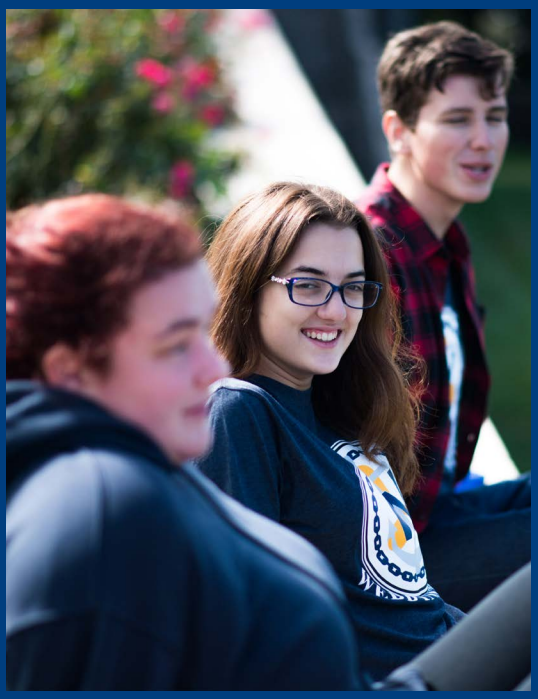
Webb Institute

An Exceptional College of Engineering



ACADEMIC CATALOG

2020 - 2021

William H. Webb

Founder of Webb Institute

Webb Institute
298 Crescent Beach Road
Glen Cove, NY 11542-1398
Admissions Office: 516-671-8355
Toll free number: 866-708-WEBB
E-mail: admissions@webb.edu
Website: www.webb.edu

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MISSION

To inspire and educate tomorrow's leaders in an extraordinary learning community focused on engineering and design in the marine field.

Webb Institute:

- Provides a rigorous education in the principles of engineering and the fundamentals of naval architecture, marine engineering and related marine technologies;
- Develops skills that will enable graduates to become leaders in, and make significant contributions to, their chosen profession and the wider community;
- Instills in graduates the highest ethical standards and sense of professionalism;
- Cultivates curiosity in the arts, sciences and humanities, and provides the background and encouragement necessary to support lifelong learning; and
- Perpetuates the values of William H. Webb.

ACCREDITATION

Webb Institute is accredited by the Middle States Commission on Higher Education, 3624 Market Street, Philadelphia, PA 19104. (267-284-5000) www.msche.org. The MSCHE is an institutional accrediting agency recognized by the U.S. Secretary of Education and the Council for Higher Education Accreditation (CHEA).

Webb Institute's initial accreditation was granted in 1950. Please visit the MSCHE website for the Webb Institute's current accreditation phase and status:
https://www.msche.org/institution/0426/

MSCHE
MIDDLE STATES COMMISSION ON HIGHER EDUCATION

The Naval Architecture and Marine Engineering program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org

It is the policy of Webb Institute not to discriminate on the basis of race, creed, gender in its admissions, employment, or other activities administered by this college. The information contained herein is current as of the date of publication; however, it is subject to change.

Verification or information on possible changes may be obtained by letter or telephone call to:

Registrar, Webb Institute
298 Crescent Beach Road, Glen Cove, New York 11542-1398
Telephone 516-671-2215, Toll Free: 866-708-WEBB

The Couch Academic Center

THE COLLEGE

Webb Institute, the oldest school devoted to naval architecture and marine engineering in the United States, is located in Glen Cove on the picturesque north shore of Long Island, about thirty miles from New York City. Webb Institute seeks to attract students who are interested in the design and construction of ships of all types and in their motive power. The aim of Webb is to educate its students generally, while simultaneously providing professional competence in naval architecture and marine engineering. To this end the curriculum is designed to be of such depth and quality that all graduates will be fully prepared to enter directly the practice of their profession or to go forward into graduate work and research. Special effort is made to develop the student's capability for independent study and original thought as well as to foster those work habits that contribute to professional excellence. Students who successfully complete all of the courses prescribed in the regular four-year undergraduate curriculum and the required practical work are awarded the degree of Bachelor of Science in Naval Architecture and Marine Engineering.

The Institute is fully accredited. The school maintains close contact with the marine industry and assists graduates in their placement to the full extent of resources. Its graduates have been in great demand, not only in maritime and marine enterprises but also in many related industries and in the field of education. The Institute's graduate placement rate is 100 percent annually. Graduates of Webb Institute are very successful in entering the graduate schools of their choice, and many continue on to the doctoral level.

All of the undergraduate students have four-year, renewable, full-tuition scholarships from Webb; they are selected by rigorous standards and the academic pace is fast.

To understand the reason for existence of this very unusual college one must know something about the background of its founder, William H. Webb, and conditions existing in the maritime industry at the time he established and endowed "Webb's Academy." William Henry Webb was the foremost shipbuilder of New York City during the period when a majority of the most important shipyards of the United States were located on the Manhattan and Brooklyn banks of the East River. Mr. Webb was born in 1816 and learned the art of shipbuilding from his father, Isaac Webb, whose shipyard he eventually took over upon the latter's death in 1840. From then until 1869 William Webb contracted for, designed, and supervised the construction of one hundred and thirty-five wooden vessels of all types, including fishing schooners; ferry boats; fast sailing packets; clipper ships; large Atlantic, Pacific and coast-wise steamships; as well as ironclad warships for European navies.

During this 29-year period, Mr. Webb constructed both a larger number and a greater tonnage of vessels than any other American shipbuilder of the era. He was active in the formation of a number of steamship lines, both before and after his retirement as a shipbuilder.

With the replacement of wooden ships by iron ones,

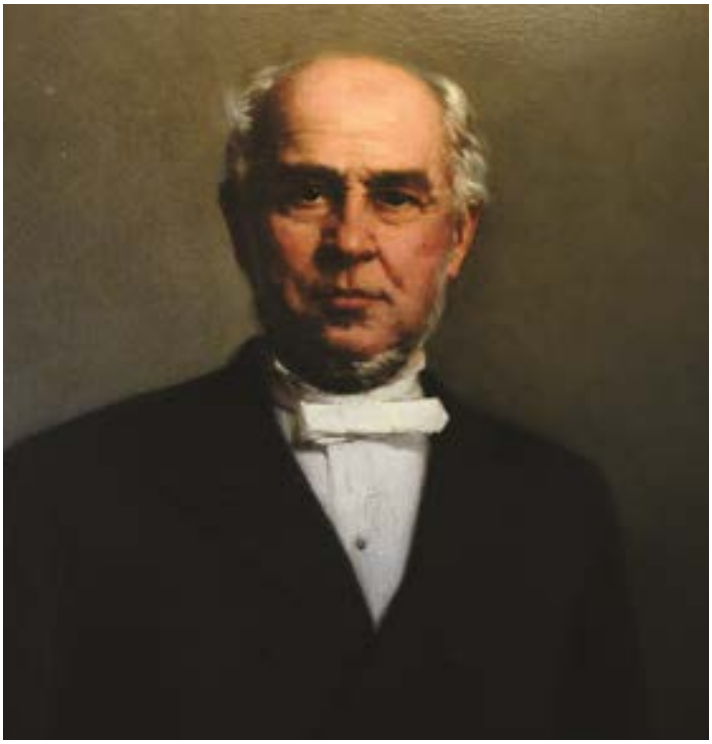
largely occurring in the 1870s and the continued developments in size, speed, power, and complexity of steamships, it became evident that a more formal and detailed education would be required for naval architects and marine engineers than that offered by the apprenticeship systems under which Mr. Webb and his contemporaries had learned their profession.

With this in mind, Mr. Webb decided to create a school to train future designers of ships and marine machinery. The State of New York granted a Charter to Webb's Academy and Home for Shipbuilders on April 2, 1889. Instruction was started in 1894 with a faculty of three, and the first class of eight men graduated in 1897.

The length of the course was increased from three to four years in 1909. In 1933 authority was obtained from the University of the State of New York to award a Bachelor of Science degree. The present name of Webb Institute was adopted in 1994. Although radical change has occurred in curriculum content since the program's inception, the basic educational goals have persisted: educating young men and women generally, while simultaneously training them professionally as naval architects, with an included competence in marine engineering.

Until his death in 1899, Mr. Webb assumed all the operating expenses of the Academy. In addition, properties, mostly in the form of real estate, were transferred to it. Further endowment was provided under the terms of Mr. Webb's will. Under the management of the original Board of Trustees and their successors, this endowment has been extensively increased. The endowment income, together with gifts from foundations, corporations, alumni and other individuals, largely defrays current operating costs. Despite continuous increases in faculty, facilities, and their accompanying expenditures, the Institute still offers a full-tuition scholarship education to its undergraduate students.

One of the unique features of the Webb Institute educational system is the winter work term. Each year the school closes in late December and does not reopen until the end of the winter work period in early March. During this period between academic semesters, each student is required to engage in eight weeks of practical work in a shipyard, aboard ship in the engine room, in a design office or in other course-related industries. The practical work period provides a break in the academic routine. It gives the students an opportunity to relate their classroom and laboratory work to actual commercial practice. It solidifies that which has been



Webb's Founder - William H. Webb

learned and opens up new engineering vistas for the future. In addition, each student is paid the going rate by the employer, and the wages received are normally more than sufficient to cover travel and subsistence costs while away from the Webb campus.

The campus of Webb Institute covers 26 acres, fronting directly on Long Island Sound. The property was once the estate of Herbert L. Pratt, the son of one of the founders of the Standard Oil Company, and there is a magnificent view across the Sound to Westchester and the Connecticut shore. The campus is within the limits of the city of Glen Cove. The center of the city is about a mile and a half from Webb.

The educational and supportive facilities of Webb Institute are housed in six buildings. In addition to the academic buildings, the campus includes a private beach, boathouse, tennis courts, a gymnasium, and playing fields. The main building, Stevenson Taylor Hall, was originally the residence of the Pratt family and is now the hub of Webb's academic and social activity. It contains all the undergraduate classrooms, faculty and administrative offices, the Livingston Library, dormitory rooms, public rooms and the dining hall. On the lower floor are the science laboratories, recreation rooms, and the Henry Auditorium, a combined lecture hall and auditorium with amphitheater seating for 180 persons.

GOVERNANCE

Webb Institute is a private, nonprofit, post-secondary school chartered under the laws of the State of New York. It is supported by its endowment, initiated by William H. Webb, and by gifts from private industry, private foundations, alumni, parents, and friends of Webb. It receives Bundy aid from the State of New York, and occasional grants for specific purposes from the Department of Education and the National Science Foundation. Its general policies and financial affairs are managed by the Board of Trustees, a group of private citizens interested in the school and its educational program. The curriculum, conforming to the requirements of the New York State Education Department and to the standards of the accrediting organizations, is designed and managed by the faculty under the leadership of the Dean and approved by the President and the Board of Trustees, with due consideration to the views and recommendations of the Student Education Committee of the Student Organization, discussed under "CAMPUS LIFE." It is the policy of Webb Institute to comply with all federal regulations in the areas of non-discrimination and rights of privacy of students and their parents.

FACILITIES

Our 26-acre waterfront campus, which includes a private beach, is located 25 miles east of Manhattan on Long Island's North Shore. The main building, Stevenson Taylor Hall, was the former estate of Herbert L. Pratt, son of one of the founders of Standard Oil.

LIBRARY

Through a generous donation by the late John A. Livingston and his wife, the Livingston Library, located in Stevenson Taylor Hall, was built in 1973. The Livingston Library's expansive collection of approximately 50,000 titles and 300 periodicals is designed to support Webb's curriculum, housing standard works on engineering, marine engineering, naval architecture, professional periodicals, and proceedings of conferences and engineering societies. Additionally, the library subscribes to various research databases and has an expansive collection of electronic titles as well.

GYMNASIUM

Provided by donations to Webb's Alumni Association, the Alumni Gymnasium was built in 1947. The gymnasium has a standard basketball court, and is also used as a volleyball court. It also houses weight machines, lockers, office space, and spare guest rooms. Behind the gymnasium are two hard surface tennis courts which are available to all students.

LABORATORIES

The chemistry, physics, and materials science laboratories are located in Stevenson Taylor Hall. The chemistry laboratory contains the standard equipment for performing inorganic chemistry experiments. The physics laboratory, in which experiments involving heat, sound, and light are performed, includes various types of calorimeters, thermal expansion apparatus, thermal conductivity apparatus, apparatus for the study of waves, vapor pressure apparatus, spectroscopes, and optical benches. It is co-located with the chemistry laboratory.

Marine Engineering: This laboratory is equipped with a complete small but fully functional steam plant, a diesel engine lab with two small engines for students to disassemble and reassemble, two diesel engines with attached dynamometers and emissions measuring equipment, a small gas turbine, and additional equipment for studying machinery performance, including a centrifugal pump lab analysis skills.

Material Testing and Structural: This lab has brand new Instron testing equipment which includes an 8801 material testing system with an environmental chamber, three point fixture, and fatigue testing capabilities. The lab also has a newly upgraded Southwark Emery universal testing machine with 200,000 pound load capability. Both machines include digital load/strain control and data capture, synchronized video capabilities, and an assortment of grips for testing samples of varying shapes. Lastly, the lab also includes a Tinius Olsen Charpy impact test apparatus.

Electrical: The equipment includes instruments for measuring resistance, capacitance, inductance, current, voltage, and power. Five multi-purpose Hampden work stations are available for student use. Also available for student use are motors, generators, transformers, controllers, and various digital and analog electronic devices. The work in the laboratory ranges from electrical measurements through the study of circuits, machines, and electronic devices.

Fluids Laboratory: This laboratory is equipped with devices that provide demonstrations to the students as well as research capabilities. The largest device is a recently purchased Edinburgh Designs circulating water channel.

The Robinson Model Basin: This building houses a ship model towing tank and instrumentation room. The tank is used for student course work, academic instruction, consulting work, and U.S. Navy research. The single-rail towing tank is 93 feet long, including an eight-foot starting dock at one end. It is ten feet wide and five feet deep. Ship models can be towed and their resistance measured by suitable dynamometers up to speeds of 15 feet per second. Open-water tests of model propellers are also conducted using a special propeller boat equipped with a drive motor and dynamometers. Its eight-paddle wavemaker can produce regular and irregular long crested seas of

varied configurations. The wavemaker also provides active wave damping in the basin. A full-height viewing window allows observations from above and below the waterline. The tank's electric power is provided through a harmonic power filter and has 24 hours of battery back-up. Electronic instrumentation and data processing equipment are installed as an integral part of the tank. Most of the instrumentation is compatible with the circulating water channel, including the particle image velocimetry (PIV) instrumentation.

Advanced Learning Center: The ALC was designed to support new learning technologies together with distance learning capabilities. The classroom is outfitted with a video conferencing system, cameras, speakers, and microphones that support the receipt and delivery of lectures from remote and local participants.

The Couch Lab: The Couch Lab is a state-of-the-art computer center with laser 3-D printing capability. This space is open to all students to use for academic and personal use.

SHOPS
Machine Shop: The machine shop, available for instructional use and project work, includes a set of MIG, TIG, and arc-welding stations, lathes and milling machines, as well as saws, grinders, and drill presses.

Carpenter Shop: Available for student use, Webb's Carpenter Shop houses various power tools: including a table saw, compound mitre saw, jointer, bandsaw, drill press, and a suite of hand power tools. The shop also houses the Webb model cutter, a ShopBot three-axis CNC router. Students often use the shop for various projects.

MOTLEY HALL
Motley Hall serves as a co-ed residence for students. In addition to dorm rooms, Motley Hall also includes a common room where students can gather. The building is in close proximity to Stevenson Taylor Hall where most classes are held.

THORPE ATHLETIC FIELD
The Thorpe Athletic Field was created in 1983 in memory of Richard W. Thorpe. The field is often used for athletic games, frisbee, and

GOLDBACH BOATHOUSE
Located near Webb's private beach and pier, The Goldbach Boathouse houses supplies for the fleet of 420s, Boston Whalers, wind-surfers, and kayaks that students use recreationally. Students often use the boathouse to store sailing equipment and to unwind with an outdoor BBQ.

GOALS AND OBJECTIVES

GOAL 1:
Webb will provide an engineering education of the highest quality.

- *Graduates who can function effectively in the workplace with little supervision.*
- *Graduates who exhibit superior design and analysis skills.*
- *Graduates who exhibit superior written, oral, and graphical communication skills.*
- *Graduates who exhibit superior professional judgment.*

GOAL 2:
Webb will encourage a strong professional orientation.

- *Graduates capable of achieving significant professional recognition during their careers.*
- *New graduates who are already familiar with professional work practices, and quickly assume productive roles in the workplace.*
- *Graduates who are committed to professional ethics.*

GOAL 3:
Webb will develop leadership skills.

- *Graduates possessing good interpersonal skills.*
- *Graduates who exhibit innovative thinking.*
- *Graduates who can plan and manage time effectively.*

GOAL 4:
Webb will emphasize preparation for successful professional careers.

- *Graduates who are successful in job placement and graduate school admission.*
- *Many graduates become registered professional engineers.*
- *Graduates are prepared to assume positions of increasing responsibility in a global economy.*

CAMPUS LIFE AND ACTIVITIES

The experience is absolutely student-centric. Our size (approx. 100 students) makes it ideal for students to be self-directed and self-governed.

From the classroom to our student kitchen, students lead life at Webb.

LIVING ON CAMPUS

Undergraduate students are required to live on campus and board in the college dining facilities. Exceptions to this requirement are rare and will be made only by the President. Men's dormitory rooms are on the second and third floors of Stevenson Taylor Hall. Women students are housed on the second floor of the Robinson Model Basin and in James G. Motley Hall. Rooms are furnished with beds, bureaus, clothes lockers, desks, and chairs. The students provide their own bed linen, towels, blankets, lamps, and pillows. The students are required to take care of their own rooms and assist in other projects as needed for the benefit of communal living. Maintenance and upkeep of the several laboratories, shops, library, computer center, and other Webb facilities are accomplished in part by student labor under the "Beaver Day" work program.

Students are permitted to have an automobile on campus although parking space is limited. Many students bring bicycles.

Personal counseling is available to all students. Freshmen and sophomores are assigned a faculty advisor who is available to discuss any aspect of student life at Webb of interest or concern to the student.

The dining room is also in Stevenson Taylor Hall. Students are served three meals a day, Monday through Friday. Brunch and dinner are served Saturday and Sunday. A student kitchen is available for the preparation of snacks by the students.

A doctor is on call by the Institute and cares for routine minor illness and emergencies. In addition, the well-staffed and equipped emergency room of the nearby community hospital is available as needed. All cases of serious or prolonged illness must be cared for in a hospital or elsewhere, at the expense of the student or student's family. Additional counseling services are available locally.

HONOR SYSTEM

Webb students constitute a unique community. Satisfying rigorous admission requirements, motivated by similarities in interest, and responsive to the traditions of the Institute, the students conduct themselves in a manner that reflects the ideals of American citizenship and the standards of professional engineering.

The student body is largely self-governing. Through the Student Organization and the Student Court, the students of Webb help in determining the policies and implementing the standards that govern their conduct in the classroom, in the dormitory, on the athletic field, and in all aspects and relationships of college life.

The Honor Council promulgates, administers, and enforces the honor code, which states: "Every student is on his honor to so conduct himself as to attain the objectives of the Student Organization and the college: developing graduates of professional ability who possess a sense of responsibility and leadership. Paramount to the quality of student life under the Honor Code are respect and courtesy for all others. Students should respect the privacy and rights of others at all times. It is with this in mind that each student has willingly pledged to live by the rules of this constitution."

Undergraduate students are required to live on campus and board in the college dining facilities.

In carrying out this objective, every student has a responsibility for himself or herself and for every other student. Should he realize that he has violated the self-imposed code of the student body, the individual should explain willingly to the Honor Council Chairperson the circumstances of the act. Also the student must feel responsible for the acts of his fellows. That is, he should see that the indiscretions of his associates are rectified in a fair and open way. This obligation should always be exercised in a quiet and unostentatious manner. This objective is best accomplished by explaining to the accused the grievance and asking him to report himself to the Honor Council Chairperson. The student should differentiate between violations due to ignorance, which should be handled with the greatest of tact, and those due to carelessness or willful intent. In the latter case, Student Court action is essential.

Every Webb student should regard the school as his or her home and be guided accordingly. He should make the greatest effort to preserve all school property against damage and should report immediately any damage that occurs or any conditions that may cause damage.

Every student should quickly familiarize himself with all rules of safety and the rules and notices having to do with the administration of the school. The student should speak to the Student Organization President or the Honor Council Chairperson concerning any activities of which he is uncertain.

Each student entering Webb is given indoctrination in the Honor Code and is required to pledge, in writing, to support the Honor System. Subscribing to the Honor Code means compliance with the rules and regulations of the Administration of the Institute as well as the Student Organization. The Council and the Code have retained the loyalty of all Webb students through the years. They are a source of pride and strength to the Institute and all its participants. In rare circumstances, a student may be aggrieved by the decision of the Honor Council. In such cases, the student may appeal its action to a faculty committee or through it to the President of the Institute.

ATHLETIC AND SOCIAL PROGRAMS

The athletic program at Webb has been designed to capitalize on the wholesome values such as team work and commitment, inherent in college sports, with the realization that the scope is limited due to the Institute's scholastic requirements and the small student body.

During both the fall and spring semesters, athletics constitute a major portion of the students' extracurricular activities. Varsity teams engage in intercollegiate competition in basketball, sailing, soccer, tennis, and volleyball. Webb participates in non-conference play for basketball, is a member of the Middle Atlantic Intercollegiate Sailing Association, and the Hudson Valley Intercollegiate Athletic Conference for the other sports.

The athletic facilities include a gymnasium with a standard court used for basketball and volleyball, a universal weight machine, and a free-weights room. The school also has two outdoor hard-surface tennis courts and a soccer field. In the basement of the main building the students have a billiard table, a television room, a pub, and a student kitchen.

Webb has its own waterfront on Long Island Sound equipped with a boathouse and facilities for cookouts. Eight 420 sailing dinghies, two Boston Whalers, four Lasers, five windsurfers, and four kayaks are available for the use of qualified students.

Students may use the local YMCA pool and facilities at no personal cost.

Student groups include student chapters of the Society of Naval Architects and Marine Engineers, Marine Technology Society, a chorus, and a variety of student clubs that change based on the request of the current student body. Clubs have included culture club, Bible studies, yoga, and robotics.

Although the student body is small, the Social Committee of the Student Organization is an active group. In conjunction with the Office of Student Affairs, many activities are scheduled throughout the year. Social activities include a rafting trip, musical performances, formal and informal dances, beach parties, and a ski trip.

Houses of worship of various denominations are located in Glen Cove.

ADMISSIONS AND FINANCE

Students come from all over the country for the opportunity to study at Webb.

You can't get a more thorough and practical education in the art and science of engineering design for the money anywhere else.

ADMISSIONS

GENERAL

Admission to the Institute is competitive and is based upon an examination of the applicant's entire record of scholastic and personal characteristics and performance. College Board SAT and SAT II tests are required. Due to the specialized nature of the studies and the rate of coverage of course materials, all undergraduate students enter in the freshman year. No course credit is given as a result of advanced placement examinations or courses taken elsewhere. In selecting candidates for admission, the requirements must, of necessity, be exacting. Selection is made without regard to race, creed, or sex.

Offers of admission are based on an examination of all available information concerning the applicant's abilities, attitudes, motivation, and previous performance, both scholastic and extracurricular. A fine secondary school record, high scores on the required College Board and/or ACT tests, and frank evaluation from persons who know the candidate well are of prime importance. The Institute requires a personal interview with the applicant as a prerequisite to an offer of admission. Normally students are invited to the campus for the interview during which time they are expected to do an overnight stay and sit in on classes for the day. Each candidate will meet with both the President and at least one other member of the admissions committee. During the visit students will be asked to write an essay to provide the college with an additional writing sample to be included with their application.

It is the policy of the Institute, as approved by the Board, to instill in the students of Webb Institute the benevolent spirit of its founder William H. Webb and to help ensure a full academic scholarship Webb education for future students through significant voluntary alumni support. Thus, in accepting an offer of admission, it is assumed that the student accepts the moral commitment to subscribe to that policy.

The size of Webb Institute has remained small. The exact number of freshmen admitted depends upon the facilities available. No more students are admitted than can be guaranteed a high quality education, commensurate with their demonstrated intelligence and ability. Despite the limited number of students entering each year, the freshman class is made up of students from all over the United States, representing public, private, and parochial educational training.

EARLY DECISION

Webb will consider candidates, who wish to make Webb Institute their first choice, under an early decision plan. Applicants wishing to be considered under this plan must have taken all required College Board tests by the October test date of their senior year in high school and must have an excellent academic record.

All required application forms, including a transcript indicating rank in class, must be on file by October 15 of the senior year. If the admissions committee agrees to early consideration, the applicant will be expected to come to the campus for the final interview before the middle of December. All early decision candidates will be notified by December 15 whether they have been accepted. Accepted candidates will be expected to withdraw all applications to other colleges and to provide a non-refundable deposit to secure their position in the incoming class. Any applicant not accepted under the early decision plan will be considered, without bias, for admission during the regular process beginning in March, unless a final rejection is received in December.

SECONDARY SCHOOL REQUIREMENTS

Candidates for admission are required to present the following units of high school credit:

Physics	*1*
Chemistry	*1*
College preparatory mathematics	*4*
English	*4*
History or social studies	*2*
Electives	*4*
TOTAL	**16**

It is strongly recommended that students have completed some level of AP or IB calculus by the end of senior year. Also recommended is some coursework in either mechanical drawing or CAD.

An applicant must have not less than a "B" average (85%) in physics, chemistry, and mathematics as well as a generally satisfactory high school record in order to be considered for admission.

COLLEGE BOARD REQUIREMENTS

The College Board tests required are:

1. *Scholastic Aptitude Test (SAT) (verbal, writing, and mathematical sections)*
2. *Optional: SAT Subject Tests in Math (level 1 or 2) or the Sciences.*

For most students in the U.S., there are four available test dates between the start of the last year of high school and our application deadline of February 1st. They are in

October, early in November, early in December and late in January. The best test schedule an applicant can implement is to take the required tests in November and December and leave the January date as a backup in case prior testing cannot be completed or scores obtained do not fall into the desired range for candidates.

It is suggested that those desiring more information regarding these examinations contact the Admissions Office or consult their high school guidance officers.

HEALTH REQUIREMENTS

An applicant must be physically and mentally capable of performing all work required in the academic courses and in the annual practical work periods. All students will be issued a United States Coast Guard Merchant Mariner Credential with Student Observer classification. To meet the document's requirement, an applicant must have the agility, strength, and flexibility to climb steep or vertical ladders; maintain balance on a moving deck; pull heavy objects, up to 50 lbs in weight, distances of up to 400 feet; rapidly don an exposure suit; step over doorsills of 24 inches in height and open or close watertight doors that may weigh up to 56 pounds. Any condition that poses an inordinate risk of sudden incapacitation or debilitating complication, and any condition requiring medication that impairs judgment or reaction time are potentially disqualifying. Students with disabilities should contact the Office of Admissions to determine if they can complete the academic and practical aspects of the program with reasonable accommodation. The Institute reserves the right to exclude from continued class attendance or enrollment any student who, in the judgment of the administration, is not physically or mentally qualified to follow the regular curricular program.

APPLICATION REQUIREMENTS & PROCEDURES

The following forms, furnished by the Institute upon request, should be in the Office of Admissions of the Institute as soon as possible after the beginning of the high school senior year, but, in any event, not later than February 15th.

1. Application form filled out and signed by the applicant. Application fee is $60 and must accompany the application form.

2. Transcript from an approved or accredited high school or preparatory school showing the satisfactory completion at graduation of courses aggregating sixteen units. A unit of work in this connection is defined as representing the work performed during an academic year having four class periods per week. Two hours of laboratory work are considered equivalent to one hour of classroom work. This transcript should not be held until after high school graduation but should be sent in when the application is filed, showing grades for subjects completed and indicating subjects being taken in the last year. Final grades for these subjects must be submitted when obtained. A candidate from another college must present, in addition, a transcript from that institution.

3. Confidential reports in regard to the aptitude and character of the candidate from at least two persons not related to the applicant. One of these reports must be from a teacher of the secondary school from which the candidate will graduate.

4. A birth certificate copy (or evidence of citizenship if not born in the United States).

Of the above forms, the transcript from the high school and the confidential reports will be forwarded directly to the Institute by the persons filling them out and not by the applicant. The Institute will furnish these forms to the applicant who will distribute them with addressed envelopes to the proper persons for completion and submission to the Institute.

It will be the applicant's responsibility to check whether all papers and required test scores have been received by the Institute. After all papers and required test scores are received, the applicant will be notified. Failure to receive such notice is an indication that all papers have not been received. Candidates will be informed of their acceptance or rejection as soon as possible, usually by April 15th.

EXPENSES

Tuition scholarships are awarded to cover full-tuition costs for enrolled U.S. citizens and permanent residents enrolled at Webb. The tuition charge for foreign students is $52,420 for 2020-21.

There are no laboratory, library fees, or other course fees.

CHARGES MADE BY THE INSTITUTE
The application fee of $60 is to be forwarded with the original application for enrollment, as outlined in the section on "ADMISSIONS."

A registration deposit of $200 is due at the time the candidate is notified of selection and accepts the Webb scholarship. Those students admitted under the Early Decision program are required to put down a 20% registration deposit. This sum will be applied to the first semester room and board charge when the candidate enters. The registration deposit is forfeited if the candidate does not report on schedule.

A room deposit of $150 will be required for all entering students. The charge is renewable, to the original amount, at the beginning of each semester. This deposit less charges for breakage or damage, will be returned upon graduation or disenrollment.

No records of any kind will be released to any student or third party unless the student's financial obligations to the Institute and/or the Student Organization are fully satisfied.

BOOKS, LAPTOPS, AND SUPPLIES
All students are expected to buy their own textbooks and miscellaneous academic supplies, which are available through the Student Bookstore. These expenses are about $1,080 for the freshman year. In addition, students will provide their own drafting equipment and calculators with logarithmic, power, and trigonometric functions. Programmable calculators are recommended. Students will purchase drafting equipment for their use at Webb Institute.

All students are required to purchase laptop computers through Webb Institute. The Information Technology Department will order a state-of-the-art laptop for each student, and they will be available to students during Orientation. Students will also purchase software programs for their use at Webb Institute. Laptops and software can be paid out over eight semesters.

OTHER EXPENSES
In addition to personal clothing and sporting equipment, students should bring sheets, towels, blankets and pillows for their rooms. They will need money to take care of personal laundry, transportation to and from Glen Cove, as well as all other traveling expenses and entertainment.

The Student Organization, in order to carry out its activities, requires a charge of $100 upon enrollment, of which $50 will be returned to the student upon graduation or transfer from Webb.

Students need their own hard hat, safety goggles, and steel-toed work shoes that are routinely required for ship and shipyard visits made throughout the Webb program.

Medical expenses, other than those of a minor nature, are not covered by the Institute. Counseling

services are available on campus. In addition, referrals can be made to local professionals or agencies. It is recommended that the student be covered by insurance for psychological services and against accident, serious illness, or hospitalization.

Students who are not members of a professional engineering society at whose functions attendance is required during the junior and senior years will be required by the junior and senior years will be required by the society to pay the normal nonmember fee for registration.

STUDENT EMPLOYMENT

Since the scholastic program is very demanding, it is usually neither wise nor necessary for a student to work during the academic semesters. Earnings from required winter work are normally adequate to pay for the student's travel, subsistence, and incidental expenses while on the job and in most cases to assist with educational expenses.

FINANCIAL AID

Webb Institute provides all enrolled students full-tuition scholarships to U.S. citizens and permanent residents, valued at $52,420 for the 2020-2021 academic year. Webb Institute also offers need-based aid to help cover additional costs of attending.

All students in need of financial assistance must submit a Free Application for Federal Student Aid (FAFSA). www.fafsa.ed.gov

Webb Institute Federal Code: **002900**

Proper documentation is critical to the financial aid application process. Please note that your financial aid eligibility is based on your current enrollment status and may be subject to change based on final verification of your information.

A student's financial aid package is contingent upon federal, state, and institutional appropriations and regulations. If you are selected for a process called verification, you are required to provide Webb Institute all documents requested. Any changes made to the award as a result of verification will be stated in a revised award letter.

Any change of circumstance, change of address, or receipt of external funding, must be reported to the Office of Financial Aid.

Webb Institute reserves the right to revoke any aid offer if there is any evidence that the conditions of enrollment status, financial need, or merit are not met. Changes in enrollment, including non-attendance or withdrawals, may reduce or cancel this aid offer. Canceled awards will not be replaced with other aid.

There is up to a 2.0% origination fee that may be deducted from your loan proceeds.

Federal regulation mandates that all first-time borrowers at Webb Institute complete loan entrance counseling to sign your Master Promissory Note (MPN) online, prior to receipt of Federal Direct Loan Funds at www.studentloans.gov. You will be asked to use your four-digit pin number

GRANTS

A **Pell Grant** is a grant from the federal government that **does not** have to be repaid. Pell Grants are awarded based on financial need as demonstrated on the FAFSA. The amount of **Federal Pell Grant** funds you may receive over your lifetime is limited by federal law. The federal government will keep track of your lifetime eligibility used (LEU) and reports your percentage used to the Office of Financial Aid.

COST OF ATTENDANCE 2020-2021

2020-2021 Undergraduate Tuition	$52,420
Room and Board	$15,750
General Fee	$ 460
Books	$ 700
Travel	$ 2,000
Laptop Fee	$ 3,000
Full-Tuition Scholarship	$-52,420
NET COST	*$ 21,910**

** Webb Institute provides all U.S. citizens or permanent residents full-tuition scholarships valued at $52,420 for the 2020-2021 academic year.*

NY STATE TUITION ASSISTANCE PROGRAM (TAP)

TAP is a tuition-only award for undergraduate students. It is only for U.S. citizens/permanent residents who reside in NY State and attend a NY State approved college full time. Students must make academic progress as defined by the state to continue to receive TAP. Undergraduate students are limited to eight (8) semesters of TAP. All students receiving TAP must submit proof of U.S. high school completion (final high school transcript or high school diploma). This documentation must be submitted by the first day of class of the first semester the student will receive the TAP award. Failure to submit the necessary documentation may result in losing eligibility for that semester's award.

All New York State Residents will be required to apply for NY State Tuition Assistance Program (TAP) as a condition of eligibility for any Webb Institute administered scholarships. TAP Awards are for tuition only and do not reduce student expenses. TAP Awards range from $100 to $5,165 per year. When you file your FAFSA, your FAFSA information will automatically be used to determine eligibility for TAP. Please refer to www.hesc.ny.gov

FEDERAL DIRECT LOAN PROGRAM

Federal Direct Subsidized Loan Subsidized loans are awarded on the basis of financial need. You will not be charged any interest before you begin repayment or during authorized periods of deferment because the federal government "subsidizes" the interest during these periods.

Federal Direct Unsubsidized Loan Unsubsidized loans are not based on financial need. You will be charged interest from the time the loan is disbursed until it is repaid in full.

Federal Parent PLUS Loan (for undergraduate dependent child) - If you have a dependent in college, you may be eligible for college loans through the Federal Parent PLUS Program (PLUS). Parents can borrow up to the student's cost of attendance, minus any other financial aid. These loans are based on credit history, and there is no limit on the aggregate amount.

Alternative Loans - These loans are available to students or parents to help meet the cost of education. They are based on credit history. Maximum amount of eligibility is based on the cost of education minus other financial aid. Interest rates and borrower benefits vary by lender. Webb Institute recommends that you review borrowing options through the federal aid programs first and then evaluate the alternative loan options available.

Maximum Annual Loan Amounts

Dependent Student

Level	Subsidized	Unsubsidized	Total
Freshman	$3,500	$2,000	$5,500
Sophomore	$4,500	$2,000	$6,500
Junior/Senior	$5,500	$2,000	$7,500

Independent Student (24 years of age or older)

Level	Subsidized	Unsubsidized	Total
Freshman	$3,500	$6,000	$ 9,500
Sophomore	$4,500	$6,000	$10,500
Junior/Senior	$5,500	$7,000	$12,500

THE FOLLOWING DISCLOSURES ARE REQUIRED BY FEDERAL REGULATIONS

Refunds - Credit balances are refunded to students in the form of a check which is mailed to the student's primary address. When a student withdraws by filing a written formal withdrawal notice to the President of Webb Institute, refunds will be granted for room and board. Webb Institute reserves the right to change the requirements whenever the proper authorities deem such changes necessary. Students are liable for all costs in the collection of delinquent accounts and all applicable late fees.

Prior to the start of semester :	100 %
within the first week	90 %
within the second week	75 %
within the third week	50 %
within the fourth week	25 %
after the fourth week	0 %

Return of Title IV Federal Student Aid Policy - Students receiving Federal Title IV funds, who withdraw completely from Webb Institute, will have their Federal Title IV awards and loans prorated and refunded to the federal programs based upon the number of days in attendance. The amount of assistance that a student has earned is determined on a pro rata basis. Students, who did not receive all of the funds earned, may be due a post-withdrawal disbursement. If the post-withdrawal disbursement includes loan funds, students may choose to decline the loan funds to avoid incurring additional debt.

Federal and State Satisfactory Academic Progress -To be eligible for Federal and State Financial Aid, the student must maintain satisfactory academic progress and program pursuit. There are two distinct measures of satisfactory academic progress: a "quantitative" measure, the number of credits that the student is completing, and a "qualitative" measure, the student's cumulative grade point average. Students are required to meet both standards to remain in good academic standing.

FINANCIAL AID RESOURCES

www.finaid.org
www.studentaid.ed.gov
www.hesc.ny.gov
www.fafsa.ed.gov
www.studentloan.gov
www.collegeboard.org

SCHOLARSHIP PROGRAM

Webb has been successful in insuring the admission and continuation of education for all students in financial need, as long as all academic requirements are met. Students needing additional funds to meet the necessary expenses are requested to consult the Office of Financial Aid prior to the start of each academic year. The following internal scholarships are available to students who have completed a FAFSA and meet all academic and financial eligibility requirements:

AMERICAN BUREAU OF SHIPPING SCHOLARSHIP
Awarded to a junior and a senior student based on academic performance, work term performance, and service to Webb Institute.

CLASS OF 1956 SCHOLARSHIP
Student must have proven financial need.

CORKY SAUTKULIS SCHOLARSHIP
Open to students with proven financial need who reside on Long Island or in the tri-state area.

FIRST ROBOTICS SCHOLARSHIP
Awarded to freshmen who have participated in their high school's FIRST robotics program.

FISHER DUNDERBERG SCHOLARSHIP
Awarded to students in their freshman year. Must have proven financial need.

GLOSTEN SCHOLARSHIP
Must have proven financial need and maintain satisfactory academic standing.

H. SMITH MCKANN SCHOLARSHIP
Must have proven financial need and maintain satisfactory academic standing.

J. LANCE CLASS OF 1980 SCHOLARSHIP
Must be of good character and citizenship. Preference is given to students in their sophomore year, with proven financial need who maintaining satisfactory academic standing.

JOHN HOPKINSONMEMORIAL SCHOLARSHIP
Preference is given to students in their sophomore year, with proven financial need who maintain satisfactory academic standing.

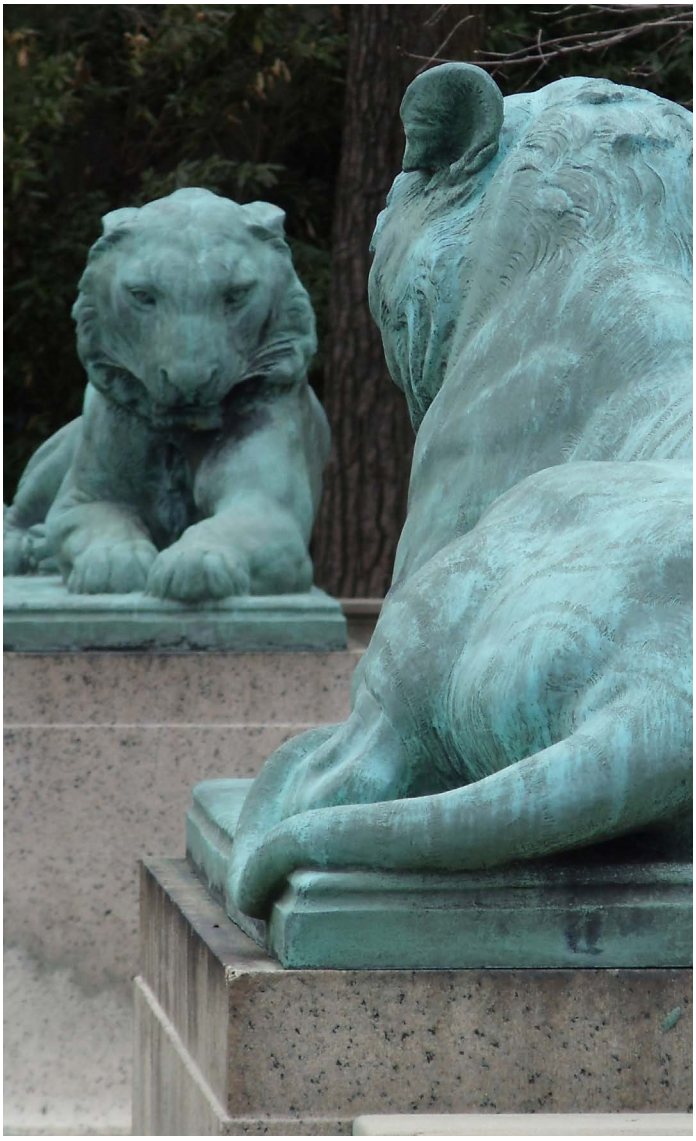
KURZ FAMILY SCHOLARSHIP
Awarded to students entering their junior or senior year. Must have proven financial need, have demonstrated satisfactory academic progress, and have maintained satisfactory academic standing.

LEAGUE SCHOLARSHIP
Essay contest open to entire freshmen class. Completed during the first week of the fall semester.

McMULLEN SCHOLARSHIP
Awarded to students in their senior year. Must have proven financial need, maintaining satisfactory academic standing.

THOMAS CROWLEY SCHOLARSHIP
Awarded to students in their junior or senior year, who are maintaining satisfactory academic progress.

WOMEN'S PROPELLER CLUB SCHOLARSHIP
Awarded to students in their sophomore or junior year, who are maintaining a solid B average and have financial need.



UNDERGRADUATE ACADEMIC PROGRAM

A single curriculum is offered. A passing grade of 70% is required in each course, and a satisfactory overall average of at least 75% must be maintained. In case of a course failure, a re-examination, or remedial work, or both may be offered. In view of this, the passing grade for re-examinations shall be 75%, and the passing grade for graded additional work shall be 80% or its equivalent. When both a re-examination and graded additional work are assigned, that student must pass both in order to proceed.

Unsuccessful re-examination or remedial work may result in termination of enrollment.

Incompletes and/or withdrawals are not options for any class taught at Webb Institute. Non-credit remedial courses are not offered.

A Webb scholarship carries with it a number of obligations. The recipient must maintain a satisfactory academic record; must be respectful to faculty, staff and fellow students; and must behave, on and off campus, in a way that reflects credit on Webb Institute. Failure to fulfill these obligations constitutes the basis for revocation of the scholarship and/or disenrollment.

Students who successfully complete all the courses prescribed in the regular four-year curriculum and the required practical work are awarded the degree of Bachelor of Science in Naval Architecture and Marine Engineering. This program is registered by the New York State Education Department as Program Code 10984, HEGIS Code 0923.

For classes graduating during the five-year period from 2014-2018, 77 percent of all freshmen completed the course with the award of the degree.

AVAILABILITY OF RECORDS

The Institute maintains the confidential academic records of each student in the Registrar's office. Students should consult the Registrar's office when requesting transcripts. Official transcripts are sent by request when the student has met all financial obligations at Webb Institute and has presented a written consent to the Registrar. There is a $5.00 processing fee per official transcript.

FAMILY EDUCATIONAL RIGHTS AND PRIVACY ACT

The Family Educational Rights and Privacy Act (FERPA) affords students certain rights with respect to their educational records. They are:

- The right to inspect and review the student's education records within 45 days of the day the Institute receives a request for access.
- The right to request the amendment of the student's education records that the student believes are inaccurate or misleading.
- The right to consent to disclosures of personally identifiable information contained in the student's education records, except to the extent that FERPA authorizes disclosure without consent.
- One exception that permits disclosure without consent is disclosure to school officials with legitimate educational interests. A school official is a person employed by the college in an administrative, supervisory, or support staff person (including security personnel); a person or company with whom the Institute has contracted (such as an attorney, auditor, or collection agent); a person serving on the Board of Trustees.
- A school official has a legitimate educational interest if the official needs to review an education record in order to fulfill his or her professional responsibility.
- Directory information is distributed without prior consent of the student. Directory information is defined as: name, address, and student's dates of attendance, date of graduation, class year and degree earned. However, students who do not wish such information to be released or made public may inform the Registrar's office.
- Students have the right to file a complaint with the U. S. Department of Education concerning alleged failures by Webb Institute to comply with the requirements of FERPA. The name and address of the Office that administers FERPA is

Family Compliance Office
U. S. Department of Education
400 Maryland Avenue, SW
Washington, DC 20202-460

COURSE DESCRIPTIONS

At Webb, you'll be building hands-on experience in engineering before your first month of college is over. From your first day of classes, you will start on your major. And on making your mark on the world.

UNDERGRADUATE ACADEMIC PROGRAM

SCHEDULE OF COURSES

The subjects of instruction, given during each of the four years, are listed on the following pages.

A semester hour represents one hour of recitation or two hours of drafting or laboratory work per week per semester. The term "semester hour" is synonymous with the term "credit hour."

FRESHMEN		*SOPHOMORE**		*JUNIOR*		*SENIOR*	
FALL	**SPRING**	**FALL**	**SPRING**	**FALL**	**SPRING**	**FALL**	**SPRING**
Math I Calculus I	Math II Calculus II	Math III Engineering Math I	Math IV Engineering Math II	Probability/ Statistics	Thesis	Thesis	Thesis
Technical Communication	Political Philosophy	Western Culture I	Western Culture II	Humanities/ Social Science Elective	Development of American Government	Professional Ethics	Professional Presentations
Chemistry	Material Science	Strength of Materials	Dynamics	Vibrations	Hydrodynamics		Special Topics
Physics I	Physics II	CAD	Physics III	Electrical Engineering I	Electrical Engineering II	Engineering Economics	Senior Seminar
Programming & Applications	Statics	Thermodynamics	Fluid Mechanics		Ship Design I	Ship Design II	Ship Design III
Introduction to Naval Architecture	Science Lab	Ship Statics		Ship Resistance & Propulsion	Ship Structures	Ship Dynamics	Advanced Computational Tools for NAs
	Introduction to Marine Engineering Systems	Marine Engineering System Components	Marine Engineering Machinery Design	Marine Engineering Applied Thermo.	Ship Auxiliary Systems	Ship Propulsion Systems	Marine Transportation

Ship/Boat Yard Trades Internship — **Cadet/Observer Aboard Ship Internship** — **Marine Industry Internship (Juniors)** — **Marine Industry Internship (Seniors)**

** Students in the fall semester of their sophomore year will have an opportunity to participate in a foreign exchange program with the University of Southampton, England. Two or three students will be able to take part in this program, and selection will take place in the spring semester of their freshman year. Exchange students will have to schedule their sophomore winter work requirement onboard ship for the summer prior to the start of junior year.*

PROGRAM EDUCATIONAL OBJECTIVES

The Webb academic program provides a rigorous undergraduate education emphasizing engineering fundamentals, strong professional orientation, and leadership development so that:

1. Graduates function effectively in the workplace with little supervision and quickly assume productive roles.

2. Graduates exhibit superior professional skills:
   a) Problem solving
   b) Written, oral, and graphical communication
   c) Time management
   d) Innovative thinking
   e) Design of complex systems

3. Graduates succeed in diverse graduate programs at prestigious institutions.

4. Graduates live and work according to high ethical standards.

5. Graduates are able to assume positions of leadership in the global and highly diverse maritime industry.

6. Graduates are "whole persons," i.e., they understand business processes like project management and teaming; they exhibit good interpersonal skills; they seek continuous intellectual growth; and they are contributing members of society.

Webb Institute's Program Educational Objectives are published on our website:

www.webb.edu/academics/

COURSE DESCRIPTIONS

The foregoing curriculum matrix and the corresponding course descriptions that follow are designed to achieve the mission of Webb Institute (inside front cover). Both overall curriculum and individual courses are under constant review to achieve continuous quality improvement.

In addition to the formal courses described below, all students attend regularly scheduled weekly lectures by invited speakers on a wide variety of topics—some technical, but many on quality of life, historical, or current events topics. The weekly lecture series is designed to expand Webb students' education in both technical and non-technical subject areas. Attendance is required at the Monday morning lecture hour although no academic credit is awarded for this activity. One absence is allowed per semester.

Once or twice a year, a formal, evening lecture of the Zeien Lecture Series is presented. All constituents of Webb are invited, as are appropriate community organizations. Webb student attendance is mandatory.

The method of instruction generally employed in all the courses consists of assigned study of textbooks, problems, etc., and of lectures by the professors, supplemented by laboratory experiments, project and design work, and assigned collateral reading; upon all of which recitations are held or written reports are required. Both the International System of units and English units are used in most science, mathematics, and engineering courses.

The faculty is a highly qualified group of educators, most of whom carry full-time course loads. Teaching ability and industry experience are strong criteria for appointment to the engineering faculty, and they maintain proficiency in their fields through research or consulting. The entire faculty is also encouraged to participate in their appropriate professional societies.

HUMANITIES AND SOCIAL SCIENCES

Professor Harris and Adjuncts

The communications courses are designed to meet the needs of students in the professional and cultural uses of the English language in writing and speaking. The courses in the humanities are designed to acquaint the students principally with the heritage of Western Civilization.

Webb's proximity to the prestigious cultural institutions in New York City permits academic field trips to be arranged to supplement classroom instruction in the humanities and social sciences.

FRESHMAN YEAR

HU1: TECHNICAL COMMUNICATION
Instruction and practice in oral, written, and graphical communication: oral and written reports, letters, summaries, graphs, and figures. Exercises prepared in conjunction with courses in introductory naval architecture and other courses. Two hours per week in the first semester.

HU2: POLITICAL PHILOSOPHY
A historical and philosophical analysis of the major political theorists of the Western Tradition beginning with the birth of philosophy among the ancient Greeks. Major thinkers treated in this course include Plato, Aristotle, Machiavelli, Hobbes, Locke, Rousseau, Burke, et al. Some of the key themes considered include theory of human nature, the concepts of law, justice and authority, the idea of the "good" state, and the notion of human happiness as it relates to the socio-political environment. Three hours per week in the second semester.

SOPHOMORE YEAR

HU3: THE WESTERN CULTURAL TRADITION – I
The first in a two-course sequence in the history of ideas. This interdisciplinary course traces the development of the Classical and Romantic world views through examination of literature, painting, sculpture, music, and architecture. hrough this course students will become familiar with some of the major writers and artists and with some of the great works of western cultural achievement through the nineteenth century. Several required field trips. Three hours per week in the first semester.

HU4: THE WESTERN CULTURAL TRADITION - II
The second course in a two-course sequence in the history of ideas. This interdisciplinary course traces a number of developments that inform "Modernism" (the notion of *modernité*) through examination of literature, painting, music, architecture, and film. Through this course students will become familiar with some of the major writers, artists, and ideas of the late-nineteenth and the twentieth centuries. Several required field trips. Two hours in the second semester.

JUNIOR YEAR

HUMANITIES/SOCIAL SCIENCES ELECTIVE
Students are allowed to choose a course from a list of classes in the humanities and social sciences. Courses will be taught by both full-time Webb faculty and by adjunct faculty who are experts in particular subject areas. Three hours per week in the first semester.

HU6: DEVELOPMENT OF AMERICAN GOVERNMENT
An examination of the development of the American national government from the mid-eighteenth century to the 1950s. Emphasis will be on how enduring values combined with changed circumstances to produce new roles for the national government. Two hours per week in the second semester.

SENIOR YEAR

HU7: ETHICS AND THE PROFESSION
This course explores some of the most influential ethical systems in the tradition of moral philosophy. The examination of these works is accompanied by class discussions that examine the practical application of these systems in the business of everyday life. Class discussions depart from the two crucial questions that form the basis of all moral inquiry: How should a person live? What do we owe to others? These questions will be explored through a variety of mediums including abstract philosophy and specific case studies drawn from the fields of science, engineering, business, and literature in order to develop the critical tools to evaluate the ethical codes that govern the students' profession. Three hours per week in the first semester.

HU8: PROFESSIONAL PRESENTATIONS
The Professional Presentations class has two major goals—(1) short term: to prepare seniors to present their thesis work to the faculty, staff, and student body at the end of the spring semester, and (2) long term: to prepare students to be able to do high quality presentations as required in subsequent professional and/or academic settings.

MATHEMATICS

Professor Goloubeva

Mathematics is an analytical tool used in all science and engineering courses. At the same time, by its very nature, mathematics is an abstract science. Mathematics at Webb is presented with the focus on applied mathematics, a branch of mathematics which is drawing on the physical world for its motivation, developing abstract concepts to refine the physical ideas, and finally applying those abstractions to mathematical modeling and better understanding of the phenomena of nature. Many Webb students go on to graduate work involving higher mathematics, and it is a strong objective of the mathematics program to prepare them well for this work.

FRESHMAN YEAR

MA1: MATHEMATICS I – CALCULUS I

This is an introductory course whose main goals are to fill in the background of students who have already had an exposure to calculus in high school, to deepen their understanding of the material, and to develop their ability for abstract reasoning and mathematical modeling. The course starts with a discussion of vectors in the plane and in space, and basic vector operations, including dot and cross products. The course continues with a review of the real number system and inequalities, algebra of complex numbers, and the theory of elementary functions such as exponentials, logarithms, trigonometric functions, inverse trigonometric functions, hyperbolic functions and their inverses. The topics covered include limits, continuity, derivatives of functions of one variable, application of derivatives to curve sketching and to simple real-life problems involving related rates, and optimization. The mean value theorem is covered. Linear and Taylor polynomial approximations are discussed and applied to limits via L'Hopital's rule. The course includes a discussion of basic numerical methods such as method of bisections and Newton's method. The course concludes with a brief discussion of integration. To develop students' ability for abstract reasoning and to reach a deeper understanding of the material, the discussion often includes proofs. The class meets four hours per week in the first semester.

MA2: MATHEMATICS II – CALCULUS II

The course starts with a discussion of integration, integration techniques, and applications of integrals. The topics of discussion include the Riemann Integral, the review of the basic techniques of integration such as substitution, integration by parts, partial fraction decomposition, and trigonometric techniques of integration. The course covers applications of definite integrals to simple problems involving area between curves, arc length, volume, projectile motion, work, and center of mass. The course continues with a discussion of the theory of parametric equations, plane curves, and polar coordinates. The concepts of calculus are extended to curves described by parametric equations and polar coordinates. In this course the geometry of three-space is covered more extensively than in Mathematics I. Cylindrical and spherical coordinates are introduced. Emphasis is placed on visualization and graphical representation of surfaces in space.

This course contains most of the calculus of functions of several variables and includes concepts of limits and continuity of functions of several variables, partial derivatives, tangent planes and linear approximations, gradients, differentials and directional derivatives. In this course we introduce the mathematical basis for finding the maximum or minimum of functions of several variables. Optimization problems for functions of several variables are introduced.

STUDENT OUTCOMES

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply the engineering design process to produce solutions which hat meet specified needs with consideration for public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The discussion includes constrained optimization and the method of Lagrange multipliers. The course also includes a brief introduction to linear algebra, which covers the rudiments of matrix algebra. Determinants are also introduced here. The course concludes with a unified discussion of real infinite series. The class meets four hours per week in the second semester.

SOPHOMORE YEAR

MA3: ENGINEERING MATHEMATICS I
Two separate components of the course: the first component starts with the discussion of applications of partial and directional derivatives, covers the theory of vector-valued functions, and multiple integrals. The second component is a beginning of the basic course in differential equations with a small linear algebra component.

MA4: ENGINEERING MATHEMATICS II
There are essentially three separate components of the course. The first component involves a discussion of multiple integrals and vector calculus. This material can best be described as the mathematics needed to study fluids. The course covers the theory of vector-valued functions. Multiple integrals are covered extensively. Emphasis is placed on transformation of space/coordinates and the role of the Jacobian. The concepts of vector and scalar fields, curl, and divergence are introduced from a very physical point of view, as are line and surface integrals. The three major theorems of vector calculus - Green's theorem, Stoke's theorem, and the Divergence (Gauss') theorem - are covered. A strong emphasis is placed on physical interpretation. This material is highly visual and makes extensive use of Maple to illustrate the concepts.

The second component of this class involves complex variables. This component covers the basic arithmetic and geometry of the complex number system. Then the calculus of functions of complex numbers is studied, including the Cauchy-Riemann equations and the implications for harmonic functions. Complex exponential, trigonometric, and logarithmic functions are defined and studied. There is a brief treatment of conformal mapping. In addition, standard integral procedures are discussed.

The third component of this course covers the remaining essential parts of linear algebra and differential equations. The class works more extensively with matrices, matrix functions, and the calculus of matrix functions. Then it discusses methods of solution of systems of first-order linear equations, eigenvalues and eigenvectors, and methods of solution of systems of differential equations. The course meets four hours per week in the second semester.

JUNIOR YEAR

MA5: PROBABILITY AND STATISTICS
This course begins with an introduction to probability theory, including set theoretic and combinatorial concepts. This is followed by treatments of discrete random variables and distributions and continuous random variables. Particular emphasis is placed on the Rayleigh and Weibull distributions, which are applied subsequently in the Ship Dynamics course as models of wave spectra and are also encountered as models of the manufacturing process. The latter third of this course addresses the application of statistical methods to engineering experimentation, beginning with an introduction to estimation and hypothesis testing and culminating with an overview of experiment design. The course meets four hours per week in the first semester.

SCIENCE

Professors Scott and Wiggins

Under this heading are grouped the courses in physics, chemistry, and materials science. These courses introduce scientific methods and provide training in the fundamentals upon which engineering knowledge depends. The courses in chemistry and materials science prepare the naval architect and marine engineer to cope with the materials used in shipbuilding.

FRESHMAN YEAR

SC1: CHEMISTRY
This is an introductory course in general chemistry. Topics covered include stoichiometry, inorganic reactions, ideal gases, condensed phases, chemical equilibrium, and acids and bases. Solubility, thermochemistry, and electrochemistry are also covered. Three hours of class per week and two hours of laboratory every other week in the first semester.

SC2: PHYSICS I - ELEMENTARY MECHANICS

The course provides a rigorous introduction to elementary mechanics. Vector algebra is introduced and used where appropriate. Newton's Laws of Motion are introduced and applied to the kinematics and dynamics of particles and rigid bodies both for linear and rotational motion. The subjects of forces on bodies, momentum, work and energy are described and applied to problems. Three hours of class per week in the first semester.

SC4: PHYSICS II – SIMPLE HARMONIC MOTION, LIGHT AND SOUND
This course is an introduction to wave theory starting with elastic behavior, simple harmonic motion, and mechanical waves, both transverse and longitudinal, as well as traveling and standing waves. Sound waves are studied, including three dimensional waves and Doppler effect. The course concludes with an examination of geometric and physical optics including reflection, refraction, mirrors, lenses, diffraction, and interference. Two hours of class per week in the second semester. Supporting laboratory exercises are conducted in the Science Lab course.

SC3: MATERIALS SCIENCE
The structure-property-processing relationships of engineering materials are investigated. Emphasis is placed on understanding the general behavior and capabilities of the different types of materials. The primary focus of this course is on metals, especially steel. Major topics include crystal structures, including crystal imperfections; diffusion in solids; mechanical properties, including tensile, hardness, impact, and fatigue testing; work hardening and annealing; phase equilibrium; and heat treatment, including non-equilibrium transformations such as martensite. Other topics include introductory coverage of stainless steel, cast iron, polymers, and composite materials. Optimal use of materials in ocean-going systems is stressed. Three hours of class per week in the second semester. Supporting laboratory exercises are conducted in the Science Lab Course.

SC5: SCIENCE LAB
This course supports the Physics II and Materials Science courses through related hands-on laboratory exercises. While half the class is performing a series of physics experiments, the other half is performing laboratory exercises that explore material properties and behavior. Students alternate between the physics laboratory and material science laboratory on a weekly basis. Two hours per week during the second semester.

SOPHOMORE YEAR

SC6: PHYSICS III - ELECTRICITY AND MAGNETISM
This course covers electrostatic and electromagnetic fields; resistors, insulators and capacitors; magnetic properties of matter and inductance; instruments and measurements; circuit analysis using mesh currents and node voltages; transients and network theorems. Two hours of class and two hours of laboratory per week in the second semester.

ENGINEERING SCIENCE

Professors Gallagher, Onas, Royce, Werner, and Wiggins

Engineering science courses deal with the application of knowledge gained in the basic sciences to the solution of engineering problems, using the theories and techniques of mathematical analysis. The principles learned are later applied in ship and power plant design. Engineering drafting and laboratory skills are included in this group of courses.

The extensive use of computers in the engineering and business communities makes it essential that all Webb graduates be literate in computer use and skilled in using complex programs. Some exposure to and practice in varied computer capabilities are stressed, including scientific and engineering problem solving, word processing and computer-aided graphics.

FRESHMAN YEAR

ES1: PROGRAMMING AND APPLICATIONS
This course provides an introduction to computer programming and focuses on the development of the logical problem-solving skills that are essential in engineering. Topics covered include logical expressions, conditional statements, variable types, looping, subroutines, and functions. The ability to properly annotate and debug coding is stressed. Student skills in the application of widely-used, commercially-available software such as Excel®, MathCad®, Visual Basic for Applications (VBA®), and MATLAB® are developed and exercised to facilitate their use in subsequent mathematics, science, and engineering courses.

ES2: STATICS
Statics is an engineering mechanics course in which mathematics and scientific principles are applied to solve real-world engineering problems. Statics is the study of physical phenomena, and it is used to describe and determine how objects in equilibrium will react when subjected to different forces. Topics discussed include vector mechanics, forces, moments, couples, centroids, and centers of gravity, analysis of structures, friction, and moments of inertia.

SOPHOMORE YEAR

ES3: STRENGTH OF MATERIALS
The concepts of stress and strain of engineering materials are described and applied to various components such as beams, rods, and columns. Methods for calculating stresses in these components are introduced using Mohr's Circle and other techniques. The response of components to axial, bending, and torsional loads is discussed and applied to problems such as torsion of shafts, stresses in pressure vessels, and buckling of columns. The deflection of beams is extensively treated. The basic concepts of fatigue are introduced. Three hours per week in the first semester

ES4: ENGINEERING GRAPHICS (CAD)
This course develops the student's ability to use modern engineering graphic techniques on computer-aided design (CAD) software. Students are introduced to fundamentals CAD usage with AutoCad in the initial part of the course. After some exercises from a text, they develop drawings on their own of various marine-related objects. The final part of the course is an introduction to 3-dimensional parametric modeling using SolidWorks software. Two hours of computer lab per week in the first semester.

ES3: THERMODYNAMICS
Properties of fluids, concepts of the system, control volume, work, heat, energy, entropy, the laws of thermodynamics, and reversibility are studied and applied to topics in power cycles, combustion, and psychrometry. Three hours per week in the first semester.

ES6: DYNAMICS
The course covers kinematics of particles, kinetics of particles by F=ma, kinetics of particles by work-energy, and kinetics of particles by impulse-momentum. It covers kinematics of rigid bodies and kinetics of rigid bodies by the same methods as for particles. An introduction to 3-D kinetics and kinematics of rigid bodies is included.

ES7: FLUID MECHANICS
This course examines both real and ideal fluids. It examines fluid statics, including hydrostatic forces, pressure at a point, and manometry. Fluid dynamics are discussed, and the Bernoulli Equation is developed. Fluid kinematics are presented along with the justification for the material derivative. As more complex fluid processes are examined, finite control volumes and differential analysis are presented. Ideal flow concepts of velocity potentials and stream functions are introduced. The Navier-Stokes equations are developed for viscous flows and applied to simple problems. Other topics include fluid properties, dimensional analysis and modeling, and viscous flow in pipes.

JUNIOR YEAR

ES8: VIBRATIONS
This course introduces mechanical vibrations of single and multi-degree-of-freedom systems. It lays the foundation for the study of vibration analysis in areas related to ship design. Topics include derivation of the equation of motion and response of different types of mechanical models under free and forced oscillation, with and without damping. Linearization of simple nonlinear systems is employed to allow a linear vibrational analysis. Computation of Fourier series approximation of specified periodic excitation is introduced. The concept of resonance and its influence on a vibrating system's response amplitude are discussed. Response under a periodic force of irregular form and convolution integrals are included. Decomposition of a transient process into forced and damped free oscillations is examined both theoretically and experimentally. The design of a vibration absorber to ameliorate vibrations on vessels is used as an application of coupled oscillators. Complex algebra and Fourier series are used throughout. Vibration measurement is discussed and demonstrated. Exact and approximate methods for determining mode shapes, natural frequencies, and modal analysis are included. Analysis of continuous systems is introduced. Three hours per week in the first semester.

ES9: HYDRODYNAMICS
The fundamentals of ship hydrodynamics are introduced in the context of naval architecture and ocean engineering. Conservation of mass and linear momentum and the Navier-Stokes equations are revisited. Description of the flow and its visualization are discussed, and the mathematical formulation of continuous flows is presented. The use of potential flow in understanding the fundamentals of fluid flow around a ship is included. Boundary layer theory is developed in relation to hull forms and lifting surfaces. An introduction is made to Computational Fluid Dynamics (CFD) with its assumptions and limitations. Unsteady motion and the concept of added mass are introduced, and calculations are carried-out for simple and more complicated shapes. Lift and drag topics include NACA foil sections, lifting line theory, Joukowski airfoils, and Glauert's method for optimum planform. Green's functions are introduced, for simplified potential theory problems. Potential theory is further developed for added mass and damping on a circular cylinder. Forces on a column are examined using Morrison's equation.

ELECTRICAL ENGINEERING

Professor Martin

The increasing use of electrical and electronic equipment in modern vessels makes necessary a more thorough treatment of electrical and electronic engineering than is customary in a non-electrical engineering curriculum. An intensive, analytical and practical course in electrical circuits and electronics is followed by a study of electro-mechanical devices and control systems. Marine applications are given where possible.

JUNIOR YEAR

EE1: ELECTRICAL ENGINEERING I - CIRCUITS AND ELECTRONICS
This course covers steady analysis of both single-phase and three-phase A/C circuits, with a focus on power calculations including load analysis. Wave-shaping circuits, filters, and resonance are introduced. Electronics topics include solid state diodes, transistors, and operation amplifiers. Digital electronics topics including logic circuits and integrated circuits are also introduced.

EE2: ELECTRICAL ENGINEERING II - MACHINES AND CONTROLS
This course covers the principles of electro-magnetic devices and steady-state performance of transformers and rotating machines (generators and motors). Both synchronous and asynchronous machines are studied. A discussion of marine electrical distribution systems, electric propulsion systems and ship automation concludes the course.

NAVAL ARCHITECTURE

Professors Gallagher, Golden, Onas, Royce, and Werner

The fundamental laws of buoyancy, stability, and strength are fully considered, as these have universal application to all kinds of ships and floating structures. The study of naval architecture is begun in the freshman year in order to familiarize the student as early as possible with ship and shipbuilding terms, technical facets of ship analysis and design, shipyard arrangements, and general methods of ship construction. Major subjects covered are hydrostatics, stability, ship structure, ship dynamics, resistance, and propulsion. Knowledge gained is subsequently applied in the design courses.

Owing to the wide variety of types and sizes of ships in service at the present time, it is inevitable that a certain amount of specialization is necessary for their design and construction. It is the aim of the courses to cover the fundamentals of naval architecture in the time available, so that the specialized study of any

one of a number of particular types or classes of ships may be left to the individual who, after graduation, is especially concerned with them.

FRESHMAN YEAR

NA1: INTRODUCTION TO NAVAL ARCHITECTURE
This course presents an overall introduction to the maritime industry. The broad spectrum of ship types and industry sectors – from sailing yachts and tugs to mammoth tankers and military vessels, from ship design and construction to marine regulations and finance – are described. The main principles of naval architecture are discussed, and students are given an opportunity to practice each of these principles in a hands-on, project-based environment. Students are guided through each project while also being introduced to the engineering method, which includes elements on design, group work, project planning, and time management, and helps build a foundation for continued success throughout their engineering education. The final part of the course is a direct preparation for the first winter work period including hands-on experiences and field trips to visit shipyards and other marine facilities.

SOPHOMORE YEAR

NA2: SHIP STATICS
This course in hydrostatics of ships covers buoyancy, weights, metacenters, and stability at small and large angles of heel and trim. Stability after damage and hydrostatic considerations in drydocking and grounding are treated. Stability regulations are discussed along with the concept of limiting vertical center of gravity. In the project part of the course, curves of form are calculated for a small vessel with much of the work done on a computer. Students are introduced to hydrostatic software in order to calculate the cross curves of stability for the same hull form.

JUNIOR YEAR

NA3: SHIP RESISTANCE AND PROPULSION
The components of a ship's resistance and the effects of important hull parameters are discussed as well as the special problems of bulbous bows and hull appendages. Full-scale prediction of ship resistance by means of model tests, standard series, and regression analyses are examined and evaluated. Wake fraction, thrust deduction, and propulsive coefficient are presented. The design and sizing of screw propellers and waterjets are presented.

NA4: SHIP STRUCTURES
The course introduces modern ship structural analysis and design techniques. The loading experienced by ship structures is outlined. The engineering properties of shipbuilding materials and typical ship structure arrangements are described. The role and use of classification society rules in structural design is explored. Methods for the analysis and design of the hull girder, beams, girders, unstiffened and stiffened plate panels are introduced. Failure due to yielding and buckling are considered. Both analytical and finite element methods for analysis are presented and applied to typical ship structural elements. Two hours of class and two hours of laboratory per week in the second semester.

SENIOR YEAR

NA5: SHIP DYNAMICS (NA V)
In the first part of this course, the student applies knowledge of rigid-body dynamics, vibrations, and hydrodynamics to the study of seakeeping, which addresses the ship's response behavior in ocean waves. In the second part, the ship's maneuvering theory in calm water is developed. The seakeeping part starts with wave statistics. The wave environment is described mathematically first using the regular wave theory and then is expanded to a stochastic or probabilistic description of the seaway using wave spectrums and scatter diagrams. The ship equations of motion are developed for seakeeping, and calculation of the wave excitation force, added mass and radiation damping are introduced, based on strip theory and velocity potential formulations. The response of a ship to ocean waves is treated, first to a single wave train and then to a wave spectrum using linear superposition principles. Calculations are compared to scale model test results. Analytical and numerical test results are validated with published seakeeping data. Seakeeping criteria are discussed, including critical vessel responses such as roll, deck wetness, slamming, and impact loads. The equations of motion for maneuvering are developed in the second part of the course. Analytical and experimental methods of determining maneuvering coefficients are presented. Controls-fixed stability is discussed in detail and calculation of stability index is carried-out. The theory of ship turning is presented with calculation of turning

parameters, emphasizing the limitations of linear theory. An introduction to rudder design follows and methods to evaluate the rudder performance characteristics are introduced. Three hours of class per week in the first semester.

NA6: ADVANCED COMPUTATIONAL TOOLS FOR NAVAL ARCHITECTS
This course reviews the general engineering process for problem solving in the context of recognizing appropriate simplifying assumptions and their impact on the fidelity of the desired solution. Effective use of Computational Fluid Dynamics and Finite Element Analysis software requires that the user understand the underlying assumptions. This course will investigate problems with increasing complexity and discuss best practices at each step of the analysis. The goal is that the student is able to critically and effectively use commercial CFD and FEA software.

NA7: MARINE TRANSPORTATION
This course gives an overview of marine transportation systems, including tankers, breakbulk, drybulk, and container lines from a business standpoint. The fundamentals of maritime economics and financial management are presented, including a fleet analysis based on the ship design project begun in the Ship Design I course. Case studies and a research paper are used as the primary learning tools. Management techniques and linear programming are included. Three hours of class per week in the second semester.

MARINE ENGINEERING

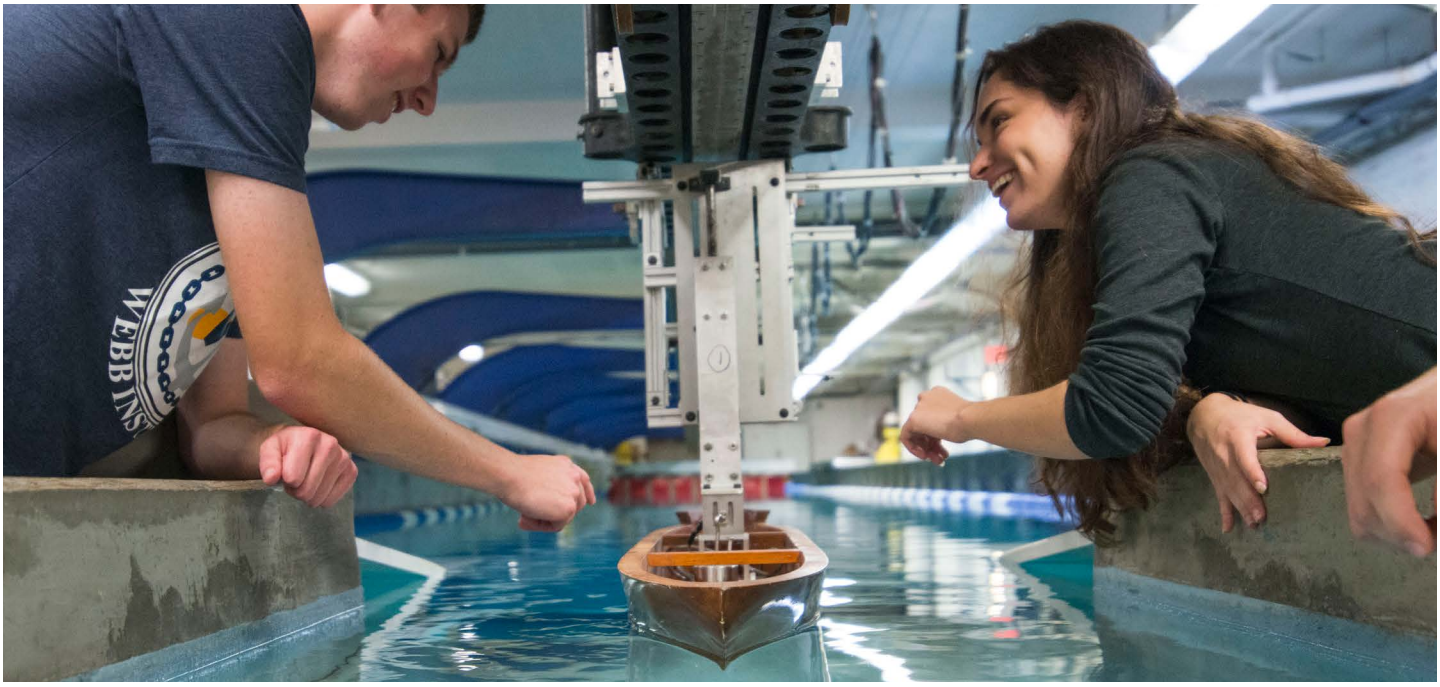
Professors Gallagher, Golden, Scott, Werner, and Wiggins

This division includes those courses that pertain directly to marine machinery. The sequence begins with an introductory survey of propulsion and auxiliary systems. In the following years, detailed studies of machinery and systems are undertaken, including design aspects of steam generators, steam and gas turbines, diesel engines, heat exchangers, power transmission systems, main engine support systems, piping systems, HVAC systems, and control systems. The concepts of system integration, configuration management, and rational evaluation of alternative approaches are stressed.

The sequence culminates in a project in which the students prepare an outline proposal for a complete power plant for a specific application and undertake an investigation of its economic merit in comparison with a group of likely alternatives.

FRESHMAN YEAR

ME1: INTRODUCTION TO MARINE ENGINEERING SYSTEMS
This course presents the fundamentals of marine propulsion systems in which the overall needs of ship board powering are described, followed by a detailed discussion of steam, diesel, gas-turbine, and



nuclear-powered prime movers. Students gain an understanding of the components and their function in each of these types of propulsion. A lab component of the course requires the students, in small groups, to run a steam plant in the marine engineering lab and to disassemble and reassemble a small diesel engine. The course begins the marine engineering program and provides background to students for their sophomore sea term. Two hours per week in the second semester.

SOPHOMORE YEAR

ME2: MARINE ENGINEERING SYSTEMS COMPONENTS
This course builds on the Introduction to Marine Engineering Systems (ME1) course and presents the fundamentals of system components and the auxiliary shipboard systems that these components produce. Components discussed include pumps, fans and blowers, compressors, valves and piping, heat exchangers, and purifiers. Auxiliary systems presented include fuel, compressed air, bilge and ballast, potable and cooling water, sanitary and sewage, HVAC and refrigeration, hydraulics, steering machinery, deck machinery, and safety systems. The course includes hands-on experiences and field trips to visit ships and other marine facilities. To help students prepare for their sophomore sea term, the course also includes information on basic shipboard first aid, firefighting, lifesaving, personal safety, and life at sea.

ME3: MARINE ENGINEERING MACHINE DESIGN
This course involves the design of specific machine elements such as shafts, gears, couplings, clutches, brakes, screw fasteners, and bolted joints. It applies the theory from the Strength of Materials course to practical problems in machine design. In addition, dynamic and fatigue stress analysis are introduced. Marine examples are used for the various elements, such as marine gearing and shafting. Three hours per week in the second semester.

JUNIOR YEAR

ME4: MARINE ENGINEERING APPLIED THERMODYNAMICS
The course consists of three distinct, related parts. Part one deals with the thermodynamic design of a combined steam turbine/gas turbine system. Design trade-offs and optimization are included. Part two deals with the design of the steam turbine from part one. Consideration of both thermodynamics and fluid mechanics are included. Part three provides coverage of heat transfer. One-dimensional steady and unsteady conduction and the empirical approach to convection are discussed. Brief coverage of radiation is provided. This part of the course culminates with the design of one of the heat exchangers in a COGAS plant. Design trade-offs and optimization are included. Three hours per week in the first semester.

ME5: SHIP AUXILIARY SYSTEMS DESIGN
This project-oriented course covers the design of shipboard auxiliary, mechanical systems building on the previous marine engineering courses and the students' examination of systems while on board ships. The principles of fluid flow, thermodynamics, material science, and stress analysis are applied to design piping, hydraulic, and heating, ventilation, and air conditioning systems for marine applications. Throughout the design work, consideration of the relevant regulatory requirements and definition of system requirements are emphasized. To support complete design functionality, the course introduces monitoring and control systems, instrumentation and instrument response, feedback controls, and event driven or sequential process control. Four hours of class per week during the second semester.

SENIOR YEAR

ME6: SHIP PROPULSION SYSTEMS
This course includes a detailed analysis of diesel engines, a review of gas turbines, and completion of a machinery plant design for the vessels used in the Ship Design sequence. This design exercise draws on all the prior marine engineering courses as well as the student's shipboard experience, in that all the propulsion and auxiliary equipment items are selected from vendor information, and the related machinery systems are designed to support them. A lab sequence involving hands-on work with low-speed and high-speed diesels is included. Four hours of class and two hours of laboratory per week in the first semester.

SHIP DESIGN

Professors Gallagher, Golden, and Onas

These three courses synthesize the course material taken to date—especially in the naval architecture and marine engineering curricula—and represent the capstone sequence of the Webb academic program. Both team and individual project work characterize these courses as do analysis and development of presentation skills.

JUNIOR YEAR

SD1: SHIP DESIGN I
In this course, students are introduced to the ship design process, from the concept/feasibility study stages right through to detail design. Ship design as a decision-making process is discussed, as is the idea that design includes a number of factors including estimation, tradeoffs, synthesis, risk assessment, aesthetics, iteration, optimization, and learning. There are many challenges to be faced during a design, and students are introduced to some of the problem-solving tools that can be used to achieve a stated goal. With this information, and using the knowledge and experiences they've gained from earlier courses and internships, small teams of students undertake the initial design of a small vessel of their choice, being led through the iterative design process with the aid of accompanying lectures. Topics discussed include parametric analysis, hull sizing, space and general arrangements, estimation of weights and centers, structural arrangements, stability, powering, propulsion, and regulations. The student-led teams are guided by faculty and industry mentors who have been identified as experts on each of the specific vessel types being designed, which gives students the opportunity to practice their communication skills and provides networking opportunities. Written design reports are produced as are oral presentations of the students' designs to a panel of invited industry professionals. Following completion of the small vessel design project, the design problem statement for a large, oceangoing ship is developed, and initial conceptual sizing is performed. This oceangoing ship design will be developed further in subsequent courses (SD2, SD3, NA6, and ME6).

SENIOR YEAR

SD2: SHIP DESIGN II
The preliminary design to meet the specifications developed in SD I is completed by each student in several projects over the semester. A general arrangement of the vessel, along with a powering analysis, is the first step. A lines plan is then developed, based on the preliminary hull from the first step. Next, another iteration of the arrangements is made, and finally the intact and damaged stability are analyzed. Two hours of class and four drawing room hours per week in the first semester.

SD3: SHIP DESIGN III
The preliminary design of the containership is concluded from the previous semester in Ship Design II. Classification rules are revisited with focus on understanding the terminology and the relevant structural requirements applicable to the project. Hull girder longitudinal strength requirements are evaluated based on classification society rules and quasi-static loading analysis using a longitudinal weight distribution method and general hydrostatics software. Using two representative ship operating condition and the calculated loads, the students are asked to design the midship section of a ship and verify that the longitudinal structure meets classification society requirements. Design of transverse structural members such as bulkheads and/or deep web frames is carried out, with verification that they meet classification society requirements. Structural performance of the hull girder is then analyzed. Finite element analysis (FEA) software is used in the structural design. Material selection, structural weight, producibility, and access for inspection and maintenance will be emphasized during the design.

OTHER REQUIREMENTS

OT1: ENGINEERING ECONOMICS
Coverage of the principles of engineering economics, including compound interest, present worth, annual cash flow, rate of return, depreciation, taxes, and replacement analysis. One hour per week in the first semester senior year.

TH1-3: THESIS
In order to qualify for graduation, each student in the senior year is required to prepare and submit a written thesis, in or related to the field of naval architecture or marine engineering under the direction of a member of the faculty. Senior theses may be individual or team efforts. In addition to a written thesis, seniors are required to present orally the results of their thesis efforts to the assembled student body, faculty, and administration in the late spring of their senior year.

SENIOR SEMINAR
The Senior Seminar, conducted during the final semester, is designed to introduce the seniors to the human factors, business considerations, management techniques, and analytical concepts they may expect to encounter after graduation. Seminar leaders are drawn from the Webb staff and from business and industry. Subjects range from labor-management relations to systems engineering. Content will vary from year to year dependent both on student interests and on developments in the area covered.

SPECIAL TOPICS
These three-credit courses represent the two opportunities for electives at Webb. The first is a humanities or social science course chosen by the students from a list of suggestions provided by the Dean and augmented by the students themselves. If sufficient interest in a topic exists, distinguished members of academia and/or industry are sought to teach the courses. These courses are intended to broaden the students' view of the world and are offered during the fall semester of the junior year, three class hours per week.

The second course is a technical elective again chosen by the students from a list provided by the Dean and augmented with their suggestions. This course provides an opportunity for Webb to engage distinguished visiting faculty to share their particular expertise and real world experience with interested students (and faculty).

These courses provide a way to either sharpen the focus of a student's program or to expand the scope of his/her undergraduate experience. This course is offered three class hours per week in the final semester of the Webb academic program.

PRACTICAL WORK (aka WINTER WORK)
Webb will assist in securing positions with advice to the students and the establishment of liaison with various companies. The sequence usually consists of working as a helper mechanic in a shipyard the first year; as a cadet/observer in the engine room of a ship the second year; and in a professional capacity as an engineer in the industry the third and fourth years. The students are paid at the going rate of their jobs, sufficient to support themselves while away from school. Housing can usually be located through the company employment departments.

Each student is required to present a technical report on the practical work undertaken during each of the four winter intersessional periods. The immediate supervisor is also invited to comment on the student's performance. Additionally, a Sophomore Sea Term Project is required following the work term spent aboard ship.

ENGINEERING VISITS
Visits of inspection are made by individual classes to nearby shipbuilding, dry docking and repair yards, other engineering plants, and to vessels in the vicinity. These visits are arranged through the courtesy of the managing officials of the companies.

In order to develop their powers of observation and to improve their ability to write technical reports, the students are required to submit brief reports of their observations immediately after each visit.

PROFESSIONAL SOCIETY MEETINGS
During the spring semester, the entire Junior class attends the Offshore Technology Conference (OTC) in Houston, Texas. The entire Senior class attends the Society of Naval Architects and Marine Engineers (SNAME) conference during the fall semester. Students regularly attend local professional society section meetings throughout the year.

PROFESSIONAL SOCIETY INVOLVEMENT

All students become student members of the two premier national professional societies for naval architects and marine engineers—The Society of Naval Architects and Marine Engineers (SNAME)* and The American Society of Naval Engineers (ASNE). A joint SNAME/ASNE student section provides Webb students with easy contact with the New York Metropolitan Section of SNAME and with the twenty-four other student sections in North America.

Webb students are frequent attendees at the monthly technical meetings (and dinners) of the "parent" New York Metropolitan Section of SNAME. All Webb seniors attend the SNAME annual conference and exposition—The SNAME Maritime Convention—wherever it is held—all expenses paid. The junior class attends the Offshore Technology Conference (OTC) annually. Other specialized symposia—like SNAME's Chesapeake Sailing Yacht Symposium and Classic Yacht Symposium are usually well-attended by Webb students.

*Of which William H. Webb was a founder in 1893.

2019-20 ACADEMIC CALENDAR

The calendar of Webb Institute contains two academic semesters, each separated by a short winter vacation in December and a winter work period of eight weeks. Exact dates may vary as much as a week because of calendar variation.

August 13-18	Freshmen Orientation
August 19	Fall Semester Begins
September 2	Labor Day Holiday
September 20-22	Family Weekend
November 25-29	Thanksgiving Recess
December 6	Fall Semester Ends
December 9-13	Final Examinations
January 2-February 28	Winter Work Term
March 2	Spring Semester Begins
April 20-24	Spring Recess
May 25	Memorial Day Holiday
June 20	Commencement
June 24	Spring Semester Ends

GRADUATION AWARDS

The Chaffee Memorial Prize was established by the alumni to honor the memory of the late Professor J. Irvin Chaffee, for many years Dean and Resident Manager. It is awarded to a member of the Senior Class recommended by the Faculty and chosen by the Webb Alumni Association from three candidates selected by the student body who has, during the four years of the course, made the best all-around record, including studies, conduct, athletics, and undergraduate activities generally. This prize was first awarded in 1921.

The American Bureau of Shipping Prize is annually awarded to the member of the graduating class who has obtained the highest general average for the Junior and Senior years. This prize was first awarded in 1925.

The Stevenson Taylor Memorial Prize was established in honor of the late Mr. Stevenson Taylor, an eminent marine engineer and an original trustee of the Institute, who later served many years as President of the Board of Trustees. It is awarded by the American Bureau of Shipping, when merited in the opinion of the faculty, to the member of the graduating class who submits the best thesis in any field. The prize was first awarded in 1928.

The Lewis Nixon Memorial Prize for Naval Architecture was established in honor of the late Mr. Lewis Nixon, formerly a member of the Corps of Naval Constructors, United States Navy, and later a prominent naval architect and shipbuilder, who was elected a member of the Board of Trustees in 1896 and served as its President from 1931 to 1940. This prize is awarded, when merited in the opinion of the faculty, to the member of the graduating class submitting the best thesis in the field of naval architecture. The Lewis Nixon Prize (now Lewis Nixon Memorial Prize) was first awarded in 1932.

The Samuel D. McComb Memorial Prize was established in honor of the late Samuel D. McComb, graduate of theWebb Institute Class of 1901, who was elected a member of the Board of Trustees in 1925 in which capacity he acted as Vice-President and Chairman of the Education Committee for many years. It is awarded to the member of each graduating class who has attained the second highest general average during the junior and senior years. The prize was first awarded in 1946.

The J. Lewis Luckenbach Memorial Prize was established to honor the memory of the late Mr. J. Lewis Luckenbach, for many years a Trustee and President of the Board of Trustees for four years. It is awarded annually to that member of the graduating class who has obtained the highest general average for the course. This prize was first awarded in 1951.

GRADUATION AWARDS

The Keeler Memorial Prize was established by friends and former students who honor the memory of the late Dean Benjamin C. Keeler who was Professor of Mathematics for thirty-nine years. It is awarded to the student who has achieved the highest average in mathematics. This prize was first awarded in 1962.

The Curran Memorial Prize was established to honor the late Dean Thomas M. Curran for his forty years of dedicated service to Webb Institute. It is awarded, when merited in the opinion of the faculty, to the member of the senior class whose scholastic performance has improved in an outstanding and consistent manner during four years at Webb. This award was established in 1976.

The Patrick Matrascia "Good Shipmate" Award was established by the college and friends of the Matrascia Family in memory of Patrick, who died in an accident before the start of his senior year. It is awarded to a member of the senior class chosen, by his or her classmates and approved by the President, as the student who best exemplifies the qualities of a "Good Shipmate," one who works unselfishly and in harmony with his or her professional colleagues. The award was first bestowed in 1986.

The Richard A. Partanen Humanities Award was established by the college in memory of Richard, who died in his senior year after a long bout with cancer. It is awarded, when merited in the opinion of the faculty, to a member of the senior class who, having demonstrated better than average competence in both naval architecture and marine engineering, also showed exceptional competence in the humanities. The award was first bestowed in 1987.

The Charles A. Ward, Jr. Memorial Awards are a bequest in the memory of the late Charles A. Ward (Webb Alumnus) to the Institute. They are awarded to the graduate attaining the highest average in the naval architecture courses and the graduate attaining the second highest average in the naval architecture courses. The first awards were presented in 1989.

The Excellence in Engineering Design Prize is for outstanding performance in engineering design, as determined by the faculty involved in the naval architecture and marine engineering design courses. The prize is funded by SeaRiver Maritime. This prize was first awarded in 1999.

Connecticut Maritime Association Scholarship: As a part of its Education Program, the Connecticut Maritime Association offers scholarships to provide financial support to three students who have excelled in maritime studies while allowing CMA members to connect with promising young people about to embark on maritime careers. CMA has asked Webb Institute to join its program by granting annual scholarships of $1,000 to each of two students selected by the faculty who have demonstrated academic excellence and who have the intent of pursuing a career in the maritime industry. This award was first presented in 2008.

The Paul E. Atkinson Memorial Prize is established in honor of a graduate of Webb Institute, Class of 1942, the late Paul E. Atkinson, who served as a member of the Board of Trustees from 1967 to 1979 and as Vice Chairman of the Board from 1974 to 1979. He was presented with the W. Selkirk Owen Award by the Alumni Association in 1977. As President of Sun Shipbuilding he conceived and oversaw the design and construction of the world's first purpose-built double-hull crude oil carrier. The award is bestowed upon that member of the graduating class who has best exemplified the ethical behavior epitomized by Mr. Atkinson throughout his career. The first award was presented in 2013.

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