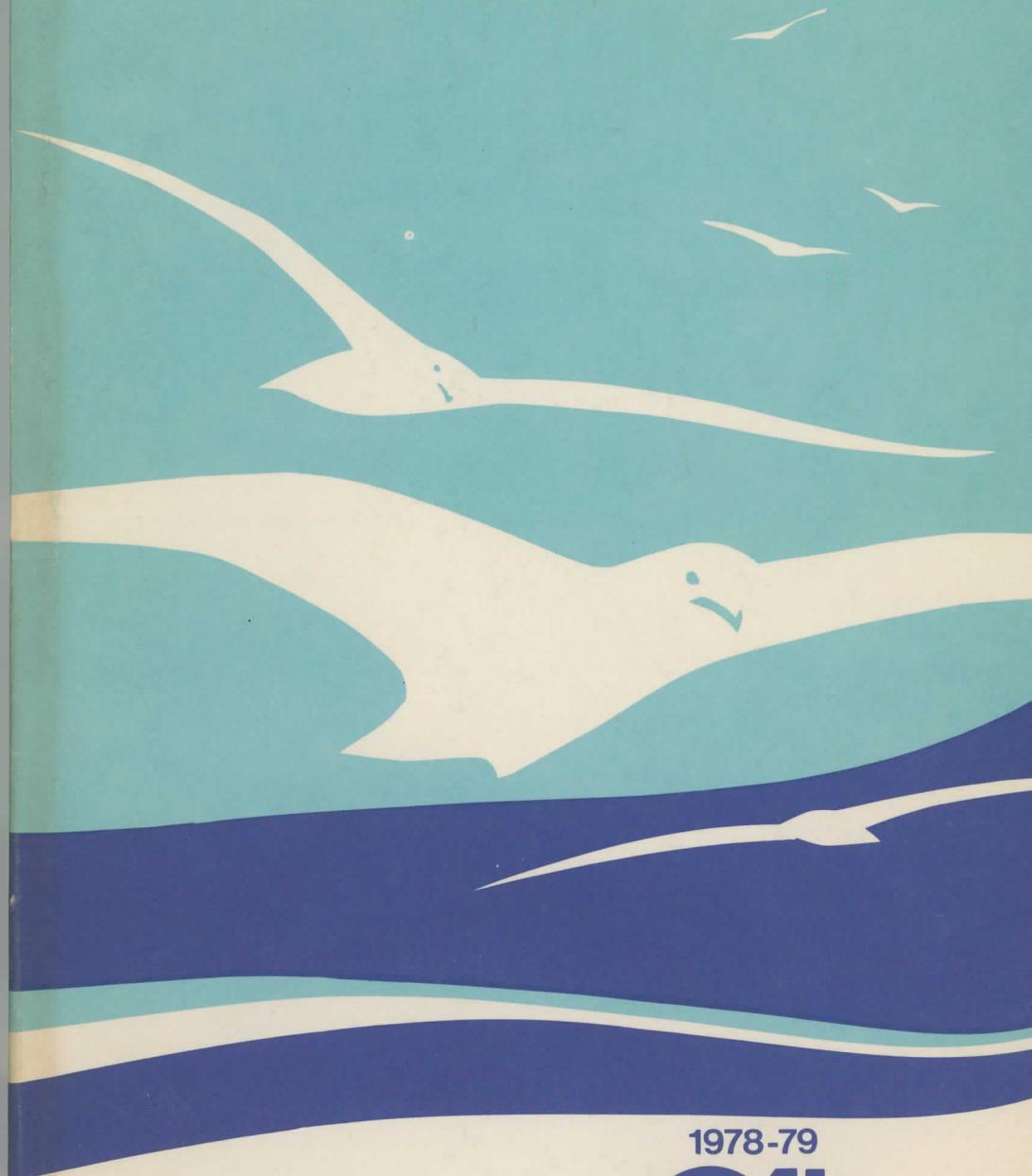


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**CAL**  
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ADMISSIONS OFFICE  
CALIFORNIA MARITIME ACADEMY  
P.O. BOX 1392  
VALLEJO, CA 94590

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

I would like additional information about the California Maritime Academy.

Please send me an Application.

Please send me Financial Aid Information and Application forms.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone Number \_\_\_\_\_ Date of Birth \_\_\_\_\_

## CALIFORNIA MARITIME ACADEMY

Vallejo, Ca 94590

Telephone (707) 644-5601

I would like additional information about the California Maritime Academy.

Please send me an Application.

Please send me Financial Aid Information and Application forms.

Name \_\_\_\_\_

**Address:** \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone Number \_\_\_\_\_ Date of Birth \_\_\_\_\_

CALIFORNIA MARITIME ACADEMY

Vallejo, Ca 94590

Telephone (707) 644-5601

## CATALOG

1978-1979

# CALIFORNIA MARITIME ACADEMY

vallejo, california

## TABLE OF CONTENTS

	<i>Page</i>
Academic Calendar 1978-1979 .....	5
President's Message .....	6
I. California Maritime Academy	
Mission .....	9
History .....	9
Location .....	10
Facilities.....	10
New Building .....	11
II. Admissions	
Application .....	14
General Admission-Qualification .....	14
Aptitude for Merchant Marine Licensing Program .....	15
Admission in Advanced Standing .....	16
The Role of State Legislators .....	18
Privacy Rights of Students .....	18
III. Tuition and Fees	
Costs of Attendance .....	22
Financial Aids.....	23
Loans.....	24
Grants.....	24
Employment .....	24
Scholarships.....	25
Veteran's Educational Assistance .....	25
IV. Student Body Organization and Activities	
Corps of Midshipmen .....	28
Entering Class .....	28
Conduct .....	28
Daily Schedule .....	30
Leave and Liberty.....	30
Student Government .....	30
Counseling.....	30
Medical and Dental Care .....	30
Motor Vehicles .....	31
V. Extra-Curricular Activities	
On-Campus .....	34
Off-Campus .....	34
Religious Practice .....	36
Industrial Contact .....	36
VI. The Academic Program	
Accreditation .....	38
Degrees .....	38
Licenses .....	38
School Year .....	38
Academic Standards .....	38
Grading System .....	38
Academic Probation .....	39
Disqualification.....	39
Readmission of Disqualified Students .....	40
Special Schools and Certification .....	40
Field Trips.....	40
Guest Speaker Program.....	40
Awards and Honors.....	41

VII. Curriculum	
The Major	44
Nautical Industrial Technology (NIT) Major	44
Marine Engineering Technology (MET) Major	44
NIT and MET Majors Compared	45
Technology and Traditional Education Compared	45
The Length of Maritime Academy Programs	46
Electives and Options	47
1. Marine Transportation Option	47
2. Marine Business Management Option	47
3. Maritime Specialties Option	48
4. Instrumentation and Automation Option	48
5. Ocean Technology Option	49
6. Naval Architectural Technology Option	49
7. Nuclear Technology Option	50
8. Bulk Liquid Dangerous Cargo Transportation	50
9. Elective Selection without a Specific Option	50
Nautical Industrial Technology Curriculum	51
Fourth Class Year (Freshman)	51
Third Class Year (Sophomore)	52
Second Class Year (Junior)	53
First Class Year (Senior)	54
Marine Engineering Technology Curriculum	55
Fourth Class Year (Freshman)	55
Third Class Year (Sophomore)	56
Second Class Year (Junior)	57
First Class Year (Senior)	58
Sea Training	59
NIT	59
MET	60
VIII. Course Description	
Department of Nautical Industrial Technology	64
Department of Marine Engineering Technology	72
Department of General Studies	81
Physical Education	86
Department of Naval Sciences	87
Department of Adult Maritime Education	88
IX. Career Opportunities in Today's Maritime Industries	89
X. U.S. Naval Reserve Officer Program	93
XI. Administration, Faculty and Staff	95

## ACADEMIC CALENDAR 1978-1979

August 15-18, 1978	Orientation week, Class of 1982
August 22, 1978	Registration, Fall Trimester
August 23, 1978	First Day of Classes
September 2-4, 1978	Labor Day Weekend
September 29, 1978	Last Day to Remove Incomplete Grades
November 22, 1978	Last Day to Withdraw from classes
November 23-26, 1978	Thanksgiving Recess
December 11-15, 1978	Final Examination, Fall Trimester
December 16, 1978-January 1, 1979	Holiday Recess
January 2, 1979	Registration, Winter Trimester
January 3, 1979	Dockside Steaming begins for classes of 79, 80, 82
January 3, 1979	Winter Trimester begins, Class of 1981
January 26, 1979	Last Day to Remove Inc. Grades
February 19, 1979	Washington's Birthday, Holiday Weekend
March 2, 1979	Last Day to withdraw from Classes
March 21-23, 1979	Final Examination, Winter Trimester
March 24-April 1, 1979	Spring Recess
April 2, 1979	Registration, Spring Trimester
April 3, 1979	First Day of Classes
April 14-15, 1979	Easter Weekend
April 16, 1979	License Seminar Begins, Class of 1979
May 8-11, 1979	USCG, License Exams, Class of 1979
May 18, 1979	Field Day, Class of 1979
May 19, 1979	Graduation, Class of 1979
May 26-28, 1979	Memorial Day Holiday Weekend
July 4, 1979	Independence Day Holiday
July 6, 1979	Last Day to withdraw from Classes
July 23-27, 1979	Final Examinations, Classes of 1980, 81, 82
July 27, 1979	Field Day, Classes of 1980, 81, 82
July 28-August 27, 1979	Summer Recess



**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 graduates 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 colleges, we are extremely proud of the employment "track" record of our graduating classes, particularly the ones of the last four or five 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 merchant marine 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 technical maritime industry.

Sincerely,

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, and as commissioned naval reserve officers.

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 physical attributes necessary to successfully meet the rigors of the sea.

### ACADEMY PROGRAM

California Maritime Academy is a four year resident college, offering a program for young men and women interested in a maritime oriented career. All students are required to live on the Academy campus.

The merchant marine license program at the Academy is designed to qualify students for a Bachelor of Science degree in either Nautical Industrial Technology (Deck) or Marine Engineering Technology (Engine), a merchant marine officer's license, and a commission as Ensign, U.S. Naval Reserve or U.S. Coast Guard. Three areas of emphasis at the Academy are: the academic, practical training, and officer development requirements.

### 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 nearly half our midshipmen.

New three-story redwood residence halls completed in 1977 provide accommodations for 264 students. A student Commons Building, also completed in 1977 provides student union facilities and a completed midshipman watch center.

The Hugh P. Gallagher Library, with additions completed in 1976, sits in the center of the campus, adjacent to Golden Bear Park. The 9,000 square foot facility offers 15,000 books, 300 periodicals and over 4,000 microforms in maritime technology. Seating is provided for 117 readers.

Mayo Hall houses a well-equipped gymnasium, 25 meter indoor pool, an exercise room and physical therapy facilities.

Classrooms are located in a two-story building and contiguous to the classrooms is a new faculty office building.

The dining hall, scheduled for complete renovation in 1978, 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 laboratory.

A combination auditorium/Lecture Hall seating 500, was completed in 1977. This modern facility is in daily use for lectures, assemblies, and symposia.

The Administration Building provides offices for the President, Commanding Officer of the Training Ship, Academic Dean, Commandant of Midshipmen, and Administrative Officer. A new warehouse was completed in 1976.

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. An additional \$2.2 million has been appropriated for this program through the middle of 1978.

A new welding laboratory will be completed early in 1978. Our Corporation Yard Shops will be completed in the same time period. By late in 1978 we expect to have expanded and modernized our dining and kitchen facilities, constructed student parking lots, improved roads and lighting. During 1979 it is planned to develop and construct a radar simulation laboratory.

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 and graduate in three years. Students with lesser or greater amounts of transfer credit should contact the Director of Admissions 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) 644-5601.

Submit the application and a \$10 non-refundable application fee to the Director of Admissions and upon receipt of the application, the Admissions Officer will respond with specific information regarding additional materials required.

The additional documents required to complete the application are:

- 1) Entrance exams test scores; either Scholastic Aptitude Test (SAT) or American College Test (ACT). No other test required.
- 2) 1 official copy of high school transcript through first three years for high school senior. Transcript should include courses scheduled to be taken in senior year.
- 3) 2 official transcripts of all college work attempted.
- 4) 3 certified copies of the applicant's birth certificate.
- 5) A letter of recommendation from a high school or college counselor or principal.
- 6) Statement of residence (a form will be mailed on receipt of application)
- 7) Physical examination (information and physical form 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 June 1st* is required. Applications received after that date will not be considered.

## GENERAL ADMISSION QUALIFICATIONS

**Age**—Candidates for freshman 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 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.

The physical status of candidates will be determined in the following manner. Medical forms to be used to record the results of the physical examination will be sent to the candidate.

Candidates who pass this physical examination and meet all other requirements will be judged provisionally accepted. They may, however, be required at a later date to complete another physical examination. Should this subsequent examination show physical deficiencies below the standards established for an original license, the applicant may be disenrolled for medical reasons.

Applicants who have applied for the NROTC program, or for admission to a Service Academy may request the Department of Defense Medical Review Board to forward a copy of their complete physical examination report to the California Maritime Academy.

**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. (See page 94)

**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 admission at the fourth class (freshman) level must meet the following requirements:

1. Be a high school graduate or have completed a high school equivalency.
2. Have a minimum academic preparation of
  - 3 years of English
  - 2 years of Algebra
  - 1 year Plane Geometry or Trigonometry
- It is recommended that the candidate have at least 2 years of laboratory science with physics or chemistry being included.
3. Submit results of either the College Entrance Examination Boards Scholastic Aptitude Test (SAT) or the American College Test (ACT). One of these tests should be taken not later than the January test date of the year in which the candidate is planning to enter the Academy. No other test is required.

## APTITUDE FOR MERCHANT MARINE LICENSING PROGRAM

An applicant's file normally includes information indicating aptitude for Merchant Marine Officer training. Aptitude in this respect embodies character, morals, extra-curricular activities, and interest in the science of the sea.

A personal interview is desirable, and will be arranged if considered to be essential in the process of selection.

The Admissions Office is available for interviews and Academy tours Monday through Friday from 9:00 A.M. until 4:00 P.M.

**Appointments to visit the Academy are required and should be scheduled well in advance.** Prospective candidates who wish to visit the Academy are encouraged to plan their visit between August and June. Those who wish to visit our Training Ship are advised that the ship is on cruise from January through March.



### 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. 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 47 to 50.
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 and graduate in three years.

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.

In summary a transfer student contemplating graduation from the Academy in three years must present the following course transfer credits.

	Semester hour units
<i>For both the Nautical Industrial Technology and the Marine Engineering Technology curriculums:</i>	
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)	$1\frac{1}{2}$
Economics (Principles) .....	4

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

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 .....	
Social Science or Humanities .....	3
Computer Science (Fortran or Basic Programming) .....	3
Total for NIT Students, 47½ Semester Units.	

Marine Engineering Technology students should transfer a second 3 unit course in Calculus (Technology level acceptable) and 3 additional semester hours <i>selected from:</i>	
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
Total for MET Students 47½ Semester Units	

### 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 Admissions Office 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

† 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.

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.

### NOTICE

The Board of Governors of the California Maritime Academy reserves the right to add, amend, or repeal any of its regulations, rules, resolutions, standing orders, and rules of procedure, in whole or in part, at such time as it may choose. The President of the California Maritime Academy reserves the right to add, amend, or repeal provisions of this catalog and rules of the California Maritime Academy, including handbooks, at such time as he may choose.

Every effort has been made to assure the accuracy of the information in this catalog. Students are advised, however, that such information is subject to change without notice. Therefore, they should consult the appropriate instructional departments, schools, or administrative offices for current information.

### NONDISCRIMINATION ON THE BASIS OF SEX

The California Maritime Academy does not discriminate on the basis of sex in the educational programs or activities it conducts. Title IX of the Education Amendments of 1972, as amended, and the administrative regulations adopted thereunder prohibit discrimination on the basis of sex in education programs and activities operated by the California Maritime Academy. Such programs and activities include admission of students and employment. Inquiries concerning the application of Title IX to programs and activities of the California Maritime Academy may be referred to the Administrative Officer, the campus officer assigned the responsibility of reviewing such matters or to the Regional Director of the Office of Civil Rights, Region 9, 760 Market Street, Room 700, San Francisco, California 94102.

### INSTITUTIONAL INFORMATION

The following information concerning student financial assistance may be obtained from Diane B. Hulen, P. O. Box 1392, Vallejo, California 94590, (707) 644-5601.

1. Student financial assistance programs available to students who enroll at the California Maritime Academy;
2. The method by which such assistance is distributed among student recipients who enroll at the California Maritime Academy;
3. The means, including forms, by which application for student financial assistance is made; the requirements for accurately preparing such applications; and

the review standards employed to make awards for student financial assistance; and

4. The rights and responsibilities of students receiving financial assistance.

The following information concerning the cost of attending the California Maritime Academy is available from the Director of Admissions, Box 1392, Vallejo, California 94590, (707) 644-5601.

1. Tuition fees;
2. Estimated costs of books and supplies;
3. Estimates of typical student room and board costs or typical community costs; and
4. Any additional costs of the program in which the student is enrolled or expresses a specific interest.

Information concerning the refund policy of the California Maritime Academy for the return of unearned tuition and fees or other refundable portions of costs is available from the Business Manager, P. O. Box 1392, Vallejo, California 94590, (707) 644-5601.

Information concerning the academic programs of the California Maritime Academy may be obtained from Mr. Wilbur H. Parks, Academic Dean, P. O. Box 1392, Vallejo, California 94590, (707) 644-5601.

1. The current degree programs and other educational and training programs;
2. The instructional, laboratory, and other physical plant facilities which relate to the academic program;
3. The faculty and other instructional personnel.

#### **ON-CAMPUS RESIDENCY REQUIREMENT**

All aspects of student life at the Academy are essential and vital to the development of midshipmen during their four-year program of study. This includes the training-at-sea trimester. Therefore, it is the policy of the Academy that all students must complete the last three years in residence at CMA. Exception to this policy would only effect students that transfer to CMA from another state or federal maritime academy in the United States.

#### **CAREER PLACEMENT INFORMATION**

The campus may furnish, upon request, information concerning the subsequent employment of students who graduate from programs or courses of study which have the purpose of preparing students for a particular career field. This information includes data concerning average starting salary and the percentage of previously enrolled students who obtained employment. Interested prospective students may request copies of the published information from the Director of Adult Maritime Education, P. O. Box 1392, Vallejo, California 94590, (707) 644-5601.

#### **REQUIREMENT AND USE OF SOCIAL SECURITY NUMBER**

Applicants are required to include their Social Security number in designated places on applications for admission. The Social Security number will be used as a means of identifying records pertaining to the student as well as identifying the student for purposes of financial aid eligibility and disbursement and the repayment of financial aid and other debts payable to the institution.

### **COOPERATION AND FINANCIAL AID**

To do this, the school, students, parents and business leaders, teachers, parents, business leaders and the community must be fully involved in the planning and implementation of the school's educational and financial aid programs. The school must be able to demonstrate its ability to meet the educational needs of many students from various backgrounds and economic levels.

Student participation in the school's financial aid programs is essential to the success of the school. The school must be able to demonstrate its ability to meet the educational needs of many students from various backgrounds and economic levels.

The school must be able to demonstrate its ability to meet the educational needs of many students from various backgrounds and economic levels.

Financial aid programs should not be a burden to the school, but rather a source of revenue and an opportunity for the school to meet the educational needs of many students from various backgrounds and economic levels.

The school must be able to demonstrate its ability to meet the educational needs of many students from various backgrounds and economic levels.

### **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 \$1,200 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 half of the amount directly in quarterly installments.

### Schedule of Annual Fee Payments

California Residents	1st trimester	2nd trimester	3rd trimester
Tuition*	\$135	135	135
Athletic	10	10	10
Room	225	225	225
Board	415	415	415
Medical	30	30	30
Breakage Deposit	50	—	—
Student Activities	40	—	—
Linen	15	15	15
Insurance**	15	—	—
Total Tuition and Fees***	\$935	\$830	\$830
Less MARAD Subsidy (eligible students)	400	400	400
Net Cost	\$535	\$430	\$430

\* Tuition fee for out-of-state students is \$175 additional per trimester.

\*\* Insurance consists of a group policy concerning loss of life or limb and Student Activities Liability coverage.

\*\*\* Room and Board fees for the first class 3rd Trimester are reduced \$320 to correspond with trimester length. For all other classes fees are based on annual costs divided into three equal trimester payments.

**Clothing, Books, and Supplies:** Entering students must deposit in trust \$900 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 \$75 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, books and deposit)

	Annual Fees	Total Fees (Four Years)
In-State		
Subsidized Student	\$1,345	\$5,060
Non-subsidized Student	2,545	9,860
Out-of-State		
Subsidized Student	1,870	7,160
Non-subsidized Student	3,070	11,960

### 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	0%

Within thirty days after initial arrival at the Academy all unused uniforms that have not been stencilled may be returned for a maximum refund of \$700 from the clothing deposit. A total of \$100 will be withheld to cover the cost of administration and alteration.

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 nationals of the United States or the Trust Territory of the Pacific Islands. About one-half of the students currently enrolled at the Academy receive financial aid in amounts ranging from about \$400 to \$3,500 per year. Often, "packages" of two or more kinds of aid are offered to eligible applicants. The average amount of aid received in 1977 was about \$2,000.

Eligibility for most programs is based upon an assessment of the applicant's need as determined by analysis of the Financial Aid Form (FAF) submitted annually by the student. This document was developed by the College Scholarship Service of the College Entrance Examination Board to collect and analyze family financial data, and is used by schools and other agencies nationwide to provide an objective, consistent determination of students' needs. "Need" is defined as the difference between the cost of attending the Academy and the family's expected contribution. The "expected family contribution" is based upon income and assets, medical expenses, taxes, family size and many other factors reported on the Financial Aid Form. The budget used to calculate a student's need includes approximately \$750 per year for personal expenses and transportation in addition to other school expenses.

To apply for most of the programs listed below, students must file the Financial Aid Form (FAF) and the State of California financial aid application. Students need to file only one set of these forms to be considered for state, federal and institutional programs. (Separate applications are required for Federally Insured Student Loans, short-term loans and privately funded programs).

The Financial Aid Form and the State of California form will be available after December 1st from the CMA Financial Aids Office and from high school counselors. They may be filed with the College Scholarship Service after January 1st. Filing instructions will accompany the forms. Filing deadline for State of California programs is February 1st. Cal Maritime will give priority to applications received by February 1st but will continue to accept applications as long as funds are available.

## PROGRAM DESCRIPTIONS

### Loans

THE NATIONAL DIRECT STUDENT LOAN (NDSL) is a federally funded long-term loan, repayable beginning nine months after the borrower ceases to be at least a half-time student at 3% annual interest. The loan is interest free until the repayment period begins. The CMA Financial Aids Office determines eligibility. Loans range from about \$300 to \$1,200 per year, depending upon need, and may not exceed a total of \$5,000 for an undergraduate student.

THE FEDERALLY INSURED STUDENT LOAN (FISL), made by private lenders and guaranteed by the federal government, is repayable beginning nine months after the borrower ceases to be at least a half-time student at 7% annual interest. The interest may be paid by the federal government until the repayment period begins if adjusted family income is under \$25,000 per year. The maximum loan is \$2,500 per year, and total loans to undergraduates may not exceed \$7,500. The FISL requires a separate application, available from the Academy. Application can be made at any time during the year.

THE CALIFORNIA MARITIME ACADEMY MIDSHIPMEN'S FUND LOAN is a short-term emergency loan, normally limited to the amount needed for tuition, fees, books, uniforms and supplies. Interest at 5% per year accrues from the date of the loan. Loans must generally be repaid prior to the end of the trimester in which funds were advanced. The loan requires a separate application available from the Academy.

OTHER LOANS are sometimes available from various service organizations such as the California Maritime Academy Foundation, the Propeller Club of the United States and the Society of Port Engineers. Information is available from the CMA Financial Aids Office.

### Grants

THE BASIC EDUCATIONAL OPPORTUNITY GRANT (BEOG) is a federal grant for students with exceptional need. Grants range from \$200 to \$1,400 per year. Recipients must be undergraduates working toward their first baccalaureate degree.

THE COLLEGE OPPORTUNITY GRANT (CAL GRANT B), for entering freshmen who are California residents and who demonstrate exceptional need and academic promise, is awarded by the California Student Aid Commission on a competitive basis. Grants average about \$1,100 per year.

### Employment

THE COLLEGE WORK-STUDY PROGRAM provides part-time jobs on campus for students who demonstrate need for the earnings. Eligibility is determined by the CMA Financial Aids Office. Federal and state funds provide wages, which are currently set at \$3.05 per hour.

OTHER EMPLOYMENT: Students will find that the academic schedule at CMA does not often allow time for off-campus employment. There are a limited number of on-campus jobs, paid with State Funds, which do not require a needs test for eligibility. The Financial Aids Office can provide information.

### Scholarships

CALIFORNIA STATE SCHOLARSHIPS (CAL GRANT A) of up to \$500 per year are awarded on a competitive basis by the California Student Aid Commission. Selections are based upon need and academic achievement.

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

### VETERANS EDUCATIONAL ASSISTANCE

Cal Maritime is approved for Veterans Administration educational assistance programs. Students should apply to the local Veterans Administration office in their region for assistance and information.

#### IMPORTANT DATES TO REMEMBER

DECEMBER 1:  
Financial Aid  
Applications  
Available

JANUARY 1:  
First date on  
which applications  
can be filed

FEBRUARY 1:  
Deadline for  
filing for  
California  
State programs

Applications filed by February 1st will be given priority consideration for institutional programs such as National Direct Student Loans, Work-Study and Supplemental Educational Opportunity Grants.





## 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 semi-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 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.

### ENTERING CLASS

The Corps officers, through the Commandant's office, are responsible for the orientation week which takes place early in August for the entering students.

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). Transfers between the two core curriculums may be approved by the President if space is available in the gaining program.

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.

### 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 new maritime academy graduate and 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 for a responsible life at sea. Nevertheless, 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 for 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 since a violation would be inconsiderate of 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-curricular recreation. Following the evening meal at 1730 (5:30 p.m.) the rest of the evening is generally spent in studies or liberty. To afford educational opportunities not possible during the 0800 to 1600 period some elective and out-of-sequence classes are scheduled at 1600 (4:00 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).

At the conclusion of classes at 1700 (5:00 p.m.) the First Class are granted liberty until 0200 (2:00 a.m.). Second Class liberty commences at 1700 (5:00 p.m.) and ends at 0100 (1:00 a.m.). Third class liberty begins at 1700 (5:00 p.m.) and ends at 2400 (12:00 midnight).

Fourth Class midshipmen are granted Wednesday evening liberty and 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, comprising 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 Offices of the Dean or Commandant.

## 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 at a daily sickcall or on an emergency basis.
- B. During the annual training cruise a licensed physician is on board the train-

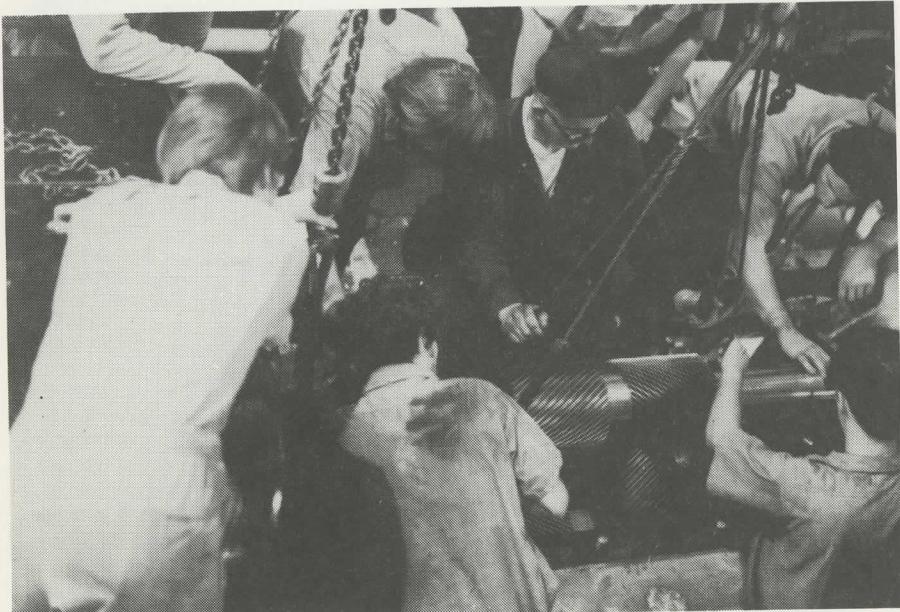
ing ship. Medical expenses or hospitalization ashore in foreign ports and transportation expenses incident thereto must be paid by the student.

C. Hospitalization is available at the U.S. Public Health Service Hospital in San Francisco.

All of the foregoing are furnished at no additional cost to the student. However, should the injury or illness occur while the student is away from the Academy, except on the annual training cruise, 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

The center for student social activities and recreation is the campus Commons Building. There, students make extensive use of the snack bar facility, reading lounge, recreation lounge, and T.V. lounge. A second recreational lounge is located in the Faculty Office Building. Another area is located in the upper resident hall.

The gymnasium, exercise room and pool are kept open in the afternoons and evenings for student use.

A variety of clubs and special interest groups are active on campus and receive support from the Academy. These groups include the Scuba Club, Sailing Club, Crew, Radio Club, Camera Club and others. Students are encouraged to take the initiative in forming new clubs and special interest groups.

On-campus social and recreational events currently include basketball, water polo, and soccer games, post-game dances and weekend picnics for alumni and other Academy related groups. Many on-campus cultural and social activities are centered in the new 500-seat auditorium.

The Academy sponsors an extensive Intramural Program. Team activities include such sports as flag football, basketball, volleyball, softball, lifeboat racing; while individual competition tournaments include golf, handball, bowling, boxing, tennis, archery and swimming.

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.

### 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 soccer, basketball, and water polo. 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, and basketball 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 inspiring stands of coast redwoods, sequoia sempervirens, are 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.

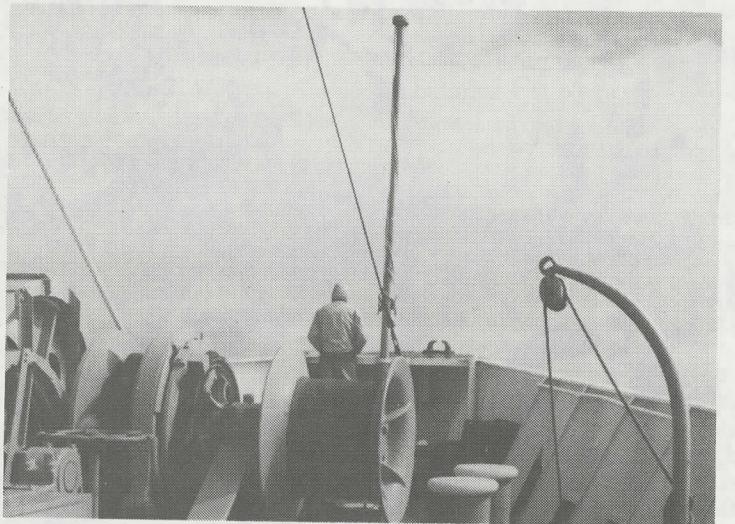
Off-campus events are of course myriad; however, the Academy, through the student council, sponsors the annual RING DANCE at one of the large hotels or private clubs in the Bay Area.



## 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. 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. Chinese and Japanese Buddhist, Taoist and Zen societies, assemblies, as well as churches exist in San Francisco and 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, i.e., 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 accredited by the Western Association of Schools and Colleges, additionally, the Marine Engineering Technology program is accredited by the Engineers Council for Professional Development and the Nautical Industrial Technology program is accredited by the National Association of Industrial Technology.

### 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.

### Commission, USNR

Students meeting all physical and academic requirements of the U.S. Navy are eligible to receive an inactive reserve commission as Ensign. Interested graduates may apply for active duty as a commissioned officer in the U.S. Navy.

### 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
P Passed .....	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.

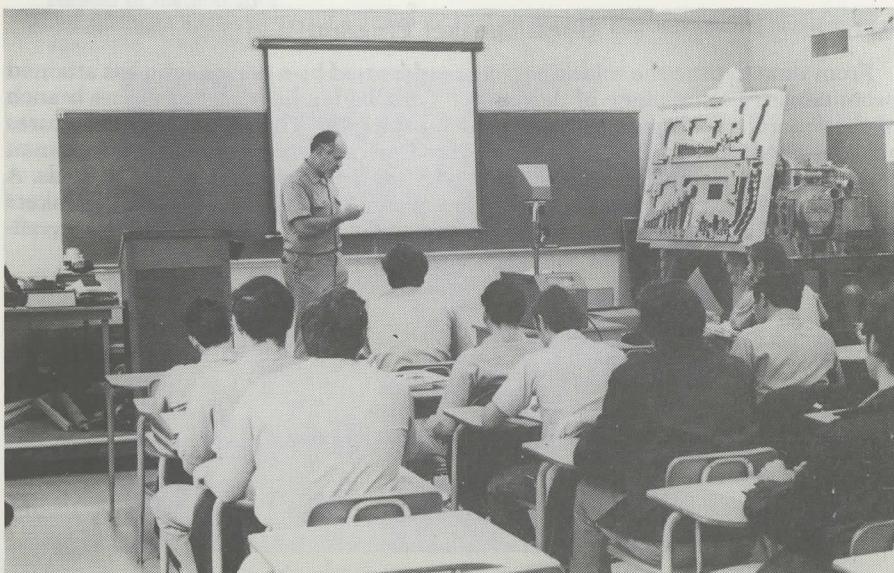
### Disqualification

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 continued 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 Admissions 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 Director of Admissions may make the decision as to the advisability of readmission or request the Academic Dean to 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
- FCC Radio Telephone Third Class Permit
- 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

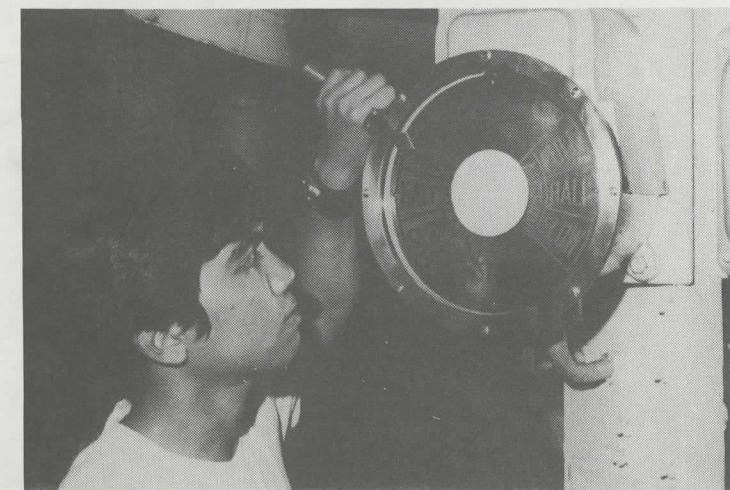
From time to time the midshipmen are addressed by a person who has attained prominence in some phase of the shipping or allied industries, or in some branch of the federal government concerned with shipping. These educational lectures are designed to supplement the information presented to the midshipmen through the curriculum 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 are available with 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.
- SHIP OWNERS 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.



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## 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, purers, 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 Technology. 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 management 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 management 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 on board 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, Any Tonnage. 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 examinations for the successively higher licenses.

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

The engineering department of a ship is organized similarly to the deck depart-

ment 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, maintenance 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

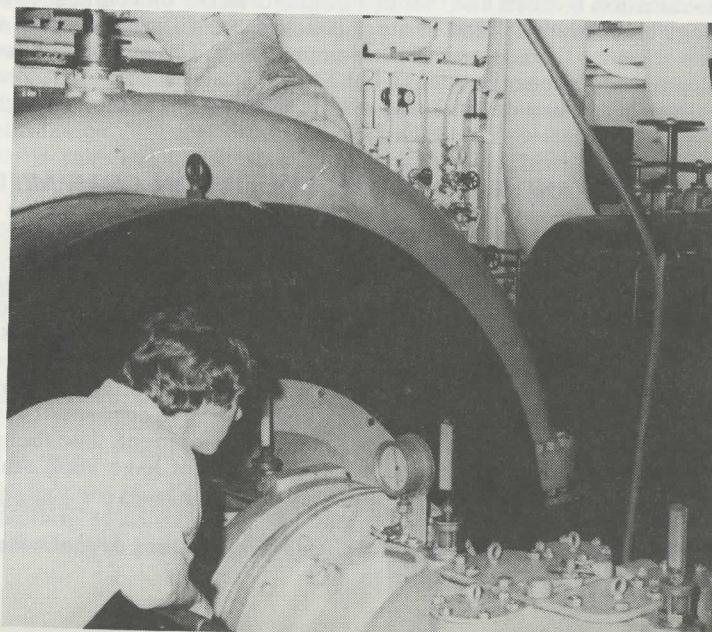
Both of Cal Maritime's Major curriculums follow the philosophy of technology education. Technology graduates are prepared to be doers in current operations. On the other hand traditional educational programs in engineering or management give students a background in sophisticated theory for the design and development 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.

Eight options have been developed and are in full operation. The courses which may be counted in each of these options are listed below:

#### 1. MARINE TRANSPORTATION OPTION

<i>Required for Option</i>	<i>Sem. Units</i>
D-114 Introduction to Marine Transportation (Prereq: None) .....	3
D-313 Directed Study (in field of option) (Prereq: 1st Class) .....	2 or 3 (arrange)

##### *And Six or More Semester Units of the Following Courses:*

D-250 International Business & Finance (Prereq: G-141) .....	3
D-252 Economics of Sea Transport (Prereq: G-141, D-114) .....	3
D-319 Petroleum Transportation Management (Prereq: D-310) .....	3

##### *Additional Courses to Make a Minimum Total of 16 Semester Units May be Selected From:*

D-230 Business Statistics (Prereq: G-105) .....	3
D-232 Accounting Principles I (Prereq: None) .....	3
D-240 Industrial Relations and Personnel Management (Prereq: NS-101) .....	3
E-240 Contract Law and Specifications (Prereq: 3rd Class) .....	3
E-241 Shipyard Management (Prereq: E-240) .....	3
E-290 Pollution Control and Laws (Prereq: G-107) .....	2
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

<i>Required for Option</i>	<i>Sem. Units</i>
D-114 Introduction to Marine Transportation (Prereq: None) .....	3
D-313 Directed Study (in field of option) (Prereq: 1st Class) .....	2 or 3 (arrange)

##### *And Six or More Semester Units of the Following Courses:*

D-230 Business Statistics (Prereq: G-105) .....	3
D-232 Accounting Principles I (Prereq: None) .....	3
D-233 Accounting Principles II (Prereq: D-232) .....	3
G-120 Computer Science II (Prereq: G-119) .....	3

*Additional Courses to Make a Minimum Total of 16 Semester Units  
May be Selected From:*

D-240 Industrial Relations & 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
D-319 Petroleum Transportation Management (Prereq: D-310) .....	3
E-240 Contract Law and Specifications (Prereq: 3rd Class) .....	2
E-241 Shipyard Management (Prereq: E-240) .....	3
E-290 Pollution Control and Laws (Prereq: G-107) .....	2
G-117 Introduction to Oceanography I (Prereq: None) .....	2
G-118 Introduction to Oceanography II (Prereq: None) .....	2

### 3. MARITIME SPECIALTIES OPTION

*For Nautical Industrial Technology Students:*

*Required for Option*

D-313 Directed Study (Prereq: 1st Class) .....	Sem. Units 2 or 3 (Arrange)
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Nine 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 Total 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*

*Required for Option*

E-313 Directed Study (Prereq: 1st Class) .....	Sem. Units 2 or 3 (Arrange)
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Ten 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. curricula.

Additional Courses to make a Minimum Total 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
E-313 Directed Study (In field of Option) (Prereq: 1st Class) .....	Sem. Units 2 or 3 (Arrange)

*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
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

*Required for Option*

G-313 Directed Study (In field of option) (Prereq: 1st Class) .....	Sem. Units 2 or 3 (arrange)
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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  
—for all students in the option*

E-240 Contract Law and Specifications (Prereq: 3rd Class) .....	2
E-270 Ship Resistance and Propulsion (Prereq: Consent of Instructor) .....	2
E-271 Introduction to Ship Design (Prereq: E-109, E-230) .....	3
E-272 Ship Structure and Design (Prereq: G-119 and Consent of Instructor) .....	2
E-313 Directed Study (Prereq: E-272 and Consent of Instructor) .....	Sem. Units 2 or 3 Arrange

*—for NIT students only*

E-230 Statics (Prereq: G-205, G-210) .....	2
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*Additional Courses to make a Total of at least 16 Semester Units in the Option may be selected from:*

*—for all students in the option*

E-241 Shipyard Management (Prereq: E-240) .....	3
D-114 Introduction to Marine Transportation (Prereq: None) .....	2
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 NIT students only*

E-332 Materials, Properties and Strength (Prereq: E-230, G-107) .....	5
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Note: (1) MET students in this option may exclude E-306 from the MET core curriculum.  
(2) NIT students in this option may exclude D-207 from their NIT 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-250 & E-261) .....	3
E-313 Directed Study (Prereq: E-351) .....	2 or 3 (arrange)

*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
Other Marine Technology Elective Courses prefixed E-numbers .....	As selected
D-114 Introduction to Marine Transportation.....	3
G-117 Introduction to Oceanography I .....	2
G-118 Introduction to Oceanography II .....	2
G-120 Computer Science II (Prereq: G-119).....	3

## 8. BULK DANGEROUS LIQUID CARGO TRANSPORTATION

### Required for Option

D-114 Introduction to Marine Transportation (Prereq: None) .....	3
D-319 Petroleum Transportation Management (Prereq: D-310) .....	3
D-318 Marine Transportation of LNG & LPG (Prereq: D-310, D-319) .....	3
D-313 Directed Study (Prereq: 1st Class) .....	2 or 3 (Arrange)

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

E-240 Contract Law and Specifications.....	2
E-290 Pollution Control.....	2
G-117 Introduction to Oceanography I .....	2
G-118 Introduction to Oceanography II .....	2

## 9. 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 <sup>1)</sup>

### 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

#### Winter Trimester (Fourth Class Cruise)—12 Weeks

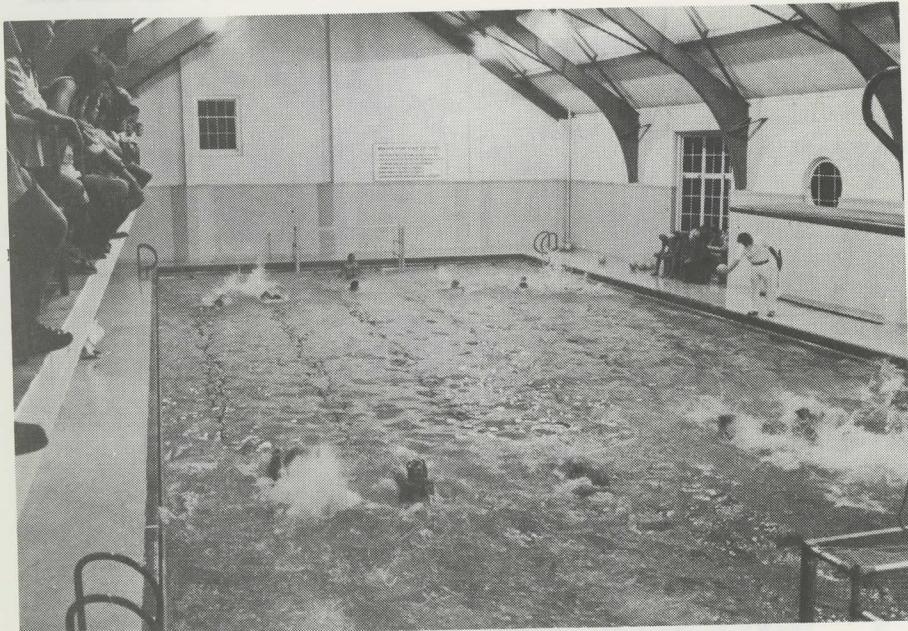
D-501 Sea Training (for License qualification) .....	4 *
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#### Spring Trimester—16 Weeks

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	2
D-116 Shipboard laboratory .....	0	6	2
NS-302 Naval Ship Systems.....	3	0	3

\* Credit required beyond eight-semester baccalaureate degree.

NOTE: <sup>1)</sup> Because of continued program planning, curriculum requirements are subject to change without notice.



## NAUTICAL INDUSTRIAL TECHNOLOGY CURRICULUM <sup>1)</sup>

### 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
			<u>18½</u>

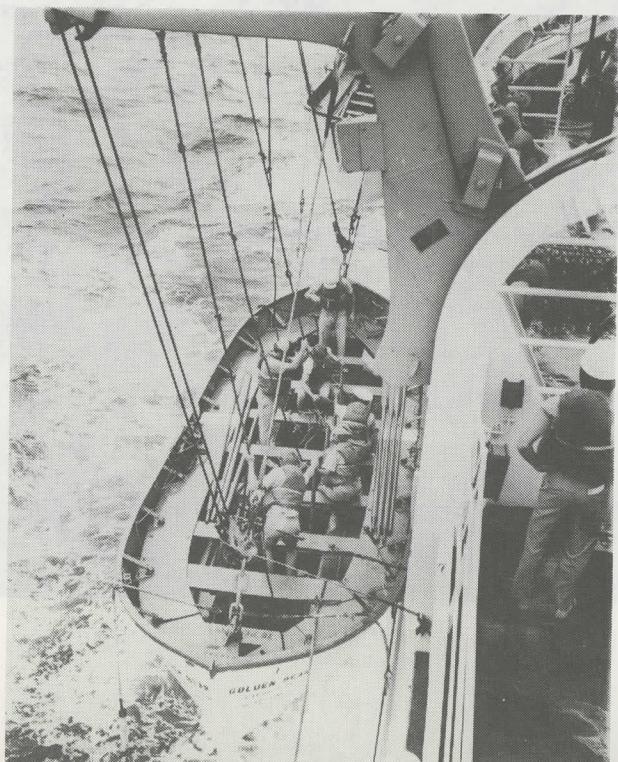
#### Winter Trimester—12 Weeks

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
			<u>13</u>

#### Spring Trimester—17 Weeks

D-108 Navigation .....	3	0	3
D-210 Naval Architecture (Stability) .....	3	0	3
G-119 Computer Science .....	3	0	3
D-215 Seafarership 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) .....			<u>2</u>
			<u>19½</u>

NOTE: <sup>1)</sup> Because of continued program planning, curriculum requirements are subject to change without notice.



## NAUTICAL INDUSTRIAL TECHNOLOGY CURRICULUM <sup>1)</sup>

### 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) .....			<u>3</u>
			<u>18</u>

#### Winter Trimester (Second Class Cruise)—12 Weeks

D-401 Sea Navigation Laboratory .....		<u>2</u>
D-502 Sea Training (for license qualification) .....		<u>4*</u>

#### Spring Trimester—17 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 Seafarership (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) .....			<u>3</u>
D-510 Internship (May be taken during summer) .....		2 Weeks	<u>2*</u>
			<u>16</u>

\* Credit required beyond eight-semester baccalaureate degree.

NOTE: <sup>1)</sup> Because of continued program planning, curriculum requirements are subject to change without notice.

### NAUTICAL INDUSTRIAL TECHNOLOGY CURRICULUM <sup>1)</sup>

#### 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	3	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-512 License Seminar.....	6 weeks	4 *	
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) <sup>2)</sup> .....	4 days		

\* Credit required beyond eight-semester baccalaureate degree.

NOTES: <sup>1)</sup> Because of continued program planning, curriculum requirements are subject to change without notice.

<sup>2)</sup> Students must pass USCG license examination to receive Baccalaureate Degree.



### MARINE ENGINEERING TECHNOLOGY CURRICULUM <sup>1)</sup>

#### 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	1	
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 *

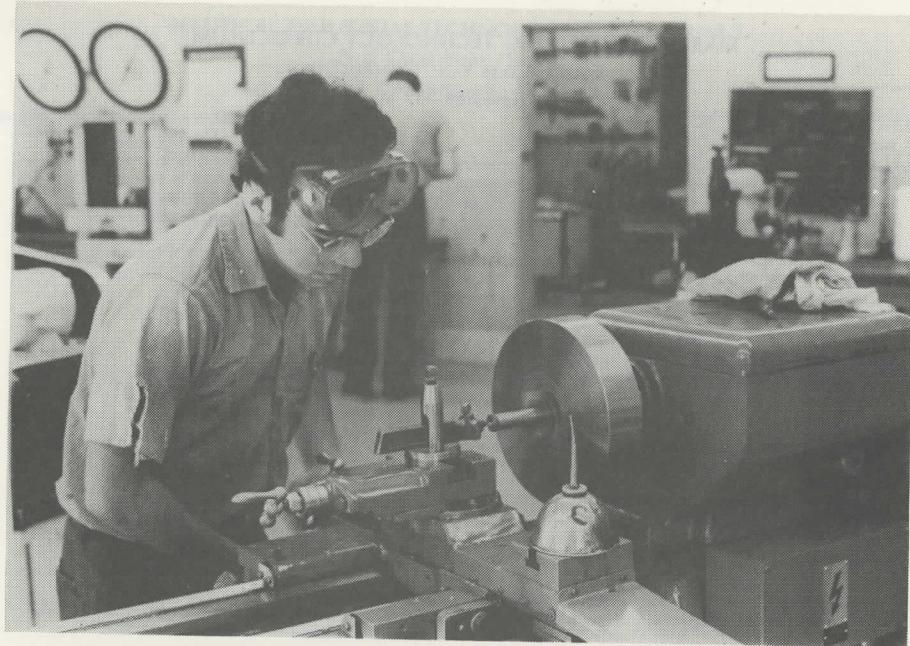
#### Spring Trimester—17 Weeks

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

\* Credit required beyond eight-semester baccalaureate degree.

NOTE: <sup>1)</sup> Because of continued program planning, curriculum requirements are subject to change without notice.





#### MARINE ENGINEERING TECHNOLOGY CURRICULUM <sup>1)</sup>

##### 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—12 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—17 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

NOTE: <sup>1)</sup> Because of continued program planning, curriculum requirements are subject to change without notice.

#### MARINE ENGINEERING TECHNOLOGY CURRICULUM <sup>1)</sup>

##### 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 *
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##### Spring Trimester—17 Weeks

E-204 Alternating Current Electrical Engineering .....	3	0	3	
E-303 Diesel Engineering I .....	3	0	3	
NS-301 Navigation .....	2	0	2	
D-205 Management .....	2	0	2	
E-226 Marine Practices Laboratory III .....	0	9	3	
Elective (Maritime Related) .....			3	
E-510 Internship (May be taken during summer) .....	2 Weeks		2 *	
			17	

\* Credit required beyond eight-semester baccalaureate degree.

NOTE: <sup>1)</sup> Because of continued program planning, curriculum requirements are subject to change without notice.



## MARINE ENGINEERING TECHNOLOGY CURRICULUM <sup>1)</sup>

### 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
E-503 Sea Training (for license qualification)	3 *

#### Spring Trimester—6 Weeks

E-512 License Seminar	6 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	
Misc. Systems	2 hrs/week	
Fire Fighting and Regulations	2 hrs/week	
License Examinations (U.S. Coast Guard) <sup>2)</sup>	4 days	

\* Credit required beyond eight-semester baccalaureate degree.

NOTES: <sup>1)</sup> Because of continued program planning, curriculum requirements are subject to change without notice.

<sup>2)</sup> 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 upperclassmen 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.

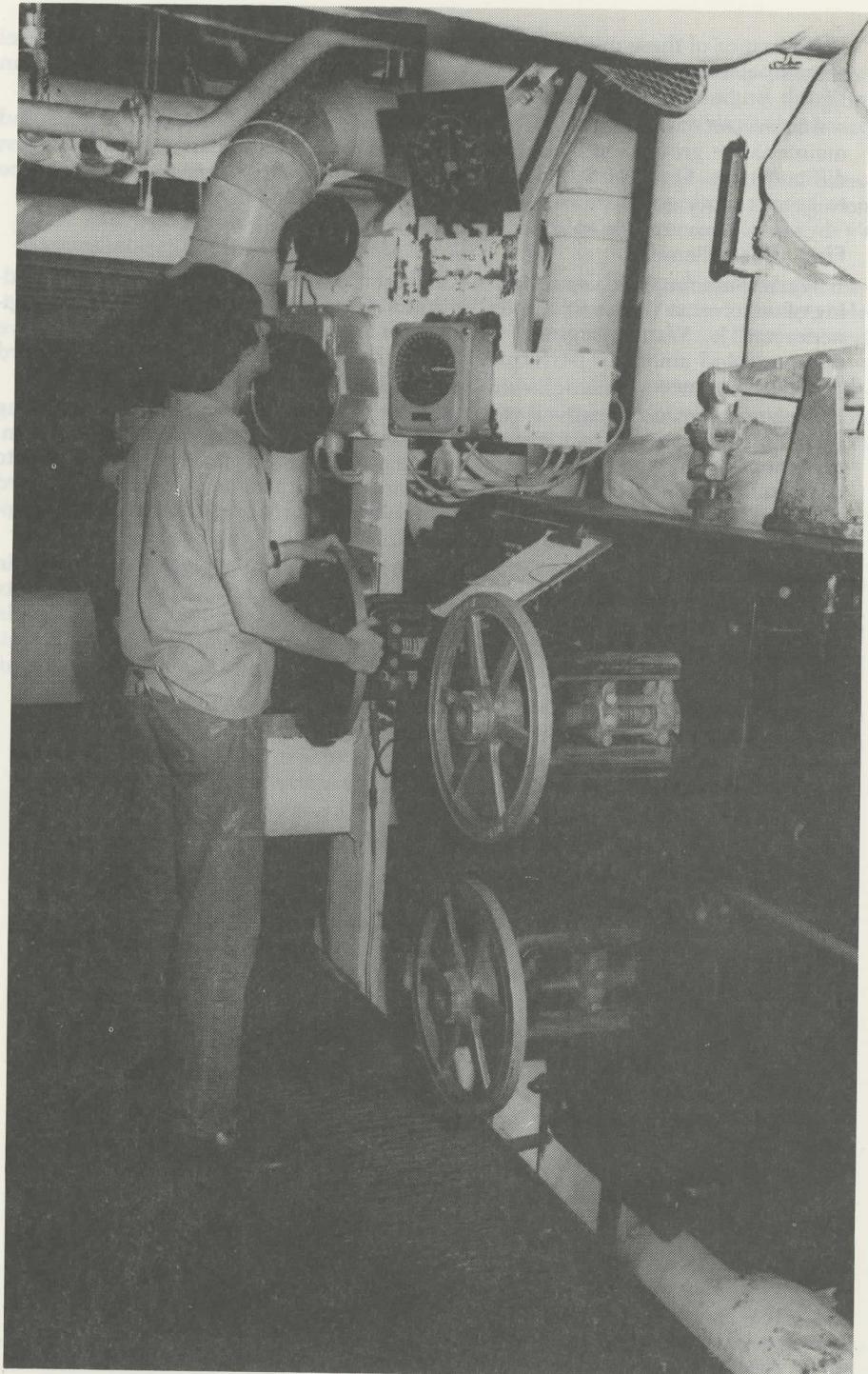
*Maintenance and Repair*—Works as an intermediate member of repair and maintenance groups, and may work alone or with fourth class assistants on less difficult tasks. On completion, must have gained the experience and confidence to head a work group.

### **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.



100. INDEPENDENT STUDY: Directed Individual Study  
Course to be held independently

101. INDEPENDENT STUDY: Directed Individual Study  
Course to be held independently

102. INDEPENDENT STUDY: Directed Individual Study  
Course to be held independently

103. INDEPENDENT STUDY: Directed Individual Study  
Course to be held independently

104. INDEPENDENT STUDY: Directed Individual Study  
Course to be held independently

105. INDEPENDENT STUDY: Directed Individual Study  
Course to be held independently

106. INDEPENDENT STUDY: Directed Individual Study  
Course to be held independently

107. INDEPENDENT STUDY: Directed Individual Study  
Course to be held independently

## VIII. COURSE DESCRIPTION

108. INDEPENDENT STUDY: Directed Individual Study  
Course to be held independently

109. INDEPENDENT STUDY: Directed Individual Study  
Course to be held independently

110. INDEPENDENT STUDY: Directed Individual Study  
Course to be held independently

111. INDEPENDENT STUDY: Directed Individual Study  
Course to be held independently

112. INDEPENDENT STUDY: Directed Individual Study  
Course to be held independently

113. INDEPENDENT STUDY: Directed Individual Study  
Course to be held independently

114. INDEPENDENT STUDY: Directed Individual Study  
Course to be held independently

## 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

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

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-199. INDEPENDENT STUDY (Nautical Industrial Technology)

**Credit:** To be determined by Instructor

**Prerequisite:** Instructor approval

Designed to provide additional study and research in a subject area under the direction of a faculty member.

#### D-201. NAVIGATION Credit: 4

**Prerequisites:** D-108, D-203

The principal 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 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 hypothesis, 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 PRINCIPLES 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. MARITIME INDUSTRIAL RELATIONS 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 collisions, 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, 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: Two or more units 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-318. TRANSPORT OF LIQUIFIED NATURAL GAS CREDIT: 3****Prerequisite: D-319**

This course is primarily devoted to students desiring a background in the operation of LNG vessels, with an emphasis on the technological aspects of such vessels.

**D-319. ADVANCED TANKER OPERATIONS (formerly Petroleum Transportation Management, D-319) CREDIT: 3****Prerequisite: D-310 for chemical tanker portion; D-318 for liquified gas portion.**

This course is devoted to students desiring an in depth background in the operation of both chemical and liquified gas tankers (other than LNG), with an emphasis on the technological aspects of such vessels. The student may elect to complete only the chemical tanker portion of the course for reduced credit, or the student may elect to complete both portions for full credit.

**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: 1

**Prerequisites:** None

A systematic study of the basic systems and elements of the training vessel's engineering plant. Requires individual tracing of systems, preparation of system diagrams, and demonstration of understanding system function and operation. Plus 3 hours per week assisting with engineering maintenance aboard the training ship as an introduction to electrical work, pipefitting, machinery repair, etc.

### E-199. INDEPENDENT STUDY (MET) CREDIT: To be determined by instructor

**Prerequisite:** Instructor approval

Designed to provide additional study and research in a subject area under the direction of a faculty member.

### 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 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 ship-board 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 scalar methods, including forces, couples, resultants, equilibrium, 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 AND PROPULSION. CREDIT: 2****Prerequisites: Consent of instructor**

Fundamentals of hull resistance and propulsion systems for vessels. Introduction to theory of ship motions.

**E-271. INTRODUCTION TO SHIP DESIGN CREDIT: 3****Prerequisites: E-109, E-230**

The statics of Naval Architecture relative to development of a lines plan. Two hours lecture and three hours lab per week.

**E-272. SHIP STRUCTURE AND DESIGN CREDIT: 2****Prerequisites: G-119 and consent of instructor**

An introduction to analysis and design of hull structure emphasizing the use of electronic computers. One hour lecture and three hours lab per week.

**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: Two or more units 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.



**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 water chemistry, boiler water and feedwater conditioning, the principles of corrosion control, and other applications of chemical principles to the maritime industry.

**G-109. HUMANITIES CREDIT: 3****Prerequisites: None**

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

**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 communication 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: G-105, G-106**

This course is an introduction to computer programming. It covers the fundamentals of program 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 lists, 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-199. INDEPENDENT STUDY (General studies) CREDIT: To be determined by instructor****Prerequisite: Instructor approval**

Designed to provide additional study and research in a subject area under the direction of a faculty member.

**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**

Electrostatics, magneto statics, direct and alternating current circuits, magneto dynamics, electron devices, theory of light, refraction, diffraction, geometric optics, special and general relativity, atomic theory.

**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**

This course is a continuation of G-210. It includes the integration and differentiation of inverse trigonometric functions, logarithmic and exponential functions, integration by parts, integration by partial fractions, geometric and physical applications of the definite integral, polar coordinates and Taylor's theorem.

**G-214. LITERATURE II CREDIT: 3****Prerequisites: G-101, G-102**

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: None**

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, CPR training, and radio aid.

**G-313. DIRECTED STUDY CREDIT: Two or more units 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 CREDIT: $\frac{1}{2}$

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: $\frac{1}{2}$

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: $\frac{1}{2}$ - $\frac{1}{2}$

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, 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

The objective of this course is to introduce both NIT and MET students to the basic principles of management and leadership necessary to be an effective manager in the merchant marine, Navy, or in any field. In addition, the course will introduce the Naval Organization in order to provide a sound basis for liaison between the merchant marine and the U.S. Navy.

### NS-201. Naval Operations Credit: 3

An introduction to Naval Operations with emphasis to the relationship between the merchant marine and the Navy in accomplishing the common seapower objectives. Merchant marine and Naval emergency procedures such as: anti-air warfare, anti-surface warfare, anti-submarine warfare, amphibious, mine warfare, and electronic countermeasures will be reviewed. The student will become proficient in convoy communications and operations, and the use of the maneuvering board.

### 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-313. Directed Study (Naval Science) Credit: To be determined by instructor

Prerequisite: Instructor approval

Designed to provide additional study and research in a subject area under the direction of a faculty member.

### NS-403. Division Officer Seminar Credit: $\frac{1}{2}$

Offered during the 1/c year a Seminar course for students who elect to pursue a career as a Naval Officer on active duty in the Air, Surface, or Submarine service communities. Leadership, management problems and responsibilities which will face the newly commissioned Division Officer are discussed.

## 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 advanced 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) 644-5601.

The Department of Adult Maritime Education also serves the Academy and the Corps of Midshipmen as follows:

Industry Relations Office  
CMA Placement Office  
Annual Maritime Industry Symposium  
Guest Lecturer Program  
Midshipmen Internship Program  
Midshipmen Field Trip Program  
Midshipmen "Shifting" Program  
Advisor, Propeller Club Student Port

## CAREER OPPORTUNITIES IN TODAY'S MARITIME INDUSTRIES

Career opportunities are truly "in demand" in today's maritime industry. The vast productive capacity of industry in the United States cannot be sustained by the domestic market alone, nor can we produce or refine our products without imported essential raw materials. Nevertheless, the role of oceans in water and snow transport and trade depends largely upon ships and shipping because of growing 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-type 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 seaman must master, he must also be skilled in such fields as electrical maintenance, deicing systems, marine nuclear science, marine ecology, marine survey, sonarography, marine transportation management, computer technology, and international shipping law.

Maritime has become a major industry in our nation's economy. In fact, maritime has become so important that it has been declared a national defense industry. Maritime management, marine technology, and marine science are the three major fields of study for students in the CMA and a major component of the

## IX. CAREER OPPORTUNITIES IN TODAY'S MARITIME INDUSTRIES

The following list of maritime and related industries is not all-inclusive. The importance of the maritime and related industries from marine transportation to naval construction, in view of the wide range of knowledge required of a merchant seaman, makes it likely a marine or industry career opportunities for maritime graduates are more numerous considerably in many fields of endeavor and today's graduates are more employable.

Cal Maritime graduates' beginning salaries for shore jobs are among the highest for any college graduates. Not unique for most non-good jobs, which may be over \$10,000 above the national average for college graduates with Bachelor or Masters degrees. In 1979 and 77 100% of the graduates were offered professional positions. Typical companies hiring Cal Maritime graduates in recent years are:

Cal Maritime Corp.  
CMA  
American Maritime Registry  
Marine Navigation  
Pacific Far East  
American President Lines  
Troll Shipyard  
Cochrane Shipyards  
Western Shipping  
Power, Gas and Electricity  
Country Marine (And Mark Fleet)  
Midway Beach Corporation  
Panoramic Geographical and Atmospheric Administration



The graduate going to sea today may look for starting salaries ranging from \$17,500 to \$26,000 including vacations from three to five months with pay.

## 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.

## ADMINISTRATION, FACULTY AND STAFF

### THE BOARD OF GOVERNORS

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George Murray H. E. Anderson  
William H. Bissell  
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John J. Doherty, Jr.  
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Thomas J. Patterson, Jr., Merchant Marine Hospital Representative  
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### ADMINISTRATION

John C. Johnson, Chairman  
John W. Macbeth  
Joseph P. Keane, Dean, Admiral USN  
Pennsylvania Maritime Academy, 1956  
U.S. Merchant Marine Academy, 1957  
McKee College, 1957  
M.A. Maritime University, 1958  
McKee Maritime Academy, 1959  
McKee Maritime Academy, 1960

## XI. ADMINISTRATION, FACULTY AND STAFF

COLLEGE OF MARITIME SCIENCE  
William H. Potts  
Academic Dean  
B.S. Electrical Engineering, University of California, Berkeley, 1942  
M.S. Electrical Engineering, University of California, Berkeley, 1948  
Bachelor of Professional Engineering, California

Ray K. Miller  
Administrative Dean  
M.S. Department of Naval Studies  
Graduate Institute  
B.S. Electrical, Louis University, 1944  
M.A. History, University of California, 1951  
M.B.A. Transportation, New Haven, Connecticut, 1952

### ADMINISTRATIVE OFFICES

John L. Bissell  
Administrative Officer  
B.A. Political Science, University of California, Los Angeles, 1959  
M.B.A. Business Administration, Southern University, 1960

## 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 Circular 87 requiring all Merchant Marine shipowners to apply for a commission in the U.S. Naval Reserve Officers. Those shipowners who are elected Naval Reserve commissioners 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 tactics. The Navy does not consider the Merchant Marine Academy as a primary source of commissioning officers and does not accept regular 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 reserve obligation by accepting commission in the U.S. Naval Reserve while continuing to sail in the Merchant Marine. The particular terms of this program are as follows:

1. Students at maritime academies enjoy civilian status.
2. The two possible naval reserve courses designed to qualify the students for a commission as ensign, USNR.
3. At the time the student takes the course he must agree to 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 the options to maintain his status. They are:
  - a. To apply for and receive an active duty for training as based aboard a ship for a minimum period of thirty consecutive days each year for a period of three consecutive years.
  - b. To enter into a direct commissioning program that allows a Merchantman, 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 Training Service of the Coast Guard.

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