1976-1977

CAL MARITIME

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) 642-4404

CALIFORNIA

MARITIME ACADEMY

vallejo, california

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

CATALOG
1976–1977

CALIFORNIA MARITIME ACADEMY

vallejo, california

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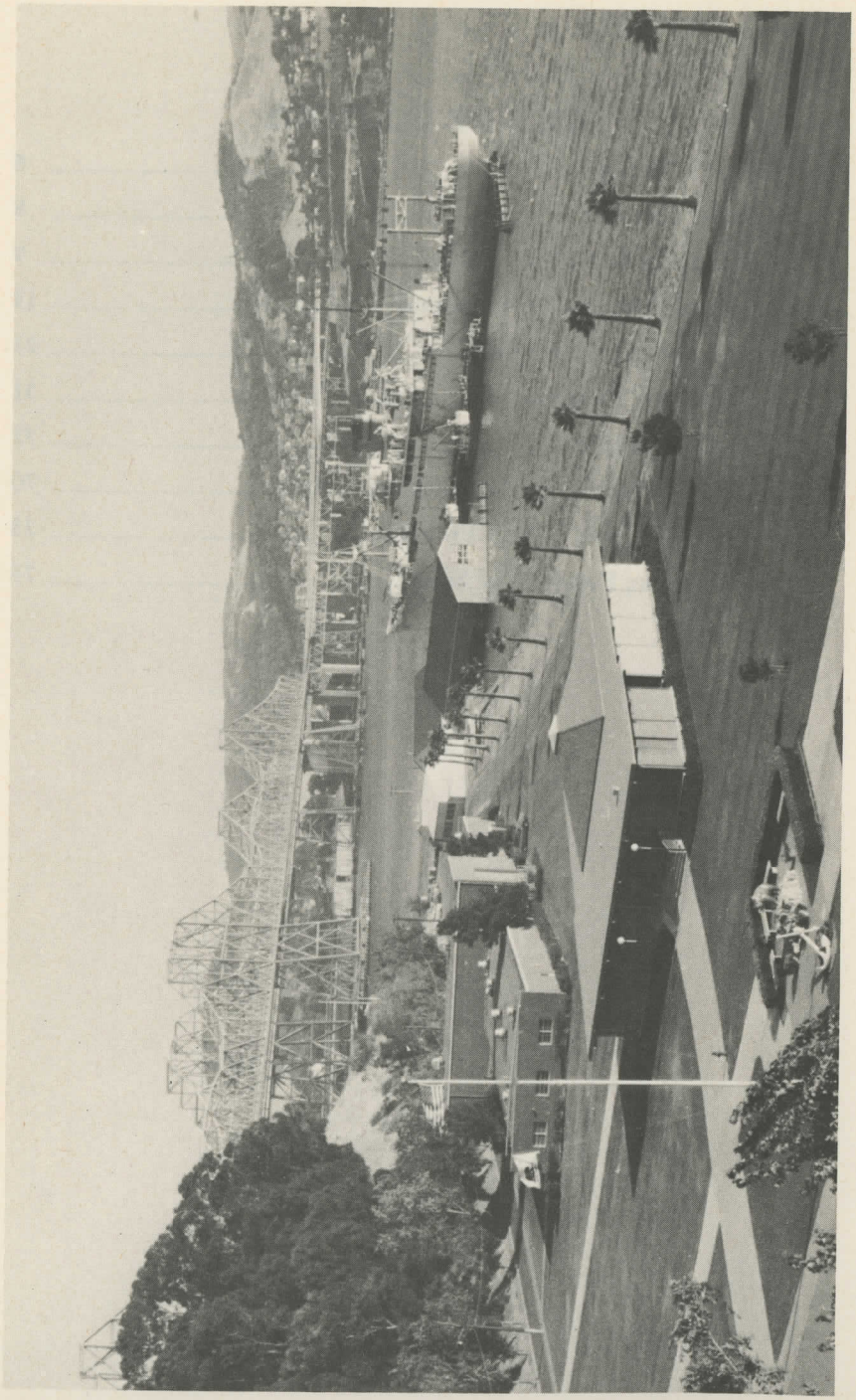


"Water covers more than two-thirds of the earth; man had to find his way across it. And so, down through the ages, man with his ingenuity and his courage fashioned the ship—free, charged with the strength and grace and poetry of the singing sea. And where once dugout and raft, galley and galleon, tall clipper and beamy paddle-wheeler tracked the sea, now giant freighters, tankers, and liners steam in endless movement around the world, bearing man's cargoes, his hopes, himself. But as he created the ship, the ship has shaped his course. Harbinger of civilization, agent of discovery and migration, it became the mightiest mobile creation the world has ever known."

—Thomas Canby, MEN, SHIPS AND THE SEA, *National Geographic*, 1962.

A Personal Message From
The President of
The California Maritime Academy

The California Maritime Academy is a unique institution with much to offer to today's young men and women who are willing to benefit from the highly specialized training given here. Academy graduates become a vital part of the modern maritime industry, both ashore and at sea.

During the School's forty-six years of service to the State of California and the Maritime Industry, it has developed over 2100 licensed graduates who are working in virtually every phase of shipping, from management to operations.

We are justifiably proud of our graduates and the reputation they earn for the school. Because of the rigorous and extensive training received while at the Academy, our graduates are in constant demand by the maritime and related industries.

As we begin our forty-seventh year, we offer a rewarding challenge of a career-oriented profession to those of you who are prepared to accept it. I invite you to study our catalogue carefully, noting all of our services—including the new building program. I believe you will find every question about life here at the California Maritime Academy thoroughly covered.

Sincerely,

J. P. Rizza

JOSEPH P. RIZZA
President

THE ACADEMY . . . CAL MARITIME

"I must down to the seas again,
To the lonely sea and the sky,
And all I ask is a tall ship
And a star to steer her by,
And the wheel's kick
And the wind's song
And the white sail's shaking,
And a grey dawn breaking.

I must down to the seas again,
For the call of the running tide
Is a wild call and a clear call
That may not be denied."

—MASEFIELD, SEA FEVER

ACADEMIC CALENDAR 1976–1977

August 2–6, 1976	Orientation Week for the Class of 1980
August 9, 1976	Registration, Fall Trimester
August 10, 1976	First Day of Classes
September 4–6, 1976	Labor Day Weekend
November 12, 1976	Last Day to Withdraw from Courses
November 12, 1976	Last Day to Validate P.E. Courses
November 25–28, 1976	Thanksgiving Recess
November 29–December 3, 1976	Final Examinations, Fall Trimester
December 6, 1976	Registration for Winter Trimester
December 7, 1976	Dockside Steaming begins for Classes of 77–78–80
December 7, 1976	Winter Trimester Classes begin for the Class of 1979
December 18–January 2, 1977	Christmas Recess
January 3, 1977	Winter Trimester Resumes
February 11, 1977	Last Day to Withdraw from Courses
February 11, 1977	Last Day to Validate P.E. Courses
February 19–21, 1977	Washington's Birthday Holiday Weekend
March 2–4, 1977	Final Examinations, Winter Trimester
March 12–20, 1977	Spring Recess
March 21, 1977	Registration for the Spring Trimester
March 22–April 1, 1977	Internship Program, Class of 1977
March 22, 1977	First Day of Classes
April 4, 1977	License Seminar Begins, Class of 1977
April 9–10, 1977	Easter Weekend
May 10–13, 1977	USCG License Exams, Class of 1977
May 20, 1977	Field Day, Class of 1977
May 21, 1977	Graduation, Class of 1977
May 28–30, 1977	Memorial Day Holiday Weekend
June 17, 1977	Last Day to Withdraw from Courses
June 17, 1977	Last Day to Validate P.E. Courses
July 1–8, 1977	Final Exams, Classes of 78–79–80
July 2–4, 1977	Independence Day Holiday Weekend
July 8, 1977	Field Day
July 16–August 7, 1977	Summer Recess

ACADEMIC CALENDAR 1977–78

August 1, 1977	Orientation Week for the Class of 1981
August 8, 1977	Registration, Fall Trimester
August 9, 1977	First Day of Classes

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 officer for the American Merchant Marine and California maritime industries and licensing therein.

Inherent in this mission are the following objectives:

To educate each Midshipman in an accredited college program in nautical sciences, marine engineering and related fields;

To train each midshipman in the skills and knowledge essential to licensing in the American Merchant Marine;

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 meeting the rigors of the sea.

HISTORY

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

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

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

LOCATION

The California Maritime Academy is located on the north shore of the Carquinez Strait, in the City of Vallejo. It is about a thirty-minute

drive on U.S. Interstate Highway 80 from San Francisco. The Naval Shipyard at Mare Island is in the immediate vicinity and is available for observation of drydocking, heavy shop practice, ship repair procedures, and electronic developments. Oceangoing steamers from all parts of the world pass through the Carquinez Strait en route to and from Sacramento and San Joaquin River ports.

FACILITIES

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

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

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

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

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

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

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

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

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

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

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

New Building Program

In the Fall of 1973 the Administration initiated an imaginative and extensive new building plan. The California State Legislature and the Governor endorsed the submitted master plan and set aside State funds of $5.7 million for construction and equipping.

The first building to be erected, a 260-student residence hall, will be completed by mid-1977 if plans progress as rapidly as outlined. Ground will be broken, also, for a 500-seat auditorium building and a 2-story faculty office building. Extensive revisions and additions will be made by expanding the gymnasium, the library, the welding lab, the administration building and the corporation yard.

It is hoped that the entire new building project will be completed by 1978. 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.

ADMISSIONS

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 17) may enter in the Fall Trimester at the third-class level. Students with lesser or greater amounts of transfer credit should contact the Academic Dean at the Academy to determine their entry status and appropriate time of entry.

HOW TO APPLY:

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

Submit the application and the following additional documents by April 30 for priority consideration. Later applications will be considered if space is available.

The additional documents required to complete the application are:

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

QUALIFICATIONS:

(General Requirements)

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

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

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

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

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

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

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

Oath of Allegiance — The U.S. Maritime Administration requires that candidates who are U. S. citizens must take an oath of allegiance to the United States of America and execute a nonsubversive and no-strike affidavit at the time of enrollment.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Admission in Advanced Standing

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

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

1. A student attends a community college briefly to rectify deficiencies and then enters the Academy in a fall trimester at the fourth class (freshman) level. At the Academy this student takes the basic fourth class program but with modifications occasioned by some required fourth class courses completed at the community college. Courses which can be taken at a community college and serve this purpose may be selected from the list of courses on page 17. Having these courses completed before beginning the fourth class makes it easier to take courses toward one of the options described on page 51.
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 17. 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 17, and settling upon the objective of a maritime education, can enter the Academy in the fall trimester at the third-class (sophomore) level.
4. A student attends one of the east coast maritime academies for one, two, or three years and then decides to attend the California Maritime Academy nearer to his home. 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 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 17.

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 Maritime License examinations. Because there is only one cruise each year, the transfer student must be in residence at the Academy for three years in order to participate in the three required sea-training cruises. The student transferring at the beginning of the third class year must present academic credit equivalent to the fall and spring trimesters of the fourth class year and the winter trimester of the third class year. This enables the transfer student to go on cruise in the winter trimester of the third class year instead of staying in the classroom on campus as the regular third class students do.

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

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

For both the Nautical Industrial Technology and the Marine Engineering Technology curriculums:

	Semester hour units
Composition	3
*Algebra (Intermediate or College Algebra)	3
*Trigonometry	3
Graphics (Elementary Engineering Drawing)	1
Physical Education	1½
Economics (Principles)	3
General Chemistry with Laboratory	4
General Physics (mechanics, fluids, heat, sound, electricity and magnetism, light and atomic theory)	7
Calculus (Technology level)	3
†American History	3
†Political Science	3
Social Science or Humanities (One course in literature and one in humanities suggested)	6
	40½

Nautical Industrial Technology students should transfer a second course in Economics (Principles) and 4½ additional semester hours of credit selected from:

	Units
Physical Education	½
Economic Geography	3
Computer Science	3
Principles of Management	3
Electives	8

Marine Engineering Technology students should also transfer a second course in Calculus (Technology level) 3 units, and 4½ semester hour units selected from:

	Units
Physical Education	½
Social Science or Humanities	3
Economics (Princples)	3
Economic Geography	3
Machine Shop	1 or 2
Welding	1
Statics (Technology level)	2
Engineering Materials	3
Computer Science	3
Electives	8

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

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

The Role of State Legislators

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

Privacy Rights of Students

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

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

FINANCIAL AIDS

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

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

Loans

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

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

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

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

Grants

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

The Supplemental Educational Opportunity Grant is a federally funded grant for students with exceptional need. It is offered when other aid is not adequate to meet a student's costs.

The College Opportunity Grant, for entering freshmen who are California residents and who demonstrate exceptional financial need, is

awarded by the California State Scholarship and Loan Commission. Applications and instructions are available from high school counselors. Application deadline is mid-December for the following academic year.

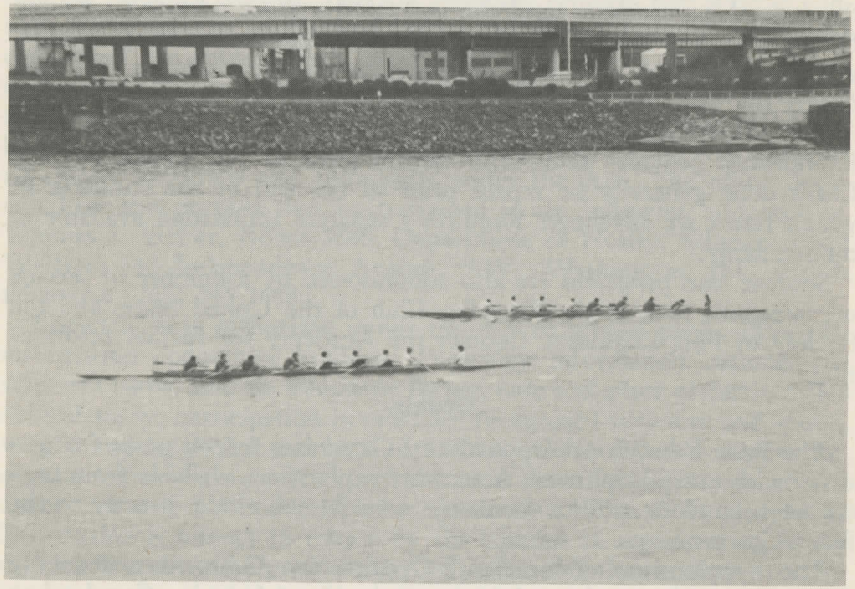
Employment

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

Scholarships

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

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



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.

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

Schedule of Annual Fee Payments

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

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

Clothing, Books, and Supplies: Entering students must deposit in trust $800 for clothing, books and supplies on or before the first day of the first trimester to be drawn from as needed. Returning students generally deposit about $100 per year to maintain a balance of at least $50 in this trust account. Any unexpended balance in the account will be refunded to the student at the termination of enrollment.

Total Costs: (excluding clothing and books)

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

Refunds

Resident and nonresident tuition 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.	

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

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

STUDENT LIFE

"Why did man (sail)? He is a mobile creature. He has always had to move from place to place to seek food, to flee invaders, to find new land, to trade—or simply to wander, to see what lies so tantalizingly over the horizon. Rivers offered paths through jungles, mountains, wastelands; seas linked islands. Man HAD to sail."

—Thomas Canby, MEN, SHIPS, AND THE SEA.

MIDSHIPMEN LIFE

Corps of Midshipmen

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

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

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

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

Orientation Week

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

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

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

Orientation also provides for the issuance of uniforms, books, instructional materials and the normal registration procedures.

All entering students are designated as Fourth Class until the completion of their first sea-training period, when midshipmen who have advanced academic standing because of previous college work can be promoted to Third Class standing.

Conduct

Midshipmen are being prepared for a career in the growing maritime industry where they will face responsibilities earlier in their career than is normally the lot of a college graduate. Upon graduation those of you who go to sea will share the responsibility for the safety of astronomically costly ships and their very valuable cargoes, human as well as material.

An education at the Maritime Academy is a total life experience. By that we mean that we seek to provide students the best opportunity for new growth in not only mind and body, but spirit and will as well.

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

Rules or goals 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 our regulations seek to keep these considerations in mind.

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

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

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

It should be noted that a midshipman who is placed on probation for conduct may lose the federal subsistence allowance for one trimester. In such cases the midshipman must pay the lost allowance to the Academy himself.

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. However, to afford educational opportunities not possible during the 0800 to 1600 period some elective and out-of-sequence classes are scheduled at 1630 (4:30 p.m.) and 1900 (7:00 p.m.)

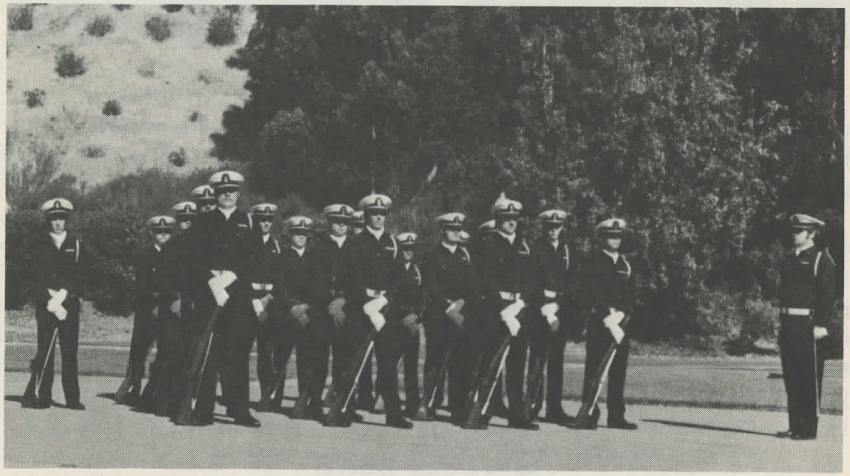
Leave and Liberty

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

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

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

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



EXTRA-CURRICULAR CLUBS AND ACTIVITIES

A wide variety of clubs and student activities are available and most students participate in one or more depending on their time and interests.

Midshipmen with a literary bent can participate in the publication activities which include the BINNACLE, a monthly student newspaper, and the HAWESPIPE, the annual yearbook of the graduating class.

Religious activities in various denominations are available in Vallejo and vicinity.

A wide variety of other activities include the ATHLETIC COUNCIL, CAMERA CLUB, SKI CLUB, RADIO CLUB, SKINDIVERS CLUB, VETERANS CLUB, NAVY CLUB and HOBBY CLUB.

The Academy, through the Naval Science Department, also sponsors HONOR GUARD and DRILL TEAM units which win many honors and awards annually while participating in parades and ceremonies all over the state.

One center for student activities is in the newly renovated Naval Science Building which includes a coffee mess, pool and ping pong tables, reading lounge, and meeting areas.

Social events include the annual RING DANCE, sponsored by the Student Council, and post basketball dances sponsored by the Athletic Council.

Student Government

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

Student Council offices are located in the residence hall and all midshipmen activities are coordinated from there.

Cultural Activities

The San Francisco Bay Area abounds with cultural activities which are available at no cost or at reduced rates for Cal Maritime students.

Within easy driving distance of the Academy are numerous museums, observatories, and zoological and botanical gardens.

For fine arts minded students, the San Francisco Symphony, Ballet and Opera offer excellent student rates, as does the American Conservatory Theatre, one of the finest theatre companies in the world.

Medical and Dental Care

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

A. A medical assistant is available for first aid. Additionally, the services of a contract physician are available.

B. During the Sea Training Trimester a licensed physician is on board the training ship.
C. Hospitalization is available at the U.S. Public Health Service Hospital in San Francisco.

All of the foregoing are furnished at no cost to the student. However, should the injury or illness occur while the student is away from the Academy, except as noted, any expense for emergency treatment or transportation to the U.S. Public Health Service Hospital must be borne by the midshipmen/midshipwoman. 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.

Counseling

Academic counseling is providing 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 Deans' office or the Commandant's.

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.

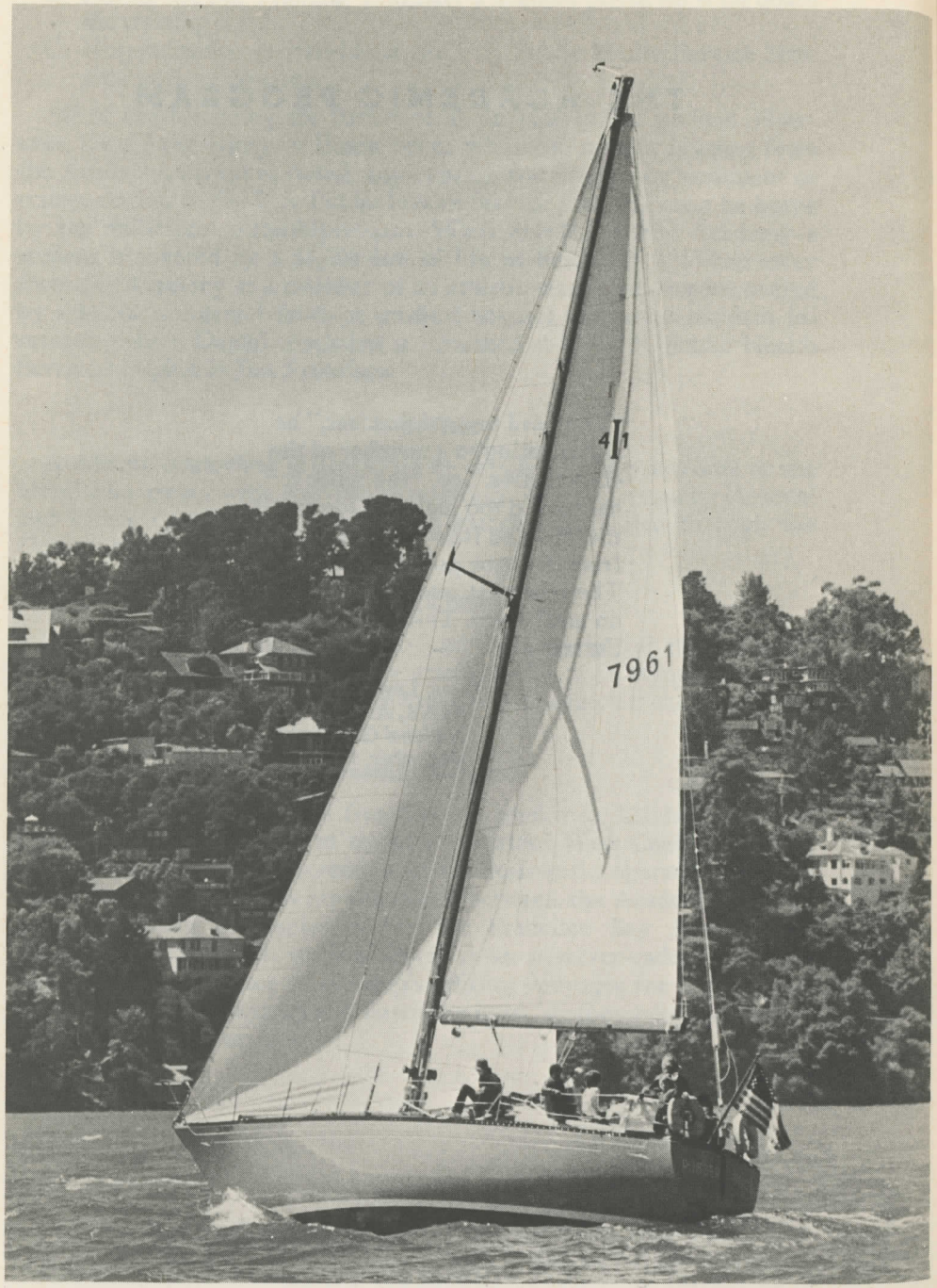
Industrial Contact

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

THE ACADEMIC PROGRAM

"You head toward that star," he
said pointing to a member of the
constellation Leo, "and when it
has moved too high and too far to
the left, you follow the next to rise
from the same point on the horizon.
Then the next, and the next, and so
on until dawn. This we call KAVEIGA,
the star path."

—David Lewis, WIND, WAVE
STAR, AND BIRD.
National Geographic,
December, 1974.



ACADEMIC PROGRAM

Accreditation

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

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

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 U.S. Coast Guard license examination.

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.

ACADEMIC STANDARDS

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.

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.

Readmission of Disqualified Students

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

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

Grading System

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

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

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

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.

Special Schools and Certification

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

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

Field Trips

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

Guest Speaker Program

From time to time the midshipmen are addressed by a person who has attained prominence in some phase of the shipping or allied industries, or in some branch of the federal government concerned with shipping. These educational lectures are designed to supplement the information presented to the midshipmen through the curriculum and to provide additional instruction in related fields.

Awards and Honors

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

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

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

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

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

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

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

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

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

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

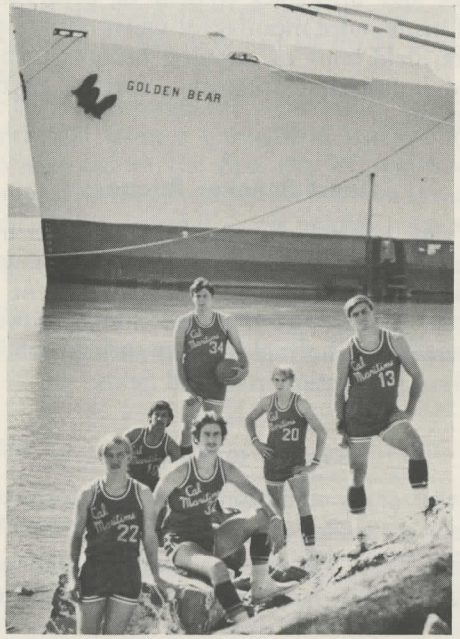
ROTARY CLUB OF VALLEJO: For the outstanding senior athlete.

SAN FRANCISCO BAR PILOTS: For excellence in Shiphandling.

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

SHIPOWNERS AND MERCHANTS TOWBOAT COMPANY: For excellence in seamanship.

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



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

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

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

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

SEA TRAINING

The sea training portion of the curriculum is divided into three training periods of approximately 12 weeks. During the training period 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.

Time is spent on liberty in many of the ports of call and in addition to enjoying the beaches and sights, midshipmen are required to do research and study to provide them information necessary to write a report on some aspect of the economic structure of the area visited.

Sea Training—Department of Nautical Industrial Technology

Fourth Class

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

Navigation—(2 units). The student is given the opportunity to use a sextant to determine lines of position of the sun. He also takes azimuths

of the sun to determine compass error, uses electronic navigation systems to determine position and uses mercator sailings to determine ship's days run.

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

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

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

First Class

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 E-501

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 main-

tenance 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.

Fourth Class E-401 Engineering Systems Lab

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 E-502

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 E-503

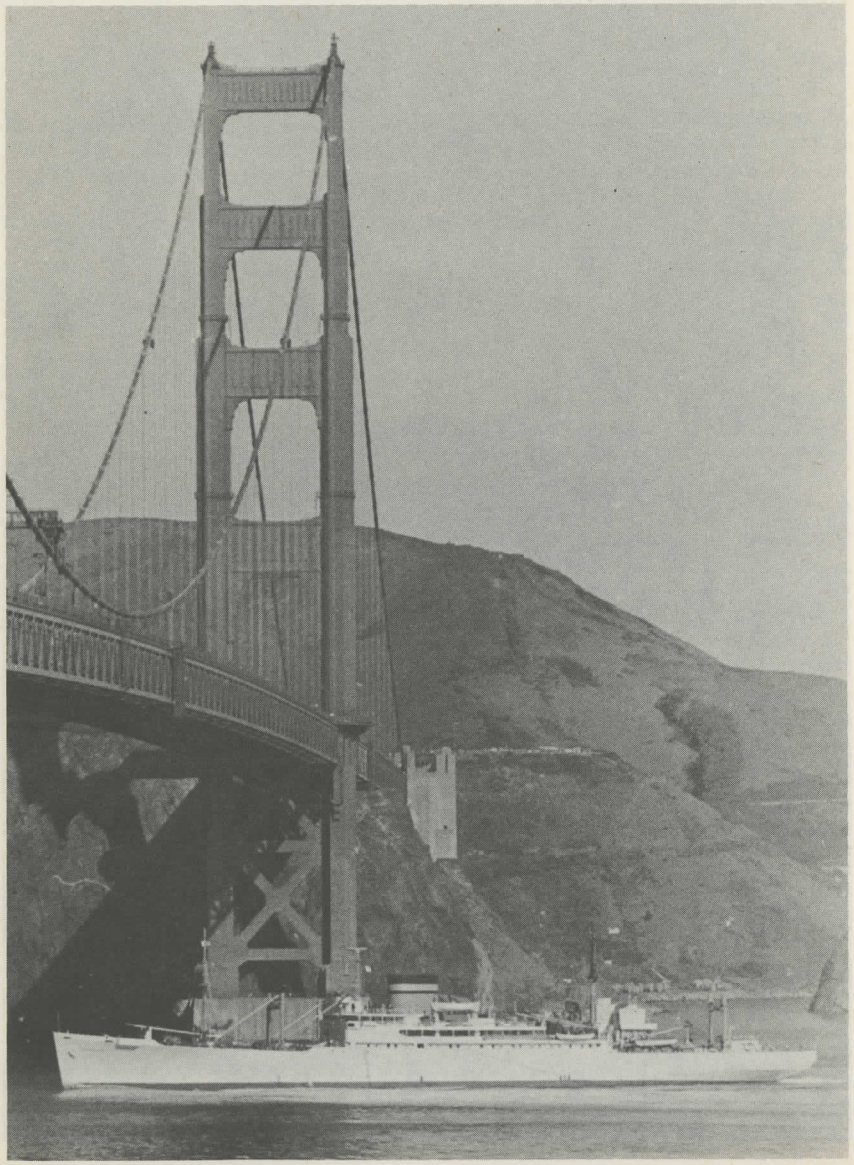
Watch Standing—Is responsible to the Licensed Watch Engineer for the standing of watches as Watch Engineer, Jr. Watch Engineer, Fireroom Jr. Watch Engineer, and Jr. Watch Engineer Evaporator Space. On completion must have demonstrated ability to perform all of the duties required of a Licensed Third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

E-425 2 units

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.

G-408 1 unit

First Class—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.



NAUTICAL INDUSTRIAL TECHNOLOGY CURRICULUM

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	2	0	2
D-115	Seamanship Laboratory	0	3	1
D-117	Boat Handling	0	3	1
D-125	Ships Operations	0	3	1
E-111	Marine Engineering I	1	1	2
NS-101	Naval Organization and Management	3	0	3
G-129	Physical Education	0	2	½
	Elective			2
				18½

Winter Trimester (Fourth Class Cruise)—12 Weeks

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

Spring Trimester—17 Weeks

G-106	Trigonometry	3	0	3
G-107	Chemistry	3	3	4
G-121	American History	3	0	3
G-141	Economics I	3	0	3
D-116	Seamanship Laboratory	0	3	1
D-126	Ships Operations	0	3	1
E-109	Engineering Graphics	0	2	1
G-130	Physical Education	0	2	½
	Elective			2
				18½

* Not counted in baccalaureate degree.

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

Third Class Year (Sophomore)

Fall Trimester—17 Weeks

Subject		Class Hours	Laboratory Hours	Semester Hours Credit
G-142	Economics II	3	0	3
G-205	Physics I	3	0	3
G-245	Economic Geography	3	0	3
D-203	Spherical Trigonometry	2	0	2
NS-201	Naval Operations	3	0	3
G-229	Physical Education	0	2	½
D-204	Management Analysis	3	0	3
				17½

Winter Trimester—10 Weeks

G-109	Humanities	4	0	3
G-125	Poltical Science	4	0	3
G-206	Physics II	5	3	4
G-209	Calculus	5	0	3
				13

Spring Trimester—17 Weeks

G-119	Computer Science	3	0	3
D-108	Navigation	3	0	3
D-112	Rules of the Road	2	0	2
D-210	Naval Architecture (Stability)	3	0	3
D-215	Applied Seamanship—Power Boats, Cargo	0	3	1
D-225	Ships Operations	0	3	1
E-211	Marine Engineering II	2	0	2
G-230	Physical Education	0	2	½
G-102	Literature	3	0	3
				18½

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

Second Class Year (Junior)

Fall Trimester—17 Weeks

Subject		Class Hours	Laboratory Hours	Semester Hours Credit
D-223	Communications	1	0	1
D-201	Navigation	3	3	4
D-207	Naval Architecture (Ship Construction)	3	0	3
D-212	Rules of the Road	2	0	2
D-226	Ships Operations	0	3	1
D-309	Transportation Management I	3	0	3
E-206	Electrical Engineering	2	1	3
	Elective			2
				19

Winter Trimester (Second Class Cruise)—12 Weeks

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

Spring Trimester—17 Weeks

D-202	Navigation	3	0	3
D-222	Navigation Instruments	0	3	1
G-307	Ship's Medical Practice	1	0	1
D-310	Transportation Management II	3	0	3
D-315	Applied Seamanship (Ship Handling)	0	3	1
D-325	Marine Supervisory Laboratory	0	6	2
E-304	Martime Law	3	0	3
E-219	Electrical Engineering Laboratory	0	3	1
	Elective			2
				17

* Not counted in baccalaureate degree.

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

First Class Year (Senior)

Fall Trimester—17 Weeks

Subject	Class Hours	Laboratory Hours	Semester Hours Credit
D-303 Meteorology	3	0	3
D-305 Radar	0	2	1
D-311 Seamanship	3	0	3
D-323 Communications	1	0	1
D-326 Marine Management Laboratory	0	6	2
NS-302 Naval Ship Systems	3	0	3
E-215 Electronics	2	0	2
D-360 Advanced Management	3	0	3
			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—7 Weeks

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

* Not counted in baccalaureate degree.
NOTE: Because of continued program planning, curriculum requirements are subject to change without notice.

MARINE ENGINEERING TECHNOLOGY CURRICULUM

Fourth Class Year (Freshman)

Fall Trimester—17 Weeks

Subject	Class Hours	Laboratory Hours	Semester Hours Credit
G-105 Algebra	3	0	3
G-107 Chemistry	3	3	4
G-141 Economics I	3	0	3
D-117 Boat Handling	0	3	1
E-109 Graphics	0	2	1
E-111 Marine Engineering I	1	3	2
G-129 Physical Education			½
Elective			2
G-109 Humanities	3	0	3
Elective			1
			18½

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-108 Marine Chemistry	2	0	2
G-205 Physics I	3	0	3
E-112 Basic Boilers	2	0	2
NS-101 Naval Organization and Management	3	0	3
G-130 Physical Education	0	2	½
Elective			2
			18½

* Not counted in baccalaureate degree.
NOTE: Because of continued program planning, curriculum requirements are subject to change without notice.

Third Class Year (Sophomore)

Fall Trimester—17 Weeks

Subject		Class Hours	Laboratory Hours	Semester Hours Credit
G-206	Physics II	3	2	4
G-210	Calculus	3	0	3
G-119	Computer Science	3	0	3
G-307	Ship's Medical Practice	1	0	1
E-201	Applications of Fluid Mechanics	3	0	3
G-229	Physical Education	0	2	½
	Elective			4
				18½

Winter Trimester—10 Weeks

G-102	Literature	5	0	3
G-125	Political Science	5	0	3
G-142	Economics II	5	0	3
G-211	Calculus II	5	0	3
G-230	Physical Education	0	2	½
				12½

Spring Trimester—17 Weeks

G-214	Literature II	3	0	3
G-245	Economic Geography	3	0	3
E-212	Thermodynamics	3	0	3
E-230	Statics	2	0	2
E-290	Pollution Control	2	0	2
NS-201	Naval Operations	3	0	3
E-118	Machine Shop I	0	3	1
E-218	Marine Machinery Lab	0	3	1
E-220	Welding	0	3	1
				19

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

Second Class Year (Junior)

Fall Trimester—17 Weeks

Subject		Class Hours	Laboratory Hours	Semester Hours Credit
E-203	Direct Current Electrical Engineering	3	0	3
E-217	Machine Shop II	0	3	1
E-222	Marine Machinery Laboratory II	0	3	1
E-221	Refrigeration and Air Conditioning	2	0	2
E-301	Marine Boilers	2	0	2
E-302	Marine Turbines	3	0	3
E-332	Materials: Strength and Properties	5	0	5
	Elective			1
				18

Winter Trimester (Second Class Cruise)—12 Weeks

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

Spring Trimester—17 Weeks

E-204	Alternating Current Electrical Engineering	3	0	3
E-216	Direct Current Electrical Engineering Laboratory	0	3	1
E-223	Marine Machinery Laboratory III	0	6	2
E-303	Diesel Engineering I	3	0	3
E-306	Naval Architecture—Ship Const. and Damage Cont.	3	0	3
E-315	Diesel Laboratory I	0	3	1
E-321	Gas Turbines	2	0	2
NS-301	Navigation	3	0	3
				18

* Not counted in baccalaureate degree.

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

First Class Year (Senior)

Fall Trimester—17 Weeks

Subject		Class Hours	Laboratory Hours	Semester Hours Credit
G-121	American History	3	0	3
D-204	Management Analysis	3	0	3
E-214	Electronics	2	0	2
E-304	Diesel Engineering II	3	0	3
E-316	Diesel Laboratory II	0	3	1
E-317	Alternating Current Electrical Engineering Laboratory	0	3	1
E-319	Marine Machinery Laboratory IV	0	3	1
E-260	Automation	3	0	3
				17

Winter Trimester (First Class Cruise)—12 Weeks

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

Spring Trimester—7 Weeks

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

* Not counted in baccalaureate degree.
NOTE: Because of continued program planning, curriculum requirements are subject to change without notice.

OPTIONS

In order to round out the academic program, seven series of elective options in "related fields" are being developed as qualified faculty become available with adequate time to teach the courses. A suggested pattern is to develop the Marine Transportation and the Marine Business Management options with one two-unit course available in each option for the first trimester the options are approved and funded. Then additional courses should be developed at the rate of one per option per academic trimester. A year later another two options would be started in the same manner. Maritime Specialties and Instrumentation and Automation are recommended with Ship Construction Technology and Nuclear Technology to be developed later.

1. Marine Transportation
Economics I: Macroeconomics
Economics II: Microeconomics
Industrial Relations and Personnel Management
Introduction to Marine Transportation
The Economics of Sea Transport
International Business and Finance

2. Marine Business Management
Economics I: Macroeconomics
Economics II: Microeconomics
Accounting I
Accounting II
Business Statistics
Industrial Relations and Personnel Management

3. Maritime Specialties
Basic Statistics
Diesel Engineering for Small Boats
Pollution Control and Technology
Statistics & Random Processes
Engineering Economics and Values
Electricity
Introductory Metallurgical Engineering
Introductory Nuclear Engineering

4. Instrumentation and Automation
Instrumentation of Mechanical Systems
Instrumentation of Thermal Systems
Dynamics of Mechanisms I, II
Shipboard Automation Systems
Instruments and Automation
Electronic Instrument Practices

5. Ocean Technology
Introduction to Oceanography
Introduction to Marine Biology
Introduction to Ocean Engineering
Oceanographic Instruments and Vessels
Introduction to Marine Biology and Ecology
Special Projects

6. Ship Construction Technology
Ships Specifications
Ship Stability
Ships Dynamics
Ship Design
Ship Structure
Independent Laboratory Study
Ship Resistance and Powering

7. Nuclear Technology
Introduction to Nuclear Engineering
Fluid Flow & Heat Transfer
Atomic Physics
Reactor Theory
Nuclear Instrumentation
Shielding and Health Physics
Reactor Plant Transient and Safety Analysis

COURSE DESCRIPTIONS

"This (the N.S. Savannah) is the ship that may revolutionize the world's merchant fleets. Atomic freighters like her will be able to go wherever there is water to float them, with no wayside stops for fuel, no waste of space for coal or oil. The SAVANNAH may bring back to the sea the freedom and endurance of sailing ships that seemed forever lost when steam took over."

—MEN, SHIPS, AND THE SEA

DEPARTMENT OF NAUTICAL INDUSTRIAL TECHNOLOGY

The Department for Nautical Industrial Technology (deck) 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
Fundamental navigational topics, including basic definitions, rudimentary knowledge of the instruments used by the navigator, charts, piloting and dead reckoning.

D-111. Seamanship Credit: 2
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-112. Rules of the Road Credit: 2
Initial study of the International Rules of the Road, including their origin, purpose, history, technical provisions, and application.

D-114. An Introduction to Marine Transportation Credit: 3
This is a general survey course that includes the history of the U.S. Merchant Marine, an overview of the current state of the maritime and related industries, its policies, and its practices.

D-115–116. Seamanship Laboratory Credit: 1-1
Instruction in practical use of cordage, knotting, splicing, whipping, reeving tackles, sewing, rigging stages, bosn's chairs, shear legs, splicing wire rope, and sewing canvas, rigging accommodation ladders, pilot ladder, handling heaving lines, mooring lines. General shipboard familiarization. Three hours of laboratory/week.

D-117. Boat Handling Credit: 1
Instruction in rowing, handling boats under oars and sail, launching and recovery of lifeboats, lifeboat nomenclature and equipment. This course prepares the midshipman for the U.S. Coast Guard Lifeboatman's Certificate. Three hours laboratory/week.

D-125–126. Ship's Operations Credit: 1-1
Instruction in ship maintenance, including the selection and application of preservatives, chipping and painting, and assigned work in the interior, exterior and navigational divisions of the training ship. Three hours of laboratory/week.

D-201. Navigation Credit: 4
The principal concerns are basic concepts of celestial navigation and nautical astronomy stressing definitions and mathematical solutions of the astronomical triangle, the thory 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
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.

D-203. Spherical Trigonometry Credit: 2

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: 3

Organization and management of business firms as related to junctions, behavioral processes and systems; analytical tools for decision making; external environment; introduction to labor relations with emphasis on the maritime industry. Case study approach.

D-207. Naval Architecture (Ship's Construction) Credit: 3

This course is a survey of ship construction with emphasis on nomenclature, strength considerations, ship performance at sea, drydocking operations, and structural components of the ship.

D-210. Naval Architecture (Stability) Credit: 3

Stability is the physical characteristic of a ship as to its ability to remain upright under different backed condition and different sea condition. Method of calculating the stability as well as trim, free surfaces, and conditions of damage are discussed.

D-212. Rules of the Road Credit: 2

A study of case histories and legal interpretations resulting from collisions at sea. This course includes a comprehensive study of both International and Inland Rules of the Road, their interpretation and practical application.

D-215. Applied Seamanship Credit: 1

A course of practical instruction covering the operation of all deck and auxiliary machinery such as anchors, winches, capstans, cargo gear; qualification in the use of power boats.

D-222. Instruments and Navigational Aids Credit: 1

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, including course recorder and gyro-pilot. Three hours laboratory/week.

D-223. Communications Credit: 1

Signaling by international code flags and flashing light; use of International Signal Book.

D-225–226. Ship Operations Credit: 1-1

Ship maintenance of specialized gear and practical work in these areas are stressed. Maintenance of ground tackle, cargo gear, lifeboats and gangways are used. Three hours laboratory/week.

D-230. Business Statistics Credit: 3

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 I: Financial Credit: 3

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 II: Managerial Credit: 3

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

D-240. Industrial Relations and Personnel Management Credit: 3

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

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. The Economics of Sea Transport Credit: 3

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: 3

Major concerns include pubs 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 2500 words required for this course.

D-302. Navigation Credit: 3

Continuation of D-301 (for three-year program only). Review of aids to navigation piloting, instruments, charts, navigation astronomy, and celestial navigation solutions preparing student for Coast Guard License examination.

D-303. Meteorology Credit: 3

Meteorology for the mariner covering principles of weather, 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

The rights, obligations and responsibilities of seamen, 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: 1

Radar covers the electronic of the radar set, basic trouble shooting within the set and set adjustment. The course also covers the operation of the set and the use of the information provided by the set in navigation and collision avoidance.

D-309. Transportation Management I Credit: 3

This course is a study of the international movement of dry cargo, and it emphasizes the roll 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

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

D-311. Seamanship Credit: 3

This course is designed to consolidate and advance the knowledge of seamanship gained by the student in his early years at the Academy. The course takes a theoretical approach towards cargo gear strains and how to reduce them, tackles and tackle systems, chemistry and application of paints and preservatives, specifications for ground tackle, wire, natural and synthetic fibres. The course also includes the preparation of a vessel for heavy weather, fuel conservation, damage control, fire detection and fire fighting equipment. Time is spent upon exploring current acceptable techniques of good seamanship and areas of possible improvement.

D-315. Applied Seamanship Credit: 1

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

D-319. Petroleum Transportation Management Credit: 3

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

D-323. Communications Credit: 1

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: 2

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: 2

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: Senior Seminar Credit: 3

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

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

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

During the first sea training period the students are familarized 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

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

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

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

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 for Marine Engineering Technology courses prepare the graduate to perform the duties of an engineer officer afloat.

E-109. Engineering Graphics Credit: 1

A general course in engineering drawing. Material covered includes lettering, applied geometry, use of instruments, orthographic projection, free hand and isometric sketching, isometric and oblique drawing, sections, drawings of shipboard devices and equipment. Two hours of laboratory/week.

E-111. Marine Engineering I Credit: 2

A systematic study of the basic systems and elements of the training vessel's engineering plant. Subject matter is directed to aid the student's understanding of the function of the marine power plant and preparing him for his first sea-training trimester. One hour lecture, one hour laboratory/week.

E-112. Basic Boilers Credit: 2

A study covering basic boiler designs, the advantages and disadvantages of each. It includes all appurtenances such as air heaters, economizers, desuperheaters, superheaters, baffling, dry pipes, safety valves, the functions and design requirements of each as established by regulatory agencies.

E-118. Machine Shop Laboratory I Credit: 1

Together with E-217 a laboratory sequence in which the student will gain a knowledge of and skill in the principles and operation of hand tools and power machines. Individual projects ranging from turning a simple diameter to computing and machining helical gearing are performed. Three hours of laboratory/week.

E-120. Marine Machinery Lab Credit: 1

This is essentially the same as E-218, except that students who elect to can take this course as additional practicum on board the training ship. This course is designed to aid transfer students.

E-201. Applications of Fluid Mechanics Credit: 3

This course covers rules governing classification and installation of the three classes of marine piping systems. All types are studied, including rotary, centrifugal, positive displacement, eductors, injectors, air ejectors. Their characteristics are analyzed with a view towards selection in application to 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

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 magetism, 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

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: 2

Study of merchant ship propulsion systems and utilities.

E-212. Thermodynamics Credit: 3

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

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

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

E-216. D–C Electrical Laboratory (For M.E.T.) Credit: 1

A laboratory course designed to provide the engineering student with an operating knowledge of DC electrical principles and operations.

E-217. Machine Shop Laboratory II Credit: 1

Continuation of E-118. Three hours of laboratory per week.

E-218. Marine Machinery Laboratory I Credit: 1

Together with E-223 and E-319 a series of practical laboratories 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 year, and continuing through the first class year, the 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 steam generators and pressure vessels, piping systems, turbine and reciprocating machinery, pumps, electrical equipment, diesel engines, machine shop repairs, welding repairs and many other items of shipboard equipment.

Fluid mechanics measurements and fluid machinery tests constitute one portion of this sequence. Three hours laboratory/week.

E-219. Electrical Laboratory (For N.I.T.) Credit: 1

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

E-220. Arc and Gas Welding Credit: 1

A laboratory course providing experience in welding, brazing and burning techniques sufficient to permit effecting emergency repairs. Three hours of laboratory/week.

E-221. Refrigeration and Air Conditioning Credit: 2

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-222. Marine Machinery Laboratory II Credit: 1

Continuation of E-218. Three hours of laboratory per week.

E-223. Marine Machinery Laboratory III Credit: 2

Continuation of E-218 and E-222. Six hours of laboratory per week.

E-230. Statics Credit: 2

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

E-240. Contract Law and Specifications Credit: 2

The course prepares the student for 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

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 Credit: 3

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

E-260. Shipboard Automation Credit: 3

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

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-270. Ships Resistance, Propulsion and Propellers Credit: 3

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

E-271. Introduction to Ship Design Credit: 3

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

E-290. Pollution Control and Laws Credit: 2

Discussion on 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. Applications 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: 2

An advanced course covering the operation and maintenance of marine steam generators. Course includes studies on feedwater systems and controls; feedwater analysis and treatment; fuel oils—refinement, specific gravity, cost, heating value; flue gas analysis; and combustion control.

E-302. Marine Turbines Credit: 3

A detailed course covering the operation and maintenance of main propulsion equipment and accessories of the marine steam power plant. Course includes studies

on turbine principles, construction, bearings and lubrication, governors, reduction gears, shafting, propellers, and preventive maintenance.

E-303–304. Diesel Engineering I–II Credit: 3-3

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

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-315. Diesel Laboratory Credit: 1

Provides the engineering student operational experience with a marine diesel propulsion plant. It also familiarizes the student in engine analysis, maintenance schedules and prevention of casualties by utilizing data obtained during engine operation.

E-316. Advanced Diesel Laboratory Credit: 1

A laboratory designed to acquaint the student with the use of electronic engine analyzing equipment and testing of lubricating and fuel oils. The course also covers analysis in refrigeration and pneumatic systems oriented toward automation principles.

E-317. A–C Electrical Laboratory Credit: 1

A laboratory course designed to provide the engineering student with an operating knowledge of AC electrical principles and operations.

E-319. Marine Machinery Laboratory IV Credit: 1

Continuation of E-218. Three hours of laboratory per week.

E-321. Gas Turbines Credit: 2

A course covering the application of gas turbines in the marine field, i.e. main propulsion and auxiliary equipment. Course includes studies on principles, construction, lubrication, testing, controls, fuels, economic concerns, and preventive maintenance.

E-332. Materials, Properties and Strength Credit: 5

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 Diesels Credit: 3

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 twenty (20) hours of lab work on disassembly and repair of small engines.

E-351. Nuclear Power Plants Credit: 3

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

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

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

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 charges in pattern and tell when a machine should be taken off the line.

E-501. Sea Training Credit: 4

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: 5

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

E-503. Sea Training Credit: 3

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

E-510. Internship Credit: 2

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

E-512. License Seminar Credit: 4

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

DEPARTMENT OF GENERAL STUDIES

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

G-101. Composition Credit: 3

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

G-102. Introduction to Literature Credit: 3

This course is designed to introduce students to several major forms of English literature. The course emphasizes close analysis of particular works (intensive reading), but also the range of forms and styles (extensive reading) in English prose and poetry.

G-105. College Algebra Credit: 3

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

G-106. Trigonometry Credit: 3

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

G-107. Chemistry Credit: 4

Introduction to chemical theory; structure of matter; valence; chemical change; oxidation-reduction; equilibrium; solutions; ionization reactions in solutions, weak electrolytes. 3 hours lecture and 3 hours laboratory/week.

G-108. Marine Chemistry Credit: 2

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

G-109. Humanities Credit: 3

An integrated course which deals with the several arts: music, the visual arts, literature, drama, architecture, philosophy, and history. Study is made of slides, prints, films, and of selections from literature and philosophy.

G-117. Introduction to Oceanography I Credit: 2

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

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

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

G-120. Computer Science II Credit: 3

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

G-121. American History Credit: 3

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

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. Economics I Credit: 3

Basic economic methodology, analysis, and policy; economic institutions, organizations and industrial structure, the monetary system; measurement, determination and stability of national income; monetary, fiscal and balance of payments problems and policies.

G-142. Economics II Credit: 3

Basic analysis of prices and markets; consumer behavior; behavior of a firm; factor markets; international trade theory; economic growth and development.

G-205. Physics I Credit: 3

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

Electricity and magnetism, direct and alternating circuits and machines, light and atomic theory. 3 hours lecture and 3 hours lab/week.

G-209. Calculus (For N.I.T.) Credit: 3

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

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

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

G-214. Literature II Credit: 3

A concentrated course of selected readings of major novels in world literature. Form, style, and ideas are discussed within a chosen conceptual, historical, or biographical framework. Emphasis is placed on the novel as a lively instrument for human communication.

G-217. Oceanographic Instruments and Vessels Credit: 3

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 institution. Emphasis on equipment handling and data implications.

G-218. Ocean Engineering Credit: 3

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

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-245. Economic Geography Credit: 3

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

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

G-312. Maritime Research Credit: 2

An elective course offering credit for guided "in depth" individual research in a marine-related subject of the student's choosing. Covers fundamentals of library usage, research methodology, bibliography compilation, indexing, and justification of findings. Prerequisite: G-101, or equivalent, or validation of same.

PHYSICAL EDUCATION

G-129. Physical Education Credit: ½

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

First half—Water safety and survival swimming.

Second half—Physical Fitness through weight lifting and jogging.

G-130. Team Sports Activity Credit: ½

Fundamentals and techniques of team sports to be chosen from the following: Flag Football, Basketball, Softball, Volleyball, and Soccer.

G-229, 230. Individual Sports Activity Credit: ½,½

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

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

DEPARTMENT OF NAVAL SCIENCE

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

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

An introduction to the structure and principles of Naval Organization and Management. Naval Organization and Management practices and the concepts that lie behind them are examined within the context of American social and industrial organization and practice. The course includes coverage of lines of command and control; organization for logistics, service and support; functions and services of major components of the Navy and Marine Corps; and shipboard organization.

NS-201. Naval Operations Credit: 3

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

NS-301. Navigation Credit: 3

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

NS-403. Seminar Credit: 0

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

DEPARTMENT OF ADULT MARITIME EDUCATION

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

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

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

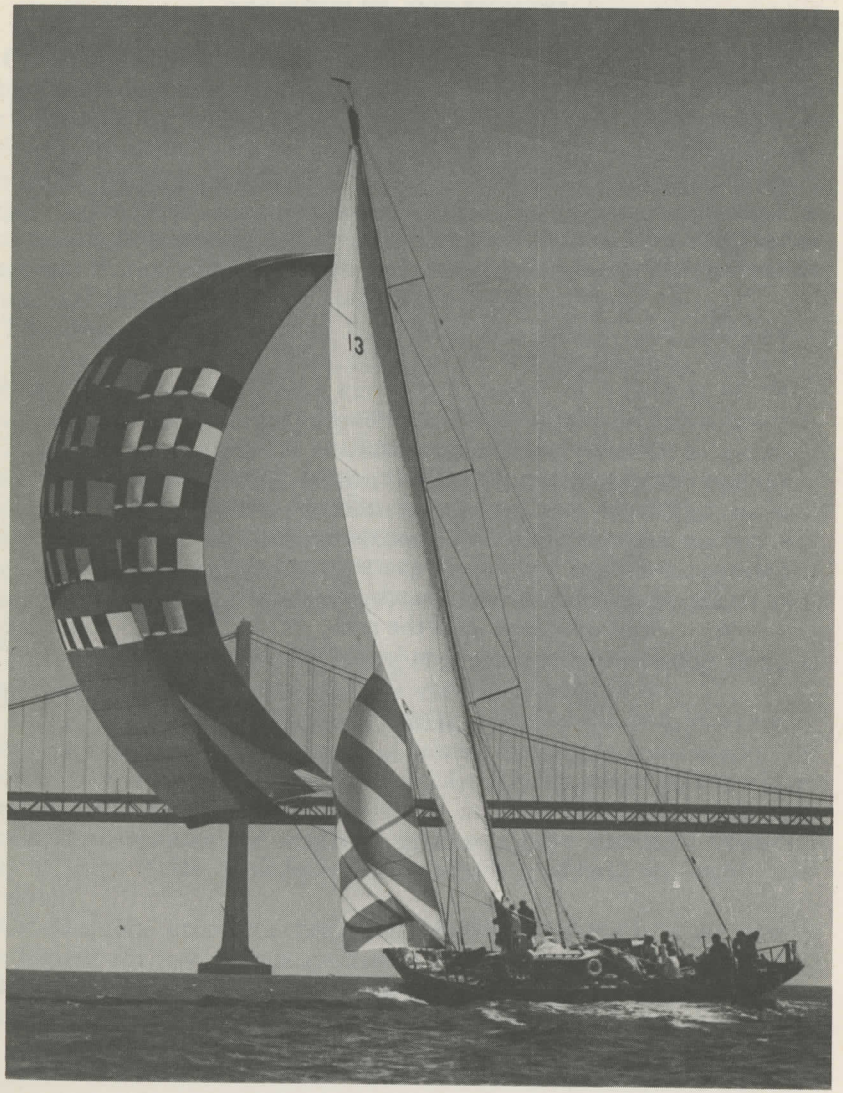
Assist those already employed in the maritime industry to acquire more skills to maintain their level of employment, to advance in their professions, or to change fields.

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

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

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

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



CAREER OPPORTUNITIES IN THE MARITIME INDUSTRY

"Life on a tanker centers in two 'islands.' Amidships stand the bridge, wheelhouse, chartroom, gyro room, radio shack, and deck officers' quarters. Aft are the galley, messrooms, engine officers' and crew's quarters, and the engine room. A catwalk above the low well deck joins the two islands; crossing it in heavy seas calls for a 190-foot dash."

—MEN, SHIPS AND THE SEA

CAREER OPPORTUNITIES IN TODAY'S MARITIME INDUSTRY

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

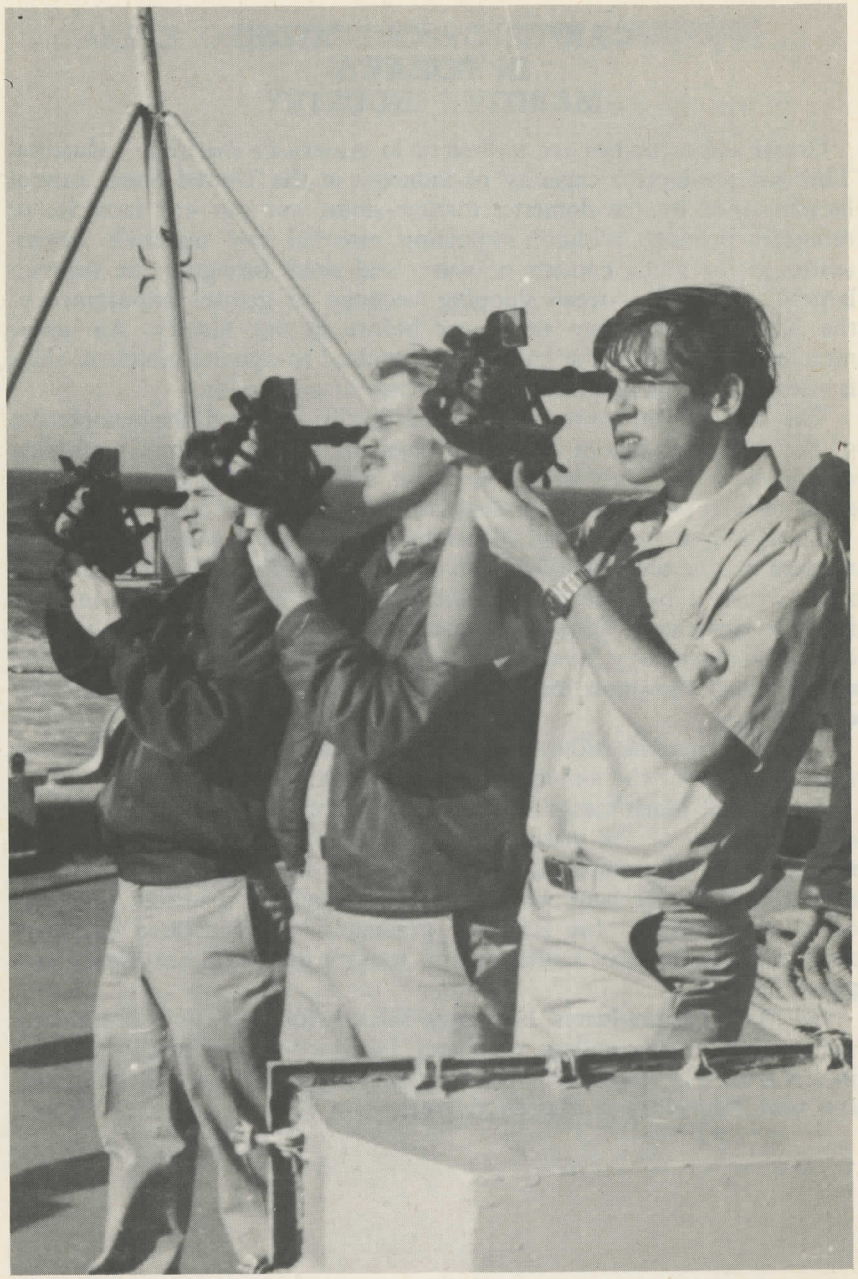
The demands of commerce have radically changed the complexion of the merchant marine from the days of the small, slow, lumbering sailing ships to vessels with a carrying capacity of hundreds of thousands of tons which travel at speeds never previously believed possible.

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

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

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

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



U.S. NAVAL RESERVE OFFICER PROGRAM

"Break, break, break,
On thy cold gray stones, O Sea!
And I would that my tongue could utter
The thoughts that arise in me.
O well for the fisherman's boy,
That he shouts with his sister at play!

O well for the sailor lad,
That he sings in his boat on the bay!
And the stately ships go on
To their haven under the hill . . .

—Tennyson, BREAK, BREAK, BREAK

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 * STAFF * AND * FACULTY

"Up went the huge sail . . . and away
we shot like a racehorse . . . Every
timber . . . creaked . . . while the mast
bent like a reed, and cracked in
its socket as if it would split
the deck in two . . . the sea was
like a hissing cauldron . . . and the kalia,
instead of having time to mount over
the smaller waves, cut its way right
through them."

—from the log of an English Missionary telling of his voyage on a Samoan, "kalia," 1846.

THE BOARD OF GOVERNORS

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

THE BOARD OF VISITORS

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

ADMINISTRATION

PRESIDENT

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

COMMANDING OFFICER, Training Ship Golden Bear

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

ACADEMIC DEAN

Wilbur H. Parks
Academic Dean
B.S., Electrical Engineering, University of California, Berkeley, 1935
M.S., Mechanical Engineering, University of California, Berkeley, 1942
Registered Professional Engineer, Colorado
Rory K. Miller
Assistant Academic Dean
Head, Department of General Studies
Associate Professor
B.A., English, Loyola University, 1969
M.A., English, University of California, 1971

ADMINISTRATIVE OFFICES

William C. Black
Administrative Officer
B.A., Political Science, University of California, Los Angeles, 1950
M.B.A., Business Administration, Syracuse University, 1958
Business Manager, M. G. Saladin
B.S., Business, Indiana University, 1941
Maureen Browning, Registrar
Public Information Officer and Athletic Director, Harry Diavatis
B.F.A., Dramatic Arts, University of Utah, 1969
Student Affairs Officer, Diane Hulen
B.A., Social Science, University of Oregon, 1961

COMMANDANT OF MIDSHIPMEN

Richard D. Heron, Commander, CMA
Commandant of Midshipmen
Executive Officer, *Training Ship Golden Bear*
B.S., Nautical Science, California Maritime Academy, 1938
Chief Mate, Unlimited, Any Ocean

Winthrop Yinger, Lieutenant, CMA
Assistant to the Commandant
B.A., History, Political Science, Albion College, 1957
M. Div., Biblical Studies, Colgate Rochester, 1961
M.A., Communications, Fresno State University, 1970
Donovan C. Lenhart, Pharmacist Mate, CMA
USAF School of Aviation Medicine

LIBRARY

Head Librarian, Paul W. O'Bannon
B.A., History, University of California, 1955
M.S.L.S., Library Science, University of Southern California, 1956
Assistant Librarian, Nathan Plotkin
B.A., Sociology, University of Illinois, 1952
M.A., Geography, Kansas State University, 1964
M.S., Library Science, University of Illinois, 1973

Faculty

DEPARTMENT OF NAUTICAL INDUSTRIAL TECHNOLOGY

William H. Aguilar, Captain, CMA
Head, Department of Nautical Industrial Technology
Professor
B.S., Nautical Science, California Maritime Academy, 1934
Master Mariner, Unlimited, Any Ocean
Joe Barron, Lieutenant, CMA
Assistant Professor
B.S., Nautical Science, California Maritime Academy, 1970
First Mate, Unlimited, Any Ocean
Calvin Bourke, Lieutenant, CMA
Assistant Professor
B.S., Nautical Science, United States Merchant Marine Academy, 1943
Master, Unlimited, Any Ocean
Robert Craig, Lieutenant, CMA
Assistant Professor
B.S., Nautical Science, California Maritime Academy, 1949
Second Mate, Unlimited, Any Ocean
William B. Hayler, Lieutenant Commander, CMA
Associate Professor
B.S., Nautical Science, United States Naval Academy, 1944
M.A., International Relations, George Washington University, 1964
Naval War College, 1960
Master Mariner, Unlimited, Any Ocean
John Keever, Lieutenant Commander, CMA
First Lieutenant, *Training Ship Golden Bear*
Associate Professor
B.S., Nautical Science, California Maritime Academy, 1970
Second Mate, Unlimited, Any Ocean
Fred B. Newton, Lieutenant Commander, CMA
Navigator, *Training Ship Golden Bear*
Associate Professor
B.S., Nautical Science, California Maritime Academy, 1973
Master Mariner, Unlimited, Any Ocean
Paul Seiler, Chief Boatswain, CMA

DEPARTMENT OF MARINE ENGINEERING TECHNOLOGY

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

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

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

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

Mark T. Donahue, Lieutenant, CMA
Assistant Professor
B.S., Marine Engineering, United States Merchant Marine Academy, 1972
M.S.E., Naval Architect Marine Engineering, University of Michigan, 1975
Third Assistant Engineer, Steam Vessels, Unlimited Horsepower
Third Assistant Engineer, Diesel, Unlimited Horsepower

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

Imon L. Pilcher
Assistant Professor
B.S., Electrical Engineering, University of Washington, 1964
M.S., Electrical Engineering, Naval Post Graduate School, Monterey, 1973
Third Assistant Engineer, Steam, Unlimited Horsepower
Third Assistant Engineer, Diesel, Unlimited Horsepower

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

Charles Ludwig, Warrant, CMA
Welder

DEPARTMENT OF GENERAL STUDIES

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

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

David D. Blaskovich
Assistant Professor
B.S., Zoology/Chemistry/Mathematics, Iowa State, 1970
M.A., Natural Science/Oceanography, San Jose State University, 1974

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

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

Robert C. Kelly, Lieutenant, CMA
Assistant Professor
B.S., Geology, Oregon State, 1950
M.B.A., Business Administration, University of Washington, 1955
Marine Engineering, California Maritime Academy, 1944
Second Assistant Engineer, Steam Vessels, Unlimited Horsepower
Third Assistant Engineer, Diesel Vessels, Unlimited Horsepower

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

DEPARTMENT OF NAVAL SCIENCE

Donald G. Thomas, Lieutenant Commander, USN
Head, Department of Naval Science
Associate Professor
B.S., Nautical Science, United States Merchant Academy, 1964
Third Mate, Unlimited Horsepower, Any Ocean

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

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

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

A. P. Dougherty, QM1, USN
Instructor

DEPARTMENT OF ADULT MARITIME EDUCATION

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

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