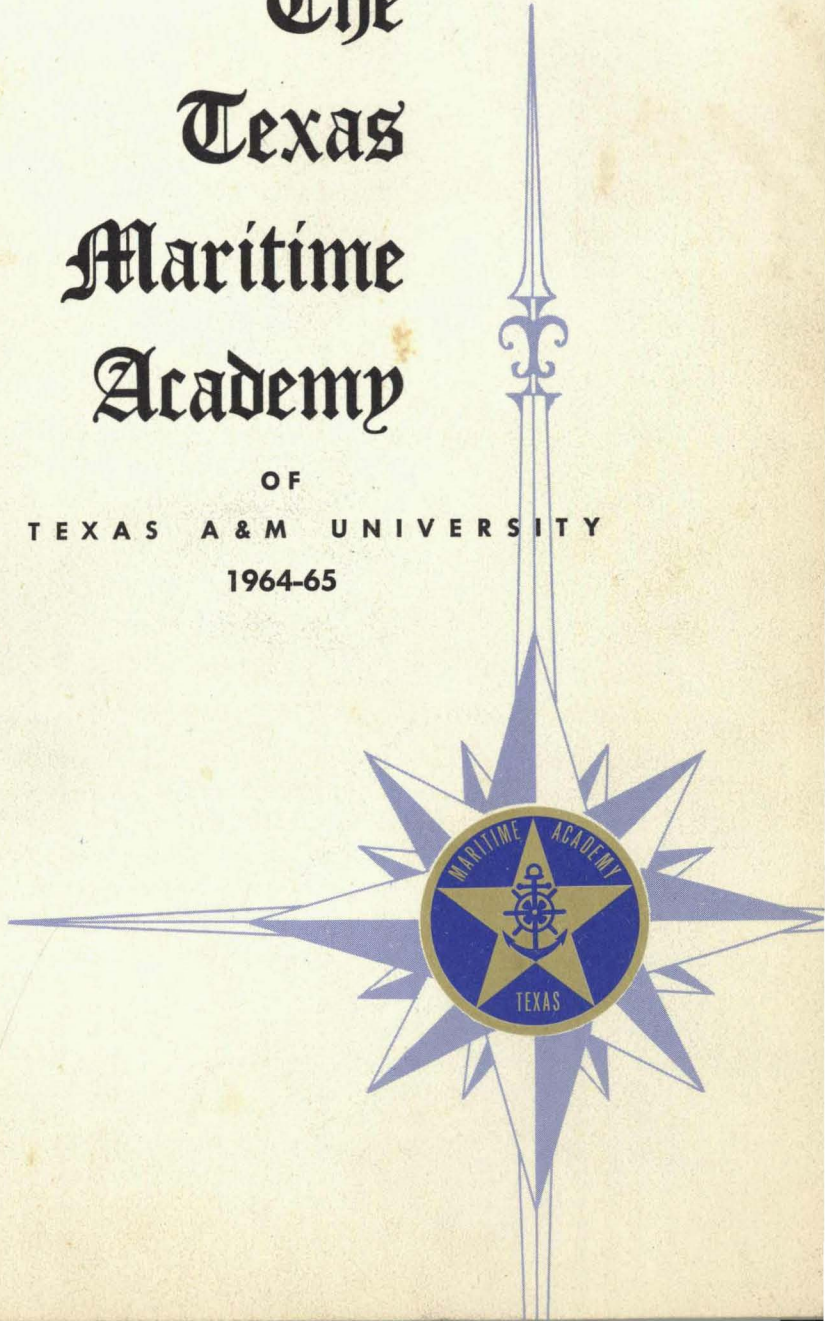




The Texas Maritime Academy

OF
TEXAS A & M UNIVERSITY
1964-65



ACADEMIC CALENDAR

SUMMER SESSION, 1964

June 1	Monday, 7:00 a.m. to 12:00 noon, Registration for the first term at College Station.
June 2	Tuesday, 7:00 a.m., beginning of classes.
July 10	Friday, last day of first term final examinations.
July 13	Monday, 7:00 a.m. to 12:00 noon, Registration for second term at College Station.
July 14	Tuesday, 7:00 a.m., beginning of classes.
August 21	Friday, last day of second term final examinations at College Station and Galveston.

REGULAR SESSION, 1964-65

Fall Semester, 1964

September 9	Wednesday, new freshmen who participated in the summer counseling and orientation program report to the campus, at College Station.
September 9-10	Wednesday-Thursday, New Student Program at College Station.
September 10	Thursday, 8:00 a.m. to 12:00 noon, Registration of new freshmen who did not participate in the summer counseling and orientation program.
September 10-11	Thursday, 1:00 p.m. to 5:00 p.m. and Friday, 8:00 a.m. to 5:00 p.m., registration of all other students at College Station.
September 14	Monday, 8:00 a.m., beginning of classes at College Station and Galveston.
November 26-29	Thursday-Sunday, inclusive, Thanksgiving Holidays.
December 19	Saturday, noon, beginning of Christmas Recess.
January 4, 1965	Monday, end of Christmas Recess, 8:00 a.m.
January 23	Saturday, last day of semester examinations.

Spring Semester, 1965

January 27	Wednesday, new freshmen report to campus at College Station.
January 29-30	Friday, 1:00 p.m. to 5:00 p.m., and Saturday, 8:00 a.m. to 5:00 p.m., registration of all students at College Station.
February 1	Monday, beginning of classes.
April 14	Wednesday, 5:00 p.m., beginning of Spring Recess.
April 20	Tuesday, 8:00 a.m., end of Spring Recess.
May 29	Saturday, last day of semester examination.

SUMMER SESSION, 1965

June 1	Tuesday, maritime students board training ship in Galveston for summer training cruise. <i>Tentative</i> schedule: Scandinavia and British Isles and return to Galveston via New York.
August 20	Friday, summer training cruise ends.

GENERAL INFORMATION

The Texas Maritime Academy

of Texas A&M University

offers an opportunity for the high school graduate and college freshman:

- To qualify as an officer in the United States Merchant Marine.
- To earn a commission as Ensign in the United States Naval Reserve (Inactive).
- To earn a Bachelor of Science degree in Marine Engineering or in Marine Transportation.

Program Includes

- Freshman year at A&M Campus at College Station, Texas.
- Three summer training cruises in a maritime academy training ship to EUROPE, CARIBBEAN, and SOUTH AMERICA.
- Three years at Texas Maritime Academy Campus in Galveston, Texas.

Cruises

- 1963: New York, Albany, Dublin, Bremen, Antwerp, Naples, and Palma de Majorca.
- 1964: Cartagena, Colombia; Curacao, NWI; San Juan, Puerto Rico; Castine, Maine; St. Thomas, Virgin Islands; Bridgetown, Barbados; Aruba, NWI.
- 1965: *Tentative*: Scandinavia, British Isles, and New York.

The freshman year starts in September each year

Certain well-qualified students who have successfully completed one semester of an accredited college will be considered for entry in classes commencing each *February*. The number accepted will be limited to existing vacancies. Students who wish to be better prepared may enter in June or mid-July.

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The Texas A&M University System

Composed of all colleges, agencies and services under the supervision of the Board of Directors of the Texas A&M University, including:

Texas A&M University

The Texas Agricultural Experiment Station
The Texas Agricultural Extension Service
The Texas Engineering Experiment Station
The Texas Engineering Extension Service
The Texas Transportation Institute
The Texas Maritime Academy

The Arlington State College

The Tarleton State College

The Prairie View Agricultural and Mechanical College

The Texas Forest Service

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Texas Maritime Academy

of
TEXAS A&M UNIVERSITY

Organization

President, Texas A&M University.....Earl Rudder, B.S., LL.D.

BOARD OF VISITORS TEXAS MARITIME ACADEMY

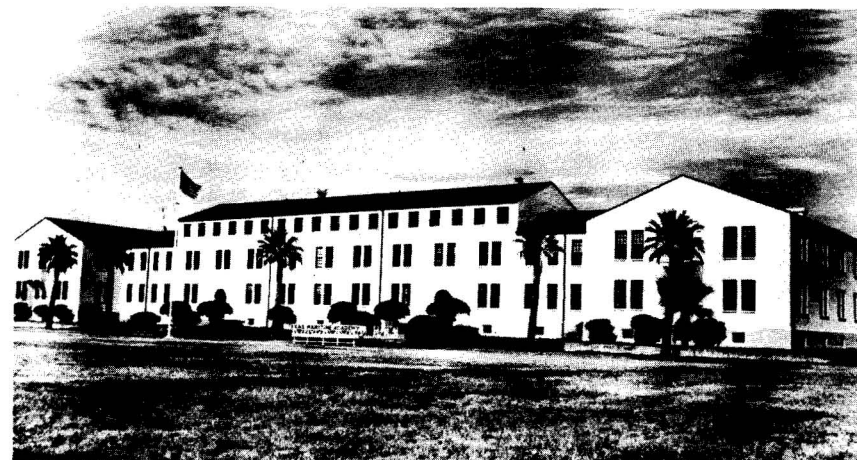
Rear Admiral Sherman B. Wetmore, USNR (Retired), Chairman.....Galveston
Ship Pilot and Community Leader
Captain Charles H. Glenwright, Vice Chairman.....Port Arthur
District Marine Manager
John A. Parker, Secretary.....Galveston
Insurance Executive
Russell Brierly.....Houston
Marine Surveyor
Captain John T. Everett, USMS, Maritime Administration.....Washington, D. C.
Cadet Training Officer
Dr. William J. Graff.....College Station
Dean of Instruction, Texas A&M University
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Emmett O. Kirkham.....Galveston
Shipyard Executive
Judge Peter J. La Valle.....Texas City
County Judge
Sam D. W. Low.....Houston
U. S. Collector of Customs
J. C. Rudd.....Orange
Marine Sales Manager
Captain Neal S. Storter.....Brownsville
Steamship Company Executive
Captain Wesley A. Walls.....Corpus Christi
Marine Surveyor
Captain Ernest Hendrix.....New Orleans
Steamship Company Executive

TEXAS MARITIME ACADEMY

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Captain, U. S. Navy (Retired)

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Commander Frank W. Smith, B.S., License: Master Mariner
Allison Saville, B.A., M.A., Ph.D.
Lieutenant Commander Francis C. Tormollan, M.S.
Lieutenant Randall Ward, U. S. Navy, B.S.
Lieutenant Dennis P. Cannon, B.S., License: Master Mariner
Lieutenant Klaus Luehning, B.S., License: Second Assistant Engineer
Ensign David Mercer, B.S., License: Third Assistant Engineer
Mrs. John Thiel, B.S.
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C. F. Bryant, Jr., Chief Gunners' Mate, U. S. Navy
Steven A. Gann, Firecontrol Technician, First Class, U. S. Navy



GALVESTON CAMPUS

Texas Maritime Academy

Establishment

The Texas Maritime Academy was established February 24, 1962 by the Board of Directors of the Texas A&M University System, by authority of Acts of the Fifty-sixth Legislature, Regular Session 1959, and by the federal Maritime Academy Act of 1958. The Fifty-seventh Legislature of 1961, appropriated funds for starting operations and for the development of the Texas Maritime Academy campus at Galveston. An agreement between the Governor of the State of Texas and the Maritime Administrator, Department of Commerce, has been executed. This agreement, pursuant to the federal Maritime Academy Act of 1958, commits the federal government to provide a suitable training ship, \$75,000 annual funds matching state appropriations, adequate funds for the annual overhaul of the training ship, and a subsistence grant of \$50 per month to each student. The State on its own part agrees to provide adequate facilities and faculty necessary to conduct a course of training for future officers of the United States Merchant Marine.

Maritime Academies

Maritime Academies have been in existence for over 85 years and are well known in other parts of the country. The Texas Maritime Academy is one of six in the United States. Maine, Massachusetts, New York, and the United States Merchant Marine Academy are all located on the Atlantic seaboard. The California Maritime Academy serves the maritime industry on the Pacific Coast. The Texas Maritime Academy is the only maritime school dedicated to serve the industry on the Gulf Coast. For the first time, the young men from Texas and neighboring states have the opportunity to seek entrance in a maritime academy

without competing with prospective students from the Atlantic and Pacific seaboards. Moreover, travel to the educational institution is reduced, and opportunities for being at home more often are enhanced. In the past, few young men from Texas and neighboring states have had the opportunity for assuming key positions in the maritime industry of the Gulf Coast—afloat and ashore. The Texas Maritime Academy will gradually bring about a change in this situation.

Mission

The mission of the Texas Maritime Academy is to provide a course of instruction and training that will qualify its graduates as officers in the United States Merchant Marine. A supplementary objective is to qualify its students for a commission in the United States Naval Reserve.

Responsibilities

In order to carry out the mission and objective to the fullest measure, the Texas Maritime Academy is charged with the following responsibilities:

- To provide the student with a college education in the fields of Marine Engineering or in Marine transportation, supplemented with a course of study in Naval Science, and
- To provide a sound academic background by combining a nautical education with the liberal education of a college curriculum in order to prepare the student for a successful career afloat and ashore in the maritime industry, and
- To train the student in leadership and to instill in him an abiding sense of honor, responsibility, pride in profession, and mature citizenship.

The U. S. Merchant Marine — A brief History

The construction of the NS SAVANNAH, the world's first nuclear merchant ship, carries on the historic mission of the U. S. Merchant Marine in opening new paths of progress for our country. The building of this ship is a demonstration to the world of a peaceful use of atomic power. The ship is expected to be a forerunner of nuclear-powered merchant ships of the future. Of special interest is the fact that this ship's nuclear fuel plant is to be serviced by a shipyard located in Galveston, Texas.

From the beginning merchant ships have played an important part in the history of the United States. From a few scattered groups of isolated colonists in a strange land, merchant ships have helped build a country strong and rich and powerful, a leader among nations of the world.

Ships helped knit America together as a united country fronting on two oceans. They brought goods and people from the East coast to the West coast around the Horn, later by way of Panama, making possible the rapid development of that rich area following the discovery of gold in 1849.

The earliest American ships sailed when cargo was offered. Often the captain undertook to sell the cargo on shares. Later cargo was carried at fixed rates for merchants, and regular sailings were made at stated intervals.

The famous clipper ships appeared in the 1840's and were used principally on the long voyages to the West coast, India, and China, often sailing at 18 to 19 knots with favoring winds, faster than many cargo ships today.

Decline of the Merchant Fleet

But gradually sail was replaced by steam and America lost her lead among maritime nations, for she lacked the abundant coal close to the sea, and the skilled iron workers. Furthermore, the time and money of explorers and investors were being spent in building railroads and opening up the West. At the beginning of the twentieth century only one American trans-Atlantic line was in operation and American ships were carrying less than 10 percent of United States trade.

World War I

When the first World War broke out in Europe, ships of the warring nations were suddenly withdrawn from our services, and the United States was left with goods piled up at ports. This was disastrous to the farmers and merchants of the nation. After the United States entered the war in 1917 the situation became even more serious, for it was necessary to rely on foreign vessels to transport our men and supplies to the fighting fronts. A great shipbuilding program was begun and over 2,300 ships were built, but most were delivered after the war was over.

A slump in shipping during the world-wide depression in the 1930's brought the United States merchant fleet again to a dangerously low level.

The Merchant Marine Act of 1936

In 1936 a new law to assist merchant shipping was passed. This Merchant Marine Act, 1936, declared it to be the national policy to foster the development and encourage the maintenance of a merchant marine sufficient to carry the domestic waterborne commerce and a substantial portion of the foreign commerce of the country on essential trade routes, capable of serving as a naval and military auxiliary in time of war, owned and operated insofar as practicable by citizens of the United

States, and composed of the best equipped, safest, and most suitable type of vessels manned by a trained and efficient citizen personnel. A great shipbuilding program was started as a result of this Act.

World War II

Before the program was well started, World War II broke out in Europe. Again, as in World War I, ships were in tremendous demand. The number of ships to be built was doubled and redoubled until over 5,500 ships were completed through 1945. In addition to transporting millions of our men and millions of tons of supplies to battlefields in every part of the world, the merchant fleet carried four-fifths of the supplies for the entire war effort. At the same time it brought back essential raw materials for the war effort and supplies needed to maintain the civilian economy.

The Postwar Period

After the troops were brought home merchant ships carried food, clothing, and machinery to start the rebuilding of cities shattered in the war. Hundreds of ships were laid up or sold to other nations.

Korea

When war broke out in Korea in 1950 there was again a sudden urgent demand for ships—not only for Korea but also to carry coal and grain to countries in Europe and Asia which were suffering from a severe winter. Over 500 ships were withdrawn from reserve fleets and placed in operation. After Korea these ships were again laid up and today the merchant ships are carrying out the international trade of the United States operating over routes to the great trading areas of the world.

The United States Merchant Marine Today

The active merchant fleet today numbers about 915 oceangoing ships. They consist of 31 passenger-cargo vessels, 608 dry cargo ships, and 276 tankers. In addition, there are nearly 1,900 other vessels in the various reserve fleets located in eight coastal anchorages around the country.

These ships belong to some 120 ship operators employing a total of about 150,000 shore side employees. These are in addition to about 50,000 seafaring personnel actually sailing the merchant ships. Of this number about 9,000 are licensed officers. Our Merchant Marine is, then, big business.

U. S. World Trade Moves by Ship

American business is world business. The channels of American trade and industry have never stretched so far nor flowed so fully—

among our neighbors and to such faraway places as New Zealand, Australia, Liberia, Hong Kong, or Kenya. And the traffic is not one way.

American foreign trade today is not simply a matter of manufacturing goods in this country and selling them in world markets, in exchange, perhaps, for exotic foreign products and raw materials not available in this country. U. S. plants are strung around the globe, frequently using local raw materials, local labor, managerial talents, and capital. The final product may be consumed locally or pumped into the arteries of international trade.

At the same time, we consume vast quantities of foreign goods and raw materials. Foreign nations have a substantial stake in our industries. We are constantly absorbing new ideas from abroad, new processes, and new products.

The Maritime Administration and the Texas Maritime Academy

The Maritime Administration of the U. S. Department of Commerce is the agency charged with fostering the development of a merchant marine composed of the best equipped, safest, and most suitable types of vessels manned by a trained and efficient citizen personnel. Thus, the training of personnel for merchant ships is a responsibility of the Maritime Administration. The Maritime Academy Act of 1958 is the guiding program for the training of merchant marine officers in maritime academies. Under the plan each student receives a subsistence payment of \$50 per month to assist in defraying the cost of uniforms, textbooks, and subsistence. State maritime academies receive a training ship and financial support from the Maritime Administration.

The Maritime Industry

The maritime industry includes everyone who is involved with the transporting of people and goods by ship. There are hundreds of specific jobs in the major areas of: maritime transportation; auxiliary facilities; design, construction and repair; trade and finance; and the port industries. The industry, as the center of our foreign trade and travel, is a vital and dynamic part of the nation's economy, as well as an essential element of the United States defense program. Over ninety nine percent of all goods in the foreign trade are carried by sea. Although we live in the air age the place of ocean shipping is secure. Even the largest of cargo planes can carry but a fraction of the tonnage of a cargo ship and many cargoes are of such a nature as to make air transportation entirely impractical. In terms of dollars and cents, ships

offer the most economical method of transporting cargo. Air freight is over 190 times more expensive than sea shipment. Thus, it is reasonable to believe that cargo ships will continue to be the principal carriers of heavy cargoes.

To this end, the industry is engaged in a huge shipbuilding program in which old ships will be replaced by new and modern ships. The program provides for an expenditure of \$4.5 billion for the construction of some 300 ships during the years ahead. Over 125 of these ships have been completed or are under construction.

Texas—A Maritime State

Why a maritime school in Texas? The true significance of Texas as a great maritime state is not always appreciated fully by its own citizens. The maritime industry in Texas has a leading role in the foreign commerce of the United States. Texas ranks first among all the states as determined by the tons of water-borne cargo, foreign and domestic, loaded and unloaded in its modern thriving seaports. Texas runs a close second to New York State in the number of seagoing ships entering and leaving port.

The Port of Houston, in tonnage handled, vies with New Orleans for the honor of being the second-largest port in the United States. In 1963 the Port of Houston handled almost 59 million tons of cargo. The shipping of the oil industry with its ocean terminals and sea-going tankers is phenomenal. 3948 ships called in the port during the year.

The Port of Galveston's great cotton and grain exporting center services ships sailing to all parts of the world. Beaumont, Port Arthur, Corpus Christi, Brownsville, and other growing ports make up a maritime industry requiring thousands of highly trained and well educated men to operate it.

It is time Texas trained its own citizens to take the lead in operating its own maritime industry including its shipbuilding yards, steamship lines, port terminals, export and import houses, and hundreds of related industries.

There is no other maritime college in the South. The Texas Maritime Academy offers the first step in providing such education.

Careers As Merchant Marine Officers

Seafaring is a profession with few geographical limits. In the conduct of world commerce, ships of the United States Merchant Marine sail in and out of every port of call in the free world, discharging and taking on cargo and passengers, refueling, provisioning, and making repairs. Stamina, ingenuity, and courage are the fundamental characteristics of the mariner as he plies the seven seas.

Career opportunities in this profession are not limited to well-defined channels. The modern mariner finds broad horizons of adventure in the technological advances of his age. Officers of the Merchant Marine are preparing for the near day when nuclear-powered merchant ships will launch a new era in commercial propulsion. They are involved in the development and staffing of huge super-tankers and record-breaking passenger liners; in revolutionizing ship navigation and stability control; in expediting cargo-handling techniques. Each step forward opens new frontiers for the Merchant Marine and new careers for men of professional training and experience.

A deck graduate, reporting aboard his first ship as third officer, stands a watch, is responsible for life-saving equipment, and assists in other duties. When he advances his license and is appointed a second officer, he becomes responsible for the navigation of the ship. And finally, as the culmination of the difficult training that has gone before, the proud day comes when the officer receives his "master" license and is qualified to command his own ship.

A marine engineer graduate is first assigned aboard ship as third assistant engineer. He stands an engine room watch, is responsible for auxiliary machinery, and works for advancement to second assistant engineer, the first assistant, and finally to chief engineer.

Placement

The Texas Maritime Academy expects to play a major role in the placement of its graduates. It is the only such school dedicated to serving the steamship lines whose ships ply out of ports of the Gulf of Mexico.

There will be a continual need for well-educated and highly-trained officers to man the new, modern, replacement ships in the Merchant Marine.

Few other professions offer such immediate financial rewards. New graduates of the Texas Maritime Academy may expect to earn at least \$8,000 per year plus meals and quarters. Maritime academy graduates who already have risen to positions of command or are serving as chief engineers—relatively young men—are receiving annual salaries ranging from \$13,000 to \$18,000 and above.

Shore Employment

Although the primary aim of the Academy is to prepare young men for leadership *at sea*, eventually as masters and chief engineers, the marine careers open to them are not limited to the actual operation of ships. Many well educated and trained officers, after establishing successful records at sea, have been selected to become port captains and marine superintendents, or operating managers ashore. Many have

advanced rapidly to positions in the executive and administrative branches of the shipping industry and to high offices in governmental agencies relating to maritime operations. Some are employed as shipping representatives in home and foreign ports. Others are attracted to a lucrative field as marine sales engineers.

The Academy

The Texas Maritime Academy offers young men the opportunity to continue formal education and, at the same time, to prepare to become licensed ships' officers in the United States Merchant Marine.

Upon completion of the first semester, the cadet selects one of two areas of specialization: Marine Engineering or Marine Transportation. Thereafter he is known as an Engineer Cadet or as a Deck Cadet.

Upon the successful completion of the course of study, three ocean training cruises, and upon passing the United States Coast Guard license examination for a Third Mate or Third Assistant Engineer, a graduate receives a Bachelor of Science Degree in Marine Transportation or in Marine Engineering.

Upon graduation the cadet who has the required qualifications may apply for a commission as Ensign, United States Naval Reserve.

Academic Program

The first school year consists of nine months and the remaining three school years consist of eleven months of instruction and training. The year is divided into two academic semesters and one ocean training cruise. Both the Marine Transportation and Marine Engineering Curricula require the study of general education courses in addition to the professional and technical subjects.

Afloat Training



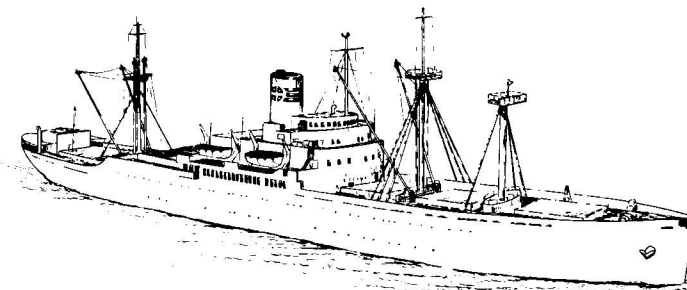
Each Sea Training Period is a required, staff-supervised, educational term intended to insure necessary operational training periods and experience for all cadets.

During the three required operational training periods completed, the cadet progresses from the apprentice stage through the artificer level to the junior officer category. In addition to practical experience in ship operations, safety at sea is continuously emphasized and boat drills are conducted in preparation for the "lifeboatman" examination.

The operational training period includes visits to four to six foreign ports. Different ports are selected each year to provide cadets with a wide range of experience. Ample liberty time is provided in each port, affording cadets the opportunity to visit places of cultural and historic, as well as maritime, importance.

The Federal Maritime Administration will provide the Academy with a suitable training ship for the purpose of conducting the sea training cruise. Since the Texas Maritime Academy is new and will not have senior cadets who are able to operate the ship, it will be necessary to cruise with the cadets in the training ship of another state maritime academy for the first two years.

Cruises



TRAINING SHIP

During the summer of 1963, cadets of the Texas Maritime Academy made the annual training cruise aboard the EMPIRE STATE IV, the training ship of the State University of New York Maritime College. The cruise period from June 1 to August 24 covered more than 10,000 miles in waters of the Atlantic and Mediterranean. The foreign ports visited from four to six days each were: Dublin, Bremen, Antwerp, Naples, and Palma de Majorca in the Balearic Islands. This cruise contributed to each student's cultural and technical knowledge.

The 1964 cruise ports scheduled include:

Cartegena, Colombia
San Juan, Puerto Rico
Castine, Maine
Charlotte Amalie, St. Thomas, Virgin Islands
Bridgetown, Barbados
Aruba Island, Netherlands West Indies

This cruise is scheduled in the Maine Maritime Academy's training ship STATE OF MAINE, a former passenger liner.

The 1965 cruise will be in the training ship of the Texas Maritime Academy. This ship is a former combination cargo and passenger liner of over 10,000 tons. The ship is being completely modernized by the U. S. Maritime Administration for this purpose. By 1965 enough students will have been trained to operate the ship under the supervision of the faculty. The faculty serves as ship's officers as well as instructors. The cruise will be scheduled for a different part of the world than previously visited.

The U. S. Navy and the Maritime Academy

The Navy has a distinct interest in maritime training schools. However, the Navy neither requires nor desires the operation of any maritime school for the sole purpose of training Naval Reserve Officers. These schools are required for the preparation of officers to man the ships of our Merchant Marine. National defense demands an adequate Merchant Marine manned by well trained officers who possess an understanding of naval procedures and who are capable of operating with the Navy in time of war or national emergency. The Navy has participated and desires to continue to participate in the training of these officers by teaching naval science courses in the maritime schools, and granting inactive Naval Reserve commissions to those cadets meeting all qualifications.

The Navy Department, in cooperation with the Maritime Administration, U. S. Department of Commerce, has authorized physical examinations and preliminary interviews for applicants who have been accepted at the Maritime Academy. This is to determine the candidate's suitability for eventual appointment to commissioned grade in the Naval Reserve and not for either enlistment or appointment in the Naval Reserve while the cadet is enrolled at the Academy.

Candidates are required to take the naval officer's physical examination and undergo an interview at the Office of Naval Officer Procurement for processing as merchant marine students. This procedure is prescribed by Maritime Administration regulations governing admission of students to all maritime schools and governing payment of any allowances by the Federal Government. The assignment for taking the naval officer physical and interview will be made by the Academy after the candidate has undergone his admissions test and first physical examination.

Candidates for admission shall also agree in writing to apply at an appropriate time, prior to graduation, for a commission as Ensign in the U. S. Naval Reserve and to accept such commission if tendered. A candidate must also enroll and complete the Naval Science courses offered at the Academy. These requirements, stated above, are the

qualifying factors governing the payment of the uniform, textbook, and subsistence allowance prescribed by the Maritime Administration.

Other pertinent points of the program are:

- (1) Students are to retain civilian status.
- (2) The Director of Selective Service has provided for deferment of these students.
- (3) After graduation, those who obtain employment at sea in the Merchant Marine, may be tendered an inactive Naval Reserve commission, if eligible in all respects.
- (4) After graduation, those who, through no fault of their own, are unable to obtain employment at sea in the Merchant Marine, and who volunteer for active duty, may be commissioned, if eligible, and placed on active duty if there is an actual need for their services.

MISCELLANEOUS INFORMATION

Location of the Campus at A&M University and the Academy

Texas A&M University is located in the City of College Station, and the adjoining Bryan, in Brazos County, Texas. The campus is 100 miles northwest of Houston, 100 miles east of Austin, and 170 miles south of Dallas.

Galveston Campus

The Texas Maritime Academy campus is in Galveston, 50 miles south of Houston. The campus is part of the A&M Marine Laboratory on spacious grounds of the former Fort Crockett on the shores of the Gulf of Mexico.

The Academy building, a three-story concrete structure, provides messing and living spaces as well as classrooms and administrative offices. These accommodations are very modern and all spaces are air-conditioned.

Galveston's concrete piers and warehouses provide berthing accommodations for 40 modern ships. A large shipyard is nearby. These shipyard facilities will help serve as a laboratory for the students. In addition, the NS SAVANNAH, the first atomic-powered merchant vessel in the world, is to be regularly serviced in Galveston. Galveston promises to become an important center for commercial nuclear propulsion.

Based in Galveston is the R.V. ALAMINOS, Oceanographic vessel operated by the Department of Oceanography and Meteorology of Texas A&M University. This 180-foot research vessel is equipped with modern diesel plant and is outfitted with a full array of electronic navigation and oceanographic apparatus. When in port she will serve as a part-time laboratory for students of the Academy. Library and other facilities of the Marine Laboratories are shared with the Academy.

College and Academy Health Services

The College Hospital provides efficient service, is well equipped and has a competent medical staff including a number of specialists. The Student Services Fee provides for clinic visits, diagnostic examinations, care of acute illness, emergency care for accidents, and 10 days of infirmary care each semester in cases requiring hospitalization. There are no charges for these services.

Cadets of the Texas Maritime Academy become eligible for U. S. Public Health Service free medical treatment upon enrollment in the U. S. Maritime Service (some time before the end of the freshman year).

There is a U. S. Public Health Service hospital located in Galveston near the Academy campus.

During the training cruise, a qualified physician is attached to the training ship.

Living and Learning at A&M Campus

At Texas A&M dormitory life is considered an integral part of the educational program—a laboratory where students learn to live together as good neighbors and good citizens. Resident halls are so arranged that two men occupy a single room. It is each student's responsibility to learn to live harmoniously with the other, and to develop that consuming spirit of comradeship which is the trademark of all cadets in College Station. This training will be invaluable for the future period when cadets go to sea in the training ship where space is more confined and there is no escape from the ever presence of shipmates.

Corps Life Offers Valuable Training

The Corps of Cadets at Texas A&M University is a joint organization of Air Force and Army cadets who are now being joined by the maritime cadets of the Texas Maritime Academy who will study naval science instead of air or military science. The Corps, the largest of its kind in the United States, is steeped in many proud traditions. While the Corps is recognized as a top military training group, its primary objectives are to teach cadets a deep sense of personal integrity, to teach respect for constituted authority, to promote a high standard of conduct, to practice courtesy, and to teach the art of self discipline. Various organizations in the Corps of Cadets, such as the famed Aggie Band, Ross Volunteers, and the Freshman Drill Team, plus an array of Corps social activities make life in the Corps of Cadets an unforgettable experience in the life of a student.

Uniforms

Cadets of the Texas Maritime Academy will wear the uniform of the Corps of Cadets while on the A&M Campus. A special designed patch will be worn on the left shoulder.

Starting with the first training cruise, the cadets will turn in the Corps of Cadets uniforms and will shift to midshipman style uniforms of dress blues, whites, and khaki. The cost of the latter have been included in the estimates of expenses.

ADMISSIONS

Limited Enrollment

The ultimate enrollment of the Academy will approximate 200 students. Classes entering in September will be limited to approximately 50 new students. Qualified applicants from other states are accepted. Selection to the Academy is based on the applicant's ability to satisfy requirements as indicated by such criteria as the individual's secondary school or college grades, rank in graduating class, grade point ratio, character, and general accomplishment in high school or college. The college Entrance Examination Board test scores are considered.*

Application for Admission

Any person who desires to apply for admission to the Texas Maritime Academy should write the Director of Admissions, Texas A&M University, College Station, Texas, for a formal application blank. If the applicant has attended any other college or university, he must submit a complete, official, and original transcript for each institution previously attended. In such a case, the college transcript will serve in lieu of the high school transcript required of those who have had high school attendance only. It is important that these credentials be submitted well in advance of registration.

Admission Requirements

An applicant must have graduated from a properly accredited secondary school with a minimum of 15 units (credits) acceptable to the University for entrance purposes. Superior students with unit deficiencies will be considered on the basis of their merit.

The 15 acceptable entrance credits shall include:

- 4 units of English
- 2 units of social science
- 2 units of algebra
- 1 unit of plane geometry
- 1 unit in a natural science
- 5 acceptable elective units

It is recommended that the five elective units include additional courses from the following subject areas: foreign languages, mathematics, natural sciences, social sciences, and speech. It is strongly recommended

*Scholastic Aptitude Test (SAT), English Composition Achievement Test, Mathematics Achievement Test (Intermediate or Advanced).

applicants present trigonometry, one-half unit, and solid geometry, one-half unit, in addition to the algebra and plane geometry requirements as stated above. Three units in English and two units in foreign language may be substituted for four units required in English. Applicants are advised to take chemistry or physics in satisfying the natural science requirements. More than the minimum of one unit in the natural sciences should be presented if possible.

Admission of College Transfer Students

A limited number of students from other colleges or from other schools in Texas A&M University may be accepted for registration as second semester freshmen on 1 February.

A&M Students

Students in other schools at A&M with overall satisfactory records may change major to Marine Engineering or Marine Transportation provided they are able to present a grade of C or better in the following subjects:

Chemistry 101—General	4 credits
English 103—Composition and Rhetoric	3 credits
Mathematics 102—Algebra	3 credits
Mathematics 103—Plane Trigonometry	3 credits
Air or Military Science	1 credit

For Marine Engineer Students only:

Engineering Graphics 105—	
Engineering Drawing	2 credits

Credit will be given for other subjects completed with a grade of C or better when such subjects are a requirement in the maritime program and scheduled for later semesters. Most prevalent among these subjects will be History 105 (United States History) and Mathematics 121 (Analytic Geometry and Calculus).

The number of students who may so change is limited.

Transfer Students from another College or University

The foregoing requirements apply to applicants from other colleges or universities who wish to enter the maritime program in the second semester commencing 1 February.

Admission to such advanced standing may be granted to an applicant who has satisfied the requirements listed above and outlined below:

An applicant who has attended another college or university must be eligible to return to that institution and also must have for the

total record of attendance, a grade point ratio of 1.00 (C-average) or better on all courses undertaken.

An official transcript of the record at each college or university previously attended must be submitted.

An applicant is not at liberty to disregard the record of any previous training and gain admission by individual approval or on the basis of a high school record.

It is essential that all credentials be forwarded to the Director of Admissions well in advance of registration day.

Expenses

Expenses to students of the Texas Maritime Academy are based on those of Texas A&M University. The primary difference is the additional costs which accrue during the three summer training cruises. These additional expenses added to those of the higher-cost midshipman type uniforms are, however, offset by subsistence payments received by each student from the U. S. Maritime Administration of the U. S. Department of Commerce. These payments, not to exceed \$600 per year, are for the purpose of assisting in defraying the cost of uniforms, textbooks, and subsistence. In comparing expenses it is pertinent to point out that the maritime students attend eight full semesters ashore plus an additional 36 weeks in a training ship afloat. The 36 weeks afloat are equivalent to three summer sessions.

ESTIMATED EXPENSES

	<i>Texas Residents</i>			
	Freshman Year	Sophomore Year	Junior Year	Senior Year
Summer Cruise	\$450	\$450	\$450
First Semester	675	450	450	450
Second Semester	675	450	450	125
Texas Residents	\$1350	\$1350	\$1350	\$1025
	<i>Non-Residents</i>			
Summer Cruise	\$600	\$600	\$600
First Semester	825	600	600	600
Second Semester	825	600	600	275
Non-Residents	\$1650	\$1800	\$1800	\$1475

These estimates represent the balances after crediting \$50 per month subsistence assistance to the student's account. Those students not qualifying for U. S. Maritime Administration assistance will be required to pay a sum of \$50 per month in addition to other fees, as a reimbursement to the Academy for loss of subsistence allowance included under provisions of Maritime Administration General Order 87.

Fees are to be paid at the beginning of each semester, but installments may be arranged.

These estimated expenses and fees are for eight full semesters and three summer sessions (sea training cruises) and include fees and costs for the following:

Tuition	Board Plus Tax	Uniforms
Student Services	Room Rent	Slide Rule and
Student Activities	Laundry (limited)	Instruments
Property Deposit	Textbooks and	Medical Care
Room Deposit	Supplies	Cruise Expenses
	Laboratory Fees	

All known expenses, except incidentals, have been included in the estimates. Spending money for each cruise need not exceed \$125.

Loan Funds

The Association of Former Students of Texas A&M University administers a series of loan funds which are available to any student who has been in the University for at least three semesters and whose record in conduct and scholarship is satisfactory. The amount of the loan in each case depends on the student's actual needs.

Various other loan funds are available, among them the A&M University Loan Fund, The Propeller Club of the United States, and the National Defense Student Loan Program.

Employment for Students

Part-time employment of resident students is coordinated by the Office of Student Labor and Loans, a part of the services of the Office of Placement and Special Services. Some employment is available but seldom are all needs met. Assignments are made primarily on the basis of need and sincerity of purpose.

ADDITIONAL INFORMATION

The current Undergraduate Catalogue of Texas A&M University has additional information of interest.

Write to:

The Director of Admissions and Registrar
Texas A&M University
College Station, Texas

COURSES OF INSTRUCTION BY DEPARTMENTS

All courses offered by the departments in the Texas Maritime Academy and by other departments of Texas A&M University are described on the following pages and are listed by departments.

The course number scheme is as follows:

- 101 to 199, courses primarily open to freshmen.
- 201 to 299, courses primarily open to sophomores.
- 301 to 399, courses primarily open to juniors.
- 401 to 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 eighteen weeks.

Roman numerals to the right of the credit value of each course indicate the semester in which it is regularly offered. The letter "S" denotes summer offerings.

Department of Marine Engineering

The Marine Engineering program leads to the degree of Bachelor of Science in Marine Engineering and to the U. S. Coast Guard issued license as Third Assistant Engineer, Steam and Motor Vessels, Ocean, Unlimited. Marine Engineering, which is closely related to mechanical engineering, emphasizes the design, operations, and maintenance of maritime power plants and associated equipment. Thorough preparation in mathematics, the sciences, and basic and applied engineering subjects is fundamental and necessary.

Engineering theory and practice are coordinated by relating classroom study to the student's practical experience aboard ship.

102. Orientation. (0-2). Credit 1. I

An introduction to basic marine engineering systems. A general description of the shipbuilding industry is related to the steamship industry. The career of an engineer officer is surveyed.

200. Basic Operations. Credit 4. S

This course represents the practical application of the student's classroom studies while at sea in the training ship during the sea training period. The student is required to complete several projects relating to the engineering plant of the ship. Lifeboat training.

201. Marine Engineering Mechanics. (3-0). Credit 3. I

The application of the principles of mechanics to elementary problems of marine engineering design. Topics include: forces and couples, analysis of structures and friction; principles of kinetics and kinematics.

203. Engineering Laboratory. (1-3). Credit 2. I

A study of pipe and valve standards; packing and gasket material; gearing and bearings; use of brass and copper service tubing; silver brazing techniques; corrosion controls in heat exchangers.

204. Engineering Laboratory. (1-3). Credit 2. II

An academic and practical study of the various marine power systems in use today and some future developments. Visits to various ships in Galveston harbor and to the local shipyard will be scheduled.

300. Intermediate Operations. Credit 4. S

The training program for the second sea training period. Sea Projects are required of each student under the supervision of the officer-instructors. Lifeboat and safety training is included.

301. Fluid Mechanics and Heat Transfer. (3-0). Credit 3. I

The application of principles of fluid statics and dynamics to marine engineering problems. A study of the fundamental laws relating to heat flow; characteristics of pumps; topics in compressible flow.

302. Engineering Laboratory. (0-3). Credit 1. II

A demonstration of the basic concepts of fluid mechanics; calibration of flow meters, centrifugal pumps, orifice and weir flow. Additional practice is given in the principles and operations of power machinery.

303. Marine Thermodynamics I. (3-0). Credit 3. I

Energy concepts and the laws of thermodynamics. The Carnot principles and reversible cycles. The properties and processes of vapors; vapor power cycles and vapor refrigeration cycles.

304. Marine Thermodynamics II. (3-0). Credit 3. II

Properties and processes of perfect gases, gas compression cycles, gas power cycles, the air refrigeration cycle, and processes involving mixture of gases and vapors.

305. Strength of Materials. (3-0). Credit 3. II

The fundamental principles underlying the analysis and design of machine members subjected to various combinations of loading. Emphasis is given to the theoretical and empirical basis for material specification formulas as found in the United States Coast Guard Marine Engineering Regulations.

306. Marine Refrigeration and Air Conditioning. (2-2). Credit 3. II

The theory and practice of mechanical refrigeration. Specific topics include: thermodynamics of the Reverse Carnot cycle, vapor compression cycles; thermal, physical, and chemical properties of refrigerants. Descriptions of shipboard ventilation and air conditioning for passenger spaces and cargo hold conditioning.

307. Electrical Circuits. (2-3). Credit 3. I

A study in fundamental electrical theory as it applies to an understanding of the behavior, the mode of operation, the applications, and the maintenance of electrical equipment as used aboard ship. Measurements of the circuit phenomena, including fundamental amplifiers and rectifiers.

308. Electrical Machinery. (2-3). Credit 3. II

A study of the principal types of electrical machines aboard ship, including their characteristics, applications, and control devices. Laboratory work includes actual operation and testing of electrical machinery and equipment of the type installed aboard ships.

331. Theory and Application of Electron Tubes. (3-3). Credit 4. I

A study of theory of operation and characteristics of electronic devices and circuits with emphasis on instrumentation and control. A survey is made of electronic devices found aboard ship with concentration on maintenance and repair.

400. Advanced Operations. Credit 4. S

The training program for the third sea training period. At the end of this period each student will have completed approximately 36 weeks aboard ship while on sea training periods. He will have achieved the knowledge and will have demonstrated his ability to take complete charge of a modern marine power plant while underway at sea.

401. Nuclear Propulsion I. (3-0). Credit 3. I

A study of reactor mechanics with emphasis placed on fluid hydraulics, reactor core design, reactor fuels and their properties, shielding, construction and operation of related auxiliary machinery.

402. Diesel Engineering. (2-2). Credit 3. II

Basic principles of the two and four stroke cycle diesel engines; intake, scavenging and exhaust systems; injection systems, starting and reversing methods; cooling and lubricating systems; and engine room layout in modern motor vessels.

403. Marine Steam and Gas Turbines. (2-2). Credit 3. I

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.

404. Marine Regulatory Law. (3-0). Credit 3. II

A study of marine engineering standards, specifications, and requirements prescribed by the Bureau of Marine Inspection, U. S. Coast Guard; the American Bureau of Shipping; and the Bureau of Ships, U. S. Navy.

405. Steam Generators. (2-2). Credit 3. I

Characteristics, historical development, and classification of marine boilers. Construction specifications of the U. S. Coast Guard Marine Engineering Regulations. Principles of combustion and boiler head balance when using fuel oil. Water conditioning and procedures in operation and maintenance.

406. Engineering Repairs. (1-3). Credit 2. II

Basic foundations in the theory and practical applications of machinery repair equipment commonly found aboard ship. Practice in oxy-acetylene welding, brazing, cutting and electric arc welding; pipe welding, tube sweating; valve and pump maintenance; emergency repairs.

408. Nuclear Propulsion II. (2-2). Credit 3. II

A study of reactor controls and instrumentation including basic electronics, design, installation, and maintenance of various types of control systems. A survey of nuclear propulsion and the marine industry is made. Advantage is taken of the shipyard nuclear facilities in the Galveston area for practical field trips.

409. Naval Architecture III. (2-0). Credit 2. I

The resistance and powering of ships; principles of model testing and similitude for ship's hulls and propellers, and propulsive efficiency. Fundamentals of propeller design, blade strength and cavitation.

**Department of Marine Transportation and
Nautical Science**

The department provides a basic program for deck officer candidates. This program will have a major in the field of Marine Transportation. It is designed to combine the humanities and sciences with maritime subjects to achieve a well-rounded college curriculum which will fully equip a young man to meet the present and future needs of the maritime industry afloat and ashore.

Theory and practice are integrated by relating the scholastic efforts of the academic year to those of the sea training periods in the training ship.

The student who successfully completes the courses required by this curriculum, and after passing the required U. S. Coast Guard examination, receives the degree in Bachelor of Science in Marine Transportation and a federal license as Third Mate in the Merchant Marine.

Marine Transportation

101. Maritime Orientation. (0-2). Credit 1. I

A survey of the maritime industry, ocean transportation, trade routes of the world, and the vital part played by the U. S. Merchant Marine in the international trade of the United States and in the

defense of the nation. Steamship organization, ship organization, and general operating methods are discussed. A survey is made of the career patterns available to graduates in this field.

301. Ocean Transportation. (3-0). Credit 3. I

The principles and practices of marine carrier operations; organization, structure, policy, administration, and documentation. Topics include charter parties, rate conferences, bills of lading, contracts of carriage, terminal operations; tanker, cargo, and passenger ship management.

302. Marine Cargo Operations I. (2-2). Credit 3. I

The essential requirements and problems in the stowage and carriage of general and bulk (dry and liquid), refrigerated, and special cargoes. Theoretical and practical problems in receiving, stowing, securing, transporting, and discharging all types of cargo.

401. Marine Insurance. (3-0). Credit 3. I

The principles and practices of marine underwriting, loss adjusting, and general average with emphasis on the application of these principles to the policies and problems of cargo, hull, and protection and indemnity insurance. The interest of the underwriters in safety problems and accident prevention in the maritime industry is surveyed.

403. Admiralty and Maritime Law. (3-0). Credit 3. I

A survey of the history and the development of admiralty law; fundamental legal problems connected with shipping; federal and state jurisdiction over maritime matters, admiralty torts, and contracts. Laws governing marine inspection and safety at sea; obligations and responsibilities of ships' personnel. Labor relations and contracts between shipowners and unions are thoroughly reviewed.

404. Ocean Traffic Management. (2-0). Credit 2. II

The organization and administration of passenger, freight and subsidiary departments of steamship lines; conferences and rate making; chartering; booking and documentation, and ship scheduling. The elements of transportation expenses including port charges, overhead, brokerage, ship operating expenses, and insurance are related to revenue.

406. Marine Cargo Operations II. (2-3). Credit 3. II

Methods of handling special cargo such as gold; regulations pertinent to entry and clearance of vessels from ports in various nations. An exercise is made of loading general cargo in Galveston with a ship destined for ports in the Far East and return. Cargo is loaded and discharged in way ports. The student is required to prepare loading plans for each port taking into account considerations of draft, load line, trim, and expeditious turn around. He is to prepare manifests and other documents, and from a given set of expense factors he is to calculate the profit and/or loss for the voyage.

Nautical Science

102. Ship Organization and Operation. (2-0). Credit 2. II

An elementary introduction to ship organization covering such topics as station bills, routine, duties of personnel; types of ships, ship nomenclature; safety at sea and emergency drills; general preparation for the first sea training period.

200. Basic Communications, Navigation, and Seamanship. Credit 4. S

This course represents the practical application of the student's classroom studies aboard the training ship during the first training cruise. The student completes basic projects in communications, navigation, and seamanship.

201. Naval Architecture I. (3-0). Credit 3. I

Description of the ship as a self-sustaining unit; shipbuilding nomenclature and dimensions, types of construction and classification of merchant ships; classification societies; shipbuilding materials and methods, and structure components of the ship.

202. Naval Architecture II. (2-0). Credit 2. II

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. I

The art of handling small boats under oars, sail, and power. Lifeboat launching and equipment; construction and types of boats. The application of ground tackle, knotting and splicing, blocks and tackle. Communications practice; Rules of the Nautical Road.

204. Terrestrial Navigation. (3-0). Credit 3. I

The fundamentals of basic navigation with definitions; plane sailing, middle latitude sailing, and mercator sailing; piloting, chart projections, and chart navigation.

300. Intermediate Communications, Navigation, and Seamanship. Credit 4. S

This course represents the practical application of the student's classroom studies aboard the training ship; during the second training cruise. The student completes intermediate projects in communications, navigation, and seamanship.

301. Seamanship II. (2-3). Credit 3. I

The mechanical principles involved in the operation of ship's cargo gear; the operational limitations and safety factors of such heavy lifts as locomotives and power plant generators. Marine inspection regulations pertaining to passenger vessels and tankers. Additional communications including use of the International Signal Book (H.O. No. 87).

302. Seamanship III. (1-3). Credit 2. II

Qualifying tests in communications. A thorough study is made of the U. S. Public Health requirements in first aid and ship sanitation. Marine inspection rules for safety at sea are stressed.

303. Celestial Navigation. (2-3). Credit 3. I

A survey of nautical astronomy and the use of time in the nautical almanac; use of the sextant; problems in celestial navigation including calculations of time of sunset, sunrise, sun's transit, and determination of compass error by azimuth and amplitude; lines of position; observations by use of stars, planets, and the moon; solution of the spherical triangle by a number of methods and tables.

304. Electronic Navigation. (2-2). Credit 3. II

A study of the theory, methods, and application of determining position by means of electronic aids including radar, direction finder, and Loran. The student is examined by the U. S. Coast Guard for certification as Radar Observer.

400. Advanced Communications, Navigation, and Seamanship. Credit 4. S

This course represents the practical application of the student's classroom studies aboard the training ship during the third training cruise. The student completes advanced projects in communications, navigation, and seamanship.

401. Seamanship IV. (2-3). Credit 3. II

Principles and methods of propulsion and steering of ships. Ship handling in heavy seas, docking, undocking, anchoring, mooring, towing, salvage, and ice seamanship. Damage control is stressed. Qualification examinations are held in seamanship and communications.

404. The Navigator. (2-3). Credit 3. II

Exercises in the day's work of the navigator at sea. Planning routes of voyages. A study is made of the buoyage systems used throughout the world and a survey is made of various sailing guides and port directories. Gyroscope compass fundamentals and magnetic compass compensation are covered.

Department of Naval Science

The Naval Science Department administers prescribed naval subjects within academic standards set by the Chief of Naval Personnel. Areas of instruction which are duplicated by the Academy are not taught by the Naval Science Department. Each cadet who completes the Naval Science courses and is otherwise qualified becomes eligible for, and may be granted, an inactive commission as Ensign, U. S. Naval Reserve, upon graduation.

The objectives of the Naval Science Department are:

- (1) to provide the cadet with a well-rounded course in basic naval subjects;
- (2) to develop an understanding of naval service and knowledge of naval practice;
- (3) to develop, by precept and example, the psychology and technique of leadership.

109. Orientation and Sea Power. (0-2). Credit 1. I

A study of naval organization, customs, traditions, standard shipboard organization, types and characteristics of naval vessels, and elements of the various types of naval warfare.

110. Orientation and Sea Power. (0-2). Credit 1. II

A continuation of 109.

209. Sea Power. (3-0). Credit 3. I

A course to stimulate an interest in naval history and an appreciation of the contribution of sea power to the past, present, and future progress of the United States, stressing the influence of sea power on global history.

210. Naval Weapons. (3-0). Credit 3. II

An introduction to naval weapons to familiarize the cadet with the nomenclature and types of weapons in use today. The course includes explosives, armor, guns and gun mounts, power drives, basic principles of rockets and guided missiles, the fire control problem and associated equipment, relation of radar and CIC equipment to gunnery, anti-submarine warfare, and introduction to space technology and nuclear warfare.

309. Naval Machinery. (3-0). Credit 3. I

A course offered to deck cadets to afford a basic understanding of ship stability, naval engineering including main propulsion plants (steam, nuclear, and internal combustion) with emphasis being placed upon the fundamental principles. It also familiarizes the cadet with the entire shipboard engineering plant, including electrical systems, refrigeration, distillation and miscellaneous equipment, and with administration and organizational concepts in the field of naval engineering.

310. Naval Operations. (3-0). Credit 3. II

To acquaint the student with those responsibilities which face him in shipboard operations such as relative motion, tactical communications and instructions, and rules of the nautical road so that he may qualify in bridge and CIC watch billets afloat with a minimum of additional training; to afford a basic understanding of fleet com-

munications; to introduce electronic counter-measures, and to afford a basic understanding of naval operations.

311. Navigation. (3-0). Credit 3. I

A course offered to engineer cadets to enable the cadet to acquire an understanding of the theory and technique of terrestrial and celestial navigation.

410. Principles of Naval Leadership. (3-0). Credit 3. II

A course built upon the foundation of General Order No. 21 which defines naval leadership as the art of accomplishing the Navy's mission through people, based on three precepts: personal example, good management practice, and moral responsibility.

COURSES FROM OTHER DEPARTMENTS OF TEXAS A&M UNIVERSITY

Department of Chemistry

101. General Chemistry. (3-3). Credit 4. I, II, S

Fundamental laws and theories of chemical activity. Practical applications of the more important chemical processes involving non-metals are briefly described.

General laboratory work deals with non-metals and simple tests of technical importance supplementing lecture demonstrations.

102. General Chemistry. (3-3). Credit 4. I, II, S

Fundamental theories of structure and activity. Practical applications of the more important chemical processes involving metals described. Organic Chemistry is briefly outlined.

Laboratory work consists of elementary qualitative separation and identification of metallic and non-metallic ions. Prerequisite: Chemistry 101.

106. General Chemistry. (3-3). Credit 4. II

A survey course in chemistry for students needing it as a cultural subject and not as a basis for advanced work.

Department of Economics

203. Principles of Economics. (3-0). Credit 3. I, II, S

An introductory survey course designed to acquaint the student with elementary principles of economics; the economic problem, the measurement of determination of national income, money and banking, and the theory of price. Prerequisite: Sophomore classification.

321. International Trade and Finance. (3-0). Credit 3. I

A study of international economics, including the theory of international trade, foreign exchange, and the balance of payments; tariffs, exchange controls, and other barriers to trade; international investment; and contemporary problems of international disequilibrium. Prerequisite: Economics 203.

Department of Education and Psychology

Psychology

303. Psychology for Technical Students. (3-0). Credit 3. I, II, S

An introductory course emphasizing the applications of general psychology. Designed for students of agriculture, business administration, and engineering. (This course serves as a prerequisite to Naval Science 410—Principles of Leadership.)

Department of Engineering Graphics

105. Engineering Drawing. (0-6). Credit 2. I, II, S

Care and use of drawing instruments and equipment, vertical freehand lettering, engineering geometry, view drawings, revolutions, auxiliaries, sections, engineering sketching, pictorials, dimensioning, working drawings.

Department of English

103. Composition and Rhetoric. (3-0). Credit 3. I, II, S

Composition, oral and written. Readings in modern prose (non-fiction). Emphasis on language study and the mechanics of writing. (Special sections are offered for students of high proficiency and low proficiency in writing.)

104. Composition and Rhetoric. (3-0). Credit 3. I, II, S

Composition, oral and written. A continuation of the study in English 103. Emphasis on the short composition and the writing of investigative papers.

301. Writing for Professional Men. (3-0). Credit 3. I, II, S

Advanced writing in scientific and technical fields including technical reports and papers designed for technical and scientific journals; business correspondence. Prerequisite: The completion of the freshman-sophomore program in English.

320. Selected Reading. (1-0). Credit 1. S

The reading of several books. Objects: to teach students to read good books and to enjoy and understand good literature.

401. Public Speaking. (0-2). Credit 1. I, II, S

Practice in the planning and delivery of speeches, in parliamentary procedure, and in group discussion. Prerequisite: Completion of the sophomore program in English.

485. Problems. Credit 1 to 3. I, II, S

Individual supervision; no class meetings. Readings designed for the student with a major or a minor in English and selected to round out his overall knowledge of literature and the criticism of literature. There will be written reports on the readings and a semester examination.

Department of Geography

201. World Regional Geography. (3-0). Credit 3. I, II, S

A study of the differences in physical and cultural environment over the earth's surface, with emphasis on the changes in the landscape created by man. Culture "worlds" are recognized as a means of presenting these differences in orderly fashion.

401. International Political Geography. (3-0). Credit 3. I

A study of some of the present social and political problems of world powers and also the weaker nations. An effort to find geographic factors back of these problems and possible geographic adjustments.

Department of Health and Physical Education

101. Required Physical Education. (0-2). No credit. I, II

102. Required Physical Education. (0-2). No credit. I, II

201. Required Physical Education. (0-2). No credit. I, II

202. Required Physical Education. (0-2). No credit. I, II

Those students who are unable to pass a prescribed swimming test will be required to register for elementary swimming instruction, and students who are unable to pass a physical fitness test will be given general conditioning activities. All others may register for various sports activities.

Department of History and Government

Government

206. American National Government. (3-0). Credit 3. I, II, S

The organization, functions, and nature of the national government; the rights, privileges, and obligations of citizenship; immigration and naturalization laws, all as closely related to the constitution of the United States as possible. Prerequisite: Sophomore classification.

History

105. History of the United States. (3-0). Credit 3. I, II, S

English colonization; the Revolution; adoption of the constitution; growth of nationalism; cotton and slavery problem; war for Southern independence.

106. History of the United States. (3-0). Credit 3. I, II, S

Reconstruction; new social and industrial problems; rise of the progressive movement; United States emergence as a world power; World War I; reaction and the New Deal; World War II; contemporary America. Prerequisite: History 105.

318. International Developments Since 1918. (3-0). Credit 3. I, II, S

A general survey of world politics since the close of World War I. Particular attention will be given to the problems and ideologies of the great powers of Europe and to those factors and conditions which explain present political tendencies and policies. Due consideration will also be given to colonial problems in Asia and Africa, the Sino-Japanese question; and the clash of United States-Japanese policies. World War II, the conflict of ideologies.

Department of Mathematics

102. Algebra. (3-0). Credit 3. I, II, S

Quadratic equations, ratio, proportion, variation, progressions, binomial theorem, complex numbers, theory of equations, determinants, partial fractions.

103. Plane Trigonometry. (3-0). Credit 3. I, II, S

Definitions of the trigonometric functions, evaluation of the functions of special angles, fundamental relations, solution of right triangles, trigonometric reductions, angular measure, functions of a composite angle, logarithms, solutions of oblique triangles, inverse trigonometric functions, trigonometric equations.

106. Spherical Trigonometry. (3-0). Credit 3. II

Geometry of the sphere; derivation of oblique spherical triangle; application of spherical trigonometry to terrestrial and celestial spheres. A brief survey of the celestial system is included.

121. Analytic Geometry and Calculus. (4-0). Credit 4. I, II, S

Equation of a locus, locus of an equation, lines, circles, other conic sections, functions, limits, derivatives of polynomial and other algebraic functions, applications of differentiation, integration of polynomials, areas and volumes of integration. Prerequisites: Mathematics 102 and 103, or satisfactory performance on a qualifying examination.

122. Calculus. (4-0). Credit 4. I, II, S

Derivatives of transcendental functions; comprehensive study of integration; application of integration to moments, arc lengths, areas of surfaces of revolution, liquid pressure, and work; improper integrals; indeterminate forms. Prerequisite: Mathematics 121.

307. Calculus. (3-0). Credit 3. I, II, S

Introduction to series, Taylor's series, partial differentiation, elementary differential equations, applications. Prerequisite: Mathematics 122.

308. Differential Equations. (3-0). Credit 3. I, II, S

Fourier series, linear equations, solution by Laplace transforms and by series, applications. Prerequisite: Mathematics 307.

Department of Mechanical Engineering

309. Machine Production Techniques. (0-3). Credit 1. I, II, S

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: Engineering Graphics 105.

Department of Modern Languages

105. Beginning Spanish. (3-0). Credit 3. I, II, S

For students who have had no previous training in Spanish. Study of standard elementary grammar with oral and reading exercises; early attention given to background for conversation. One half of class preparation will be done in language laboratory. On completion of course the student should have a 500-word active vocabulary; he should be capable of simple conversation.

106. Beginning Spanish. (3-0). Credit 3. I, II, S

Continuation of Modern Language 105. Extensive reading of easy texts with written and oral exercises and grammar review. Oral exercises designed to develop conversational ability. On completion of the course, the student should have an active vocabulary of 900 words and passive vocabulary of about 1300. Part of preparation will be done in language laboratory. Prerequisite: Modern language 105 or equivalent.

205. Intermediate Spanish. (3-0). Credit 3. I, II

Rapid review of Spanish language structure, followed by intensive practice on the 1,500-word level, with emphasis on development of aural comprehension and speaking ability. Supplemental written and oral exercises designed to develop self-expression and recognition ability. Language laboratory available for collateral training. Prerequisite: Modern Language 106 or two years of high school Spanish.

206. Intermediate Spanish. (3-0). Credit 3. I, II

Continuation of Modern Language 205. Reading of standard literary work on the 2,000-word level. Extensive written and oral work, translation and original, aimed at fixing correct grammatical usage and ease of self-expression. Partly conducted in Spanish. On completion of the course the student should have basic ability to understand and speak standard Spanish and, with a dictionary, to read any modern text. Prerequisite: Modern Language 205 or equivalent.

Department of Oceanography and Meteorology

Meteorology

302. Weather Reports and Forecasting. (3-0). Credit 3. I

Theory, methods, and practice of synoptic weather analysis. Survey of structure and motions of air currents, fronts, cyclones, anti-cyclones, pressure waves, tropical storms, and other features of circulation. Global weather reporting, codes and data transmission; facsimile weather maps by radio. Avoiding storms at sea.

Oceanography

403. Tides, Waves, Currents, Sea Ice. (3-0). Credit 3. II

The elements of physical oceanography pertaining to marine transportation and navigation. Astronomical and meteorological tides, wind waves and swell, major ocean current systems, sea ice.

Department of Physics

201. College Physics. (3-3). Credit 4. I, II, S

An elementary course with material selected especially with reference to the needs of premedical and predental students and students of architecture and education. Fundamentals of classical mechanics, heat, and sound. Prerequisite: Mathematics 103.

202. College Physics. (3-3). Credit 4. I, II, S

A continuation of Physics 201. Fundamentals of classical electricity and light and introduction to contemporary physics. Prerequisite: Physics 201.

211. A Brief Survey of Physics. (3-3). Credit 4. II

A course designed to acquaint students with a field of knowledge and contemporary activity of importance in modern thinking. Prerequisite: Mathematics 102.

**Curriculum in
MARINE ENGINEERING**

FRESHMAN YEAR

First Semester	Th	Pr	Cr	Second Semester	Th	Pr	Cr
Chemistry 101	(3-3)		4	Chemistry 102	(3-3)		4
General Chemistry				General Chemistry			
Engineering Graphics 105	(0-6)		2	English 104	(3-0)		3
Engineering Graphics				Composition and Rhetoric			
English 103	(3-0)		3	Mathematics 121	(4-0)		4
Composition and Rhetoric				Analytic Geometry and Calculus			
Mathematics 102	(3-0)		3	Mechanical Engineering 309	(0-3)		1
Algebra				Machine Production Techniques			
Mathematics 103	(3-0)		3	Nautical Science 102	(2-0)		2
Plane Trigonometry				Ship Organization and Operations			
Marine Transportation 101	(0-2)		1	Naval Science 110	(0-2)		1
Maritime Orientation				Orientation and Sea Power			
Marine Engineering 102	(0-2)		1	Physics 201	(3-3)		4
Marine Engineering Orientation				College Physics			
Naval Science 109	(0-2)		1	Physical Education 102	(0-2)		R
Orientation and Sea Power							19
Physical Education 101	(0-2)		R				
			18				

SUMMER SESSION I

(Two terms of 6 weeks each at sea in training ship)

English 320	Cr
Selected Reading	1
Marine Engineering 200	4
Basic Operations	5

SOPHOMORE YEAR

History 105	(3-0)	3	Economics 203	(3-0)	3
History of the United States			Principles of Economics		
Mathematics 122	(4-0)	4	Government 206	(3-0)	3
Calculus			American National Government		
Marine Engineering 201	(3-0)	3	History 106	(3-0)	3
Marine Engineering Mechanics			History of the United States		
Marine Engineering 203	(1-3)	2	Marine Engineering 204	(1-3)	2
Engineering Laboratory			Engineering Laboratory		
Naval Science 209	(3-0)	3	Mathematics 307	(3-0)	3
Sea Power			Calculus		
Physics 202	(3-3)	4	Naval Science 210	(3-0)	3
College Physics			Naval Weapons		
Physical Education 201	(0-2)	R	Physical Education 202	(0-2)	R
		19			17

SUMMER SESSION II

(Two terms of 6 weeks each at sea in training ship)

English 485	1
Problems	
Marine Engineering 300	4
Intermediate Operations	5

JUNIOR YEAR

Marine Engineering 301	(3-0)	3	Marine Engineering 302	(0-3)	1
Fluid Mechanics and Heat Transfer			Engineering Laboratory		
Marine Engineering 303	(3-0)	3	Marine Engineering 304	(3-0)	3
Marine Thermodynamics			Marine Thermodynamics		
Marine Engineering 307	(2-3)	3	Marine Engineering 305	(3-0)	3
Electrical Circuits			Strength of Materials		
Mathematics 308	(3-0)	3	Marine Engineering 306	(2-2)	3
Differential Equations			Marine Refrigeration and		
Nautical Science 201	(3-0)	3	Air Conditioning		
Naval Architecture I			Marine Engineering 308	(2-3)	3
Naval Science 311	(3-0)	3	Electrical Machinery		
Navigation		18	Nautical Science 202	(2-0)	2
			Naval Architecture II		
			Naval Science 310	(3-0)	3
			Naval Operations		18

SUMMER SESSION III

(Two terms of 6 weeks each at sea in training ship)

English 485	1
Problems	
Marine Engineering 400	4
Advanced Operations	5

SENIOR YEAR

First Semester	Th	Pr	Cr	Second Semester	Th	Pr	Cr
Marine Engineering 331	(3-3)	4		English 301	(3-0)	3	
Theory and Application of Electron Tubes				Writing for Professional Men			
Marine Engineering 401	(3-0)	3		English 401	(0-2)	1	
Nuclear Propulsion I				Public Speaking			
Marine Engineering 403	(2-2)	3		Marine Engineering 402	(2-2)	3	
Marine Steam and Gas Turbines				Diesel Engineering			
Marine Engineering 405	(2-2)	3		Marine Engineering 404	(3-0)	3	
Steam Generators				Marine Regulatory Law			
Marine Engineering 409	(2-0)	2		Marine Engineering 406	(1-3)	2	
Naval Architecture III	(3-0)	3		Engineering Repairs			
Psychology 303	(3-0)	3		Marine Engineering 408	(2-2)	3	
Psychology for Technical Students				Nuclear Propulsion II			
				Naval Science 410	(3-0)	3	
				Principles of Naval Leadership			
							18

Curriculum in

MARINE TRANSPORTATION

FRESHMAN YEAR

Geography 201	(3-0)	3	Chemistry 106	(3-3)	4
World Regional Geography			General Chemistry		
English 103	(3-0)	3	English 104	(3-0)	3
Composition and Rhetoric			Composition and Rhetoric		
Mathematics 102	(3-0)	3	Mathematics 106	(3-0)	3
Algebra			Spherical Trigonometry		
Mathematics 103	(3-0)	3	Nautical Science 102	(2-0)	2
Plane Trigonometry			Ship Organization and Operations		
Marine Transportation 101	(0-2)	1	Naval Science 110	(0-2)	1
Maritime Orientation			Orientation and Sea Power		
Marine Engineering 102	(0-2)	1	Physics 211	(3-3)	4
Marine Engineering Orientation			A Brief Survey of Physics		
Naval Science 109	(0-2)	1	Physical Education 102	(0-2)	R
Orientation and Sea Power					
Physical Education 101	(0-2)	R			17
		15			

SUMMER SESSION I

(Two terms of 6 weeks each at sea in training ship)

English 320	Cr	1
Selected Reading		
Nautical Science 200		4
Basic Communications, Navigation, and Seamanship		5

SOPHOMORE YEAR

History 105	(3-0)	3	Economics 203	(3-0)	3
History of the United States			Principles of Economics		
Modern Language 105	(3-0)	3	Government 206	(3-0)	3
Beginning Spanish			American National Government		
Nautical Science 203	(2-3)	3	History 106	(3-0)	3
Seamanship I			History of the United States		
Nautical Science 204	(3-0)	3	Modern Language 106	(3-0)	3
Terrestrial Navigation			Beginning Spanish		
Naval Science 209	(3-0)	3	Nautical Science 303	(2-3)	3
Sea Power			Celestial Navigation		
Physical Education 201	(0-2)	R	Naval Science 210	(3-0)	3
		15	Naval Weapons		
			Physical Education 202	(0-2)	R
					18

SUMMER SESSION II

(Two terms of 6 weeks each at sea in training ship)

English 485	1
Problems	
Nautical Science 300	4
Intermediate Communications, Navigation, and Seamanship	5

JUNIOR YEAR

First Semester	Th	Pr	Cr	Second Semester	Th	Pr	Cr
Economics 321	(3-0)	3		History 318	(3-0)	3	
International Trade and Finance				International Developments Since 1918			
Marine Transportation 301	(3-0)	3		Marine Transportation 404	(2-0)	2	
Ocean Transportation				Ocean Traffic Management			
Modern Language 205	(3-0)	3		Modern Language 206	(3-0)	3	
Intermediate Spanish				Intermediate Spanish			
Nautical Science 201	(3-0)	3		Nautical Science 302	(1-3)	2	
Naval Architecture I				Seamanship III			
Nautical Science 301	(2-3)	3		Nautical Science 202	(2-0)	2	
Seamanship II				Naval Architecture II			
Naval Science 309	(3-0)	3		Nautical Science 304	(2-2)	3	
Naval Machinery				Electronic Navigation			
			18	Naval Science 310	(3-0)	3	
				Naval Operations			18

SUMMER SESSION III

(Two terms of 6 weeks each at sea in training ship)

English 485	1
Problems	
Nautical Science 400	4
Advanced Communications, Navigation, and Seamanship	5

SENIOR YEAR

Geography 401	(3-0)	3	English 301	(3-0)	3
International Political Geography			Writing for Professional Men		
Marine Transportation 401	(3-0)	3	English 401	(0-2)	1
Marine Insurance			Public Speaking		
Marine Transportation 403	(3-0)	3	Marine Transportation 406	(2-2)	3
Admiralty and Maritime Law			Marine Cargo Operations II		
Marine Transportation 302	(2-2)	3	Nautical Science 401	(2-3)	3
Marine Cargo Operations I			Seamanship IV		
Meteorology 302	(3-0)	3	Nautical Science 404	(2-3)	3
Weather Reports and Forecasting			The Navigator		
Psychology 303	(3-0)	3	Naval Science 410	(3-0)	3
Psychology for Technical Students			Principles of Naval Leadership		
		18	Oceanography 403	(3-0)	3
			Tides, Waves, Currents, Ice		19

SUMMARY OF ADMISSION REQUIREMENTS

Academic

15 Units (credits) (See Admissions)

General

Be a citizen of the United States.

Be unmarried and remain unmarried until graduation.

Be not less than 17 and not yet 22 years of age on day of registration.

Be of good repute.

Physical

Meet standards as set forth in Department of the Navy, Bureau of Naval Personnel Recruiting Service Manual.

In general the physical examination disqualifying factors are epilepsy, insanity, senility, asthma, rheumatic heart condition, diabetes or other defects that would render the applicant incompetent to perform the ordinary duties of an officer at sea.

Vision

Deck applicants: 20/40 in one eye and 20/70 in the other.

Engineer applicants: 20/50 in one eye and 20/70 in the other.

Color blindness is disqualifying for both. Both eyes must be correctible to 20/20 with glasses.