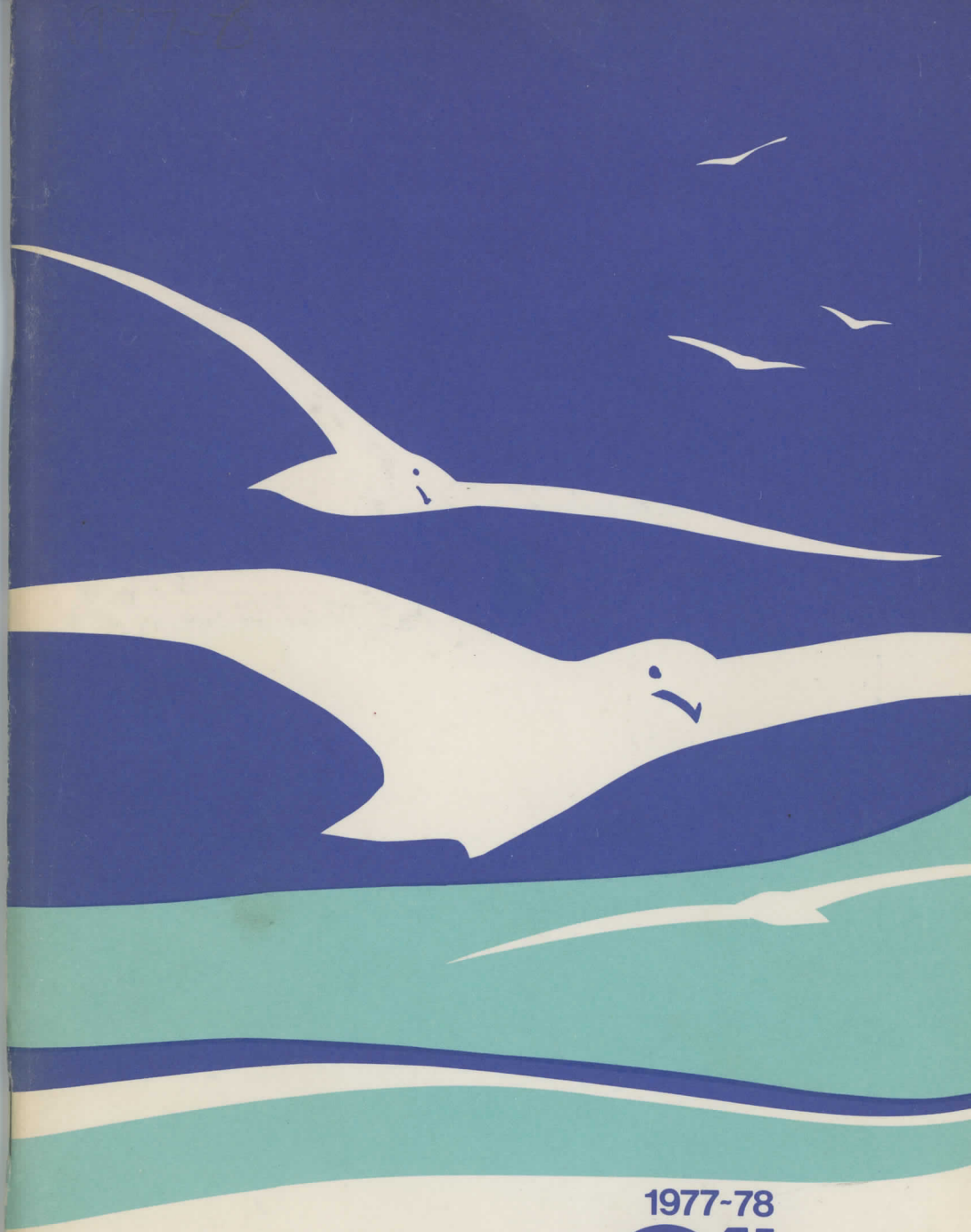

1977-78

CAL MARITIME

Postage
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ADMISSIONS OFFICE
CALIFORNIA MARITIME ACADEMY
P.O. BOX 1392
VALLEJO, CA 94590

CATALOG
1977–1978

CALIFORNIA MARITIME ACADEMY

vallejo, california

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A Message From
The President of
The California Maritime Academy

The California Maritime Academy is one of the most unique educational institutions in the State of California. Whereas most schools of higher education in the state emphasize "academia", at Cal Maritime we attempt to strike a harmonious balance between academic theoretical learning and the practical application of that learning. In other words, the students are equipped to carry out what they learn.

As a result Cal Maritime students are highly sought after by the maritime industries which they serve. Although the employment opportunities of our graduates are subject to the whims of the economy, as are graduates of other schools, we are extremely proud of the employment "track" record of our graduating classes, particularly the ones of the last three or four years. Probably few educational institutions in California, and possibly in the United States, can match the employment prospects enjoyed by our graduates.

In this technologically changing world, those students who have had the advantage of a fully rounded technical education will be better prepared to take full advantage of career opportunities. Not since the steam engine replaced sails has such a technological revolution swept the maritime industry.

The advent of fast, highly sophisticated vessels requires a new breed of officer—one who has the breadth of education and depth of training to cope with the complexities of a rapidly changing technology.

At the California Maritime Academy we provide not only the educational and training opportunities, but also the opportunity to develop into a mature individual, capable of assuming the great responsibility and leadership required by a highly sophisticated Merchant Marine.

Sincerely,

Joseph P. Rizza

Joseph P. Rizza
Rear Admiral, USMS
President

I. CALIFORNIA MARITIME ACADEMY

THE MISSION OF THE CALIFORNIA MARITIME ACADEMY

To provide instruction in Nautical Industrial Technology, Marine Engineering Technology and related fields, including all of those necessary to provide the highest quality licensed officer for the American Merchant Marine and California maritime industries.

Inherent in this mission are the following objectives:

To educate each Midshipman in an accredited college program in Nautical Industrial Technology, Marine Engineering Technology and related fields.

To train each Midshipman in the skills and knowledge essential to licensing in the Merchant Marine of the United States.

To develop in each Midshipman a strong sense of duty, honor, and service to country and instill a pride in the profession; and

To develop in each Midshipman a sound body and the physicial attributes necessary to successfully meet the rigors of the sea.

HISTORY

The California Maritime Academy was originally established in 1929 as the California Nautical School by an act of the State Legislature. In 1972 it was given its present status as an independent institution of higher education, deriving certain administrative support from the Trustees of the California State University and Colleges.

Federal authority and encouragement for state maritime academies date from an Act of Congress of 1874. While it is distinctly an educational agency of the State of California, the California Maritime Academy obtains considerable assistance from several federal agencies: Maritime Administration, Navy, Coast Guard, and Public Health Service.

The United States Maritime Administration interest stems directly from a mandate of the Congress, expressed in the Merchant Marine Act of 1936, which directs the maintenance of an adequate Merchant Marine to support American domestic and foreign commerce and to meet the requirements for national defense. The act provides that the Merchant Marine be "manned with a trained and efficient citizen personnel."

LOCATION

The California Maritime Academy is located on the north shore of the Carquinez Strait, in the City of Vallejo. It is about a thirty-minute drive on U.S. Interstate Highway 80 from San Francisco. The Naval Shipyard at Mare Island is in the immediate vicinity and is available for observation of drydocking, heavy shop practice, ship repair procedures, and electronic developments. Oceangoing steamers from all parts of the world pass through the Carquinez Strait en route to and from Sacramento and San Joaquin River ports.

FACILITIES

The Academy is situated on a 67-acre campus adjacent to the Carquinez Strait. A deep water pier provides berthing space for the training ship *Golden Bear* and encloses a boat basin for power, sailing and rowing boats.

A three-story brick residence hall, with a commanding view of the Strait, was completed in late 1958 and provides living and study accommodations for the midshipmen.

The Hugh P. Gallagher Library, completed in 1970, sits in the center of the campus, adjacent to the Golden Bear Park. The 5,000 square feet facility offers some 15,000 books, 200 periodicals, and over 2,500 microforms in maritime technology. Seating space is provided for 86 readers with new building plans to include increased space allowing greater resources.

Mayo Hall houses a well-equipped gymnasium, 25 meter indoor pool, and a 10-man Universal weight machine.

Classrooms are located in a two-story building and contiguous to the classrooms is a small assembly hall.

The dining hall is adjacent to the midshipmen formation area. Service is cafeteria style, and a balanced diet is provided.

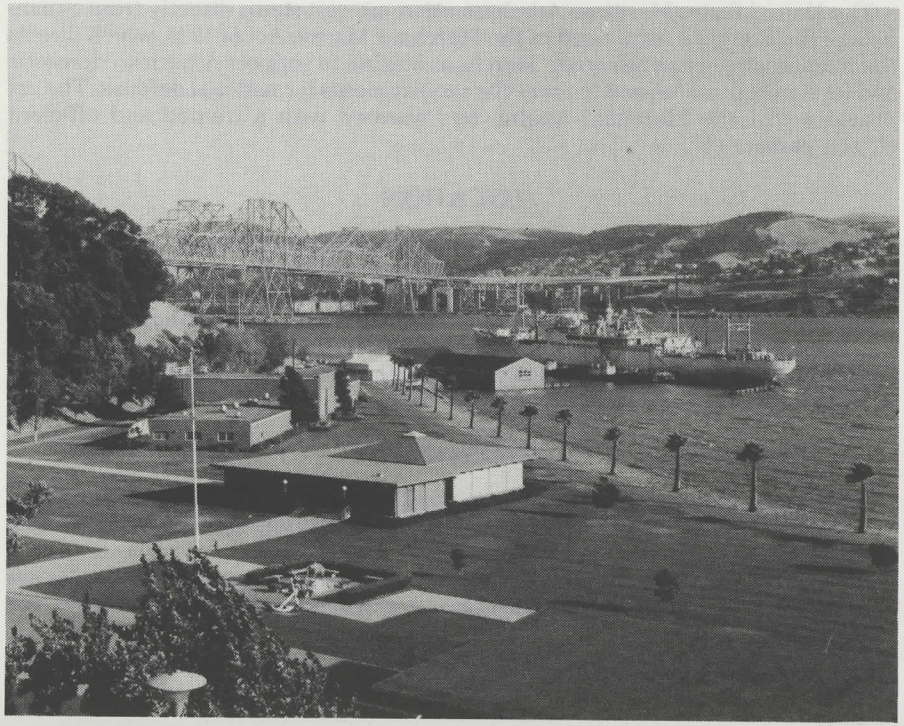
The Seamanship Building is located adjacent to the boat basin and provides facilities for instruction in manila and wire rope splicing, practical seamanship, boat overhaul and the reeving of blocks and tackles.

An engineering building, Dwyer Hall, completed in 1961, provides office space for the Marine Engineering Technology Department and classroom and laboratory facilities for instruction in chemistry, physics, electricity, electronics, diesel engines, and machine shop. A welding and burning shop are also provided. Dwyer Hall also houses the Academy's computer lab.

The Administration Building provides offices for the President, commanding officer of the Training Ship, Academic Dean, Commandant of Midshipmen, and Administrative Officer.

Tennis and handball courts and an athletic field provide ample outdoor recreational facilities.

The Academy's training ship GOLDEN BEAR is a 7,987 gross-ton vessel which can cruise at 16 knots and serves as a "floating laboratory" during the annual 10-week training cruise.



New Building Program

In the Fall of 1973 the Administration initiated an imaginative and extensive new building plan. The California State Legislature and the Governor, in 1975, endorsed the submitted master plan and set aside State funds of $5.7 million for construction and equipping. Over $1 million more has been requested for this program through the middle of 1978.

The first building to be erected, a 264-student residence hall, will be completed by mid-1977 if plans progress as rapidly as outlined. Ground will be broken, also, for a 500-seat auditorium building and a 2-story faculty office building. Extensive revisions and additions will be made by expanding the gymnasium, the library, the administration building and the corporation yard. A new welding laboratory will be built in the second half of 1977. The new building project is scheduled for completion by 1978. Bids have been accepted and construction has begun as of this writing (early 1976).

We believe that this innovative and bold expansion plan will create a maritime academy that will be a model for other academies and colleges. It has been designed to meet the needs of each student as he or she prepares to meet the challenges, opportunities and complexities of a growing maritime academy.

II. ADMISSIONS

Students normally enter the Academy in the Fall Trimester at the fourth class (freshman) level. Students who have attended a two-year or four-year college and have taken appropriate courses (see page 18) may enter in the Fall Trimester at the third-class level. Students with lesser or greater amounts of transfer credit should contact the Academic Dean at the Academy to determine their entry status and appropriate time of entry.

APPLICATION

Request an application for admission by writing or telephoning the Admissions Office, California Maritime Academy, P.O. Box 1392, Vallejo, CA 94590, telephone: (707) 642-4404.

Submit the application to the Registrar and upon receipt of the application, the Registrar will respond with specific information regarding additional materials required.

The additional documents required to complete the application are:

1) Entrance exams test scores
2) 1 official copy of high school transcript
3) 2 official transcripts of all college work attempted
4) 3 copies of birth certificate from the issuing agency
5) 3 letters of recommendation, at least one of which is from a high school or college counselor or principal
6) Statement of residence (will be mailed on receipt of application)
7) U.S. Coast Guard physical (authorization will be mailed on receipt of application)

Applications are processed and acceptance letters are issued as soon as applicant's file is complete. Application prior to April 1 is advised. Late applications will be considered if space is available.

GENERAL ADMISSION QUALIFICATIONS

Age—Candidates for freshman (4th class) standing must be at least 17 and under the age 24 if non-veterans, or under the age of 27 if veterans at the time of entrance into the Academy. Transfer applicants who are eligible to enter at the second year (3rd class) level may be one year older.

Citizenship—All candidates who expect to obtain a Coast Guard license are required to be citizens of the United States. The California Maritime Academy observes scrupulously the requirements of Title VI of the Civil Rights Act of 1964.

Section 601 of this title is quoted as follows: "No person in the United States shall, on the ground of sex, race, color, creed, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance."

Eligibility is without restriction as to sex, race, color, creed or national origin.

Physical Requirements—Candidates must meet the physical requirements for licensed officers in the U.S. Merchant Marine. Applicable regulations include the following:

1) Eyesight—Nautical Industrial Technology majors: minimum 20/100 in each eye. Correctable to 20/20 in one eye, and at least 20/40 in the other. Marine Engineering Technology majors: minimum 20/100 in each eye, correctable to at least 20/30 in one eye and 20/50 in the other.
2) General Health—Candidates must be mentally and physically sound. Epilepsy, insanity, badly impaired hearing or any other disability which might prevent the candidate from performing the ordinary duties of an officer at sea would preclude admission.
3) Color Blindness—Both Nautical Industrial Technology and Marine Engineering Technology students must be able to distinguish red, blue, green, and yellow in order to apply for the appropriate license.

Naval Reserve—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 and to accept the commission if offered.

Application for USCG Documentation—All students will be required to apply for a U.S. Merchant Mariner's Document which is issued by the U.S. Coast Guard. Additionally, all graduates will be required to apply for a license issued by the Coast Guard.

In applying for said document and license, each person must certify that he or she has not been convicted by any court (including a military court) for other than a minor traffic violation, and that he or she has neither used narcotics, nor been addicted to the use of narcotics. The definition of narcotics includes marijuana. A false application in this regard is a Federal crime, and any license or document falsely obtained from the Coast Guard may be administratively revoked by that agency.

Scholastic Requirements—Applicants for entrance at the fourth class (freshman) level must be high school graduates or holders of a high school equivalency certificate.

Each candidate must have his schools submit detailed records to the Academy of all completed high school, preparatory school and college work. To insure timely evaluation of the candidate's qualifications, these academic records should be received by 30 April of the year of desired admission to the Maritime Academy.

In addition, candidates must take one of the following three entrance examination test series and have the results sent to the Academy. Transfer students who took one of these series while in high school may have the results sent to the Academy. Transfer students who have less than one full year of college work and who have not taken the tests should take them and have the results sent to the Academy. Candidates having one or more years of college work to establish their performance in college-level studies need not submit entrance test results.

1) College Entrance Examination Board Scholastic Aptitude Test (SAT)

For dates and locations where these tests are given, consult your school counselor or contact:

College Board ATP
Box 1025
Berkeley, CA 94701
(415) 849-0950

2) American College Testing Program (ACT)
This series includes tests on English, Mathematics, Social Studies and Natural Sciences

For dates and locations where these tests are given, consult your school counselor or contact:

The American College Testing Program
P.O. Box 168
Iowa City, IA 52240
(319) 356-3711

3) California Maritime Academy Entrance Examination
The Academy offers its own entrance examinations in English and Mathematics for those persons who are not able to take the SAT or the ACT. The Academy administers its own entrance examination on the first Saturday of every month from January through June. In addition, if some persons are unable to travel to the Academy for the examination, arrangements can be made through a school counselor to administer the examinations locally. Please contact the Academic Dean of the California Maritime Academy to make arrangements.

When an applicant's file is complete, it is reviewed to determine admissibility. Although all of the data in the file are considered, some items are of paramount importance. These are:

The successful completion of two units (two years) of high school algebra is so important as a base for the academic programs of the Academy that an applicant without this qualification probably will not be admitted.

Good performance in the mathematics and science courses taken and good performance on the mathematical and quantitative positions of the entrance examinations are good predictors of success at the Academy, and are considered very important in the determination of admissibility.

A desirable distribution of subject matter in a high school program would be: 3 units of College Preparatory Mathematics, 2 units of Laboratory Science, 3 units of English, 2 units of History, 2 units of Foreign Language, 1 unit of Literature or Social Science, 2 units of Electives.

Admission in Advanced Standing

It is appropriate for a student to begin a maritime education at a college near home and then transfer to California Maritime Academy to complete the work. Living at home and attending a nearby college reduces the expense of education while giving the student an opportunity to test his or her abilities and preferences in college-level education. However, the format of education at California Maritime Academy is distinctly different from that at other four-year colleges and it is very important to do careful planning for the transfer.

Four commonly-occurring transfer student situations are described below in an attempt to clarify transfer possibilities.

1. A student attends a community college briefly to rectify deficiencies and then enters the Academy in a fall trimester at the fourth class (freshman) level. At the Academy this student takes the basic fourth class program but with modifications occasioned by some required fourth class courses completed at the community college. Courses which can be taken at a community college and serve this purpose may be selected from the list of courses on page 18. Having these courses completed before beginning the fourth class makes it easier to take courses toward one of the options described on pages 46 to 49.
2. A student attends a community college or a four year college for one and a half to two years and takes the courses listed on page 18. Then the transfer is made to the Academy in a fall trimester at the third-class (sophomore) level.
3. A student attends college for two, three, or even nearly four years searching for a field of interest or pursuing one field and becoming discouraged with employment possibilities in it. By this time, hopefully, he has taken most of the courses listed on page 18, and settling upon the objective of a maritime education, can enter the Academy in the fall trimester at the third-class (sophomore) level.
4. A student attends one of the other maritime academies for one, two, or three years and then decides to attend the California Maritime Academy. Such a student can usually complete his or her education with little loss of time because the curriculum contents at the various maritime academies are very similar. One year of residence at the California Maritime Academy and a G.P.A. of 2.0 for transfer credit is required of such a student who wishes to receive a degree from the Academy.

The recommended time for transfer into the California Maritime Academy is the fall trimester of the third class (sophomore) year. To accomplish the transfer into the third class without loss of time, the student should present 48 semester hour units of credit in very nearly the subject matter distribution of the list of courses on page 18.

It is well to remember that the curriculums of the Academy require four years, and that school is in session three trimesters (eleven months) each year. Included in the twelve trimesters are the three cruise, or sea-training, trimesters required by the Coast Guard as qualification to sit for the U.S. Coast Guard License examinations. Because there is only one cruise each year, the transfer student must be in residence at the Academy for three years in order to participate in the three required sea-training cruises. The student transferring at the beginning of the third class year must present academic credit equivalent to the fall and spring trimesters of the fourth class year and the winter trimester of the third class year. This enables the transfer student to go on cruise in the winter trimester of the third class year instead of staying in the classroom on campus as the regular third class students do.

If a student takes the courses listed below in another college and transfers to the California Maritime Academy in the fall trimester of the third class year, he or she will find courses scheduled so that time conflicts do not occur between the various required courses and the curriculum requirements may be completed within three years. If a student presents an array of courses which do not include the listed courses, a time schedule disaster will result. This is because so many of the courses at the Academy are sequential, most courses are offered only once each year and the time schedule format is very tight because of the many hours devoted to laboratory work.

Students transferring to the Academy at the beginning of the third class year should present the following course transfer credit:

2—89344

	Semester hour units
For *both the Nautical Industrial Technology and the Marine Engineering Technology* curriculums:	
Composition, UCB Engl. 1A or equivalent (or pass CMA English Proficiency Examination)	3
*Algebra (Intermediate or College Algebra)	3
*Trigonometry	3
Graphics (Elementary Engineering Drawing)	1
Physical Education (includes activity courses)	1½
Economics (Principles)	4
General Chemistry with Laboratory (college course at level of superior high school course is acceptable)	4
General Physics (mechanics, fluids, heat, sound, electricity and magnetism, light and atomic theory—mathematics base—trigonometry or calculus)	7
Calculus (Technology level acceptable)	3
†American History	3
†Political Science	3
Social Science or Humanities (one course in literature and one in humanities suggested)	6
	41½
Nautical Industrial Technology students should also transfer additional	
Social Science or Humanities	3
Computer Science (Fortran or Basic Programming)	3
Marine Engineering Technology students should transfer a second course in Calculus (Technology level acceptable) and 3 additional semester hours *selected from:*	
Social Science or Humanities	3
Economic Geography or Cultural Geography	3
Machine Shop	1 or 2
Welding	1
Statics (Technology level acceptable)	2
Engineering Materials (Technology level acceptable)	2
Computer Science (Fortran or Basic Programming)	3

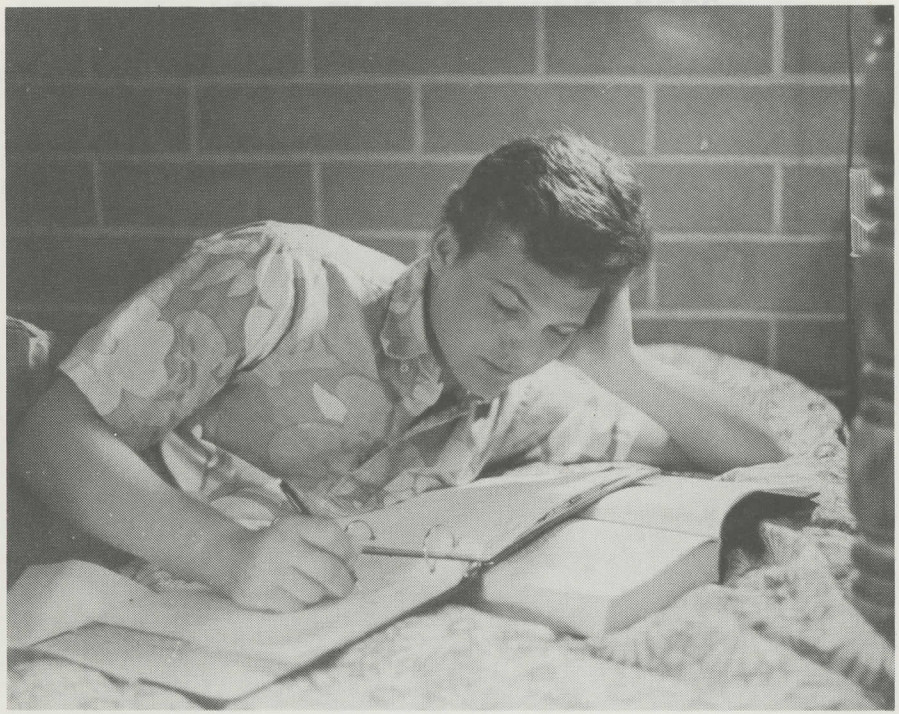
The Role of State Legislators

In years past legislators nominated individuals as candidates for admission to the Academy. As a result of Concurrent Resolution No. 64, legislators no longer nominate candidates for admission. But the Board of Governors wishes to keep legislators involved and notifies them of successful candidates from their districts so that they will have the opportunity to send letters of congratulations. The Registrar at the Academy will send all required enrollment forms and formal notification of admission direct to the candidate.

Privacy Rights of Students

Section 438 of the General Education Provisions Act, as amended, which is effective as of November 19, 1974, sets out requirements designed to protect the privacy of parents and students. Specifically, the statute governs (1) access to records maintained by the campus, and (2) the release of such records. In brief, the statute provides that the campus must provide students access to official records directly related to the student and an opportunity for a hearing to challenge such records on the grounds that they are inaccurate, misleading or otherwise inappropriate; the right to a hearing under the Act does not include any right to challenge the appropriateness of a grade as determined by the instructor; the student may, however, use this process to verify that the grade given by an instructor has been properly transmitted into the student's records. The Act generally requires that written consent of the student be received before releasing personally identifiable data about the student from records to other than a specified list of exceptions. This summary of the Act's provisions is being supplied as required under the Act. An office and review board has been established by the Department of Health, Education and Welfare to investigate and adjudicate violations and complaints under the Act. The office designated for this purpose may be contacted at the following address: Mr.Thomas S. McFee, Room 5660, Department of Health, Education and Welfare, 330 Independence Avenue, S.W., Washington, D.C. 20201; telephone (202) 245-7488.

The campus is authorized under the Act to release public directory information concerning students. Directory information includes the student's name, address, telephone listing, date and place of birth, major field of study, participation in officially recognized activities and sports, weight and height of members of athletic teams, dates of attendance, degrees and awards received, and the most recent previous educational agency or institution attended by the student. The above designated information is subject to release by the campus at any time unless the campus has received a prior written objection from the student specifying information which should not be released.



* Waived if the Calculus course taken was based solely upon knowledge of high school Algebra and Trigonometry.

† These courses meet the State of California American History and American Institutions requirements. They also meet corresponding requirements within the U.S. Naval Reserve Commission Program.

III. TUITION AND FEES

COSTS OF ATTENDANCE

Payment: Total assessed fees, as shown in the schedule below, are due on or before the first day of each trimester. There is no exception to this requirement; according to State regulation a student is not enrolled nor entitled to attend classes or receive other services until all fees have been paid. Charges are subject to change without notice. Financial assistance is available, but the student must arrange for financial assistance prior to registration.

Maritime Administration Subsidy: Most students will receive a subsidy of $600 per year from the U.S. Maritime Administration (MARAD). However, the selection of subsidized candidates is not made until after the first trimester, based on fall trimester grades. Those who receive the subsidy will be paid directly in quarterly installments.

Schedule of Annual Fee Payments

California Residents	*1st trimester*	*2nd trimester*	*3rd trimester*
Tuition*	$135	135	135
Room	150	150	150
Board	400	400	400
Medical	25	25	25
Breakage Deposit	50	—	—
Student Activities	40	—	—
Insurance**	10	—	—
Total Tuition and Fees	$810	$710	$710
Less MARAD Subsidy (eligible students)	200	200	200
Net Cost	$610	$510	$510

* Tuition fee for out-of-state students is $175 additional per trimester.
** Insurance is a group policy concerning loss of life or limb.

Clothing, Books, and Supplies: Entering students must deposit in trust $800 for clothing, books and supplies on or before the first day of the first trimester to be drawn from as needed. Returning students must deposit sufficient funds to maintain a minimum balance of $50 at the beginning of each trimester. Any unexpended balance in the account will be returned to the student at the termination of enrollment.

Total Costs: (excluding clothing and books)

	Annual Fees	*Total Fees (Four Years)*
In-State		
Subsidized Student	$1,630	$6,520
Non-subsidized Student	2,230	8,920
Out-of-State		
Subsidized Student	2,155	8,620
Non-subsidized Student	2,755	11,020

Refunds

Resident and nonresident tuition and fees paid to the State of California may be refunded to a student withdrawing from the Academy or ceasing to be a student. Such fees may be refunded in accordance with the formula herein set forth:

FORMULA FOR REFUND

Time of Withdrawal	*Refund*
(1) Before or during the first week of a trimester	95%
(2) During the second week of a trimester	90%
(3) During the third week of a trimester	70%
(4) During the fourth week of a trimester	50%
(5) During the fifth week of a trimester	30%
(6) During the sixth week of a trimester	10%
(7) No refunds after sixth week of trimester	10%

All unused uniforms that have not been stencilled may be returned for a refund if a student leaves the academy prior to September 15.

All fees collected in error, including nonresident tuition, may be refunded at any time within one year of the Academy's collection of such fees.

Student activities fees will be partially refunded only before or during the first week of the trimester.

FINANCIAL AIDS

Financing should not be a barrier to attendance at Cal-Maritime. Loans, grants, scholarships and part-time employment are available to those who demonstrate need for assistance and are United States nationals. Often, "packages" of two or more kinds of aid are offered to eligible applicants.

Eligibility, unless otherwise noted, is based upon need as determined annually by analysis of the Parents' Confidential Statement (PCS). Applicants should submit the PCS, available from high school counselors and the Academy, and the CMA Financial Aid Application, available from the Academy, prior to March 1, for consideration. Later applications will be accepted if funds are available.

Loans

The National Direct Student Loan is a federally funded long-term loan, repayable beginning nine months after graduation at 3% annual interest. The loan is interest-free until the end of the grace period.

The Federally Insured Student Loan, made by private lenders and guaranteed by the federal government, is repayable beginning 9 months after graduation at 7% annual interest. The interest may be paid by the federal government until the end of the grace period if adjusted family income is under $15,000 per year. Requires a separate application, available from the Academy. Application can be made at any time during the year. Processing takes approximately two months.

The California Maritime Academy Midshipmen's Loan Fund provides short-term tuition loans at 5% annual interest. Loans must generally be repaid prior to the end of the trimester in which funds are advanced. Requires a separate application available at the Academy.

Student loan programs are also subsidized by a number of service organizations such as the California Maritime Academy Foundation, the Propeller Club of the United States, and the Society of Port Engineers and individuals. Contact the Academy for further information.

Grants

The Basic Educational Opportunity Grant is a federal grant for students with exceptional need. A separate application, available from high school counselors and the Academy, must be submitted directly to the federal government.

The Supplemental Eduational Opportunity Grant is a federally funded grant for

students with exceptional need. It is offered when other aid is not adequate to meet a student's costs.

The College Opportunity Grant, for entering freshmen who are California residents and who demonstrate exceptional financial need is awarded by the California State Scholarship and Loan Commission. Applications and instructions are available from high school counselors. Application deadline is mid-December for the following academic year.

Employment

The College Work-Study Program, funded by the federal government, provides part-time jobs on the campus. Midshipmen generally work from 5 to 15 hours per week at an average wage of $2.80 per hour.

Scholarships

California State Scholarships in the amount of $400 are awarded annually by the California State Scholarship and Loan Commission to California residents, based upon need and academic achievement. Applications are available from high school counselors and the Academy. Deadline is mid-November for the following academic year.

Privately administered scholarships, generally awarded on the basis of need and academic achievement, are offered by many service organizations. Information is available from high school counselors and public libraries. Application is made directly to the donor.

VETERAN'S EDUCATIONAL ASSISTANCE

Cal Maritime is approved for student assistance by the Veteran's Administration. Students should apply to the local office of the V.A. in their region for assistance and information.

IV. STUDENT BODY ORGANIZATION AND ACTIVITIES

STUDENT BODY ORGANIZATION AND ACTIVITIES

Corps of Midshipmen

For purposes of organizational training and the further development of a sense of self-discipline, the student body is organized into a Corps of Midshipmen.

A quasi-military routine is followed and the midshipmen wear a functional, standard merchant marine khaki uniform most of the time (dress blues, tropical whites, etc. at other times).

The entire student body is under the direction of the Office of the Commandant of Midshipmen who is responsible for the conduct, welfare and morale of the corps. The Commandant's office is presently under expansion in order that student services will include a sensitive personal counseling program for those who have need.

The corps is divided into eight divisions which are commanded by students of the senior class, called First Class at the Academy. They in turn are responsible to the Corps Commander and his Executive Officer. Such training is maintained in order that the young men and women of the Academy may experience first hand the chain of command interdependence found on all merchant ships as well as to gain first hand experience in the management of personnel and leadership.

Orientation Week

The Corps officers, through the Commandant's office, are responsible for the orientation week which takes place early in August for the entering 4th class (freshman).

The purpose of orientation is to provide an understanding of the life of midshipmen at the Academy, including responsive attitudes toward study, discipline, duty and personal growth.

Entering students are provided with a background in the Academy's two core curriculums (Nautical Industrial Technology and Marine Engineering Technology) to enable them to make a decision as to which course of study they wish to pursue in the basic four-year program of the school.

The orientation week also provides for the issuance of uniforms, academic testing, academic counselling and normal registration procedures.

As far as their position in Corps of Midshipmen and its functions are concerned, all entering students are designated as Fourth Class until the completion of their first sea-training period. At that time some midshipmen who have advanced academic standing because of previous College work can be advanced to Third Class (Sophomore) standing within the Corps. Other students of academic standing sufficiently advanced to complete within three years are given a Third Class academic status at entrance. This is of particular significance to those who because of their age would not be eligible to enter at the Fourth Class level. This academic standing does not exempt entering students from a beginning status (Fourth Class) in the Corps of Midshipmen.

CONDUCT

Midshipmen are being prepared for a life at sea where responsibilities for the safety and welfare of the ship, her passengers, crew and cargo must be met from the first day aboard the first ship as a fresh Maritime Academy graduate and newly licensed officer. An education at the Maritime Academy is, therefore, a total life experience. By total life experience it is meant that the student is given the best opportunity for growth and discipline in not only mind and body, but in spirit and will as well.

Students will receive an academic education comparable to that offered by any college in the State. At the same time they will be taught the mental and physical skills essential to a responsible life at sea. But the mariner is not mind and body alone. He is also a person performing in a profession where he must maintain a meaningful relationship with his fellow men. This is one strong reason why the student body is organized into a corps of midshipmen and close communal living on campus as well as on board the training ship are regarded as an integral part of the educational process.

Rules are essential in any social group. They are particularly important on ships at sea where responsibilities are great, associations are intimate and teamwork essential. Midshipmen will discover that the Academy rules seek to keep these considerations in mind.

Basically the Academy rules seek to encourage a growth of personal responsibility and consideration of your fellow midshipmen. They are directed to preserving the good order that a serious pursuit of study and effective learning demands. Complying with the Academy rules should be no problem because a violation would be inconsiderate of your fellow midshipmen and clearly an injustice to them.

Breaking of established Academy regulations can mean the assignment of demerits. If a student reaches a total of 65 demerits during a trimester, he or she is called before one of the Review Boards for a hearing, and may be dropped from the Academy or may be denied re-enrollment for the succeeding academic year.

Midshipmen may be dismissed from the Academy by the President at any time for a serious disciplinary infraction or may be dropped for academic failure or inaptitude.

It should be noted that a midshipman who is placed on probation for conduct may lose the federal subsistence allowance for one trimester.

Midshipmen are, therefore, expected to maintain a high personal standard of self-discipline and motivation.

Daily Schedule

A midshipman's daily routine begins at 0630 (6:30 a.m.) followed by breakfast and morning colors formation at 0800 (8:00 a.m.). After colors, midshipmen have scheduled classes and laboratories in Academy laboratories or aboard the Training Ship Golden Bear until 1600 (4:00 p.m.)

The time between 1600 (4:00 p.m.) and 1730 (5:30 p.m.) is a midshipman's free time and is normally devoted to varsity athletics, intramurals, club meetings, library study, or some form of extra-curriculare recreation. Following the evening meal at 1730 (5:30 p.m.) the rest of the evening is generally spent in studies or liberty. However, to afford educational opportunities not possible during the 0800 to 1600 period some elective and out-of-sequence classes are scheduled at 1630 (4:30 p.m.) and 1900 (7:00 p.m.)

Leave and Liberty

All midshipmen are granted approximately two weeks leave during the Christmas Holiday, three days during Thanksgiving, one week in the spring following the training cruise and three weeks at the conclusion of the academic year (July and August weeks).

At the conclusion of classes at 1600 (4:00 p.m.) the First Class is granted liberty until 0230 (2:30 a.m.). Second Class liberty commences at 1630 (4:30 p.m.) and ends at 0200 (2:00 a.m.). Third class liberty begins at 1630 (4:30 p.m.) and ends at 0100 (1:00 a.m.).

Fourth Class midshipmen are only granted Wednesday evening liberty in addition to weekend liberty during the first two trimesters at the Academy, in order that healthy study habits can be formed. Midshipmen on the 24-hour watch section or on conduct restriction must remain on the campus at all times.

The Commandant's office grants sick leave or emergency leave to any midshipmen when circumstances warrant, and also grants special leave or liberty for extra-curricular activities and special events.

Student Government

Students are encouraged to participate in an active student government. A Student Council, comprised of the elected officers of each of the four classes, meets with the President and other administrative officers periodically to discuss applicable items of student interest.

Counseling

Academic counseling is provided by assigned faculty advisors or the Dean who meets with students periodically or upon request. Personal and career counseling is available to students as needed through the Dean's Office or the Commandant's.

Medical and Dental Care

With regard to medical treatments facilities available in case of illness or injury occurring at the Academy:

A. A medical assistant is available for first aid. Additionally, the services of a contract physician are available.
B. During the Sea Training Trimester a licensed physician is on board the training ship.
C. Hospitalization is available at the U.S. Public Health Service Hospital in San Francisco.

All of the foregoing are furnished at no cost to the student. However, should the injury or illness occur while the student is away from the Academy, except as noted, any expense for emergency treatment or transportation to the U.S. Public Health Service Hospital must be borne by the student. While enrolled at the Academy a student is covered by a $5,000 loss of life or limb policy. When away from the Academy as a member of an athletic team a student is covered by a $1,500 accidental death or medical hospital indemnity-accident insurance policy. Dental treatment is furnished at the U.S. Public Health Service Hospital in San Francisco.

Motor Vehicles

The use of motor vehicles (autos and motorcycles) at the Academy is considered a privilege which is granted subject to compliance with Academy regulations. The privilege may be withdrawn if the regulations are violated.

V. EXTRA-CURRICULAR ACTIVITIES

EXTRA-CURRICULAR ACTIVITIES

ON CAMPUS

A center for student social activities and recreation, temporarily housed in the Naval Science Building, includes a coffee mess, pool table, naval library and reading lounge and meeting areas. A television lounge is provided in the dormitory for student use during free time as well as reading lounges in the campus library. There is also a canteen in the dormatories for the purchase of small items.

The gymnasium, exercise room and pool are usually kept open in the evening for use by students.

A variety of clubs and special interest groups are in existence with full endorsement of the Academy and financial support in the form of equipment and material. The monthly student newspaper, the BINNACLE, and the annual yearbook of the graduating class, the HAWSEPIPE, are two activities receiving Academy financial support and students interested in journalism are encouraged to participate in their publication. Students are also encouraged to take the initiative in forming new clubs and special interest groups with faculty advisement.

There are no fraternities or sororities sanctioned by the Academy, nor does the Academy take any official stand, pro or con, on the existence of such organizations.

On campus social and recreational events currently include basketball and soccer games, post game dances and weekend picnics for alumni and other Acadedmy related groups. Considerable expansion of the on-campus cultural and social calendar is planned upon completion of the 500-seat auditorium.

The HONOR GUARD and DRILL TEAM sponsored by the Academy through the Department of Naval Science practice on campus, but participate in parades and other competitions throughout the state, winning many honors and awards yearly.

OFF-CAMPUS

The San Francisco Bay area is world renowned for the variety and richness of its religious, cultural, educational and entertainment activities. The student will have no difficulty in finding pursuits to fill his or her leisure time.

Driving time from Vallejo in the extreme north of San Francisco Bay to San Jose in the extreme south is less than two hours. Included within this driving range are social, educational and cultural events conducted on campuses of the University of California and California State Universities as well as several private universities and community colleges which are free or at reduced rates for Cal Maritime students. Also within this range are the San Francisco and Oakland symphonies; the Oakland Center for the Performing Arts; the American Conservatory Theatre widely recognized as one of the finest theatre companies in the world; the San Francisco Opera and Ballet Company; various public and private theatres offering legitimate theatre, musical comedy and pop-concerts; countless public and private museums and art galleries; and zoological and botanical gardens. Many of these functions are at no cost or at reduced rates for Cal Maritime students.

Cal Maritime teams participate in inter-collegiate basketball and soccer, and other inter-collegiate sports events can be attended by Cal Maritime students at reduced rates. The San Francisco Bay area is home for major league baseball, football, basketball and ice hockey and Cal Maritime students are eligible for student rates for these events wherever offered.

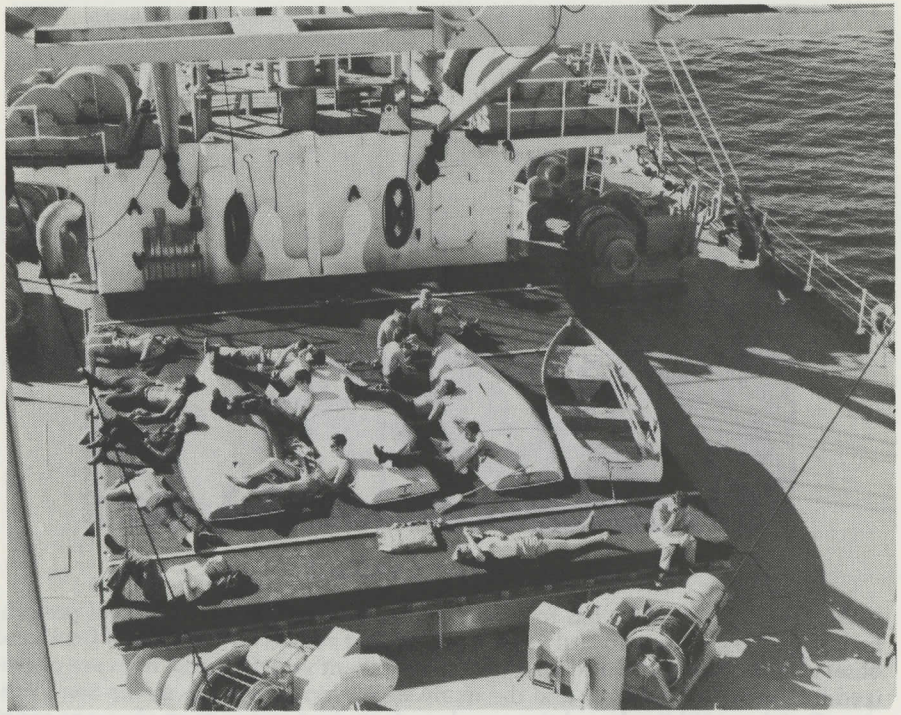
For outdoor lovers the Academy and the California Maritime Academy Foundation operate several power and sailing boats and yachts used for cruising and fishing around the Bay, Sacramento and San Joaquin Rivers and Deltas, and near

California coastal waters of the Pacific. Midshipmen are welcome on these cruises as crew members, operators or guests, which is an excellent opportunity to practice and polish small boat handling techniques and seamanship or to just relax.

The California Maritime Academy Foundation also uses its yachting fleet to give an opportunity to disadvantaged youth to learn something about boating, and Midshipmen are invited to participate in this program.

Other outdoor activities in the area include picnicing, hiking, horseback riding, surfing, scuba diving, and so on, in many national, state and regional parks; all within the two-hour driving time. Just to mention a few, there are: Golden Gate Park in San Francisco; Tilden Park in Berkeley; Muir Woods Park in Marin County, where one of the most inspiring stands of coast redwoods, sequoia sempervirens, is to be seen; Mount Diablo Park in Contra Costa County; Angel Island recreation area in San Francisco Bay; Stinson and Bolinas Bay beaches in Marin County, and San Francisco Beach in San Francisco. Admittance to these facilities is gratis or for a small fee.

Off-campus events are of course myriad; however, the Academy, through the student council, sponsors the annual RING DANCE at one of the large hotels or private clubs in the Bay Area.



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RELIGIOUS PRACTICE

The Academy has no official stand on religious practice nor are any formal religious observances conducted on campus or the training ship with mandatory attendance by students. However, since every major religion and many religions not commonly considered major are active within the two-hour driving time from the campus, no student should unwillingly suffer from lack of spiritual guidance and fellowship.

The Protestant, Roman Catholic, Eastern Orthodox and Jewish faiths all have congregations in Vallejo or environs, ethnic Chinese and Japanese Buddist, Taoist and Zen societies and assemblies as well as churches exist in San Francisco and other parts of the Bay area and an Islamic Center and Moslem Mosque are located in San Francisco. There are numerous Spanish-speaking Protestant and Roman Catholic congregations scattered throughout the San Francisco Bay area and in the Sacramento and San Joaquin Valleys. There are a variety of Eastern Orthodox congregations in the Bay area with liturgies in the Greek, Russian, Armenian, Serbian, and Arabic languages. Virtually all congregations in the Bay area have their own social programs in which the student is free to participate; however, several religious clubs are in existence on-campus whose members attend services as a group and hold prayer meetings and breakfasts during the year.

Industrial Contact

Whenever the student has free time, *ie,* weekends, holidays, vacation periods, he is urged to go to sea aboard various West Coast vessels for a period of first-hand observation of the real-world operation of merchant vessels. These trips are organized between the Academy and the many steamship companies in the San Francisco Bay Area. While aboard the vessel, each student serves as an observer-cadet under the direction and assistance of the ship's officers. Voyages for the students may be just a few days up and down the coast, or they take the student to Alaska, Hawaii, or Japan.

VI. THE ACADEMIC PROGRAM

ACADEMIC PROGRAM

Accreditation

The California Maritime Academy is recognized by the Accrediting Commission for Senior Colleges and Universities of the Western Association of Schools and Colleges as a candidate of the Commission. A candidate is an emerging institution, which has indicated its intent to work toward accreditation, has provided evidence of sound planning and of the resources to implement these plans, and appears to have the potential to attain accreditation within a reasonable time. Candidate status is not accreditation, and does not assure or imply eventual accreditation.

In addition to institutional accreditation, the college is pursuing accreditation of its two degree programs. The Engineers Council for Professional Development granted the Marine Engineering Technology program candidate status in its accreditation process. This status is subject to annual review.

The National Association of Industrial Technology, not having a candidate status, has had a representative pay a consulting visit to the campus for the purpose of observation and review of the Nautical Industrial Technology program.

Degrees*

The bachelor of science degree in nautical industrial technology or the bachelor of science degree in marine engineering technology is conferred upon midshipmen successfully completing the academy program of instruction and the applicable U.S. Coast Guard license examination(s).

Licenses

Midshipmen meeting the physical and educational requirements of the U.S. Coast Guard examination are licensed as third mates or third-assistant engineers and are qualified in these capacities to serve aboard any American Flag ship.

School Year

The academic year is divided into three trimesters. The Fall and Spring trimesters are approximately 17 weeks each and the winter trimester is approximately 12 weeks in length. A brief recess follows each trimester.

ACADEMIC STANDARDS

Grading System

The letter grading system with corresponding grade points is used to indicate the caliber of the student's work. The scholastic significance of the grades are:

Letter scale		*Grade points*
A	Outstanding	4
B	Excellent	3
C	Average	2
D	Minimum passing grade	1
F	Failed	0
T	Taken out of sequence	0
V	Validated—requirement met	0
W	Withdrew	0
WF	Withdrew under failing conditions	0

* Note: See description of the major programs in "Curriculum" chapter.

In certain courses, grades must of necessity be assigned on a pass or fail basis. The designation P or F is used in such case.*

A midshipman is expected to maintain a grade point average of 2.0 (C) or better to continue in good standing. To be eligible for the B.S. degree a student is expected to complete the program with a grade point average of 2.0 (C) or better.

Academic Probation

A student will be placed on probation when his grade point average falls below 2.0 (C). A student on probation will be restored to good standing whenever his grade point average is restored to 2.0 or higher.

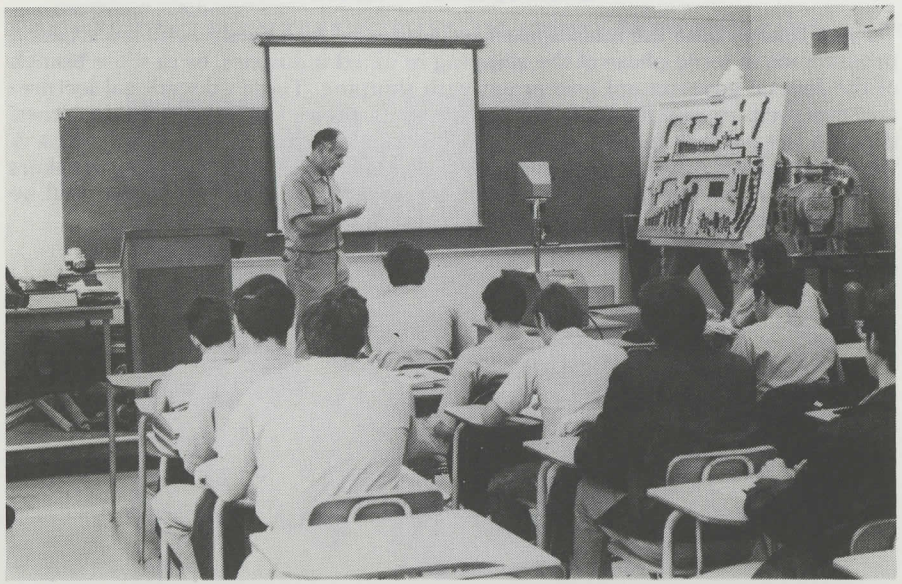
Disqualification

1. A student on probation will be disqualified at the end of any trimester for which he fails to earn a minimum of 2.0 (C) average.
2. Any student whose grade point average falls below the following scale may be disqualified by action of the Academic Board regardless of whether or not he is on probation.

Units attempted	*Disqualification Minimum*
0–29	1.5
30–59	1.7
60–89	1.9
90 or more	2.0

3. The Academic Board may take special action to place a student on probation or disqualify him when the student's academic performance during any one trimester is so poor as to raise serious doubts as to the desirability of his cotinued enrollment, even though his cumulative grade point average meets minimum scholarship requirements. The Academic Board may also grant continuance for students falling below the minimums providing there are extenuating circumstances. Such stays must be made up the following trimester.

* Courses taken on a pass or fail basis are not counted in G.P.A. unless a failing grade is assigned.



Readmission of Disqualified Students

Disqualified students may, after at least one regular trimester has elapsed, petition the Readmission Board through the Dean's Office for readmission. Petitions will receive consideration if they are accompanied by evidence that would justify readmission, such as successful academic work elsewhere. A disqualified student who is readmitted will be on a probationary status until he has removed all grade point deficiencies or is again disqualified.

No application for readmission for a particular trimester will be accepted for consideration from a disqualified student if it is presented later than three weeks before the first day of registration. The Dean may make the decision as to the advisability of readmission or schedule a meeting of the Readmission Board if in his opinion such action is needed.

Special Schools and Certification

Incorporated into the instructional program are a series of special schools and U.S. Coast Guard examinations designed to provide the midshipmen with training and certification in special fields. Among these are:

U.S. Navy Firefighting School
U.S. Navy Damage Control School
U.S. Coast Guard Lifeboatman Certification
U.S. Coast Guard Able Seaman Certification
U.S. Coast Guard Radar Observer Certification
Communications Certification
U.S. Public Health Service First-Aid Certification

Field Trips

The knowledge and principles studied in professional courses are strengthened and made more meaningful when observed in their natural setting. Therefore, field trips to shipping terminals, cargo vessels, ship repair yards, and industrial laboratories, form a regular part of the instructional program.

Guest Speaker Program

From time to time the midshipmen are addressed by a person who has attained prominence in some phase of the shipping or allied industries, or in some branch of the federal government concerned with shipping. These educational lectures are designed to supplement the information presented to the midshipmen through the cirriculum and to provide additional instruction in related fields. A weekly one-hour period free of scheduled classes is provided for visiting speakers and special Academy programs. Greatly improved facilities for this hour will be available upon the completion of the 500-seat auditorium.

Awards and Honors

It is expected that every midshipman will perform to the best of his ability and maintain an academic record that will be of credit to himself and the Academy. The "Dean's List" is published each trimester to honor those students who have earned a 3.0 grade point average (B average).

Upon graduation, outstanding scholarship as well as practical sea-going talents are recognized by the granting of various awards from major maritime and related industrial groups. In the past, the following awards have been granted:

AMERICAN BUREAU OF SHIPPING, NEW YORK: For the highest overall grade point average.

CALIFORNIA MARITIME ACADEMY ALUMNI ASSOCIATION: For outstanding contribution to the Midshipmen Corps.

CALIFORNIA MARITIME ACADEMY FOUNDATION: For outstanding services to the CMA Foundation.

CHEVRON SHIPPING COMPANY OF SAN FRANCISCO: For excellence in Practical Navigation and for excellence in Marine Machinery Lab courses.

GEORGE K. GANN MEMORIAL AWARD: For displaying marked love and affection for the sea.

MATSON NAVIGATION COMPANY'S "HUGH GALLAGHER AWARD": For greatest leadership last cruise.

NAVAL SCIENCE-U.S. NAVAL INSTITUTE AWARD: For recognition of scientific and professional knowledge of the Navy.

PACIFIC FAR EAST LINE: For greatest contribution to the interests of the maritime profession as a Midshipman.

ROTARY CLUB OF VALLEJO: For the outstanding senior athlete.

SAN FRANCISCO BAR PILOTS: For excellence in Shiphandling.

SAN FRANCISCO JUNIOR CHAMBER OF COMMERCE, MARINE COMMITTEE: For the best overall performance during sea training.

SHIPOWNERS AND MERCHANTS TOWBOAT COMPANY: For excellence in seamanship.

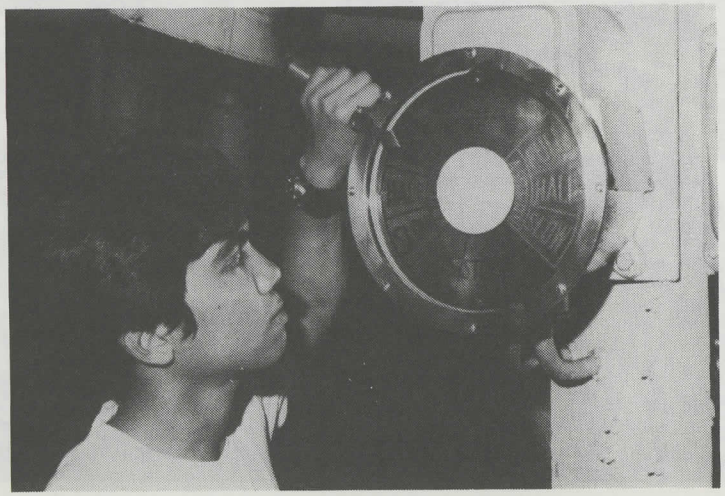
THE SOCIETY OF PORT ENGINEERS OF LOS ANGELES-LONG BEACH: For outstanding practical student in each department from Southern California.

THE SOCIETY OF PORT ENGINEERS OF SAN FRANCISCO: For excellence in Watch Standing.

R. D. SWEENEY OF LOS ANGELES AWARD: For the highest three-year Conduct Grade.

WOMEN'S PROPELLER CLUB OF SAN FRANCISCO: For the highest composite GPA for courses in mathematics.

PROPELLER CLUB OF THE UNITED STATES AWARD: For outstanding academic average.



VII. CURRICULUM

CURRICULUM

THE MAJOR

Students at the Academy major in either Nautical Industrial Technology or Marine Engineering Technology. Bachelor of Science degrees are awarded in these two fields. These major programs are organized to reflect the division of labor and responsibility found on vessels of the Merchant Marine, Navy, Coast Guard and other marine services and industries. The traditions, customs and regulations of most maritime nations dictate that ships crews will be divided into the major departments of deck, engineering, and other departments composed of cooks and stewards, pursers, radio officers, doctors, etc.

NAUTICAL INDUSTRIAL TECHNOLOGY MAJOR (N.I.T.)

The student aspiring to a career as a licensed deck officer majors in Nautical Industrial Tehnology. This title is used for the deck program because the deck curriculum embodies the two major aspects of industrial technology programs taught at other colleges; namely, a technology concentration and a mangement concentration. For the N.I.T. program the technology concentration consists of seamanship, navigation, ship operation, cargo handling and nautical rules of the road. These, the deck officer must master to meet his immediate responsibilities as a mate. A mate is also a manager aboard ship. Mates rise to the position of Captain or Master of the ship. The Master is the commanding or managing officer of the ship. After considerable experience at sea, mates are often given the opportunity to serve ashore in a shipping company or related maritime industry in a managment capacity. It is for these reasons that management is the second emphasis in the Nautical Industrial Technology Curriculum.

Composition, number and organization of departments and groups onboard ship vary from nation to nation, industry to industry, company to company and ship to ship; however, on all ships the Master, Captain or Commanding Officer is the ranking officer aboard to whom the heads and chiefs of the various departments and groups are responsible. Directly under the Master in chain of command are the chief officer, the junior deck officers and deck department charged with the navigation, cargo stowage and management of the ship.

Deck licenses issued by the Coast Guard in increasing rank are: Third Mate, Second Mate, Chief Mate and Master. Licenses are further restricted as to waters and vessel tonnage. Nautical Industrial Technology Majors will satisfy all the requirements to take the Coast Guard Examination for Third Mate, Oceans, Unlimited. Further raise in grade is dependent upon the graduates ability to accumulate sea time and to pass examinations of increasing complexity and difficulty. The higher licenses to deck officers are issued by the United States Coast Guard after satisfactory completion of a written examination and actual sea going experience, usually one year, in the next grade of license lower to that being issued.

The Nautical Industrial Technology program is designed to give the student the necessary background in navigation, seamanship, cargo handling and rules for all grades of license up to and including Master. After the requisite experience it is a comparatively simple matter for an Academy graduate to review his studies, integrate his experience and successfully undertake the examnations for the successively higher licenses.

MARINE ENGINEERING TECHNOLOGY MAJOR (M.E.T.)

The engineering department of a ship is organized similarly to the deck department with the Chief Engineer as the ranking officer. The Chief Engineer on most vessels ranks with the Master in salary but under laws and by tradition is responsible to the Master. Under the Chief Engineer are the First Assistant Engineer, the junior engineers and engineering department charged with operation, maintainance and repair of the vessel's Engineering Systems.

Engineering licenses issued by the Coast Guard in increasing rank are: Third Assistant Engineer, Second Assistant Engineer, First Assistant Engineer and Chief Engineer. Engineering licenses are further limited as to type of main propulsion machinery, i.e., steam, diesel, etc., and horsepower. Marine Engineering Technology majors will satisfy all the requirements to take the Coast Guard examination for Third Assistant Engineer, Steam Vessels, Unlimited with an endorsement as Third Assistant Engineer, Motor Vessels, Unlimited. Further raise in grade is dependent upon the graduate's ability to accumulate sea time and to pass examinations of increasing complexity and difficulty. Higher licenses to engineering officers are issued by the United States Coast Guard after satisfactory completion of a written examination and actual sea going experience, usually one year, in the next grade of license lower to that being issued.

The Marine Engineering Technology program is designed to give the student the necessary background in marine propulsion systems and the other engineering systems aboard ship for all grades of engineering license up to and including Chief Engineer. After the requisite experience, it is a comparatively simple matter for an Academy graduate to review his studies, integrate his experience and successfully undertake the examinations for the successively higher licenses.

N.I.T. AND M.E.T. MAJORS COMPARED

At the time of graduation the Nautical Industrial Technology graduate has a specific training which fits him for service as a mate on a ship. As his management experience accumulates and is enhanced by further education his employment horizons can broaden. On the other hand, the Marine Engineering Technology student at graduation is fitted not only for service as an engineer aboard a ship but for employment as an engineering technologist in a wide range of industries ashore. His education is much like that of a graduate of the mechanical engineering technology curriculum offered in other colleges, the difference being an emphasis on power rather than on manufacturing processes. The M.E.T. graduate has wider employment horizons than does a N.I.T. graduate with more jobs to choose from at the time of graduation, and, also, after a number of years of sailing on his license.

TECHNOLOGY AND TRADITIONAL EDUCATION COMPARED

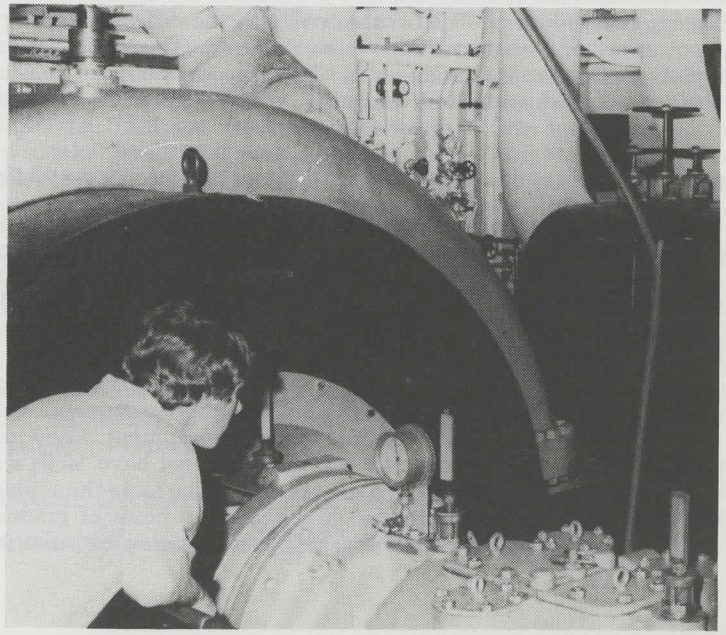
Both of Cal Maritime's Major curriculums follow the philosophy of technology education. Technology graduates are prepared to be doers in current operations. On the other hand traditional educational programs in engineering or management give students a background in sophisticated theory for the design and devisement of the engineering devices or systems or the management operations of the future. In traditional programs knowledge of current techniques and operations must be learned through on-the-job training. The technologist studies theory with lesser mathematical sophistication and with more attention to concepts. He spends a great deal of time studying and operating current equipment. The technology graduate has skills which the traditional graduate does not have, skills which his employer can put to immediate use. On the other hand he lacks the sophisticated theoretical knowledge of the traditional graduate. Both kinds of graduates are needed in the modern industrial system. They work together to make it go.

That a technology graduate has not been exposed to sophisticated theory and methods, does not preclude his getting this exposure at a later date through further education. Capable technology graduates are welcome in traditional engineering and business administration graduate programs. It is true that they will have to take some prerequisite theoretical undergraduate courses to get started, but the transition is not very difficult for the capable student. When he has acquired the masters degree, he knows first hand how it is done now and has full background for the design and innovation of future systems. This is good equipment for the man who aspires to top-level positions.

THE LENGTH OF MARITIME ACADEMY PROGRAMS

One who is familiar with other college programs notices that maritime academy programs are longer than those at other colleges. California Maritime Academy has this characteristic in common with other maritime academies. The elapsed time to earn a bachelor's degree is the same, four calendar years, at the academies and at traditional colleges. However, students are in attendance at an Academy for eleven months a year while at traditional colleges students are in attendance for nine months each year. The Academy midshipman is therefore in school for more months and earns more units of academic credit for his bachelor of science degree than does a student at other colleges.

The reason for this longer program at academies lies in the fact that virtually no on-the-job training is available to the new third mate or third assistant engineer aboard a merchant vessel. The new officer must be able to assume full responsibilities of operation, watch and equipment maintenance the first hour on a ship. Preparation for these responsibilities comes from the sea training cruises where the midshipmen operate the school ship under the monitoring and instruction of licensed officers who are also instructors for the midshipmen in the campus classrooms and laboratories. The total instructional program is thus efficiently integrated to cover all of the theory, equipment familiarization, and operating skills which the new officer must have.



ELECTIVES AND OPTIONS

In order to round out the academic program, maritime-related elective courses are offered by the Academy. Each curriculum requires eight semester units of these electives. Superior students may take an additional eight units as overload for a total of sixteen to build a concentration in some speciality. Such a concentration will be called an option, and its completion, together with its title, will be noted on the student's academic record at the time of graduation. Transfer students, because of courses completed elsewhere, at times find themselves with free space in their class schedule. It would be well for them to use this free time to take elective courses toward the eight extra credits required to complete an option. Some courses taken at other institutions, if judged the equivalent of the elective courses in the lists below, may be used to meet elective and option requirements of Academy programs.

Seven options are being developed and it is expected that they will be in full operation by the Fall of 1977. The courses which may be counted in each of these options are listed below:

1. MARINE TRANSPORTATION OPTION

Required for Option	*Sem. Units*
D-114 Introduction to Marine Transportation (Prereq: None)	3
D-232 Accounting Principles I (Prereq: G-105)	3
D-240 Industrial Relations and Personnel Management (Prereq: NS-101)	3
D-250 International Business and Finance (Prereq: G-141)	3
D-252 Economics of Sea Transport (Prereq: G-141, D-114)	3

One Additional Course Selected From:

D-313 Directed Study (In field of option) (Prereq: 1st Class)	Arrange
D-319 Petroleum Transportation Management (Prereq: D-310)	3
E-240 Contract Law and Specifications (Prereq: 3rd Class)	2
E-341 Small Engines (Prereq: None)	1
G-117 Introduction to Oceanography I (Prereq: None)	2
G-118 Introduction to Oceanography II (Prereq: None)	2
G-120 Computer Science II (Prereq: G-119)	3

2. MARINE BUSINESS MANAGEMENT OPTION

Required for Option

D-114 Introduction to Marine Transportation (Prereq: None)	3
D-230 Business Statistics (Prereq: G-105)	3
D-232 Accounting Principles I (Prereq: G-105)	3
D-233 Accounting Principles II (Prereq: D-232)	3
D-240 Industrial Relations and Personnel Management (Prereq: NS-101)	3

One Additional Course Selected From:

D-313 Directed Study (In field of option) (Prereq: 1st Class)	Arrange
D-319 Petroleum Transportation Management (Prereq: D-310)	3
E-240 Contract Law and Specifications (Prereq: 3rd Class)	2
E-341 Small Engines (Prereq: None)	1
G-117 Introduction to Oceanography I (Prereq: None)	2
G-118 Introduction to Oceanography II (Prereq: None)	2
G-120 Computer Science II (Prereq: G-119)	3

3. MARITIME SPECIALTIES OPTION

For Nautical Industrial Technology Students:

Twelve or more semester units of Marine Engineering Technology courses (E-prefix numbers) not included in the Nautical Industrial Technology curriculum. Additional courses to make a minimum of 16 semester units may be selected from:

D-114 Introduction to Marine Transportation (Prereq: None)	3
G-117 Introduction to Oceanography I (Prereq: None)	2
G-118 Introduction to Oceanography II (Prereq: None)	2
G-120 Computer Science II (Prereq: G-119)	3

For Marine Engineering Technology Students:

Thirteen or more semester units selected from Nautical Industrial Technology courses (D-prefix numbers) and from those Marine Engineering Technology courses (E-prefix numbers) which are not a part of the required M.E.T. or N.I.T. curriculums. Additional courses to make a minimum of 16 semester units may be selected from:

G-117 Introduction to Oceanography I (Prereq: None)	2
G-118 Introduction to Oceanography II (Prereq: None)	2
G-120 Computer Science II (Prereq: G-119)	3

4. INSTRUMENTATION AND AUTOMATION OPTION

Required for Option

E-240 Contract Law and Specifications (Prereq: 3rd Class)	2
E-261 Instrumentation and Control Devices (Prereq: G-206)	3
E-262 Westinghouse Shipboard Automated System (Prereq: E-261)	3
E-263 General Electric Shipboard Automated System (Prereq: E-261)	3

Additional Courses to make a Total of at least 16 Semester Units in the Option may be selected from:

E-241 Shipyard Management (Prereq: E-240)	3
E-313 Directed Study (In field of option) (Prereq: 1st Class)	Arrange
Other Marine Engineering Technology Elective Courses (E-prefix numbers)	As Selected
D-114 Introduction to Marine Transportation (Prereq: None)	3
G-117 Introduction to Oceanography I (Prereq: None)	2
G-118 Introduction to Oceanography II (Prereq: None)	2
G-120 Computer Science II (Prereq: G-119)	3

Note: Students in this option take the three automation courses E-261, E-262 and E-263 in place of the automation course E-260 in the M.E.T. core curriculum.

5. OCEAN TECHNOLOGY OPTION

	Credit
Required for Option	Arrange
G-313 Directed Study (In field of option) (Prereq: 1st Class)	As Selected
And ten or more semester units of the following oceanography courses:	
G-117 Introduction to Oceanography I (Prereq: None)	2
G-118 Introduction to Oceanography II (Prereq: None)	2
G-217 Oceanic Instruments and Vessels (Prereq: G-117 or G-118)	3
G-218 Ocean Engineering (Prereq: G-117, G-118)	3
G-231 Marine Biology (Prereq: G-117, G-118)	3
G-233 Nearshore and Estuarine Processes (Prereq: G-117, G-118)	3

Additional courses to make a minimum total of 16 semester units may be selected from:

D-303 Meteorology (Prereq: None)	3
G-120 Computer Science II (Prereq: G-119)	3
D-114 Introduction to Marine Transportation (Prereq: None)	3

6. NAVAL ARCHITECTURAL TECHNOLOGY OPTION

Required for the Option

E-240 Contract Law and Specifications (Prereq: 3rd Class)	2
E-270 Ships Resistance, Propulsion and Propellers (Prereq: E-201)	3
E-271 Introduction to Ship Design—Form Calculations and Stability (Prereq. or Coreq: E-230 or D-210)	3
E-272 Ships Structures and Design (Prereq. E-271 and Prereq. or Coreq: E-332)	3

Additional Courses to make a Total of at least 16 Semester Units in the Option may be selected from:

E-241 Shipyard Management (Prereq: E-240)	3
E-313 Directed Study (In field of option) (Prereq: 1st Class)	Arrange
Other Marine Engineering Technology Elective Courses (E-prefix numbers)	As Selected
D-114 Introduction to Marine Transportation (Prereq: None)	3
G-117 Introduction to Oceanography I (Prereq: None)	2
G-118 Introduction to Oceanography II (Prereq: None)	2
G-120 Computer Science II (Prereq: G-119)	3

Note: Students in this option take the three ships construction courses E-271, E-272, E-270 in place of the ships construction course E-306 in the M.E.T. core curriculum.

7. NUCLEAR TECHNOLOGY OPTION

Required for Option

E-240 Contract Law and Specifications (Prereq: 3rd Class)	2
E-250 Introduction to Nuclear Technology (Prereq: G-206)	3
E-261 Instrumentation and Control Devices (Prereq: G-206)	3
E-351 Nuclear Power Plants (Prereq: E-261)	3

Additional Courses to make a Total of at least 16 Semester Units in the Option may be selected from:

E-241 Shipyard Management (Prereq: E-240)	3
E-313 Directed Study (In field of option) (Prereq: 1st Class)	Arrange
Other Marine Technology Elective Courses (E-prefix numbers)	As Selected
D-114 Introduction to Marine Transportation (Prereq: None)	3
G-117 Introduction to Oceanography I (Prereq: None)	2
G-118 Introduction to Oceanography II (Prereq: None)	2
G-120 Computer Science II (Prereq: G-119)	3

Note: Students in this option take the automation course E-261 and deal with automation in E-351. Because of this, they are exempt from the M.E.T. core curriculum automation course E-260.

8. ELECTIVE SELECTION

Without a Specific Option

Students may prefer to select elective and overload courses to strengthen and supplement required programs without meeting the requirements of a specific option. In selecting elective courses prerequisites should be met. If a student wishes, he/she may take all eight semester units of required elective in one option.

NAUTICAL INDUSTRIAL TECHNOLOGY CURRICULUM [1)]

Fourth Class Year (Freshman)

Fall Trimester—17 Weeks

Subject		*Class Hours*	*Laboratory Hours*	*Semester Hours Credit*
G-101	Composition	3	0	3
G-105	Algebra	3	0	3
D-111	Seamanship	3	0	3
G-128	Physical Education (Row/Sail)	0	2	½
NS-101	Naval Organization and Management	3	0	3
D-115	Shipboard Laboratory	0	6	2
G-121	American History	3	0	3
				17½

Winter Trimester (Fourth Class Cruise)—12 Weeks

D-501	Sea Training (for License qualification)			4 *

Spring Trimester—16 Weeks

G-141	Economics I Macro/Micro	4	0	4
G-106	Trigonometry	3	0	3
G-107	Chemistry w/laboratory	3	3	4
E-109	Engineering Graphics	0	2	1
G-130	Physical Education	0	2	½
D-116	Shipboard laboratory	0	6	2
NS-302	Naval Ship Systems	3	0	3
				17½

* Not counted in baccalaureate degree.

NOTE: [1)] Because of continued program planning, curriculum requirements are subject to change without notice.

NAUTICAL INDUSTRIAL TECHNOLOGY CURRICULUM [1)]

Third Class Year (Sophomore)

Fall Trimester—17 Weeks

Subject		Class Hours	Laboratory Hours	Semester Hours Credit
G-245	Economic Geography	3	0	3
D-203	Spherical Trigonometry	2	0	2
G-205	Physics I	3	0	3
D-204	Management Analysis	4	0	4
NS-201	Naval Operations	3	0	3
G-229	Physical Education	0	2	½
D-207	Naval Architecture (Ship Construction)	3	0	3
				18½

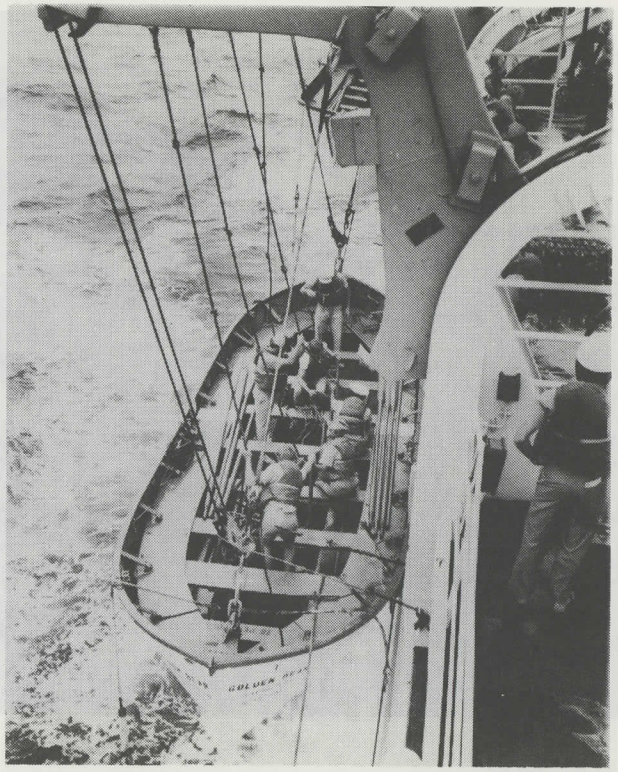
Winter Trimester—11 Weeks

G-209	Calculus	5	0	3
G-206	Physics II w/Laboratory	5	3	4
G-109	Humanities	4	0	3
G-125	Political Science	4	0	3
				13

Spring Trimester—16 Weeks

D-108	Navigation	3	0	3
D-210	Naval Architecture (Stability)	3	0	3
G-119	Computer Science	3	0	3
D-215	Seamanship Laboratory	0	6	2
G-230	Physical Education	0	2	½
E-211	Marine Engineering II	3	0	3
G-102	Literature	3	0	3
Elective (Maritime Related)				2
				19½

NOTE: [1)] Because of continued program planning, curriculum requirements are subject to change without notice.



NAUTICAL INDUSTRIAL TECHNOLOGY CURRICULUM [1)]

Second Class Year (Junior)

Fall Trimester—17 Weeks

Subject		Class Hours	Laboratory Hours	Semester Hours Credit
D-201	Navigation w/Laboratory	3	3	4
D-212	Rules of the Road	3	0	3
D-309	Transportation Management I	3	0	3
D-223	Communications	1	0	1
D-226	Ship Operations	0	3	1
E-206	Electrical Engineering	3	0	3
Elective (Maritime Related)				3
				18

Winter Trimester (Second Class Cruise)—12 Weeks

D-401	Sea Navigation Laboratory			2
D-502	Sea Training (for license qualification)			4 *

Spring Trimester—16 Weeks

D-202	Navigation w/Instrument Laboratory	2	3	3
D-310	Transportation Management II	3	0	3
D-325	Marine Supervisory Laboratory	0	3	1
D-315	Applied Seamanship (Ship Handling)	0	3	1
G-307	Ship's Medical Practice	1	0	1
D-304	Maritime Law	3	0	3
E-219	Electrical Engineering Laboratory	0	3	1
Elective (Maritime Related)				3
				16

* Not counted in baccalaureate degree.

NOTE: [1)] Because of continued program planning, curriculum requirements are subject to change without notice.

NAUTICAL INDUSTRIAL TECHNOLOGY CURRICULUM [1]

First Class Year (Senior)

Fall Trimester—17 Weeks

Subject		Class Hours	Laboratory Hours	Semester Hours Credit
D-311	Seamanship	4	0	4
D-303	Meteorology	3	0	3
D-305	Radar w/Laboratory	1	1	2
D-323	Communications	1	0	1
D-326	Marine Management Laboratory	0	3	1
E-215	Electronics	2	0	2
D-360	Advanced Management	3	0	3
D-301	Navigation	2	0	2
				18

Winter Trimester (First Class Cruise)—12 Weeks

D-425	Ships Organization and Management Laboratory			2
D-503	Sea Training (for license qualification)			4 *

Spring Trimester—6 Weeks

D-510	Internship		2 weeks	2 *
D-512	License Seminar		4 weeks	4 *
				6 *
	Navigation	5 hrs/week		
	Rules of the Road	5 hrs/week		
	Pollution, Rules and Regs.	5 hrs/week		
	Miscellaneous	5 hrs/week		
	License Examinations (U.S. Coast Guard) [2]		4 days	

* Not counted in baccalaureate degree.

NOTES: [1] Because of continued program planning, curriculum requirements are subject to change without notice.
[2] Students must pass USCG license examination to receive Baccalaureate Degree.

MARINE ENGINEERING TECHNOLOGY CURRICULUM [1]

Fourth Class Year (Freshman)

Fall Trimester—17 Weeks

Subject		Class Hours	Laboratory Hours	Semester Hours Credit
G-105	Algebra	3	0	3
E-111	Marine Engineering I	1	3	2
G-107	Chemistry w/Laboratory	3	3	4
E-109	Graphics	0	2	1
G-129	Physical Education	0	2	½
G-109	Humanities	3	0	3
G-141	Economics I Macro/Micro	4	0	4
				17½

Winter Trimester (Fourth Class Cruise)—12 Weeks

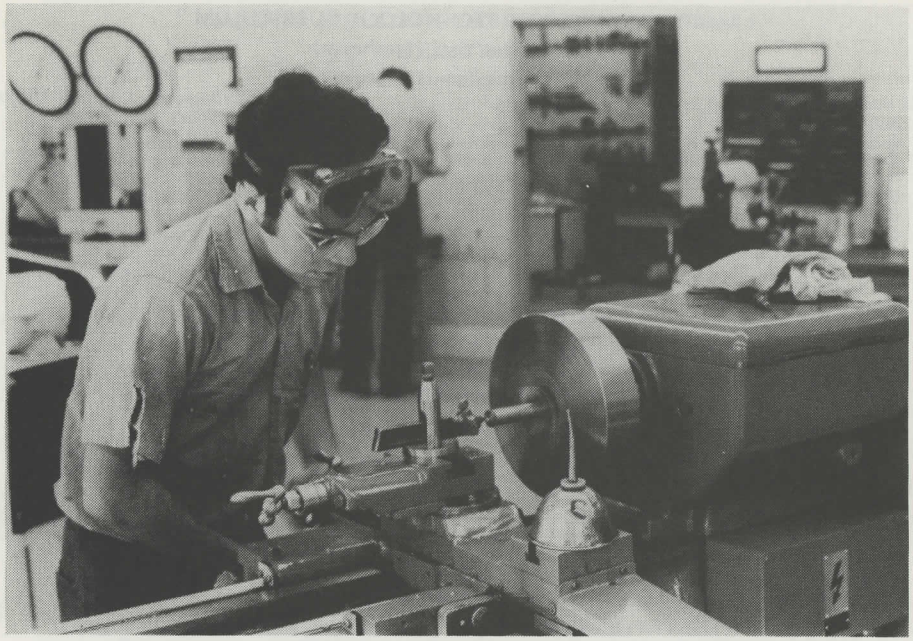
E-401	Engineering Systems Laboratory			1
E-501	Sea Training (for license qualifications)			4 *

Spring Trimester—16 Weeks

G-101	Composition	3	0	3
G-106	Trigonometry	3	0	3
G-205	Physics I	3	0	3
NS-101	Naval Organization and Management	3	0	3
G-108	Marine Chemistry	2	0	2
G-128	Physical Education (Row/Sail)	0	3	½
G-111	Speech	2	0	2
				16½

* Not counted in baccalaureate degree.

NOTE: [1] Because of continued program planning, curriculum requirements are subject to change without notice.



MARINE ENGINEERING TECHNOLOGY CURRICULUM [1)]

Third Class Year (Sophomore)

Fall Trimester—17 Weeks

Subject		Class Hours	Laboratory Hours	Semester Hours Credit
G-210	Calculus I	3	0	3
G-307	Ship's Medical Practice	1	0	1
G-206	Physics II w/Laboratory	3	2	4
E-221	Refrigeration and Air Conditioning	2	0	2
G-119	Computer Science	3	0	3
E-201	Applications of Fluid Mechanics	3	0	3
G-229	Physical Education	0	2	½
Elective (Maritime Related)				2
				18½

Winter Trimester—11 Weeks

G-102	Literature I	4	0	3
G-211	Calculus II	5	0	3
G-125	Political Science	4	0	3
G-121	American History	4	0	3
G-230	Physical Education	0	2	½
				12½

Spring Trimester—16 Weeks

G-214	Literature II	3	0	3
E-230	Statics	2	0	2
E-212	Thermodynamics	3	0	3
NS-201	Naval Operations	3	0	3
E-290	Pollution Control	2	0	2
G-245	Economic Geography	3	0	3
E-224	Marine Practices Laboratory I	0	9	3
				19

NOTE: [1)] Because of continued program planning, curriculum requirements are subject to change without notice.

MARINE ENGINEERING TECHNOLOGY CURRICULUM [1)]

Second Class Year (Junior)

Fall Trimester—17 Weeks

Subject		Class Hours	Laboratory Hours	Semester Hours Credit
E-332	Materials: Strength and Properties	5	0	5
E-203	Direct Current Electrical Engineering	3	0	3
E-301	Marine Boilers	4	0	4
E-225	Marine Practices Laboratory II	0	9	3
Elective (Maritime Related)				3
				18

Winter Trimester (Second Class Cruise)—12 Weeks

E-502	Sea Training (for License qualification)	5 *

Spring Trimester—16 Weeks

E-204	Alternating Current Electrical Engineering	3	0	3
E-303	Diesel Engineering I	3	0	3
NS-301	Navigation	2	2	3
D-205	Management	2	0	2
E-226	Marine Practices Laboratory III	0	9	3
Elective (Maritime Related)				3
				17

* Not counted in baccalaureate degree.

NOTE: [1)] Because of continued program planning, curriculum requirements are subject to change without notice.

MARINE ENGINEERING TECHNOLOGY CURRICULUM [1]

First Class Year (Senior)

Fall Trimester—17 Weeks

Subject		Class Hours	Laboratory Hours	Semester Hours Credit
E-304	Diesel Engineering II	3	0	3
E-214	Electronics	2	0	2
E-260	Automation	3	0	3
E-302	Marine Turbines	5	0	5
E-306	Naval Architecture—Ship Construction and Damage Control	3	0	3
E-227	Marine Practices Laboratory IV	0	9	3
				19

Winter Trimester (First Class Cruise)—12 Weeks

E-425	Marine Machinery Operations	2
E-408	Marine Chemistry Laboratory	1
		3
E-503	Sea Training (for license qualification)	3 *

Spring Trimester—6 Weeks

E-510	Internship		2 weeks	2 *
E-512	License Seminar		4 weeks	4 *
	Boilers	3 hrs/week		
	Diesel	3 hrs/week		
	Electricity	3 hrs/week		
	Turbines	3 hrs/week		
	Refrigeration	2 hrs/week		
Engr. Safety and Pollution		2 hrs/week		
	Miscl. Systems	2 hrs/week		
	Fire Fighting and Regulations	2 hrs/week		
License Examinations (U.S. Coast Guard) [2]			4 days	

* Not counted in baccalaureate degree.

NOTES: [1] Because of continued program planning, curriculum requirements are subject to change without notice.

[2] Students must pass USCG license examination in both steam and diesel to receive Baccalaureate Degree.

SEA TRAINING

The sea training portion of the curriculum is divided into three training periods of approximately 12 weeks each. During the training periods the midshipmen put the skills and knowledge which they have been taught in the classroom to the ultimate test; actual practice. The entire operation of the 491 foot, 7,987 gross-ton training ship GOLDEN BEAR, is under management entirely by students, with faculty licensed officers only acting in an advisory capacity. The faculty also grade the midshipmen for the degree of professionalism with which they accomplish an assigned task or duty. The fourth class do the more elementary tasks while the first class perform all the duties of ships' officers; from loading the ship's cargo of provisions and lighting of the boiler plants, to navigating and providing power for the ship to visit exotic ports anywhere in the world.

Sea Training—Department of Nautical Industrial Technology

Fourth Class (Freshman)

Seamanship—(2 credits). Under the direction of upperclassmen the fourth class students perform routine shipboard maintenance and repair. In addition they receive instruction in the more advanced skills of seamen such as launching of lifeboats and man overboard drill underway, damage control and emergency equipment, and wire rope splicing.

Watch standing—(1 credit). The student receives his introduction into the routine and complexities of standing watch on a ship underway. As fourth classmen the students act as bow lookout, helmsmen, and bridge messenger.

Communications—Rules of the Road—(½ credit). The students receive elementary instruction in the skills of communications by signal light and flag hoists and an introduction into the complex subject of Rules of the Nautical Road.

Cruise Notebook—(½ credit). The student is required to do a written report on a politico-economic aspect of each foreign port visited. In addition, sketches and explanation of the safety and emergency equipment of the GOLDEN BEAR is included.

Second Class (Junior)

Navigation—(2 units). The student is given the opportunity to use a sextant to determine lines of position of the sun. He also takes azimuths of the sun to determine compass error, uses electronic navigation systems to determine position and uses mercator sailings to determine ship's days run.

Watch Standing—(1 unit). As a second class midshipman a student will act as junior officer of the deck at which time he is responsible for the training and efficient watch standing of the fourth class, entries in the watch officer's log, meteorology observations and radar plotting under supervision of the midshipman officers of the deck.

Technical Seamanship Skills—(2 credits). During this cruise the second class students work as cargo gear operators, boat operators, working supervisors, and are instructed in the use of emergency fire and damage control gear, line throwing apparatus, mooring, docking, and anchoring, rigging breeches buoy, canvas work, and ship security patrol.

Rules of the Nautical Road and Communication—(1 credit). Under instruction of upper-classmen the second class midshipmen have an opportunity to put their knowledge and skill of communication and rules of the road to actual practice.

First Class (Senior)

Ships Supervision and Management Lab—(2 credits). The first class act as the overall managers and organizers of all shipboard evolution from feeding, sleeping, and recreation, to discipline. They organize and administer each day's shipboard routine.

Navigation—(2 units). The navigator works at sea and in port—practical celestial navigation, piloting and electronic navigation, estimated position, navigation chart and hydrographic publication corrections, tides and current tables, day's responsibilities of a navigator.

Meteorology—(1 unit). During each cruise each midshipman acts as ship's meteorologist taking weather observations, coding and sending radio messages. He receives weather information, develops a weather map, makes a forecast, and weather routes the ship.

Watch Standing—(1 unit). As a first class Midshipman a student will act as the Officer of the Watch and have the responsibility for the complete safe navigation of the ship including maneuvering, emergency drills, daily routine and ship's management.

Sea Training—Department of Marine Engineering Technology

Fourth Class (Freshman)

Watch Standing—Under the direction of upperclassmen, fourth class students are instructed in and perform the watch duties of oiler, fireman, watertender, evaporator operator, and wiper. On completion they must have developed a level of competence enabling them to perform these watch duties without help or direction from the upperclass.

Maintenance and Repair—Works as a junior member of repair and maintenance groups to gain experience in the actual repair and maintenance associated with an operating ship. Work groups are under the direct supervision of an Instructor or Artificer, i.e. Ship's Electrician, Marine Machinist, Marine Pipefitter, etc.

Engineering Systems Laboratory

Trace out the following systems and produce detailed sketches of same:

a) Main and Auxiliary Steam
b) Main and Auxiliary Condensate
c) Main and Auxiliary Feed
d) Regular and Contaminated Drains
e) Sanitary System
f) Heating System
g) Fresh Water Filling
h) Cold Water Supply
i) Hot Water Supply
j) Evaporator Production Distribution
k) Fuel Oil Transfer and Filling
l) Fuel Oil Service
m) Diesel Oil Filling and Transfer
n) Fire Main System

Second Class (Junior)

Watch Standing—Under the direction of the Midshipman Watch Engineer, second class students perform the duties of oiler, fireman, watertender, evaporator operator, and Refrigeration Engineer. They instruct fourth class students in the performance of these duties. On completion they must have demonstrated a level of competence that will enable them to undertake the duties of Midshipman Watch Engineer.

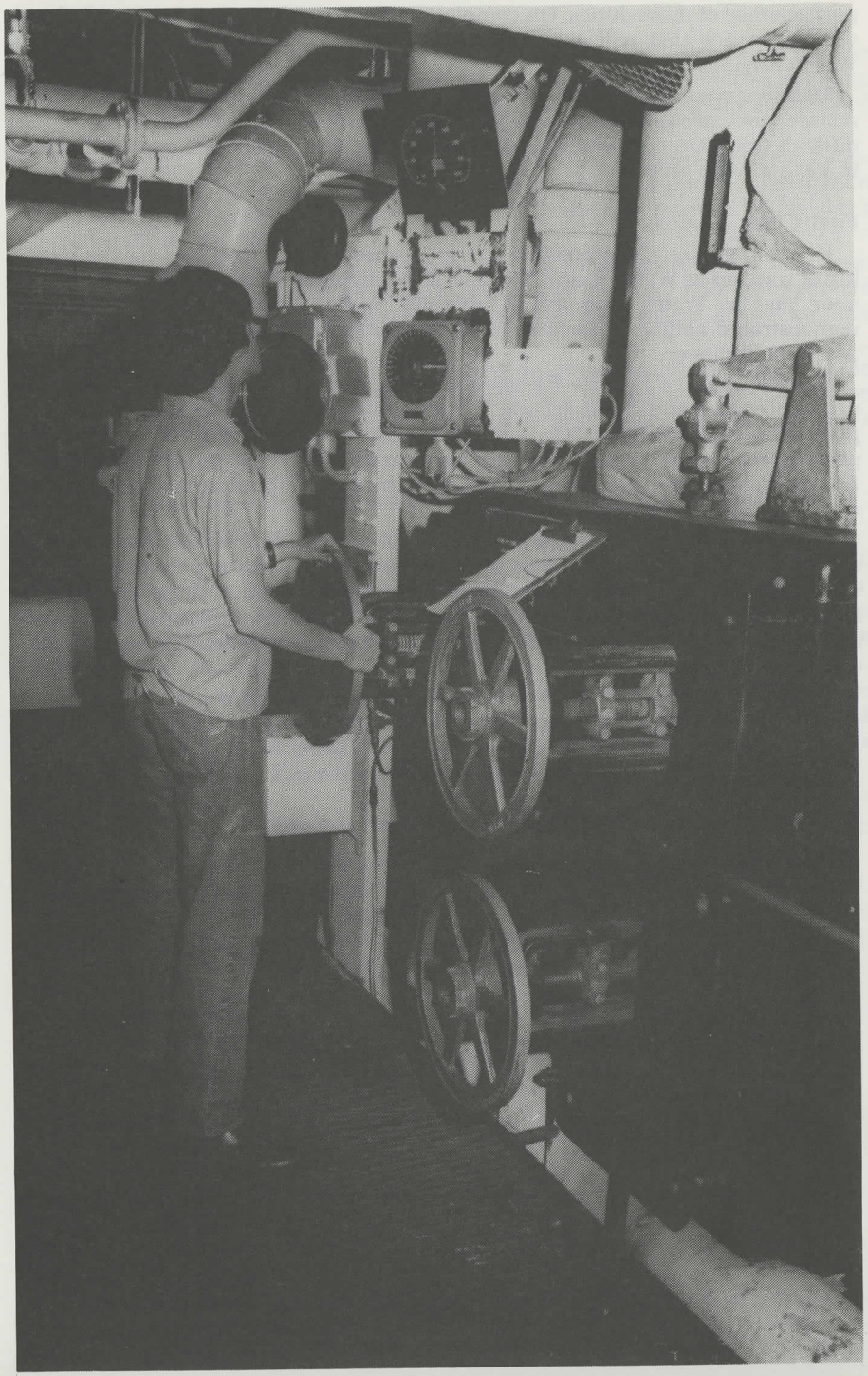
Maintenance and Repair—Works as an intermediate member of repair and maintenance groups, and may work alone or with fourth class assistants on less difficult tasks. On completion, must have gained the experience and confidence to head a work group.

First Class (Senior)

Watch Standing—Is responsible to the Licensed Watch Engineer for the standing of watches as Watch Engineer, Jr. Watch Engineer, Fireroom Jr. Watch Engineer, and Jr. Watch Engineer Evaporator Space. On completion must have demonstrated ability to perform all of the duties required of a Licensed Third Assistant Engineer.

Maintenance and Repair—Responsible to the Instructor or Artificer for heading up maintenance and repair groups. Is responsible to the Supervisor for the accomplishment of assigned tasks. On completion must have demonstrated the ability to perform maintenance and repair commensurate with those required of a Third Assistant Engineer. Included in this course is the use of Vibration Analyzing Equipment and interpretation of readings.

Marine Chemistry Lab—Under the direct supervision of the Instructor in charge of the ship's boilers. Draw boiler water samples and perform the tests to determine alkalinity, phosphate, salinity, dissolved oxygen, and dissolved solids. Enter in boiler water treatment record book and make recommendation of treatment if needed. After consultation with the Instructor, add the necessary chemicals to the boilers.



VIII. COURSE DESCRIPTION

COURSE DESCRIPTIONS

DEPARTMENT OF NAUTICAL INDUSTRIAL TECHNOLOGY

The Department of Nautical Industrial Technology courses provide a knowledge of navigation, ship handling, cargo operation, design and operation which fits the graduate for the duties of a deck officer.

D-108, NAVIGATION Credit: 3

Prerequisites: G-105 and G-106

A study of terrestrial navigation encompassing definitions, charts, publications and basic instruments used by the navigator; piloting and dead reckoning.

D-111, SEAMANSHIP Credit: 3

Prerequisites: None

The study of basic seamanship, including sea terms, nomenclature, small boats, merchant ship characteristics, deck fittings, rigging, equipment, appliances, life-saving devices, and emergency procedures.

D-114, AN INTRODUCTION TO MARINE TRANSPORTATION Credit: 3

Prerequisites: None

This course introduces the student to the field of commercial marine transportation. It gives the student a broad understanding of the nature of the maritime industry and relates his work and studies at the Academy with the maritime world. It assists the student in long range planning in his maritime career. This course includes American maritime history, government policies and regulations, steamship and stevedore company organization, principles of foreign trade, documentation and the various related organizations, both public and private.

D-115, SHIPBOARD LABORATORY (Formerly D-115 & 125) Credit: 2

Prerequisites: None

A course combining instruction in the practical use of cordage, knotting, splicing, whipping, reeving tackles and rigging stages and boatswains chairs with day to day practical operation and maintenance of an operating vessel. Chipping, painting and assigned work both on the interior and exterior of the training ship are included.

D-116, SHIPBOARD LABORATORY (Formerly D-116 and 126) Credit: 2

Prerequisites: D-115

A course consisting of instruction in both the basic practical and theoretical aspects of cargo handling. Models are used to show stresses on the various parts of conventional cargo gear. Instruction in wire splicing and canvas work is included. All instruction is put to practical use loading cargo and maintaining cargo gear on the training ship.

D-201. NAVIGATION Credit: 4

Prerequisites: D-108, D-203

The prinicipal concerns are basic concepts of celestial navigation and nautical astronomy stressing definitions and mathematical solutions of the astronomical triangle, the theory of plotting and advancing a completed line of position, basic radar plotting for navigation and collision avoidance, and mathematical solution of the plane sailings. Three hours lecture and three hours laboratory/week.

D-202. NAVIGATION Credit: 3

Prerequisites: D-201

Continuation of D-201, including solution of celestial triangle by several different methods; computation of compass error by different methods; and the rising setting, and transit of sun, moon and other celestial bodies. Additionally a laboratory covers the nomenclature, operation, use and recognition of weather instruments and navigational instruments and aids such as the magnetic compass, sextant, radio direction finder, fathometer, loran, chronometer, omega and gyro-compass, course recorder and gyro-pilot. Two hours lecture and three hours laboratory.

D-203. SPHERICAL TRIGONOMETRY Credit: 2

Prerequisites: G-105 & G-106

The course begins with theorems from spherical geometry, solution of spherical triangles by Napier's method, derives laws of sines, cosines, tangents, and haversines. It applies these methods to solve problems in great circle sailing and to the solution of all navigational problems by mathematics as distinguished from tabular solutions.

D-204. MANAGEMENT ANALYSIS Credit: 4

Prerequisites: N.S. 101

A course including the development of concepts and methods of analysis used in management to allow the student to acquire a positive and critical approach to administrative thought and practices by applying and expanding upon principles studied in beginning courses on management. Analysis methods for decision making are emphasized by introducing the student to the principles of financial and managerial economics. A portion of the course is devoted to developing an understanding on the part of the student of the evolution of the labor movement in the United States and the development of labor relations and industrial relations in the maritime industry.

D-205. MANAGEMENT AND LABOR RELATIONS Credit: 2

Prerequisites: N.S. 101

A course intended to develop in the student, a working knowledge of how the management principles studied in previous course work are applied, and to develop the evolution of the labor movement in the United States and in the maritime industry, and to deal with current union/management relations, contracts and opportunities.

D-207. NAVAL ARCHITECTURE (Ship's Construction) Credit: 3

Prerequisites: G-105

A survey course of ship design and construction emphasizing, nomenclature of the hull and structural components, hull strength, vessel performance and routine drydocking operations.

D-210. NAVAL ARCHITECTURE (Stability and Trim) Credit: 3

Prerequisites: G-205, G-209, or G-210, D-207

A study of the statics of naval architecture for ship shape hulls, emphasizing application to stability, trim, volume and moment calculations by the ship's officer. Methods of calculation for determination of intact, upright stability and trim including free surface corrections are introduced prior to a study of stability analysis techniques and criteria. A brief introduction to the naval architecture of non-ship-shape hulls and ship motions is made during the course.

D-212. RULES OF THE ROAD Credit: 3

Prerequisites: None

Comprehensive study of the International Rules of the Road, including their origin, purpose, history, technical provisions, and application. Included is a comparative study of both International and Inland Rules, their interpretation and practical application as well as a study of case histories and legal interpretations resulting from collisions at sea.

D-215. SEAMANSHIP LABORATORY (Formerly D-215 and D-225) Credit: 2

Prerequisites: D-116

Instruction and practical work covering the operation and maintenance of all specialized deck machinery including anchor windlass, winches, capstains and cargo gear; and the operation of small power boats.

D-223. COMMUNICATIONS Credit: 1

Prerequisites: None

Signaling by international code flags and flashing light; use of International Code of Signals.

D-226. SHIP OPERATIONS Credit: 1

Prerequisites: D-215

Practical work on maintenance and overhaul of shipboard safety gear including lifeboats, liferafts, emergency squad lockers, fire fighting systems and damage control equipment.

D-230. BUSINESS STATISTICS Credit: 3

Prerequisites: G-105

Statistical methods essential to management in solving common business problems of decision-making in face of uncertainty: probability and expectation, games and decisions, estimation and tests of gypothesis, regression analysis and analysis of variance.

D-232. ACCOUNTING PRINCIPLES I: FINANCIAL Credit: 3

Prerequisites: None

The objectives, basic theory and methods of financial accounting. Principles within which accounting functions. Measuring and reporting financial position. Measurement and reporting of income, cost and revenue.

D-233. ACCOUNTING PRNCIPLES II: MANAGERIAL Credit: 3

Prerequisites: G-232

Application of accounting in planning and controlling business operations. Analysis of data for management: costs; budgets; responsibility; product costing; alternative choices.

D-240. INDUSTRIAL RELATIONS AND PERSONNEL MANAGEMENT Credit: 3

Prerequisites: NS-101

Principles and practices in the management of a working force; organization and operation of the industrial relations department; policies and practices in personnel administration: functions; recruiting and selection procedures; job analysis, description and evaluation; records; research.

D-250. INTERNATIONAL BUSINESS AND FINANCE Credit: 3

Prerequisites: G-141

International trade of the U.S.; theories of international trade; balance of payments; economic policies; mechanics of trade; capital movements; international lending; foreign investment; foreign markets, trading channels and operations financing trade; and competition. Applications are made to the maritime industry.

D-252. ECONOMICS OF SEA TRANSPORT Credit: 3

Prerequisites: G-141, D-114

Maritime transportation systems and economics are approached from a managerial point of view. This course examines the role of marine transportation in the context of the entire transportation system which also includes airlines, trucking, railroads, and pipelines. The emphasis of the course is on the maritime transportation management concepts necessary to function within the maritime industrial world community.

D-301. NAVIGATION Credit: 2

Prerequisites: D-202

Major concerns include publications and chart correction, identification of celestial bodies, mathematical solutions, history of celestial navigation methods, great circle sailing, day's work of navigation at sea, and lifeboat and polar navigation. Research paper of 2,500 words required for this course.

D-303. METEOROLOGY Credit: 3

Prerequisites: G-205

Meteorology for the mariner covering principles of weather observations and reports, development of weather maps, study of air masses, fronts, winds and currents, weather forecasting and weather problems at sea.

D-304. MARITIME LAW CREDIT: 3

Prerequisites: None

The rights, obligations and responsibilities of seaman, master, and pilots as prescribed by the laws and regulations of the United States; maintenance of essential ship's papers, records and reports. Marine insurance is described as it affects hull and cargo, indicating the legal and financial responsibilities resulting from colli-

sions, cargo negligence, mismanagement, seaman's death and injury suits, maritime liens and torts. Also considered are federal and international laws affecting trade routes, mortgages, Bills of Lading, Letters of Credit, piracy, conferences on rates, anti-trust law, dry cargo and tanker chartering, World Scale and ATRS charter parties and rates, salvage and procedures of British and American admiralty courts, and admiralty law and its history.

D-305. RADAR CREDIT: 2

Prerequisites: D-201

Instruction in the classroom and laboratory in basic theory of radar and the adjustment and operation of the set. The course teaches radar plotting for collision avoidance and navigation to enable the student to receive the Coast Guard certification of "Radar Observer."

D-309. TRANSPORTATION MANAGEMENT I CREDIT: 3

Prerequisites: D-210

This course is a study of the international movement of dry cargo, and it emphasizes the role that the ship's officer plays as a front line manager in the shipping organization's structure. In relation to both break bulk and container operations, the course covers cargo handling equipment, stowage of various commodities, cargo plans and planning of stowage, and trim and stability calculations.

D-310. TRANSPORTATION MANAGEMENT II CREDIT: 3

Prerequisites: D-309

This course is a continuation of Transportation Management I and is a study of ocean transportation of bulk liquid cargo. Areas covered include characteristics of petroleum cargo, cargo planning and operations, tanker terminals, pollution control, LNG/LPG, safety, and Coast Guard regulations.

D-311. SEAMANSHIP CREDIT: 4

Prerequisites: G-107, G-205

This course is designed to consolidate and advance the knowledge of seamanship gained by the student in his earlier years at the Academy. The mechanics and chemistry of modern seamanship are brought into the classroom for study, analysis and possible revision. The physics of modern-day cargo gear and tackles are explored. This course also includes the chemistry and application of paints and preservatives, specifications for ground tackle, wire, natural and synthetic fibres, preparation of a vessel for heavy weather, fuel conservation, damage control, fire detection and fire fighting equipment. Log writing, record keeping and the ship's officers responsibilities under State and Federal safety codes are interlaced throughout the course.

D-313. DIRECTED STUDY CREDIT: By arrangement with advisor

Prerequisites: First Class (Senior) Standing

Nautical Industrial Technology and Marine Engineering Technology students may elect to make a library research program or to contact manufacturers of modern marine equipment to study in depth any aspect of marine systems under the guidance of a faculty member. The student must prepare an outline of his program for the approval of the Head of the Department and the study should result in a technical report. The program should start at the beginning of a trimester and must be completed within the same trimester.

D-315. APPLIED SEAMANSHIP CREDIT: 1

Prerequisites: Second Class Standing

Practical experience in ship handling with vessels sufficiently large to duplicate shiphandling problems encountered with much larger vessels. Participants are exercised in "soft" landings, anchoring techniques, man overboard procedures, mooring techniques and line handling, towing, emergency drills and collision avoidance.

D-319. PETROLEUM TRANSPORTATION MANAGEMENT CREDIT: 3

Prerequisites: D-310

This course is primarily devoted to those students desiring more knowledge about the shore side operations of the tanker industry with emphasis on management control of various tank ship operations. Subjects covered include general characteristics of the tanker industry, trade routes and ports, tanker chartering, cost accounting and control, labor relations and crew composition, safety and training, and tanker losses. About 25% of the course is devoted to LNG operations.

D-323. COMMUNICATIONS CREDIT: 1

Prerequisites: D-223

Instruction and practice in communications by means of Morse code sent by flashing light and international code flags. Drill for speed; knowledge and use of storm signals, quarantine signals, pilot signals, wreck signals; thorough knowledge and use of International Signal Book; preparation for U.S. Coast Guard documentation in communications. Preparation for FCC permit for radio-telephone third-class operator.

D-325. MARINE SUPERVISORY LABORATORY CREDIT: 1

Prerequisites: Second Class Standing

Basic introduction into the skills of first level management by means of supervising and directing a group of persons to accomplish an assigned technique.

D-326. MARINE MANAGEMENT LABORATORY CREDIT: 1

Prerequisites: Second Class Standing

The management of Ship Stores crew and personnel is stressed in this practically oriented course. The paper work and government forms necessary for ordering supplies, inventory lists, personnel management forms, and inspection forms are used. Project organization is stressed.

D-360. ADVANCED MANAGEMENT TECHNIQUES CREDIT: 3

Prerequisites: First Class Standing

A course offered during the Senior year primarily for NIT students. The execution of the course will utilize a combination of: discussion; team case study research and oral presentation; written reports and analysis; and extensive use of guest lecturers from the maritime industries. It will allow the student to tie together many of the qualitative and quantitative aspects of business in both a research and application environment.

D-401. SEA NAVIGATION LABORATORY CREDIT: 2

Prerequisites: D-201

Stressed are sextant adjustments and altitude measurements, computation of at least one celestial fix every day the ship is at sea with concentration of the sun,

azimuths of sun for computation of compass error, practical application of piloting and the sailings, bridge duties, and basic meteorology. (Second Class Cruise)

D-425. SHIPS ORGANIZATION AND MANAGEMENT LABORATORY CREDIT: 2

Prerequisites: First Class Standing

This course is offered to students during the last training cruise. Each student is given a responsibility normally assigned a ship officer. His job is to develop a plan to do the job, justify the personnel required, organize them into a work force and supervise the accomplishment of the task.

D-501. SEA TRAINING CREDIT: 4*

Prerequisites: None

During the first sea training period the students are familiarized with shipboard routine. They receive one unit for watch standing in the capacity of ordinary and able seaman where they act as helmsman, lookout and standby, and observe watch routine. The student receives two units of ship's maintenance and seamanship at which time they receive a blend of lecture and actual practical applications. In addition, each student receives one half of a unit for an introductory course in Communication and Rules of the Road.

D-502. SEA TRAINING CREDIT: 4*

Prerequisites: Second Class Standing

During the second sea training period the student will receive one unit for operation of the vessel in the capacity of Junior Watch Officer. Two units of marine technical skills such as loading stores, cargo operation, maintenance, supervisory skills, safety, lifesaving and firefighting. One half of a unit will be given for Communication classes in light and flag hoists and one half of a unit in Rules of the Road classes, and practical application.

D-503. SEA TRAINING CREDIT: 4*

Prerequisites: First Class Standing

During the third training cruise the student receives one unit for vessel operation while acting as Senior Watch Officer, at which time he has the full responsibility for the navigation, collision avoidance, maneuvering and routine. He receives two units for Navigation Lab during which time he determines the courses for the vessel, determines 0800, 1200, and 2000 positions and does a full day's navigation work. In addition he receives one half of a unit in Communication (radio, light and flag) and another half of a unit Meteorology lab.

D-510. INTERNSHIP CREDIT: 2*

Prerequisites: First Class Standing

Midshipmen will be assigned to a shoreside, maritime related, activity. His or her assignment will depend upon each student's specialty or special area of interest. These activities may include, but not be limited to, steamship and stevedoring companies, shipyards, government agencies, marine surveyors, ship brokerage/chartering firms, tug and barge companies, port facilities, or insurance firms. Upon completion of his/her assignment, each midshipman will submit a written report on the experiences and training received.

D-512. LICENSE SEMINAR CREDIT: 4*

Prerequisites: First Class Standing

This course is designed to tie together all of the subjects which will be covered in the Third Mates' license examination and to review much of the specific knowledge needed. The course includes subject matter in Navigation, Rules of the Road, Seamanship, Meteorology, Marine Rules and Pollution Regulations, Cargo, and Communications.

DEPARTMENT OF MARINE ENGINEERING TECHNOLOGY

The Department of Marine Engineering Technology courses prepare the graduate for the duties of an engineering officer afloat.

E-109. ENGINEERING GRAPHICS CREDIT: 1

Prerequisites: None

A general course in engineering drawing. Material covered includes lettering, applied geometry, use of instruments, (except for N.I.T. students) orthographic projections, free hand and isometric sketching, isometric and oblique drawing, sections, drawings of shipboard devices and equipment, and blue print reading. Two hours of laboratory per week.

E-111. MARINE ENGINEERING I CREDIT: 2

Prerequisites: None

A systematic study of the basic systems and elements of the training vessel's engineering plant. Subject matter is directed to aid the student's understanding of the function of the marine power plant and preparing him for his first sea-training trimester. One hour lecture, three hours laboratory per week for M.E.T. One hour lecture, one hour laboratory per week for N.I.T.

E-201. APPLICATIONS OF FLUID MECHANICS CREDIT: 3

Prerequisites: None

This course covers rules governing classification and installation of the three classes of marine piping systems. Fluid equipment studied includes rotary, centrifugal, and positive displacement pumps and eductors, injectors, air ejectors. Their characteristics are analyzed with a view towards selection in applications of different fluid systems. Consideration is given to effects of connected piping systems on pump performance, selection of prime movers and required governing mechanisms.

E-203–204. D-C AND A-C ELECTRICAL ENGINEERING (for M.E.T.) CREDIT: 3-3

Prerequisites: G-206 (E-203 is prerequisite for E-204)

The fundamentals of electrical circuits and machines giving priority to the design, operation and maintenance of equipment in the marine field; basic concepts of electricity and magnetism, direct current circuits and machines; alternating current circuits, machines and control systems; and marine electrical propulsion.

E-206. ELECTRICAL ENGINEERING (for N.I.T.) CREDIT: 3

Prerequisites: G-206

A study of electrical engineering and shipboard electrical machinery to furnish the deck officer a background for the operation and management of a ship.

E-211. MARINE ENGINEERING II (for N.I.T.) CREDIT: 3

Prerequisites: NS-302

A study of merchant ship propulsion and auxiliary systems for Nautical Industrial Technology students to prepare them for the safe and economical operation of ships.

E-212. THERMODYNAMICS CREDIT: 3

Prerequisites: G-205

Basic laws of energy and thermodynamics and their application to heat-power machinery applied on shipboard; heat-power plants, principles of thermodynamic steam and steam calorimetry, steam generators and boilers, feed water heating, reciprocating steam engines, steam engine power and economy, steam and gas turbines, steam condensing equipment, internal combustion engines.

E-214. ELECTRONICS (for M.E.T.) CREDIT: 2

Prerequisites: G-205, E-204

A course covering the fundamentals and basic concepts of vacuum tubes; gas tubes; semi-conductors; power supplies; rectifiers; amplifiers; oscillators and their applications.

E-215. ELECTRONICS (for N.I.T.) CREDIT: 2

Prerequisites: E-206

A study of electronic elements and circuits as they relate to ship operation and control and to navigation systems.

E-219. ELECTRICAL LABORATORY (for N.I.T.) CREDIT: 1

Prerequisites: E-206

A laboratory designed to provide the N.I.T. student with a knowledge of electrical principles and equipment. Three hours of laboratory per week.

E-221. REFRIGERATION AND AIR CONDITIONING CREDIT: 2

Prerequisites: Third Class Standing

Review of direct and indirect refrigeration cycles; basic refrigeration principles and equipment; and basic air conditioning, comfort, and air drying for prevention of cargo damage.

E-224. MARINE PRACTICE LABORATORY I (formerly E-118, E-218 and E-220) CREDIT: 3

Prerequisites: Third class standing

A. **SHIP OPERATIONS:** The first of a series of practical laboratory exercises in which the student becomes directly involved in the inspection, maintenance and repair of the marine machinery systems aboard the training ship beginning in the third class (Sophomore) year and continuing through the first class (Senior) year. The engineering student is assigned projects on an increasingly responsible scale in the preventative maintenance program necessary to ready the ship for annual sea training voyages.

By rotating assigned projects, the student obtains practical experience in evaluating problems and remedies connected with fired and unfired pressure vessels, piping systems, turbine-driven and reciprocating machinery, electrical equipment, diesel engines, machine shop repairs, welding repairs and many other shipboard systems and equipment.

Fluid mechanics measurements and fluid machinery tests constitute one portion of this sequence. Class time is twelve hours of laboratory per week for a period of four weeks.

B. **MACHINE SHOP I:** The first trimester of a two trimester laboratory sequence in which the student will gain a knowledge of and skill in the principles and operation of hand tools and machine tools. Individual projects range from turning a simple diameter to computing and machining helical gearing.

Class time is twelve hours of laboratory per week for a period of four weeks.

C. **WELDING LABORATORY:** A laboratory course providing experience in welding, brazing and burning techniques sufficient to effect emergency repairs.

Class time is twelve hours of laboratory per week for a period of four weeks.

E-225. MARINE PRACTICE LABORATORY II (formerly E-217, E-222) CREDIT: 3

Prerequisites: E-224

A. **SHIP OPERATIONS:** A continuation of the practical work performed on board the training ship as outlined in E-224 (A).

Class time is twelve hours per week for a period of eight weeks.

B. **MACHINE SHOP II:** A continuation of the machine shop laboratory started in E-224 (B).

Class time is twelve hours per week for a period of four weeks.

E-226. MARINE PRACTICE LABORATORY III (formerly E-216, E-223 and E-315) CREDIT: 3

Prerequisites: E-203, E-225

A. **SHIP OPERATIONS:** A continuation of the practical work performed on board the training ship as outlined in E-224(A) and E-225(A).

Class time is twelve hours of laboratory per week for a period of four weeks.

B. **POWER LABORATORY I:** The first trimester of a two trimester laboratory sequence in which the student is trained to operate and maintain a diesel engine installed to simulate a direct-drive propulsion system. During the laboratory sequence the student will perform routine maintenance on the engine including disassembly, inspection, reassembly and timing of a cylinder. The student is also trained in the use of electronic analyzing equipment.

The student also performs experiments of an increasingly difficult nature on trainers in control air systems, hydraulic systems and refrigeration systems.

Class time is twelve hours of laboratory per week for a period of four weeks.

C. **D-C ELECTRICAL LABORATORY:** A laboratory course designed to provide the engineering student with an operational knowledge of D-C electrical principles and operations.

Class time is twelve hours of laboratory per week for a period of four weeks.

E-227. MARINE PRACTICE LABORATORY IV (formerly E-316, E-317 and E-319 CREDIT: 3

Prerequisites: E-204, E-226

A. **SHIP OPERATIONS:** A continuation of the practical work performed on board the training ship as outlined in E-224(A), E-225(A) and E-226(A).

Class time is twelve hours of laboratory per week for a period of four weeks.

B. **POWER LABORATORY II:** A continuation of POWER LABORATORY I as outlined in E-226(B).

Class time is twelve hours of laboratory per week for a period of four weeks.

C. **A-C ELECTRICAL LABORATORY:** A laboratory course to provide the engineering student with an operational knowledge of A-C electrical principles and operation.

Class time is twelve hours of laboratory per week for a period of four weeks.

E-230. STATICS CREDIT: 2

Prerequisites: G-205, G-210

A study of statics by scaler methods, including forces, couples, resultants, equilibrum, trusses, cables, friction, centroids and moments of inertia.

E-240. CONTRACT LAW AND SPECIFICATIONS CREDIT: 2

Prerequisites: Third Class Standing

The course prepares the student the rigorous adherence to operating instructions and repair procedures relating to nuclear power plants, and secondarily, to cover the essential elements of contract law relating to ship construction, routine dockings and emergency repairs to both conventional and nuclear ships.

E-241. SHIPYARD MANAGEMENT CREDIT: 3

Prerequisites: E-240

This course is designed for the student specializing in ship construction. It acquaints him with the overall organization of shipyards, the differing levels of responsibility and with the schedules commonly used to coordinate design, procurement, production and the inspection departments. The shipyard's problem of allocating major facilities, such as building ways, boring equipment, launching equipment and outfitting piers is also discussed.

E-250. INTRODUCTION TO NUCLEAR ENGINEERING TECHNOLOGY CREDIT: 3

Prerequisites: G-206

A study of basic nuclear engineering principles with emphasis on nuclear physics, reactor theory, shielding and health physics.

E-260. SHIPBOARD AUTOMATION CREDIT: 3

Prerequisites: G-206

A study of automation in marine power plants leading to an understanding of modern centralized control systems typical of conventional and nuclear power plants.

E-261. INSTRUMENTATION AND CONTROL DEVICES CREDIT: 3

Prerequisites: G-206

This course includes a review of basic principles of science applicable to instruments and control devices, discussion of various instruments and sensing devices, intermediate devices that change air, hydraulic and electrical signals into other types of signals and actuators that respond to the signals. The course includes a two-hour weekly laboratory on pneumatic and hydraulic trainers where the different sensors and actuators are arranged in simple circuits and are tested.

E-262. WESTINGHOUSE SHIPBOARD AUTOMATED SYSTEMS CREDIT: 3

Prerequisites: E-261

A study of the Westinghouse centralized engine control systems appearing on new

construction merchant ships. Auxiliary central systems related to the boiler, but not incorporated in the centralized control systems are also studied.

E-263. GENERAL ELECTRIC SHIPBOARD AUTOMATED SYSTEMS CREDIT: 3

Prerequisites: E-261

A study of the General Electric centralized engine control systems appearing on new construction merchant ships. The auxiliary central systems related to the boiler, but not incorporated in the centralized control system are also studied.

E-270. SHIP RESISTANCE, PROPULSION AND PROPELLERS CREDIT: 3

Prerequisites: E-201

Fundamentals of the resistance and propulsion of ships. Topics to include selection of propulsion systems, matching and selection of propeller, hull form and ship dynamics.

E-271. INTRODUCTION TO SHIP DESIGN CREDIT: 3

Prerequisites or Corequisites: E-230 or D-210

An overview of general topics of Naval Architecture including static stability, ships structures, hull form, resistance and powering. Emphasis on a general understanding of a wide range of topics without a rigorous analysis of stresses and design.

E-272. SHIP STRUCTURE AND DESIGN CREDIT: 3

Prerequisites: E-271, E-332

A course exploring the basics of structural design as applied to ships. Analysis of bending moment, shear and deflection of ship hulls. Students will complete a design project of a midshipsection, examining primary, secondary and tertiary stresses of the hull girder.

E-290. POLLUTION CONTROL AND LAWS CREDIT: 2

Prerequisites: G-107

Discussion of identity of air, water and land pollutants; the nature of their environmental impact, and technology of reduction and elimination. Emphasis is placed on EPA regulations effecting the maritime industry. Application of control technology is obtained by operation and servicing of shipboard equipment through watch rotations during academic year as well as during sea training.

This includes control of smoke emissions, monitoring bilge overboard discharges, and operation of sewage treatment plant and testing of effluent when equipment on hand is installed.

E-301. MARINE BOILERS CREDIT: 4

Prerequisites: G-205

A complete and extensive course on power and auxiliary boilers. Studies include advantages and disadvantages of various boiler designs along with all appurtenances such as air heaters, economizers, de-superheaters, superheaters, baffling, dry pipes, safety valves and the functions and design requirements of each as established by regulatory agencies.

Following the basics of boilers, studies progress into the operation and maintenance of marine steam generators, including lectures on feedwater systems and

controls; feedwater analysis and treatment; fuel oil refinement, specific gravity, cost and heating value; flue gas analysis and boiler efficiency, and combustion control. The course is enriched through the use of guest speakers from the industry specializing in a particular aspect of boilers and field trips to various installations.

E-302. MARINE TURBINES CREDIT: 5

Prerequisites: E-301, E-212

A detailed course covering the operation and maintenance of main propulsion and auxiliary turbine equipment and accessories of the marine steam turbine and gas turbine power plants. The course includes studies of steam and gas turbine principles, construction, bearings and lubrication, governors and controls, reduction gears, shafting, propellers, testing, economics and preventative maintenance. The course is supplemented by the use of guest speakers from the industry specializing in a particular aspect of steam or gas turbines and field trips to various installations.

E-303–304. DIESEL ENGINEERING I–II CREDIT: 3-3

Prerequisites: E-212 (E-303 is prerequisite to E-304)

The development, design, construction and operating procedures of marine diesel engines and auxiliary machinery and systems employed in the modern marine diesel power plant.

E-306. NAVAL ARCHITECTURE—SHIP CONSTRUCTION AND DAMAGE CONTROL (for M.E.T.) CREDIT: 3

Prerequisites: E-332

This course includes an introduction to ship's structure, compartmentation of ships, hull piping systems, the principles of buoyancy and stability, including experiments, and coefficients and rules of mensuration.

E-313. DIRECTED STUDY CREDIT: By arrangement with adviser

Prerequisites: First Class (Senior) standing

Marine Engineering Technology and Nautical Industrial Technology students may elect to make a library research or to contact manufacturers of modern marine equipment to study in depth any aspect of marine systems under the guidance of a faculty member. The student must prepare an outline of his program for the approval of the Head of the Department and the study should result in a technical report. The program should start at the beginning of a trimester and must be completed within the same trimester.

E-332. MATERIALS, PROPERTIES AND STRENGTH CREDIT: 5

Prerequisites: E-230, G-107

Topics of material properties with greatest emphasis on metals and metallurgy; failure characteristics, structure of metals, processing, and treatment. Analysis of stresses and the resulting design of beams, shafts, columns, and pressure vessels.

E-341. SMALL ENGINES CREDIT: 3

Prerequisites: None

This is a short course in the use of hand and measuring tools and the fundamentals of operation and maintenance of small two and four cycle engines. The course includes nine hours of lab work on disassembly and repair of small engines.

E-351. NUCLEAR POWER PLANTS CREDIT: 3

Prerequisites: E-261

A detailed study of an unclassified nuclear power plant, of its systems, operational data and control mechanisms.

E-401. ENGINEERING SYSTEMS LABORATORY (for M.E.T.) CREDIT: 1

Prerequisites: E-111

Organized study of training ship's engineering systems during student's first sea training trimester, including tracing of systems and preparation of system diagrams.

E-408. MARINE CHEMISTRY LABORATORY CREDIT: 1

Prerequisites: G-108

Performance of the Chemical Analysis required in the operation of shipboard systems. These include drawing representative samples and testing for salinity, alkalinity, phosphate, pH, dissolved oxygen, total dissolved solids on boiler water. Selection of proper chemicals and required dosage to maintain concentrations within required limits. Analysis of flue gas, and use of electric salinity indicators to insure proper operation plant system.

E-425. MARINE MACHINERY OPERATION CREDIT: 2

Prerequisites: First Class Standing

This course consists of two parts. Under the Chief Engineer, the student will evaluate the daily hourly log sheets covering boiler room, engine room refrigeration, evaporator and boiler chemical log sheets, reporting any abnormalities to Chief Engineer, and the student prepares daily noon report, calculating engine miles, propeller slip, fuel consumption, barrels per mile, fresh water consumed, boiler water consumed, total water production, again evaluating any abnormalities.

Under the First Assistant he learns to take vibration readings on ship's equipment and learn to evaluate results. He should be able to distinguish changes in pattern and tell when a machine should be taken off the line.

E-501. SEA TRAINING CREDIT: 4

Prerequisites: None

The student is introduced to the fundamentals of engineering system operations. He learns the firing of boilers, handling of equipment, and feed water regulation. By rotation he is exposed to all parts of plant operations. This includes not only boilers, but power generation, propulsion system, evaporators, lube oil, bilge and fire main systems and duties in case of fire (or) abandon (ing) ship. By the end of his first cruise he should be familiar with location of all monitoring devices of the various engineering systems.

E-502. SEA TRAINING CREDIT: 4

Prerequisites: Second Class (Junior) standing

During the Second Class cruise the student assumes more operational responsibilities. Under the First Class supervision he will assist Fourth Class men learning and monitoring their responsibilities. He will have responsibility for operation of the ship's refrigeration systems. Under the rotation system he logs all data for the First Class in charge and should be able to assist in interpreting value changes. By end of cruise, he should be capable of changing over of nearly all auxiliary equipment. He will have added responsibility in performing maintenance and repair work.

E-503. SEA TRAINING CREDIT: 3

Prerequisites: First Class (Senior) standing

During the senior year the student will function in the following areas: 1) In charge of distilling plant, supervising and assuming responsibility for proper performance of one 2nd and one 4th classman; responsibility for engineer watch; takes corrective action in event of malfunction, 2) In charge of boiler room, supervising four students in proper operation of fire room systems; responsible for watch engineer and corrective action, 3) Watch engineer or shift supervisor, directing responsibility for operation of all systems, and supervising men under his jurisdiction plus those in #1 and 2; sees that all data is properly taken and logged, and that all duties are being properly performed; under the instructor, the student is responsible for all plant operations.

E-510. INTERNSHIP CREDIT: 2

Prerequisites: First Class (Senior) standing

This course provides a series of assignments to various segments of the maritime industry to obtain first hand observation of their operations. These would include dry-dock and ship repair facilities, pipe shops, plate shops, machine shops, mould and electrical repair facilities in the Bay Area. Assignment to Port Engineers staff, engineering section, accounting, traffic, fleet operations divisions provide an insight to overall maritime operations.

E-512. LICENSE SEMINAR CREDIT: 4

Prerequisites: First Class (Senior) standing

A review of the professional subject areas covered during the four year period, combined with operational experiences encountered as students. The objective is to combine experience and theory to analyze and interpret engineering problems not only for the license examination, but to increase the student's ability to make proper judgments in the field.

DEPARTMENT OF GENERAL STUDIES

The Department of General Studies includes those courses which are given to round out the education of the midshipmen as well as furnish them with sound educational foundations in English, Humanities, Natural Sciences, Mathematics and Social Sciences.

G-5. ALGEBRA REFRESHER (Summer Session) CREDIT: 4

Prerequisites: Elementary Algebra

A review of elementary Algebra with some topics from intermediate Algebra. Ten hours per week of lecture and ten hours per week of laboratory during the four-week summer session.

G-101. COMPOSITION CREDIT: 3

Prerequisites: None

Expository writing. Its purpose is to teach the essentials of clear and effective expository writing. The course focuses on the problems of unity, clarity, coherence and vitality of expository communication. Students are asked to write in the various modes: the personal essay, the technical report, the research paper, the business letter, and the personal résumé. There is also practice in delivery of effective oral reports.

G-102. INTRODUCTION TO LITERATURE CREDIT: 3

Prerequisites: None

This course is designed to introduce students to a number of forms, styles, and ideas expressed in English Literature. Emphasis is given to an exposure of English/American prose, poetry, and drama through close readings, and to the communication of these findings.

G-105. COLLEGE ALGEBRA CREDIT: 3

Prerequisites: Two years of High School Algebra

A course in college algebra designed to prepare the student for courses in trigonometry, calculus, and navigation. The course covers linear equations, exponents, functions, tables, graphs, quadratic equations, and standard algebraic subjects.

G-106. TRIGONOMETRY CREDIT: 3

Prerequisites: G-105

Continuation of G-105, stressing systems and equations, matrices, and determinants, variation, functions of composite angles, complex numbers, logarithmic solutions of triangles, mathematical induction, trigonometric equations and inverse functions.

G-107. CHEMISTRY CREDIT: 4

Prerequisites: None

Introduction to chemical theory; structure of matter; valence; chemical change; oxidation-reduction; equilibrium; solutions; ionization reactions in solutions, weak electrolytes. Three hours lecture and three hours laboratory per week.

G-108. MARINE CHEMISTRY CREDIT: 2

Prerequisites: G-107

This course covers material of special interest to marine engineers. It includes an intensive study of boiler water analysis and conditioning; testing and utilization of fuels and lubricants, elements of combustion, electrochemistry, and corrosion control.

G-109. HUMANITIES CREDIT: 3

Prerequisites: None

An integrated course which deals with the several arts: Music, the Visual Arts, Literature, Drama, Philosophy and History.

G-110. SPEECH COMMUNICATIONS LABORATORY CREDIT: 3

Prerequisites: Permission of the Instructor

An intensive course in basic movement, voice, and performing skills for the beginner. A seminar format will allow the student to gain confidence and insight into his ability to communicate on every level from the personal to the mass media.

G-111. SPEECH CREDIT: 2

Prerequisites: None

Basic principles of oral communication and public speaking. Offer the opportunity for general improvement in the basic process of oral comunication with emphasis on public speaking. It is designed to help the student in occupational and social situations by improving self-expression, self-confidence, and self-understanding. Attention is given to the basic elements of organization and delivery.

G-114. INTRODUCTION TO PSYCHOLOGY CREDIT: 3

Prerequisites: None

A beginning course to psychology consisting of three parts: lecture and class discussion on schools of thought and terminology ; study of schools of humanistic psychology in the past decade; and class experimentation and practical application.

The course is designed to give the student awareness of human behavioral problems and to discover methods for personal and group awareness, especially as it relates to ship-board living.

G-117. INTRODUCTION TO OCEANOGRAPHY I CREDIT: 2

Prerequisites: None

Introduction to geological and chemical oceanography; sea floor topography, plate tectonics, deep-sea sediments, composition of sea water, dissolved gases, affect of organisms and geology on chemistry of sea water. Oceans discussed as one dynamic medium.

G-118. INTRODUCTION TO OCEANOGRAPHY II CREDIT: 2

Prerequisites: None

Introduction to physical and biological oceanography: temperature, salinity, density, geostrophic currents, thermohaline circulation, wind driven circulation waves, tides, underwater sound, light, benthos, plankton, nekton, algae, organic production, grazing, vertical migration, food cycles.

G-119. COMPUTER SCIENCE I CREDIT: 3

Prerequisites: None

This course is an introduction to computer programming. It covers the fundamentals of problem analysis, flowcharting, program coding, file design and file manipulation. The basic language is taught with emphasis on scientific and engineering problems.

G-120. COMPUTER SCIENCE II CREDIT: 3

Prerequisites: G-119

Advanced concepts in computer programming and an introduction to systems analysis. The organization of list, tables and random access files are studied from the point of view of information and data management. Computer systems are studied as a tool in the collection and analysis of statistical and managerial information.

G-121. AMERICAN HISTORY CREDIT: 3

Prerequisites: None

A comprehensive course introducing students to the development within and interrelationship of a broad scope of historical issues and institutions in America from the Colonial period to World War II. Particular concern is given to the conflict between social values and their political expression.

G-125. POLITICAL SCIENCE CREDIT: 3

Prerequisites: None

The basic premises underlying American political institutions and behavior since World War II are analyzed through the application of generalized socio-political concepts to specific cases. A major course objective is a better understanding of the nature and function of contemporary political forces in shaping principles and policies behind our life style.

G-141. PRINCIPLES OF ECONOMICS CREDIT: 4

Prerequisites: None

Basic economic methodology, analysis, and policy; economic institutions, organizations and industrial structure, the monetary system; measurements, determination and stability of national income; monetary, fiscal and balance of payments problems and policies; basic analysis of prices and markets; consumer behavior; behavior of firms; factor markets; international trade theory; economic growth and development are studied.

G-205. PHYSICS I CREDIT: 3

Prerequisites: G-105-G-106 (G-106 can be taken concurrently)

The composition and resolution of forces and velocities, statics, moments of force, rectilinear motion, rotational motion, work energy power, friction, simple machines, elasticity, fluids, heat, sound.

G-206. PHYSICS II CREDIT: 4

Prerequisites: G-205

Electricity and magnetism, direct and alternating circuits and machines, light and atomic theory. Three hours lecture and three hours lab per week.

G-209. CALCULUS (for N.I.T.) CREDIT: 3

Prerequisites: G-105-G-106

The course consists of the study of differentiation with applications to rates, maxima and minima, followed by elementary integration as the limit of a sum, and applications to areas, and volumes. The course concludes with the use of Simpson's rule and applications.

G-210. CALCULUS I (for M.E.T.) CREDIT: 3

Prerequisites: G-105-G-106

The course introduces the derivative through the method of increments. Integration is incorporated early. Physical and geometric problems are presented as motivation for the calculus wherever possible. Derivatives and integrals of trigonometric and exponential functions, the chain rule, calculations of areas and maxima and minima are studied.

G-211. CALCULUS II (for M.E.T.) CREDIT: 3

Prerequisites: G-210

Begins with review of elementary differentiation and integration, ingegration by parts, and advanced integration, implicit differentiation, with applications to rates, volumes, surfaces, centroids, work and forces. The course concludes with an introduction to differential equations.

G-214. LITERATURE II CREDIT: 3

Prerequisites: None

A concentrated course of selective, but comprehensive readings covering both major forms and periods of world literature. Emphasis will include the mastering of literary analysis through careful readings and discussion. Heightened appreciation of the content and scope of written expressions throughout man's history, as well as the student's increased precision in his own written efforts will be sought.

G-217. OCEANOGRAPHIC INSTRUMENTS AND VESSELS CREDIT: 3

Prerequisites: G-117 or G-118

Introduction to the techniques, instrumentation, and vessels of oceanographic research; hydrographic sampling, dissolved oxygen, salinity, reversing thermometers, chlorophyll, nutrients, primary productivity, sediment size, biological sampling, tours of local vessels and institutions. Emphasis on equipment handling and data implications.

G-218. OCEAN ENGINEERING CREDIT: 3

Prerequisites: G-117 or G-118

Application of oceanographic principles to deep-ocean structures, vessels, habitats, and work systems; near-shore mooring, jetties, and seawalls; instrumentation employed in collection and analysis of data; influence of waves and currents on vessels and structures.

G-231. MARINE BIOLOGY CREDIT: 3

Prerequisites: G-117 or G-118

Course emphasizes marine plants and animals, life cycles, food chains, organic

production, and species diversity. Included are topics on ecology, marine pollution, and commercial enterprises.

G-233. NEARSHORE AND ESTUARINE PROCESSES CREDIT: 3

Prerequisites: G-117-G-118

Study of the physical and biological processes in the nearshore and estuarine environments, including waves, littoral currents, classification and evolution of estuaries, tidal influence, circulation, sediment transport, and productivity.

G-245. ECONOMIC GEOGRAPHY CREDIT: 3

Prerequisites: None

Commercial regions of the world, the pattern of production, distribution, and consumption as well as contemporary industrial and commercial development are discussed.

G-307. SHIP'S MEDICAL PRACTICE CREDIT: 1

Prerequisites: None

The practical application of the principles of first aid and the use of the ship's medicine chest at sea; anatomy, shock, unconsciousness, bleeding wounds, bandaging, artificial respiration, bones, poisoning, fractures, moving the injured, exposure, diagnosis and treatment of ailments; radio aid.

G-313. DIRECTED STUDY CREDIT: By arrangement with advisor

Prerequisites: First Class (Senior) standing

Nautical Industrial Technology and Marine Engineering Technology students may elect to make a library research program or to contact manufacturers of modern marine or oceanographic equipment to study in depth any aspect of marine or ocean systems under the guidance of a faculty member. The student must prepare an outline of his program for the approval of the Head of the Department and the study should result in a technical report. The program should start at the beginning of a trimester and must be completed within the same trimester.

PHYSICAL EDUCATION

G-128. BOAT HANDLING (Formerly D-117) CREDIT: ½

Prerequisites: None

Instruction in rowing, handling boats under oars and sail, launching and recovery of lifeboats, lifeboat nomenclature and equipment. This course prepares the midshipmen for the U. S. Coast Guard Lifeboatmen's Certificate. Two hours laboratory per week.

G-129. PHYSICAL EDUCATION CREDIT: ½

Physical fitness and swimming tests are administered to all classes. Those who do not qualify on the swim test are required to attend remedial classes until they are able to qualify.

First half—Water safety and survival swimming.

Second half—Physical fitness through weight lifting and jogging.

G-229, 230 INDIVIDUAL SPORTS ACTIVITY CREDIT: ½-½

Prerequisites: None

Fundamentals and techniques of individual and recreational sports. To be chosen from Handball, Badminton, Tennis, Golf, Table Tennis, Archery, and other carry over activities.

G-250. VARSITY SPORTS CREDIT: 1

Prerequisites: None

Those qualified may enroll by permission of the instructor. Varsity sports include Basketball, Soccer, Crew, Pistol, Sailing, Tennis, Cross-country, and Color Guard/ Drill team.

DEPARTMENT OF NAVAL SCIENCE

The Department for Naval Science provides training and instruction for all students in essential naval subjects so that coordinated action between the Navy and the Merchant Marine can be assured in time of war.

NS-101. Principles of Naval Organization and Management Credit: 3

An introduction to the structure and principles of Naval Organization and Management. Naval Organization and Management practices and the concepts that lie behind them are examined within the context of American social and industrial organization and practice. The course includes coverage of 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.

NS-201. Naval Operations Credit: 3

This course provides an introduction into various types of Naval Operations. It includes basics of communication procedures, ship formations and maneuvering, convoy operations, maneuvering board, anti-air warfare, anti-submarine warfare, amphibious warfare, underway replenishment, minesweeping operations, riverine warfare, and electronic countermeasure warfare.

NS-301. Navigation Credit: 3

The course introduces the marine engineering technology student to the principles essential for a fundamental understanding and practical working capability in safe navigation. The course consists of (1) Piloting, which is navigation involving frequent or continuous determination of position on a line of position relative to geographical points, to a high order of accuracy, and (2) Celestial Navigation, which is Navigation with the aid of celestial bodies.

NS-302. Naval Ships Systems Credit: 3

The course is designed to allow the nautical industrial technology student to (1) learn the basic considerations for hull design of naval vessels, and to relate buoyancy, equilibrium, stability, and the effects of flooding to the design characteristics of naval vessels, (2) learn the basic principles and components of a ship's propulsion system and relate them to all of the Ships Systems, and (3) relate the interrelationships and interdependency of all of a ship's systems to the successful mission of a ship.

NS-403. Seminar Credit: 0

During the senior year a seminar in the concepts, principles, and practices of Naval Leadership is conducted every other Friday afternoon. (No credit)

DEPARTMENT OF ADULT MARITIME EDUCATION

The California Maritime Academy recognizes that the transportation industry, particularly maritime transportation, faces rapidly changing technological advances. To keep abreast of these changes it is necessary that those employed in the maritime industry, ashore and afloat, continue their education and obtain additional knowledge as it becomes available.

The Department of Adult Maritime Education was established in 1974 to conduct evening and weekend classes, seminars, and symposiums to accomplish fundamental goals among which are the following:

Provide the opportunity to gain knowledge in, and enter, a maritime occupational field or prepare for more advance training programs.

Assist those already employed in the maritime industry to acquire more skills to maintain their level of employment, to advance in their professions, or to change fields.

Develop ideas which will lead to instruction in new and emerging maritime occupational opportunities.

Provide on a continuing basis counseling that is current as to the needs of occupational skills and opportunities within the maritime and related industries.

The Academy's long-term objective is the development of a complete program in adult maritime vocational education and technical training.

Courses offered by the Department of Adult Maritime Education are approved for textbook and tuition financial aid by the Veteran's Administration.

Additional information and specifics of courses currently being offered may be obtained from the Director of Adult Maritime Education, California Maritime Academy, P. O. Box 1392, Vallejo, CA 94590. Telephone (707) 642-4404.

IX. CAREER OPPORTUNITIES IN TODAY'S MARITIME INDUSTRIES

CAREER OPPORTUNITIES IN TODAY'S MARITIME INDUSTRIES

Career opportunities are many in America's maritime industries. The vast productive capacity of industry in the United States cannot be consumed by the domestic market alone, nor can our factories or refineries produce without importing essential raw materials. Seven-tenths of the globe consists of water and since foreign trade depends largely upon ships, ocean shipping becomes of greater importance to the American economy than ever before in our history. An active merchant marine and the knowledge required to operate merchant ships is essential for the commerce and defense of our nation.

The demands of commerce have radically changed the complexion of the merchant marine from the days of the small, slow, lumbering sailing ships to vessels with a carrying capacity of hundreds of thousands of tons which travel at speeds never previously believed possible.

These larger, faster ships demand crews highly trained in the most modern marine technology known to man. In addition to the traditional skills which a mariner must master, he must also be skilled in such fields as electrical engineering, electronic systems, marine nuclear science, marine ecology, meteorology, oceanography, marine transportation management, computer technology, and intermodal transportation concepts.

Within the last few decades the owners and operators of offshore production, research, exploratory and service vessels have exhibited a keen interest in Cal Maritime graduates of both majors for employment at sea and as marine managers ashore. This trend is expected to continue into the future with development of the deep ocean resources.

Today's maritime industry is a global enterprise possessing limitless opportunities for the ambitious both afloat and ashore.

Today Cal Maritime graduates can be found employed in virtually every capacity of the maritime and related industries from marine insurance to naval architecture. In view of the wide range of knowledge required of a merchant marine officer in today's maritime industry, career opportunities for academy graduates have increased considerably in many fields of endeavor and today's graduates are highly employable.

Cal Maritime graduates' beginning salaries for shore jobs are among the highest for any college graduates. Net income for initial sea-going jobs is from 1½ to over 2 times the national average for college graduates with Bachelors or Masters degrees.

X. U. S. NAVAL RESERVE OFFICER PROGRAM

U.S. NAVAL RESERVE OFFICER PROGRAM

In order for the Merchant Marine to operate more efficiently with the Navy in the case of war or national emergency, the Maritime Administration, under the Department of Commerce, issued General Order 87 requiring all Merchant Marine Midshipmen to apply for a commission in the U.S. Naval Reserve (Inactive). Those midshipmen who are offered Naval Reserve commissions are required to accept such commission upon graduation.

The objective of the Department of Naval Science is to offer a course of study designed to provide the student with a comprehensive knowledge and understanding of naval operations and practices. The Navy does not consider the Merchant Marine Academies as a primary source for active duty officers and does not actively recruit Merchant Marine graduates. However, each year a number of graduates request active duty in order to pursue a career in the U.S. Navy.

The Secretary of the Navy, in concert with the Secretary of Commerce, has developed a plan whereby merchant marine officers may fulfill their military obligation by accepting a commission in the U.S. Naval Reserve while continuing to sail in the Merchant Marine. The pertinent points of this program are as follows:

1. Students at maritime academies retain civilian status.
2. The Navy provides naval science courses designed to qualify the students for a commission as ensign, USNR.
3. At the time the student enters the academy he must agree in writing to apply for a commission as ensign, USNR, at the appropriate time before graduation and to accept such a commission if offered.
4. Upon acceptance of the commission, the Officer must choose one of four options to maintain his commission. They are:
    1. To sail on his license for a period of six months each year for three consecutive years;
    2. Sail on his license for a period of four months each year for four consecutive years;
    3. To go on active duty in the U.S. Naval Reserve for a period of three consecutive years or
    4. To apply for and serve on active duty for training on board a navy ship for a minimum period of thirty consecutive days each year for a period of three consecutive years.
5. There is also a direct commissioning program that allows a Midshipman, if he so chooses, and provided he is qualified, to enter the United States Coast Guard as Ensign upon graduation. These men are generally assigned to the Merchant Marine Inspection Service of the Coast Guard.

XI. ADMINISTRATION, FACULTY AND STAFF

ADMINISTRATION, FACULTY AND STAFF

THE BOARD OF GOVERNORS

Lieutenant General Garrison H. Davidson, USA (Ret.), Chairman
William H. McPherson, Vice Chairman
Captain Paul S. Mead
William F. Schill
Captain Edward E. Kerr, USN (Ret.)
George J. Vukasin
Dr. Archie Higdon
Thomas J. Patterson, Jr., Maritime Administration Representative

THE BOARD OF VISITORS

Robert A. Hornby — Frank P. Adams — William O. Weissich

ADMINISTRATION

PRESIDENT

Joseph P. Rizza, Rear Admiral, USMS
Pennsylvania Maritime Academy, 1936
B.S., University of Washington, 1951
Naval War College, 1952
M.A., Boston University, 1958
National War College, 1969
Master Mariner, Unlimited, Any Ocean

COMMANDING OFFICER, Training Ship Golden Bear/Dean of Students

William H. Aguilar, Captain, CMA
B.S., Nautical Science, California Maritime Academy, 1934
Master Mariner, Unlimited, Any Ocean

ACADEMIC DEAN

Wilbur H. Parks
Academic Dean
B.S., Electrical Engineering, University of California, Berkeley, 1935
M.S., Mechanical Engineering, University of California, Berkeley, 1942
Registered Professional Engineer, Colorado

Rory K. Miller
Assistant Academic Dean
Head, Department of General Studies
Associate Professor
B.A., English, Loyola University, 1969
M.A., English, University of California, 1971
M.B.A., Transportation, San Francisco State, 1976

ADMINISTRATIVE OFFICER

William C. Black
Administrative Officer
B.A., Political Science, University of California, Los Angeles, 1950
M.B.A., Business Administration, Syracuse University, 1958

M. G. Saladin, Business Manager
B.S., Business, Indiana University, 1941

Maureen Browning, Registrar

Harry Diavatis, Public Information Officer and Athletic Director
B.F.A., Dramatic Arts, University of Utah, 1969

Diane Hulen, Student Affairs Officer
B.A., Social Science, University of Oregon, 1961

COMMANDANT OF MIDSHIPMEN

Richard D. Heron, Commander, CMA
Commandant of Midshipmen
B.S., Nautical Science, California Maritime Academy, 1938
Chief Mate, Unlimited, Any Ocean

Louis M. McDermott, Lieutenant, CMA
Assistant to the Commandant
B.A., Government, University of Arizona, 1963
M.A., History, University of Minnesota, 1968

Winthrop Yinger, Lieutenant, CMA
Assistant to the Commandant
B.A., History, Political Science, Albion College, 1957
M.Div., Theology, Colgate Rochester, 1961
M.A., Communications, Fresno State University, 1970

Donovan C. Lenhart, Pharmacist Mate, CMA
USAF School of Aviation Medicine

LIBRARY

Paul W. O'Bannon, Head Librarian
B.A., History, University of California, 1955
M.S.L.S., Library science, University of Southern California, 1956

Assistant Librarian, Nathan Plotkin
B.A., Sociology, University of Illinois, 1952
M.A., Geography, Kansas State University, 1964
M.S., Library science, University of Illinois, 1973

Faculty

DEPARTMENT OF NAUTICAL INDUSTRIAL TECHNOLOGY

John Keever, Commander, CMA
Head, Department of Nautical Industrial Technology/First Lieutenant, *Training Ship Golden Bear*
Associate Professor
B.S., Nautical Science, California Maritime Academy, 1970
Second Mate, Unlimited, Any Ocean

Calvin Bourke, Lieutenant, CMA
Assistant Professor
B.S., Nautical Science, United States Merchant Marine Academy, 1943
Master, Unlimited, Any Ocean
First Class Pilot, San Pedro Bay and Tributaries

Robert Craig, Lieutenant, CMA
Assistant Professor
B.S., Nautical Science, California Maritime Academy, 1949
Second Mate, Unlimited, Any Ocean

William B. Hayler, Lieutenant Commander, CMA
Associate Professor
B.S., Nautical Science, United States Naval Academy, 1944
M.A., International Relations, George Washington University, 1964
Naval War College, 1960
Master Mariner, Unlimited, Any Ocean

Fred B. Newton, Lieutenant Commander, CMA
Navigator, *Training Ship Golden Bear*
Associate Professor
B.S., Nautical Science, California Maritime Academy, 1973
Master Mariner, Unlimited, Any Ocean

Theodore R. Wise, Jr., Lieutenant Commander, CMA
Associate Professor
B.S., Nautical Science, California Maritime Academy, 1954
B.S., Mechanical Engineering, University of California, Berkeley, 1968
M. Eng., Naval Architecture, University of California, Berkeley, 1971
Second Mate, Unlimited, Any Ocean

Paul Seiler, Chief Boatswain, CMA

DEPARTMENT OF MARINE ENGINEERING TECHNOLOGY

Otto J. Bruhn, Commander, CMA
Head, Department of Marine Engineering technology
Chief Engineer, *Training Ship Golden Bear*
Professor
B.S., Marine Engineering, United States Merchant Marine Academy, 1946
B.A., History, University of California, 1947
Chief Engineer, Steam Vessels, Unlimited Horsepower

Arthur S. Behm, Lieutenant Commander, CMA
Assistant Department Head
Associate Professor
B.S., Marine Engineering, California Maritime Academy, 1942
Chief Engineer, Steam Vessels, Unlimited Horsepower
Second Assistant Engineer, Diesel Vessels, Unlimited Horsepower

Robert Hart, Lieutenant, CMA
Assistant Department Head for Academic Matters
Assistant Professor
B.S., Naval Science, United States Naval Academy, 1945
B.S., Physics, United States Naval Post Graduate School, 1955
M.S., Physics, United States Naval Post Graduate School, 1955
LLB, Law, La Salle Extension University, 1970
Third Assistant Engineer, Steam Vessels, Unlimited Horsepower
Third Assistant Engineer, Diesel, Unlimited Horsepower

Jack Dean, Lieutenant, CMA
Assistant Professor
B.S., Marine Engineering, California Maritime Academy, 1970
Third Assistant Engineer, Steam Vessels, Unlimited Horsepower
Third Assistant Engineer, Diesel, Unlimited Horsepower

Frank E. Jump, Lieutenant, CMA
Assistant Professor
B.S., Marine Engineering, United States Merchant Marine Academy, 1967
Chief Engineer, Steam Vessels, Unlimited Horsepower
Third Assistant Engineer, Diesel, Unlimited Horsepower

Frank LaBombard, Lieutenant, CMA
Assistant Professor
Journeyman Machinist
First Assistant Engineer, Steam Vessels, Unlimited Horsepower

Howard Thor, Lieutenant Commander, CMA
Associate Professor
Marine Engineering, United States Merchant Marine Academy, 1944
B.A., Economics, University of California, 1950
M.A., Economics, University of California, 1954
Ph.D., Economics, University of California, 1965
B.S.E.E., Healds Engineering College, San Francisco, 1974
Chief Engineer, Steam Vessels, Unlimited Horsepower
Third Assistant Engineer, Diesel, Unlimited Horsepower

Charles Ludwig, Warrant, CMA
Welder

DEPARTMENT OF GENERAL STUDIES

Rory K. Miller
Assistant Academic Dean
Head, Department of General Studies
Associate Professor
B.A., English, Loyola University, 1969
M.A., English, University of California, 1971
M.B.A., Transportation, San Francisco State, 1976

Ohlen M. Alexander
Assistant Professor
B.A., Philosophy, Dartmouth, 1963
M.S., Chemistry, San Francisco State, 1974

Harry Diavatis, Public Information Officer and Athletic Director
Assistant Professor
B.F.A., Dramatic Arts, University of Utah, 1969

Martin S. Hanson
Associate Professor
B.A., English, Occidental College, 1932
M.S., Mathematics, Purdue University, 1961

A. Rene Viargues
Assistant Professor
B.A., Political Science, University of California, Davis, 1960
M.A., Political Science, University of California, Berkeley, 1962
M.A., American Civilization, University of Pennsylvania, 1965

DEPARTMENT OF NAVAL SCIENCE

Donald G. Thomas, Lieutenant Commander, USN
Head, Department of Naval Science
Associate Professor
B.S., Nautical Science, United States Merchant Marine Academy, 1964
M.P.A., Public Administration, Golden Gate University, 1976
Third Mate, Unlimited, Any Ocean

Alfred E. Yudes, Lieutenant, USN
Assistant Professor
B.S., Economics, United States Naval Academy, 1969

James Arnold, Lieutenant, USN
Assistant Professor
B.S., Naval Science, United States Naval Academy, 1970

Micheal J. Sare, Lieutenant, USN
Assistant Professor
B.S., Chemical Engineering, Illinois Institute of Technology, 1972

G. L. Pono, MMCS, USN
Instructor
B.S.E., Republic Central College, Republic of the Phillippines

A. P. Dougherty, QM1, USN
Instructor

DEPARTMENT OF ADULT MARITIME EDUCATION

Mayer Armbrust, Captain, CMA, Director
Associate Professor
B.S., Nautical Science, United States Merchant Marine Academy, 1945
Master Mariner, Oceans Unlimited

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