. Advertising, personal selling, packaging, publicity and sales promotion. Prerequisite: Mktg. 321.
- 445. Marketing Research. (3-0). Credit 3.** Nature and uses of marketing research in business. Methods of collecting and interpreting marketing information and specific application to problems in marketing. Prerequisites: B.Ana. 303; Mktg. 321.
- 485. Problems. Credit 1 to 3 each semester.** Directed study on selected problems in the area of marketing not covered in other courses. Prerequisites: Senior classification; approval of department head; Mktg. 321; 2.0 GPR in major and university course work.

MATHEMATICS (Math.)

- 104. Analytic Geometry. (3-0). Credit 3.** Rectangular coordinates; equations and set of points; lines, circles and other conic sections; polar coordinates; solid analytic 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.
- 151. Engineering Mathematics I. (3-2). Credit 4.** Rectangular coordinates, analytical geometry, vectors and matrices, functions, limits, derivatives of functions, applications, integration, areas and volumes by integration. Prerequisites: High school algebra, trigonometry and geometry or satisfactory performance on a qualifying exam.
- 152. Engineering Mathematics II. (3-2). Credit 4.** Differentiation and integration techniques and their applications, improper integrals, approximate integration, mean value theorems, analytical geometry. Prerequisite: Math. 151.

- 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.
- 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.
- 253. Engineering Mathematics III. (3-2). Credit 4.** Elementary vector algebra, infinite series, power series, Taylor series, and indeterminate forms. Calculus of functions of several variables, spatial derivatives, directional derivatives, gradient, multiple integration applications. Prerequisite: Math. 152.
- 308. Differential Equations. (3-0). Credit 3.** Linear equations, solutions in series, solutions using Laplace transforms, systems of differential equations, partial differential equations and boundary value problems. Fourier series. Prerequisite: Math. 253 or equivalent.
- 311. Topics in Applied Mathematics I. (3-0). Credit 3.** Matrices, determinants, systems of linear equations, eigenvalues, eigenvectors, diagonalization of symmetric matrices. Vector analysis; normal derivative, gradient, divergence, curl, line and surface integrals, Gauss', Green's and Stokes' theorems. Prerequisite: Math. 221 or 253 or equivalent.
- 312. Topics in Applied Mathematics II. (3-0). Credit 3.** Fourier series, Gibbs' phenomenon, Fourier integral and transform, orthogonal functions. Partial differential equations and boundary value problems; Sturm-Liouville systems and applications to vibrating systems, heat flow and potential theory. Prerequisite: Math. 308 or equivalent.
- 485. Problems. Credit 1 or more.** Special problems in mathematics not covered by any other course in the curriculum. Work may be in either theory or laboratory. Prerequisite: Approval of department head.
- 489. Special Topics in... Credit 1 to 4.** Study of selected topics in an identified area of mathematics. May be repeated for credit. Prerequisite: Approval of instructor.

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. Dimensional analysis and similitude and their application to flow through ducts and piping. Dynamic lift and related problems. Prerequisites: C.S. 202; M.E. 213 and 323 or 327 or equivalent.
- 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. 202; Math. 308; M.E. 213 or equivalent.

MECHANICS AND MATERIALS (M.M.)

460. **Introduction to Continuum Mechanics.** (3-0). **Credit 3.** Tensor formulation of the underlying physical and mathematical principles pertinent to continuous mass media. 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. Prerequisite: Approval of instructor.
302. **Weather Reports and Forecasting.** (3-0). **Credit 3.** Global weather reporting, codes and data transmission, radio-facsimile weather maps. Features of circulation, synoptic weather analysis avoiding storms at sea.

NAUTICAL SCIENCE (NAUT)

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

204. **Terrestrial Navigation.** (2-2). **Credit 3.** Fundamentals of piloting, chart construction and development, aids to navigation, useful publications, principles of magnetism and the magnetic compass, great circle, Mercator and middle latitude sailing.

300. **Intermediate Communications, Navigation, and Seamanship.** **Credit 4.** Practical application of student's classroom studies aboard training ship during second training cruise. Student completes intermediate projects in communications, navigation, seamanship and rules of the road. Thorough study made of U.S. Public Health requirements in first aid.

301. **Seamanship II.** (2-3). **Credit 3.** Mechanical appliances aboard ship, accident prevention, vessel sanitation, Marine Inspection laws and regulations, Search and Rescue Procedures, communications.

302. **Seamanship III.** (1-3). **Credit 2.** Principles and methods of propulsion and steering of ships. Ship handling in narrow channels and heavy seas, docking, undocking, mooring and towing.

303. **Celestial Navigation.** (2-3). **Credit 3.** 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; marine gyro compass, radio direction finder, Loran, Omega, Decca, satellite, echo sounder, Doppler and integrated navigation systems. Marine radar theory, operation and interpretation. Student examined for U.S. Coast Guard Certification as "Radar Observer."

400. **Advanced Communications, Navigation, and Seamanship.** **Credit 4.** Represents practical application of student's classroom studies aboard training ship during third training cruise. Student completes advanced projects in communications, navigation, seamanship and Rules of the Road.

404. **The Navigator.** (2-3). **Credit 3.** Intensive, in-depth review of the principles of electronic, celestial and terrestrial navigation in preparation for the U.S. Coast Guard examination for Third Mate.

NAVAL SCIENCE (N.S.)

112. **Naval Ship Systems I.** (3-0). **Credit 3.** Types, structure and purpose of naval ships. Ship compartmentation, propulsion systems, auxiliary power systems, interior communications and ship control. Elements of ship design to achieve safe operations and ship stability characteristics.

200. **Naval Science For the Merchant Marine Officer I.** (3-0). **Credit 3.** Organization of the U.S. Navy (including the Naval Control of Shipping Organization) with discussion of the Merchant Marine Naval Reserve

commission in order to provide a sound basis for liaison between the U.S. Navy and the Merchant Marine. Seapower will be analyzed and Naval communications procedures and underway replenishment procedures will be introduced.

210. Naval Ship Systems II. (3-0). Credit 3. Introduction to the theory and principles of operation of naval weapons systems, capabilities and limitations, theory of target acquisition, identification and tracking, trajectory principles and basics of naval ordnance.

300. Naval Science For the Merchant Marine Officer II. (3-0). Credit 3. The nature of the hostile naval threat and types of surface, subsurface, and air attacks to which both U.S. Naval and merchant shipping can be subjected are presented. Self-defense measures which merchant ships can employ and Naval escort defensive actions will be analyzed. The student will become proficient in maneuvering when in convoy and naval damage control procedures.

315. Navigation. (2-3). Credit 3. Theory, principles and procedures of ship navigation. Mathematical analysis, spherical triangulation and practical work involving sight reduction, sextants, publications and course logs. Rules of the Road, lights, signals and navigational aids; inertial systems.

316. Naval Operations Analysis. (3-0). Credit 3. Theory, principles and procedures of ship movements and employment. Communications, sonar-radar search and screening theory. Tactical formations and dispositions, relative motion, maneuvering board and tactical plots are analyzed for force effectiveness and unity.

411. Principles of Naval Organization and Management. (3-0). Credit 3. Introduction to the structure and principles of naval organization and management. Naval organization and management practices and the concepts that lie behind them within the context of American social and industrial organizations and practices. Lines of command and control; organization for logistics, service and support, functions and services of major components of the Navy and Marine Corps, and shipboard organization. Management and leadership functions.

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

OCEAN ENGINEERING (O.E.)

300. Dynamics of Waves and Structures I. (3-0). Credit 3. Physical and mathematical fundamentals of ocean wave behavior. Mechanics of wave motion. Use of statistics and probability to develop design wave criteria. Prerequisites: C.E. 311, M.E. 213 or equivalent.

301. Dynamics of Waves and Structures II. (3-0). Credit 3. Prediction of loads due to wind, current, and waves; introduction to concepts of

linear structural dynamics and to the design of ocean structures; mooring and towing analysis; fluid-structure interactions; vibration of submerged structures. Prerequisite: O.E. 300.

400. Basic Coastal Engineering. (3-0). Credit 3. Mechanics of wave motion. Wave refraction, diffraction, and reflection. Wave forecasting. Shore processes. Planning of coastal engineering projects. Design of seawalls, breakwaters, and fixed offshore installations. Offshore pipelines. Dredging. Control of oil spills in estuaries and at sea. Prerequisite: C.E. 311 or equivalent.

401. Measurements in the Ocean. (3-0). Credit 3. Fundamentals of measurement systems. Design of measurement systems, or instrumentation, used to evaluate oceanographic parameters of scientific and engineering interest. Fundamentals of underwater acoustics and the use of these fundamentals in ocean measurement systems. Introduction to laboratory and field techniques for measuring engineering parameters in the ocean environment. Prerequisites: O.E. 300 or registration therein.

403. Estuary Engineering. (3-0). Credit 3. Classification of estuaries. Introduction to tides and application of tidal hydraulics to real estuaries. Fundamentals of salinity, intrusion, turbulent diffusion and mixing, and sedimentation processes as applied to the estuarine environment. Mathematical and hydraulic modeling of estuaries. Dredging and pollution problems. Prerequisite: O.E. 300 or approval of instructor.

410. Measurements in the Ocean Laboratory. (0-3). Credit 1. Laboratory and field techniques for measuring engineering parameters in the ocean environment. Prerequisite: O.E. 300, 401, or registration therein.

OCEANOGRAPHY (Ocn.)

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

PHYSICS (Phys.)

201. College Physics. (3-3). Credit 4. Fundamentals of classical mechanics, heat and sound. Prerequisite: Math. 103.

202. College Physics. (3-3). Credit 4. Continuation of Phys. 201. Fundamentals of classical electricity and light and introduction to contemporary physics. Prerequisite: Phys. 201.

218. Mechanics. (3-3). Credit 4. Mechanics for students of the physical sciences. Prerequisite: Math. 151 or registration therein.

219. Electricity. (3-3). Credit 4. Electricity, magnetism and light. Prerequisites: Math. 122 or 152; Phys. 218 or equivalent.

- 220. Modern Physics. (3-0). Credit 3.** Continuation of Phys. 219. Atomic, nuclear, solid-state physics. Prerequisites: Phys. 219; Math. 122 or 152 or equivalent.
- 230. Modern Physics Laboratory. (0-3). Credit 1.** Experiments in atomic, nuclear and solid-state physics. Prerequisite: Phys. 220 or registration therein.
- 485. Problems. Credit 1 or more.** Special work in laboratory or theory to meet individual requirements in cases not covered by regular curriculum. Prerequisite: Approval of department head.

POLITICAL SCIENCE (Pol.S.)

- 206. American National Government. (3-0). Credit 3.** Survey of American national government, politics and constitutional development.
- 207. State and Local Government. (3-0). Credit 3.** Survey of state and local government and politics with special reference to the constitution and politics of Texas.
- 340. Introduction to Public Administration. (3-0). Credit 3.** American public administration; development of public service; theories of organization and management, executive leadership, policy formation, personnel practices and public relations. Prerequisite: Pol.S. 206 or approval of department head.
- 485. Problems. Credit 1 to 6 each semester.** Individual instruction in selected aspects of political science not adequately covered by other courses. Prerequisite: Approval of department head.
- 489. Special Topics in... Credit 1 to 4.** Study of selected topics in an identified area of political science and public policy. May be repeated for credit. Prerequisite: Pol.S. 206 or approval of department head.

PSYCHOLOGY (Psy.)

- 107. General Psychology. (3-0). Credit 3.** Introductory course dealing with elementary principles of human behavior.

STATISTICS (Stat.)

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

- 489. Special Topics in... Credit 1 to 4.** Study of selected topics in an identified area of statistics. Topics may be of interest to applied mathematics majors as well as majors in other disciplines. May be repeated for credit. Prerequisite: Approval of instructor.

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

- 300. Field Studies. Credit 3.** Integration of principles of animal and plant ecology with environmental factors to characterize wildlife populations. Intensive analysis of specific areas will emphasize either the development of a wildlife management plan or a general vertebrate natural history survey. Extended field trips required. Prerequisite: Approval of instructor.
- 400. Fisheries Survey. Credit 4.** Survey of aquatic habitats that provides the opportunity for application of principles of fish ecology, limnology and aquatic biology to the solution of current fisheries problems. Characterization of fish communities to develop management plans or to delineate factors influencing community interrelationships. Extended field trips required. Prerequisites: Junior classification and approval of instructor.
- 410. Principles of Fisheries Management. (2-2). Credit 3.** Basic knowledge from ichthyology, biology of fishes and limnology related to applied aspects of freshwater and marine fishery science. Management techniques applicable to streams, ponds, reservoirs, estuaries and the oceans.
- 485. Wildlife Problems. Credit 1 to 3.** Individual study and research on selected problem approved by instructor and academic advisor. Prerequisites: Junior or senior classification; approval of department head.



TEXAS A&M UNIVERSITY AT GALVESTON FACULTY

(Correct as of December 18, 1980)

(Figures in parentheses indicate date of first appointment on the University staff and date of appointment to present position, respectively.)

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