

**UNITED STATES  
COAST GUARD ACADEMY  
NEW LONDON, CONNECTICUT**



**CATALOG OF COURSES  
2020-2021**

This catalog contains comprehensive information about the United States Coast Guard Academy, the degrees and programs it offers, and the academic requirements a cadet must satisfy before receiving a degree. The programs, policies, statements and procedures contained in this publication are subject to change or correction by the Academy without prior notice.

The United States Coast Guard Academy reserves the right to withdraw courses; revise the academic calendar; or change curriculum, graduation procedures, requirements and policies that apply to cadets at any time. Changes will become effective whenever the proper authorities so determine.

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**NEW LONDON, CONNECTICUT**



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### **RESERVATION OF RIGHTS**

**T**his Catalog primarily reflects information regarding the Cadet Undergraduate Program for the Class of 2024.

The statements set forth in this catalog are for informational purposes only and may not be construed as the basis of a contract between a cadet and the U.S. Coast Guard Academy. Any conflict between this catalog and the applicable statutes or regulations shall be resolved by reference to language of the statute or regulation only.

The Academy reserves the right to change programs of study, academic requirements, course offerings, regulations, teaching staff, Critical Dates Calendar, and other matters described in the catalog without prior notice, in accordance with established procedures. The U.S. Coast Guard Academy endeavors to maintain the accuracy of all information provided in this catalog. However, it is the responsibility of the cadets to be aware of the current regulations, curriculum, and graduation requirements for their class and chosen major.

### **HUMAN RELATIONS STATEMENT**

The United States Coast Guard Academy is an equal opportunity employer guided by applicable Federal laws and regulations. The Academy is committed to the principles of fair treatment and equal opportunity. We recruit, educate, train and employ personnel based on merit so that each individual can excel and reach his or her maximum potential without regard to gender, race, color, religion, national origin, reprisal, sexual orientation and/or where applicable, age (over 40) and/or physical or mental disability. The Academy is also committed to achieving and maintaining a multicultural environment that values the richness brought by diversity and encourages the full participation of all its members. To this end, we promote diversity and strategies to overcome under-representation, discrimination, and acts of intolerance, thereby creating a positive and productive place in which to learn, work, and live. You, as a cadet and Coast Guard member, are strongly urged to dedicate yourself to these principles of fairness, valuing diversity, and respect to ensure they are fully embraced and carried out in your day-to-day actions.

Furthermore, the Academy leadership fully embraces the Coast Guard's Core Values of Honor, Respect, and Devotion to Duty.

Information about the U.S. Coast Guard's Civil Rights Program can be obtained from the Region 1 Zone 2 Civil Rights Directorate, U.S. Coast Guard Academy, 15 Mohegan Avenue, New London, CT 06320-4195.

## ***SUPERINTENDENT'S MESSAGE***

**A**t the United States Coast Guard Academy our mission is to develop leaders of character. We educate, develop, train, and inspire young women and men to be strong in their resolve to be worthy of the traditions of commissioned officers in the United States Coast Guard. The Coast Guard is a military, maritime, and multi-mission service that has a compelling heritage; our missions are accomplished through the efforts of a diverse and inclusive workforce who protect, defend, save, and shield our nation, its people, and the environment in which we live.

For over 130 years, we have excelled at preparing our Service's leaders for challenging and rewarding careers in America's oldest continuous seagoing service. Our cadets come from across the nation and around the globe to form a diverse and multicultural student body that collectively strives to complete a demanding 200-week program; our graduation requirements focus on development in the intellectual, physical, professional, and ethical domains. Our Core Values of Honor, Respect and Devotion to Duty are the beacons which guide our everyday lives.

Our academic program is among the nation's best. Recently, the U.S. Coast Guard Academy was ranked the #1 Public College in the North by U.S. News and World Report. As a teaching college, our faculty and staff are committed to maximizing engagement with cadets and making themselves available for assistance whenever needed. As a result, nearly 80% of Academy graduates will attend graduate school, fully funded and salaried, at the most prestigious institutions in America.

I expect you to seize the opportunities that await as you begin your own journey of self-discovery here at the Coast Guard Academy. I encourage you to fulfill the promise of that opportunity – making the Coast Guard Academy a place where all can flourish, where all are challenged, and where all contribute to making this the world's greatest Coast Guard. Collectively, we are a supportive learning community that continually strives for excellence through innovation and self-reflection.

As you have already learned, you are now serving something much larger than yourself. I believe you are each worthy of the faith and trust we have placed in you. Pursue innovation, accept responsibility for yourself and others, and strive for excellence in everything you do, and I assure you, our collective efforts will be entirely focused on your success.

Welcome Aboard!

Semper Paratus ... Go Bears!

**Rear Admiral William G. Kelly, USCG**  
Superintendent, U. S. Coast Guard Academy



## *DEAN'S MESSAGE*

**O**n behalf of the Academic Division, welcome to the United States Coast Guard Academy.

The Academy experience is one that is filled with exciting challenges and is focused on the intellectual, physical and professional growth of our future Coast Guard leadership.

The present-day world is a dynamic environment that demands well-developed critical thinking skills, a strong ability to communicate, and a relentless desire to learn. Coast Guard officers possess sharp minds, demonstrate sound and inclusive leadership competencies, and value the importance of teamwork while embodying the Coast Guard Core Values of Honor, Respect, and Devotion to Duty.

The Academy's core curriculum is firmly based in the arts and sciences with a breadth of technical and professional exposure that serves as the nucleus of each academic major. Rigorous in-depth study in a chosen area is a natural follow-on that provides opportunity for collaborative projects and self-managed intellectual work, frequently directed at analyzing and solving real-world problems. Each academic program invites and receives internal and external oversight and assessment that provides valuable feedback for continual improvement within our demanding higher education environment. Our taxpayers and our Service deserve nothing less!

The Faculty at USCGA work very hard in making themselves available to you when you are in need of assistance of any kind. They also collaborate often with other members of your individual leader development team (Academic Advisor, Company Officer/Chief, Coach, etc.) in providing assistance within and beyond the classroom. In short, we are dedicated to the collective success of our entire learning community as we all engage within the Academy's "sea" of professionalism.

This book contains valuable information about academic programs, support services, graduation standards and interesting curricular and extracurricular opportunities. I hope that you find it useful and will refer to it often.

Semper Paratus,

**Kurt J. Colella, Ph.D., P. E.**

Dean of Academics Captain, USCG (retired)



## TABLE OF CONTENTS

Reservation of Rights .....	i
Human Relations Statement.....	i
Superintendent’s Message .....	ii
Dean’s Message .....	iii
Part I – Introduction.....	1
Mission of the United States Coast Guard Academy .....	1
Program Objectives.....	1
Leadership Abilities .....	1
Personal and Professional Qualities .....	1
Ability to Acquire, Integrate and Expand Knowledge .....	1
Communication Effectiveness .....	1
Critical Thinking Ability.....	1
Academy Milestones.....	2
Institutional Accreditation.....	2
Professional Accreditation .....	2
Disclosure of Information .....	2
Critical Dates Calendar .....	3
Part II - Organization and Resources .....	4
Board of Trustees .....	4
Admissions Division .....	5
Requirements .....	5
Application.....	5
Contacting the Admissions Division.....	6
Academic Division .....	7
Engineering Department .....	8
Humanities Department .....	9
Management Department.....	9
Mathematics Department .....	10
Science Department .....	10
Governance.....	12
Dean’s Council.....	12
Faculty Senate.....	12
Credentials Committee.....	12
Curriculum Committee .....	12
4/c Course Coordinators Committee .....	12
Cadet Division.....	13



Athletics Division.....	14
Cadet Support Services .....	15
Academic Support Services .....	15
Center for Counseling & Development (CCD).....	16
The Cadet Command Religious Program.....	16
Coast Guard Academy Regional Clinic .....	16
Library.....	17
Registrar .....	17
Alumni Association.....	17
Part III - Education Programs .....	19
Academics .....	19
Philosophy of Education .....	19
Honor Concept.....	19
Minimum Course Load .....	19
Acceptance Into A Major.....	20
Course Substitutions .....	20
Academic Standing .....	20
Academic Performance Review.....	20
Performance Guidelines.....	20
Registration for Courses.....	21
Classes and Grading.....	22
Academic, Physical, and Military Recognition.....	23
Bachelor of Science .....	24
Degree and Graduation Requirements.....	24
Validations .....	25
Validation Requirements.....	25
Distribution Requirements .....	26
Majors Requirements .....	26
History of the United States Coast Guard .....	26
Summer Academic Term.....	26
Applicability.....	27
Part IV – Programs of Study.....	28
Core Curriculum.....	28
Professional Maritime Studies Program.....	28
Health and Physical Education Program .....	29
Departmental Programs .....	30
Civil Engineering .....	30

Electrical Engineering.....	33
Mechanical Engineering .....	37
Naval Architecture and Marine Engineering.....	40
Government.....	43
Operations Research and Computer Analysis.....	50
Marine and Environmental Sciences.....	53
Cyber Systems .....	58
Management.....	63
Part V - Courses.....	66
Projected Offerings.....	126
Part IV - Directory .....	134

## PART I – INTRODUCTION

The United States Coast Guard Academy at New London, Connecticut, is one of the five United States Federal Service Academies. It is supported by the Federal Government and operated within the authority of the Department of Homeland Security. It is a highly respected institution offering a superb undergraduate education. It is the principal source of graduates with technical degrees for the United States Coast Guard officer corps.

### MISSION OF THE UNITED STATES COAST GUARD ACADEMY

To graduate young men and women with sound bodies, stout hearts, and alert minds with a liking for the sea and its lore, and with that high sense of honor, loyalty and obedience which goes with trained initiative and leadership; well-grounded in seamanship, the sciences and the amenities, and strong in the resolve to be worthy of the traditions of commissioned officers in the United States Coast Guard in the service of their country and humanity.

### PROGRAM OBJECTIVES

The Coast Guard Academy is dedicated to producing officers who meet the needs of the Service. Within this broad perspective lie four primary objectives: (1) to provide, by precept and example, an environment that embraces the Coast Guard Core Values of Honor, Respect, and Devotion to Duty; (2) to provide a sound undergraduate education in a field of interest to the Coast Guard, (3) to provide leadership education, and (4) to provide professional training which enables graduates to immediately assume their duties as junior officers.

To ensure that the Academy produces graduates who demonstrate the required behaviors and leadership competencies, the faculty and staff of the Coast Guard Academy have endorsed the following **Shared Learning Outcomes**:

#### ***LEADERSHIP ABILITIES***

Graduates shall be Leaders of Character who understand and apply sound leadership principles and competencies. This includes the ability to direct, develop, and evaluate diverse groups; to function effectively and ethically as an inclusive leader, follower, facilitator or member of a team; and to conduct constructive assessment of self and others;

#### ***PERSONAL AND PROFESSIONAL QUALITIES***

Graduates shall maintain a professional lifestyle that embraces the Coast Guard Core Values of Honor, Respect and Devotion to Duty, including physical fitness and wellness, and demonstrating the customs, courtesies and social skills befitting members of a maritime military service. Graduates shall also have respect for the Coast Guard's maritime heritage and an understanding of the roles that the Coast Guard and the nation play in the global environment;

#### ***ABILITY TO ACQUIRE, INTEGRATE AND EXPAND KNOWLEDGE***

Graduates shall have developed the motivation and skills for "lifelong learning." Graduates shall be able to create a working conceptual framework that lends itself to continued expansion. To accomplish this, graduates shall be able to efficiently access a broad range of information sources, locate and interpret desired data reliably, employ appropriate technology, and integrate the specific in-depth knowledge required of both an academic major and an entry-level professional assignment;

#### ***COMMUNICATION EFFECTIVENESS***

Graduates shall be able to write clearly, concisely, persuasively, and grammatically; prepare and deliver well-organized and polished oral presentations; read and understand a variety of written materials; listen thoughtfully to oral arguments; respect diverse opinions; and formulate reasoned alternatives and responses;

#### ***CRITICAL THINKING ABILITY***

Graduates shall be able to accomplish complex tasks in a broad range of contexts by applying the basic skills of critical analysis, systems thinking, quantitative reasoning, risk management, creative problem solving, and value-based decision-making.

These outcomes were developed by analyzing the intellectual, physical, and professional job demands of Coast Guard officers and by comparing those to the developmental experiences for which the Coast Guard Academy is responsible. Graduates of the Academy earn commissions as Ensigns in the U.S. Coast Guard, thus beginning their service to the nation and humanity in the nation's oldest continuous seagoing service. The four years that cadets spend at the Coast Guard Academy are the beginning of their professional development as leaders and career Coast Guard Officers.

## ACADEMY MILESTONES

- 1790 Alexander Hamilton developed fiscal plans and economic policies for the United States. On August 4, 1790, Congress passed the Tariff Act, creating a United States Revenue Cutter Service.
- 1876 Legislation was passed granting permission to establish a cadet-training program within the U.S. Revenue Cutter Service.
- 1876 The first home for the “Academy” was established on the Revenue Cutter DOBBIN. Nine cadets were selected by competitive examination.
- 1902 “Scientiae Cedit Mare” was adopted as the Academy motto.
- 1915 The Life Saving Service joined the Revenue Cutter Service to form the “U.S. Coast Guard.”
- 1932 The Academy moved from Fort Trumbull to its present location.
- 1939 The Academy was accredited by the Engineers’ Council for Professional Development (ECPD) under “General Engineering.”
- 1940 The Academy was accredited by the Association of American Universities.
- 1941 The Academy was given authority to grant Bachelor of Science degrees.
- 1946 The Barque EAGLE, a prize of war, was commissioned into the U.S. Coast Guard.
- 1953 The Academy was accredited by the New England Association of Schools and Colleges (NEASC).
- 1966 First African American and Native American Academy graduates.
- 1973 Electrical, Marine, and Ocean Engineering programs were accredited by ECPD.
- 1976 Women were first admitted to the Academy.
- 1978 The Civil Engineering program was accredited by ECPD.
- 1980 Engineers’ Council for Professional Development (ECPD) renamed the Accreditation Board for Engineering and Technology (ABET).
- 1996 The Mechanical Engineering program was accredited by ABET.
- 2005 The Academy and its Management degree program received initial accreditation by AACSB International - the Association to Advance Collegiate Schools of Business.
- 2018 NEASC becomes the New England Commission of Higher Education (NECHE).

## INSTITUTIONAL ACCREDITATION

The U.S. Coast Guard Academy is accredited by the New England Commission of Higher Education.

Inquiries regarding the status of the U.S. Coast Guard Academy’s accreditation by the New England Commission of Higher Education should be directed to Academy administrative staff. Individuals may also contact the Commission: New England Commission of Higher Education, 3 Burlington Woods Drive, Suite 100, Bedford, MA 01803-4514.

## PROFESSIONAL ACCREDITATION

The Naval Architecture and Marine Engineering, Civil Engineering, Electrical Engineering, and Mechanical Engineering majors are accredited by the Engineering Accreditation Commission of ABET, Inc., 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 – telephone: (410) 347-7700.

The Academy and its Management degree program are accredited by AACSB International - the Association to Advance Collegiate Schools of Business.

## DISCLOSURE OF INFORMATION

The Privacy Act of 1974 provides to individuals certain safeguards against an invasion of personal privacy. Specific items of information requested by a person about another person are prohibited from disclosure. Cadets and other government employees shall not disclose the home address, home telephone number, number of dependents, withholdings, allotments, and social security number of cadets or Coast Guard employees. However, the name, rank or rate, date of rank, salary, duty status, past, present and future duty station, duty station address, office telephone, source of commission, military and civilian education level and promotion sequence number may be revealed to anyone who submits a Freedom of Information Request.

## CRITICAL DATES CALENDAR

<i>Event</i>	<i>2020-2021</i>	<i>2021-2022</i>	<i>2022-2023</i>
Intercessional Period Begins	8-Jun	7-Jun	13-Jun
4th Class Swearing-In Day	8-Jul	28-Jun	27-Jun
Intercessional Period Ends	7-Aug	6-Aug	5-Aug
Summer Training Program Ends	15-Aug	14-Aug	13-Aug
Cadet Admin Processing	TBD	16-20 Aug	15-19 Aug
Convocation	20-Aug	19-Aug	18-Aug
Class Start-Fall Semester	24-Aug	23-Aug	22-Aug
Labor Day	7-Sep	6-Sep	5-Sep
Parents' Weekend	25-Oct (Virtual)	17-19 Sep	23-25 Sep
Homecoming	Deferred to 2-Oct & 9-Oct	1-3 Oct	21-23 Oct
Columbus Day	12-Oct	11-Oct	10-Oct
Ethics Forum	Deferred (TBD)	29-Oct	28-Oct
Veterans' Day	11-Nov	11-Nov	11-Nov
Thanksgiving Leave	25-29 Nov	24-28 Nov	23-27 Nov
Last Class Day-Fall Semester	11-Dec	8-Dec	7-Dec
Study & Conf Day-Fall Semester	Canceled	9-Dec	8-Dec
Exam Period-Fall Semester	Canceled	10-16 Dec	9-15 Dec
Winter Leave	12 Dec-3 Jan	17 Dec-2 Jan	16 Dec -3 Jan
Final Grades Due-Fall Semester	16-Dec	21-Dec	20-Dec
Mid-Year Admin Processing	4-6 Jan	3-7 Jan	4-6 Jan
Class Start-Spring Semester	7-Jan	10-Jan	9-Jan
Martin L. King, Jr. Day	18-Jan	17-Jan	16-Jan
Presidents' Day	15-Feb	21-Feb	20-Feb
Spring Leave	Canceled	5-13 Mar	4-12 Mar
Spring Academic Break	8-12 Mar	N/A	N/A
Last Class Day-Spring Semester	28-Apr	27-Apr	26-Apr
Undrgrd Resrch Symp Day	29-Apr	28-Apr	27-Apr
Study & Conf Day-Spring Semester	30-Apr	29-Apr	28-Apr
Exam Period-Spring Semester	1-7 May	30 Apr-6 May	29 Apr-5 May
Summer Training Program Begins	8-May	7-May	6-May
Final Grades Due-Spring Semester	11-May	10-May	9-May
Graduation	19-May	18-May	17-May
Summer Term	14 Jun-23 Jul	13 Jun-22 Jul	12 Jun-21 Jul

The above dates are for planning purposes only and are subject to change.

## PART II - ORGANIZATION AND RESOURCES



*Hamilton Hall*

Academy personnel and facilities are organized into the rigorous and supportive learning environment needed by cadets for their intellectual, professional, physical, and values-based development. The Academic Division, Cadet Division, and Athletics Division develop and provide the core programs that define those functions and activities needed to execute the Academy's mission and achieve the institution's strategic goals. Coast Guard Headquarters, the Board of Trustees, the Superintendent's Office, and the Divisions of Admissions, Mission Support (Comptroller, Information Services, Facilities Engineering), and Health Services all collaborate to provide critical direction and support for cadet programs. These organizations and their resources form an Academy community that is dedicated to providing a rich and rewarding learning experience for future Coast Guard Officers.

### BOARD OF TRUSTEES

The Board of Trustees has cognizance of all programs at the Coast Guard Academy. The Board provides guidance and advice to the Superintendent and the chain of command up to the Commandant in the following areas:

1. Review and validate the Academy's vision, mission statements and strategic plan.
2. Provide general oversight and advice on issues associated with the well-being and safety of the faculty, students, and staff.
3. Review, validate, prioritize, and advocate resource needs.
4. Ensure that good management practices are followed.
5. Ensure proper oversight of and participation in Coast Guard Academy institutional, programmatic, and course-level accreditation evaluations.
6. Ensure that the Academy's academic, professional, and training curricula are consistent with and support the Commandant's Strategic Guidance for the Coast Guard Academy.
7. Provide general oversight and advice on issues associated with strategy and alignment, as well as providing guidance to and acting as a sounding board for the Superintendent.
8. Make appropriate recommendations on accession management issues.
9. Coordinate development efforts with the Coast Guard Foundation, the Alumni Association, and the Board of Visitors.
10. Advocate for the Academy.

## ADMISSIONS DIVISION

The mission of the Admissions Division is to attract and appoint a highly diverse and uniquely prepared selection of prospective cadets who are suited to develop into future leaders of character and commissioned officers of the United States Coast Guard. The division is responsible for recruitment, outreach, orientation, applicant pool generation, applicant pool evaluation and selection for appointment to the U.S. Coast Guard Academy.

### REQUIREMENTS

The U.S. Coast Guard Academy offers appointments on the basis of a nationwide merit-based competition. Those who are accepted are distinguished by proven academic accomplishment, skills as an athlete, a record of community service or part-time employment, motivation to embrace leadership development, and an unwavering desire to serve their country and humanity. Applicants must be U.S. citizens between the ages of 17 and 22 years old upon entering the Academy. They must be unmarried with no dependents or financial debt and possess a high school diploma or GED (or will prior to entry). Most successful candidates graduate in the top 25% of their high school class and demonstrate proficiency in both mathematical and applied science fields. Applicants must complete the SAT or ACT (with Writing Test) exam prior to or during January test administration of the year of entry.

Appointments to the U.S. Coast Guard Academy are tendered on a selective basis. Congressional nominations are not required. The only special category is International Cadets. By statutory limitations, the Academy may have a maximum of 36 International Cadets enrolled at any one time and candidates seeking admission as an International Cadet must apply through the Defense Attaché Office of their U.S. Embassy.

### APPLICATION

Application to the Academy is free, online, and secure. Applicants can access the online application directly from the Academy's website: <http://www.uscga.edu/apply>. Applicants must submit the online application and essays, official SAT or ACT (with Writing Test) exam scores, an official high school transcript, online letters of recommendation from a guidance counselor, English instructor and mathematics instructor, and complete a physical fitness examination (PFE). Applicants must also complete a medical exam with the Department of Defense Medical Examination Review Board (DoDMERB) to be tendered a full appointment. Conditional appointments will be tendered to qualified applicants who have not completed their medical examination. The online application is available each year in mid to late summer with specific deadlines published on the official [www.uscga.edu](http://www.uscga.edu) website.

The application to the Academy consists of two distinct parts. The completed application allows Admissions personnel to select students who are best suited for appointment to the Coast Guard Academy.

#### *Application Part One*

Required?	Yes
Deadline(s)?	15 October (Early Action) or 15 January (Regular Admissions) (year of entry)
Contents?	Online Application and Essays, High School Transcript, Standardized Test Scores (SAT or ACT with Writing Test), Instructor Letters of Recommendation, Physical Fitness Examination, College Transcript for post-high school applicants, and Commanding Officer Recommendation for active duty and reserve applicants

Contact information for the individuals providing this information is provided by the applicant in Part One. These individuals receive instructions via e-mail for submitting the requested information to the Admissions Office either online or through other means. SAT or ACT (with Writing Test) scores must be submitted by the applicant's high school or received directly from the College Board or ACT.

#### *Application Part Two*

Required?	Yes
Deadline?	1 June (year of entry) - Applicants must be found medically qualified for admission
Contents?	Information on scheduling a medical examination is mailed to competitive applicants

## **CONTACTING THE ADMISSIONS DIVISION**

To contact the Admissions Division please use the information below or refer to listings on the website.

U.S. Mail:      Director of Admissions  
                    U.S. Coast Guard Academy  
                    31 Mohegan Avenue  
                    New London, CT 06320-8103

Telephone:     1-800-883-USCG  
                    1-860-444-8503

Web:            <http://www.uscga.edu>  
                    <http://www.uscga.edu/admissions>



## ACADEMIC DIVISION

The Academic Division, headed by the Dean of Academics, consists of the Library, Registrar's Office, Academic Support Services, and the following academic departments of instruction: Engineering, Humanities, Management, Mathematics, and Science. The Division offers nine academic majors – Civil Engineering, Cyber Systems, Electrical Engineering, Government, Management, Marine and Environmental Sciences, Mechanical Engineering, Naval Architecture and Marine Engineering, and Operations Research and Computer Analysis. Offices and academic departments are staffed through the appointment of permanent and time-limited civilian, permanent military, and rotating military faculty.

The Academic Division is responsible for providing a four-year academic program that leads to a Bachelor of Science degree and a commission as an Ensign in the United States Coast Guard. The curriculum is constantly reviewed to ensure that it meets the needs of the Service; therefore, the pattern and content of the courses described in this catalog may be revised at any time without prior notice.

The mission of the Academic Division is to develop the intellectual abilities and nurture the attitudes and aptitudes that will produce officers who are intellectually curious and have a life-long desire for continuous self-improvement, with a commitment to service and ethical practice. The Division accomplishes this in several ways. It affords challenging classroom and laboratory experiences that promote intellectual growth. It offers a curriculum that fosters the achievement of Coast Guard Academy Shared Learning Outcomes by providing a strong background in science and technology, a sound foundation in the liberal arts, and an in-depth concentration in a major field of study of value to the Coast Guard. It presents a curriculum that positions our students for acceptance into the finest graduate schools, and it provides intellectual resources through partnerships responsive to the Commandant's direction.

## ENGINEERING DEPARTMENT



*McAllister Hall*

The Department of Engineering provides a nationally recognized high-quality engineering education. While designated a department within the Academy organizational structure, it would function as a school of engineering in the civilian education community.

Within the Department, there are four engineering programs or majors, all accredited by the Engineering Accreditation Commission of ABET (<http://www.abet.org>). These four programs are Civil Engineering, Electrical Engineering, Mechanical Engineering, and Naval Architecture and Marine Engineering. Each of these majors is administered by a section that would function as a department of engineering in a civilian institution.

The Cyber Systems major is a new academic program within the Department of Engineering that will have its first graduates with the Class of 2022. This program will seek accreditation from ABET and will meet the curricular requirements for designation by the National Security Agency and Homeland Security as a Center of Academic Excellence in Cyber Defense Education.

Graduates of the Department of Engineering majors have an outstanding record of accomplishment in graduate school. Approximately half of the engineering graduates are selected for graduate programs fully funded by the Coast Guard. Successful candidates are assigned to various universities and their only duty is to attend school. Others take advantage of tuition assistance and attend graduate programs in off-duty hours while in a professional Coast Guard assignment. Other graduates, who leave the active Coast Guard following completion of their five-year obligation, often go on to respected graduate programs nationwide. All told, over 80% of engineering graduates of the Academy go on to obtain graduate degrees.

### **The mission of the Department of Engineering is:**

The CGA Engineering Department is a "best-in-class" institution for developing culturally and ethically competent engineers and cyber systems majors who as leaders excel academically, succeed professionally, and positively respond to the needs of multidisciplinary communities within New London, the Coast Guard, and the Department of Homeland Security.

### **Student outcomes of the four engineering programs within the Department of Engineering include producing graduates who have:**

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of 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

Once commissioned in the Service, Department of Engineering graduates go on to assignments in every area of the Coast Guard. Engineers are preferred for filling approximately one third of the jobs in the Coast Guard. There are many positions

assigned exclusively to engineers. However, this does not mean that engineering graduates are limited to technical assignments. While engineering careers are the most often selected, many alumni pursue careers in other fields. Notable non-engineering assignments that have been held by Academy engineering graduates include Commandant of the Coast Guard, Superintendent of the Coast Guard Academy, Aide to the President of the U.S., Aide to the Secretary of Transportation, NASA astronauts, and many others. In fact, engineering graduates are eligible for every assignment in the Service. Cyber Systems graduates will join their engineering counterparts in serving as exemplary commissioned officers throughout the Coast Guard including within the growing Cyber officer specialty in order to meet the Cyber needs of the Service in support of the Coast Guard's Cyber Strategy.

## HUMANITIES DEPARTMENT



*Satterlee Hall*

The Department of Humanities provides the essential liberal arts foundation of the academic curriculum at the Coast Guard Academy. The core courses offered in the Department enrich the writing, critical thinking, and public speaking skills of all cadets while imbuing them with an appreciation for national and global challenges to governance and an understanding of their unique roles as citizen/officers. The Department sponsors a number of learning opportunities for cadets outside the classroom, including the 1/c Summer Intern Program for first class cadets; the Model UN team, which competes internationally; the International Law of Armed Conflict Competition in San Remo, Italy; *id est*, the cadet literary magazine; and the Society for Policy and International Affairs, which sponsors cadet travel to Coast Guard Headquarters and other government agencies.

The Department offers a single major in Government. The Government major provides cadets a broad understanding of governmental systems and their cultural, historical, theoretical, and jurisprudential underpinnings. A required concentration in either Politics, Policy, and Law; Security Studies; or International Relations enables future leaders to develop in depth understanding of how cultures, theories, institutions, and political processes influence the evolution of domestic, international, and global peoples, systems, and institutions. A required cognate concentration in the Humanities expands cadets' understanding of the human condition and human societies. The Department is a member of the American Political Science Association and sponsors cadet membership in Pi Sigma Alpha, the National Political Science Honor Society.

The Government major prepares graduates to serve in almost any career path in the Coast Guard. Government majors are to be found commanding cutters or shore stations, heading policy offices, negotiating treaties on behalf of the U.S. government, leading regulatory projects, and flying aircraft, reflecting the maxim that a liberal undergraduate education recognizes no limits. The Government major provides graduates with an excellent background for postgraduate study in a variety of disciplines.

## MANAGEMENT DEPARTMENT

The Department of Management, which functions much like a typical business school at civilian institutions of higher education, is internationally recognized for providing high-quality business education. It is one of the smallest business program that is accredited by AACSB International, the premier accrediting body for collegiate schools of business and accounting.

The mission of the Department of Management is to prepare future commissioned officers of the U.S. Coast Guard to be competent and ethical management professionals. The broad program of study is guided by the emerging needs of the Coast Guard through its Management Advisory Council comprised of the Coast Guard's Chief Financial Officer, Chief Information Officer, Chief Human Capital Officer, and other senior managers from the Department of Homeland Security, Coast Guard Headquarters, and higher education. The Management Department further enables Coast Guard management effectiveness through faculty scholarship and consulting.

The Management major is one of the largest at the Academy. Students enrolled in the Management major study a wide range of business disciplines including accounting, finance, economics, management, behavioral/organizational science and leadership, marketing, strategy, human resource management, management of information systems, quantitative methods, operations management, and decision sciences. In addition to learning business competencies, graduates must demonstrate proficiency in leadership, communication skills (verbal and written), and integration/critical thinking.

The average size of a Management class is under 18 students; this ensures lively discussion and a tailored learning process that is interactive and highly collaborative. All classes in the Management program of study are taught by qualified faculty

members under rigorous AACSB standards. The faculty also serves as high-touch career advisers to their students whom they get to know both in and out of the classroom. Graduates of the program earn a Bachelor of Science degree in Management.

After graduation Management alumni can serve as line officers in any operational mission specialty –on ships, in planes, and at shore units. After establishing an operational specialty, Management alumni find themselves particularly well-suited to be stewards and managers of the U.S. Coast Guard’s financial, human, and information resources. The Coast Guard is a global organization with a \$10 billion per year budget, a total workforce of over 85,000 people, and extensive interdependent information systems that are changing at the pace of technology. Many Management alumni are selected by the Coast Guard to attend graduate school full-time and fully funded. They have attended some of the most prestigious MBA, accounting, and information systems management programs in the country. Management alumni have an outstanding record of academic achievement at graduate school, and an exemplary record of performance as senior resource managers.

## **MATHEMATICS DEPARTMENT**

The Department of Mathematics is staffed by civilian and military faculty. The dedication and diverse mix of experiences of the faculty add a unique depth and flavor to a cadet’s academic and military experiences at the Coast Guard Academy. The focus is on support of the Academy’s Shared Learning Outcomes, the Operations Research and Computer Analysis (ORCA) major, and the broad technical core curriculum.

The Operations Research and Computer Analysis major provides graduates a background in mathematics, probability, statistics, deterministic and non-deterministic modeling and computer programming and analysis. The primary focus is to enable cadets to conceptualize and describe reality using the tools of mathematics and statistics, analyze possible models and solutions, use appropriate computer technology, apply these skills to specific Coast Guard problems, and effectively communicate solutions. The study of Operations Research and Computer Analysis highlights for cadets the means by which mathematics and computers can be used to analyze complex problems and improve decision-making. Department of Mathematics core and service courses include Foundation for Calculus, Calculus I, Calculus II, Probability and Statistics, Multivariable Calculus, Differential Equations, and Advanced Engineering Mathematics. Major courses, some of which are also incorporated into the curriculum of other majors, include Probability Theory, Mathematical Statistics, Linear Regression, Computer Modeling Languages, Information Systems, Algorithms with Applications, Discrete Mathematics, Linear Algebra, Decision Models, Linear Optimization, Network and Nonlinear Optimization, Intermediate Deterministic Models, Probability Models, Simulation with Risk Analysis, and the cadet capstone courses Operations Analysis Prep and Operations Analysis.

## **SCIENCE DEPARTMENT**



*Smith Hall*

The Science Department consists of three sections: Chemistry, Marine Science, and Physics. It is responsible for the chemistry, physics and oceanography core courses as well as a large array of upper level courses. Faculty and cadets are involved in a wide range of projects that deal with interesting and important environmental issues. These include coastal food chains using isotope measurements, issues related to fisheries management, estuarine dynamics, and application of geospatial technologies to increasing the Coast Guard’s Maritime Domain Awareness. Other activities involve a host of projects relating to environmental forensics, including the detection and identification of petroleum compounds in sea water samples, materials from suspected arson sites, and geochemical samples.

The Science Department offers a major in Marine and Environmental Sciences which provides a multi-disciplinary and technical education in marine and environmental sciences and is closely aligned with Coast Guard missions, including Homeland Security, Prevention and Response (e.g., marine environmental protection, oil and hazardous materials spill cleanup), Port Security, Fisheries Law Enforcement and Management, Search and Rescue, Ice Operations, and Aviation. The

curriculum stresses understanding of the complex interactions between humans and their environment, especially the oceans, and the interplay between the scientific, regulatory and social aspects of marine resource management. Students may concentrate their course work in the biological, chemical, or physical aspects of the marine environment.

Resources used by students in the Marine and Environmental Sciences program include a 30-foot research vessel, chemistry and biology labs equipped with state-of-the art analytical instrumentation, remote sensing facilities including a satellite ground station, and a computer laboratory. In addition to coursework, there are opportunities for independent research and summer internships, which allow students to be involved directly with Coast Guard operations or make extended visits to research labs where work related to the major is carried out. Extensive use is made of the nearby Thames River estuary for field studies and experiments.

The department maintains an astronomical observatory in nearby Stonington. Although it is not a required part of the major, many students in this and other majors take the astronomy course as an elective.

## **GOVERNANCE**

### ***DEAN’S COUNCIL***

The Dean’s Council, consisting of Department Heads of all programs that offer courses for credit, support areas (Associate and Assistant Deans, Registrar, Library), the President of the Faculty Senate, and the President of the Faculty Union, shapes the Academic Division’s strategic thinking and planning, especially in curricular areas. The Council also serves as the faculty’s formal agent for academic program evaluation, review, development and assessment; faculty recruitment and professional development; graduation standards; and the standards and policies for the core, admission into the major, grading, academic honors, probation and suspension. The Council may address extraordinary academic problems and circumstances of individual students.

### ***FACULTY SENATE***

The Faculty Senate represents the Coast Guard Academy military and civilian faculty and aspires to inform the Superintendent of faculty opinion on matters of mutual concern. The Faculty Senate addresses matters relating to the common curriculum, academic standards, faculty professional development, criteria and methodologies for evaluating teaching effectiveness, grading policies, academic advising, program evaluation, instructional technology, innovative teaching methods, and other issues for which the faculty are a primary source of professional expertise. The administration attempts to keep the Faculty Senate informed of pending academic issues so that the Faculty Senate may serve as a conduit for this information between and among the faculty and the Academy administration.

### ***CREDENTIALS COMMITTEE***

The Credentials Committee is a source of peer review and evaluation of academic faculty qualifications and scholarly accomplishments. The purpose of the Committee is to ensure that equitable standards are applied to all faculty members and that proper recognition is accorded to faculty scholarship. The committee consists of the most senior faculty and serves in an advisory capacity to the Dean of Academics.

### ***CURRICULUM COMMITTEE***

The Curriculum Committee’s primary responsibility is to provide guidance on curricular issues to the Dean of Academics and the Dean’s Council. The Committee reviews and comments on proposed changes to courses and also discusses and promotes the curricular philosophy and structure of the Coast Guard Academy.

### ***4/C COURSE COORDINATORS COMMITTEE***

The 4/c Course Coordinators Committee is primarily concerned with the academic success of fourth-class cadets during their first year at the Academy. The committee coordinates the common 4/c exam period and other exams and major assignments, oversees the 4/c Early Alert System, and serves as both a resource and clearinghouse for coordination across all aspects of 4/c cadet life.



## CADET DIVISION



*Chase Hall*

The Cadet Division is responsible for directing, supporting, and managing the military and professional programs for the Corps of Cadets. The Cadet Division develops ethical leaders and lifelong learners while producing professional career military officers for the U.S. Coast Guard. Fundamental to their development, and ingrained in all Cadet Division activities, are the Coast Guard Core Values of Honor, Respect, and Devotion to Duty.

The Cadet Division is organized into four branches. The Commandant of Cadets is an active duty Coast Guard Captain (O-6) who fulfills the duties of the Cadet Division Chief, somewhat equivalent to a “Dean of Students.” The Commandant directly oversees a full-time staff of approximately 100 people. The Commandant of Cadets is located in Chase Hall: the four annex, 450 room building that serves as the home for the Corps of Cadets.

**The Cadet Branch**, also located in Chase Hall, is responsible for the day to day administration of the corps including discipline and the general health and well-being of the Corps of Cadets. Administered within the Cadet Branch are the Cadet Regiment, Cadet Company Officers and Chiefs, Cadet Musical and Vocal Activities.

**The Cadet Training Branch** is responsible for the entire spectrum of training delivered to the Corps of Cadets across the 200-week course of instruction. Administered within the Training Branch are: Cadet Training, Career Development, Cadet Administration, and Weapons Training. It also serves as liaison to the fleet and to Coast Guard Cutter EAGLE, the Academy’s sail training vessel.

**The Waterfront, Seamanship and Sailing Branch** is located at the Academy waterfront on the Thames River. It is comprised of the Sail Training Section and the Waterfront Section and is responsible for, or the support of, all Academy conducted sail and seamanship training for the Corps of Cadets, and the coaching/management of the competitive inter-collegiate and offshore sailing program. The branch maintains over 130 boats of eight different classes that are used in the various programs, sports, and courses. It also identifies and prioritizes work projects that affect the piers and buildings along the waterfront.

**The Professional Maritime Studies Branch** is located in Yeaton Hall. A four-year Navigation and Nautical Science curriculum is delivered by the Branch culminating with the issuance of a 100-Ton Merchant Mariner Master’s License at graduation for those cadets that meet all Coast Guard requirements. In addition to providing theory and application in the classroom, the material for these courses are reinforced with experiential learning in shipboard simulators and at the waterfront. The Professional Maritime Studies Branch serves as the program manager for the Ship Control and Navigation Training System (SCANTS), which includes two full mission bridge simulators and a multitude of advanced part-task simulators. The Branch is the CGA liaison to the Office of Cutter Forces (CG-751), Coast Guard Personnel Command (OPM-2), and the Coast Guard National Maritime Center.

## ATHLETICS DIVISION



*Roland Field House, Billard Gym*

Many factors contribute to the development of leaders of character. In addition to the Coast Guard Academy's emphasis on the intellectual and professional development of cadets, there is a high value placed upon each cadet's physical development and wellness. This is accomplished through classes in the Health and Physical Education Department, athletics competition during the daily sports period, and an institutional commitment to physical fitness.

The physical education program emphasizes professional competencies and lifetime fitness and wellness. The intercollegiate sports program is one of the broadest in NCAA Division III athletics, with twelve men's sports, ten women's sports, and three coeducational varsity sports. The intercompany and club sports program is very active and cadet driven. All cadets are required to participate in these activities, which provide multiple opportunities for personal and professional development. Oversight for the Athletic Division is provided by the Director of Athletics.



## CADET SUPPORT SERVICES



*Coast Guard Memorial Chapel and Officers Row*

To foster the welfare and success of cadets, numerous services are provided by way of academic assistance, personal and professional counseling, religious activities, and administrative support.

### ACADEMIC SUPPORT SERVICES

The following programs are provided under Academic Support Services:

***Academic Advising Program*** prepares cadets to make sound decisions and to set their own priorities. Fourth class cadets must initially meet with their academic advisors every two weeks. As cadets progress through their four years at the USCGA, however, they take increasing responsibility for their own academic success. Advisors provide assistance to all cadets and help them develop study skills, set priorities, and obtain information on career opportunities. Additionally, academic advisors approve cadets' course registrations, class schedule changes, and course adds and drops. Even though a faculty member may be assigned to a cadet as an advisor, cadets are free to consult with any faculty member. The faculty and staff are deeply concerned for the welfare and success of each cadet, and they will generously give their time to any cadet.

***Hewitt Writing and Reading Center (HWRC)*** is located on the second deck of the Library in Waesche Hall. Mentors and tutors in the HWRC provide assistance to cadets in all class years and majors. The HWRC is open Sunday through Thursday evenings and during most business hours. Cadets can make an appointment and upload work through an online scheduling program. Faculty and civilians who are professional writers and educators staff the HWRC. Established in 1987, the HWRC operates, in part, from funds provided by the John and Erna Hewitt Endowment.

***Cadet Academic Advisory Board (CAAB)*** provides a direct channel of communication between the Corps of Cadets and the Dean of Academics. The CAAB operates under the auspices of a faculty advisor who is assisted by the Charlie Company Academics Officer - the chair of the CAAB. Depending upon the circumstances, the chair of the CAAB may also be invited to participate in meetings held by the Dean's Council.

***Cadet Academic Assistance Program (CAAP)*** provides discipline-specific, voluntary evening workshops and tutoring to help cadets with course concepts, classroom assignments and test preparation.

***4/c Cadet Academic Support Program (4CASP)*** provides mandatory instruction in selected subject areas to designated 4/c cadets who have been deemed to potentially benefit from directed, hands-on, supplemental academic work.

***Early Warning System*** provides information to faculty and academic advisors concerning the academic performance of fourth class cadets so that intervention strategies can be promptly implemented to help cadets succeed at the Academy.

***Fundamentals of Mathematics and Communication Program (FMCP)*** supports fourth class cadets whose SWAB Summer placement scores indicate they would benefit from assistance in the fundamentals of mathematics, English, and reading. Support includes placement in foundational courses in the fall semester and two classes during the summer before their third class year.

**Fourth Class (4/c) Course Coordinators Committee** addresses topics that support cadets in their adjustment to Academy life, develops the 4/c exam schedule, and aids the Associate Dean for Academic Affairs in executing the early warning system.

**Honors Program** provides opportunities for cadets who wish to enrich their academic experiences. Included in the program are Alpha Lambda Delta, the national honor society for first-year college students; honors classes; and the Honors Colloquium, which prepares cadets to compete for postgraduate fellowships and scholarships such as the Rhodes, Fulbright, and Truman.

**Instructional Support Program**, hosted through the Information Services (mi) Branch, provides a variety of services to help cadets use computers, various software applications, equipment, and information technology more productively. Services include training and access to a multimedia center which allows cadets to create high-quality programs and presentations.

**International Cadet Council (ICC)** engages in activities in support of its cultural, social and educational mission. The most important activities include an annual visit to the United Nations and/or Pentagon, the Royal Military College of Canada, and the U.S. Naval War College. Cadets also participate in the annual United States Naval Academy (USNA) International Ball. Through identification of host families and assessment of cadets' interests and language skills, the coordinator of the ICC facilitates the assimilation of international cadets into the Corps of Cadets and introduces them to many aspects related to day-to-day living in the U.S.

**Peer Tutor Program** is comprised of 3/c through 1/c cadets who have performed well academically and have successfully completed training and certification. A list of peer tutors and the courses they support is posted on the Corps of Cadets Regimental Staff home page and on the peer tutor site located under Academic Resources on the Academic Division section of the portal.

## **CENTER FOR COUNSELING & DEVELOPMENT (CCD)**

Licensed psychologists, who have particular expertise in the college-aged population, staff the Center. They are available to meet with Academy cadets who are experiencing personal, mental health, educational, military, or leadership concerns.

Personal counseling sessions may address a variety of topics including: stress management, interpersonal relationships, depression, anxiety, family problems, eating or body image concerns, sexual assault or other trauma, loneliness, self-esteem, motivation, academic difficulty, and life transitions.

The CCD engages in outreach and training to address the emotional well-being Cadets, enhance their leadership capabilities, and promote the overall mental health of the Cadet population.

Counseling and psychotherapy are confidential and do not become part of a cadet's medical, academic, or military record. The CCD also serves as a confidential resource for cadets who experience sexual assault, whether or not they report it. Our office number is (860) 444-8520, and email is [CGACounselingCenter@uscga.edu](mailto:CGACounselingCenter@uscga.edu).

## **THE CADET COMMAND RELIGIOUS PROGRAM**

The Superintendent is responsible for the physical, moral, and spiritual well-being of all cadets, faculty, and staff. The Superintendent provides for spiritual welfare through the Command Religious Program (CRP), managed by assigned Navy chaplains assigned to CGA.

Chaplains provide a robust ministry to cadets, faculty, staff, and family members. They facilitate the religious needs of all and provide liaison to civilian religious leaders, communities, organizations, and agencies. CGA chaplains care for all regardless of faith background or no faith background and offer complete confidentiality in counseling. Chaplains also advise leadership on issues of ethical and spiritual wellness and morale. Our chaplains provide weekend and weekday religious services during SWAB Summer and during the Academic Year, as well as religious education and sacramental preparation when the Corps of Cadets is aboard.

## **COAST GUARD ACADEMY REGIONAL CLINIC**

The CG Academy Regional Clinic is the 2nd largest clinic in the Coast Guard. The Clinic includes an Outpatient Department, Dental Clinic, Pharmacy, Radiology, Physical Therapy, moderate complexity Lab, Physical Exam Department, Optometry and Psychiatry. The Clinic provides routine care for illness and injury to Academy cadets and active duty, as well as several local CG units in the region. A Duty Crew is available 24 hours a day, to include a medical officer and dental officer on call. The professional staff consists of U.S. Public Health Service officers detailed to the Coast Guard, Coast Guard active duty personnel,

and civilian contractors. The staff includes physicians with board certifications in family medicine, flight medicine, preventive medicine and psychiatry. Also, on staff are board-certified physician assistants, pharmacist, doctoral level physical therapist, optometrist, and registered nurses. The dental clinic staff consists of three dental officers, two dental hygienists, and dental technicians. The Clinic has the capability to perform routine laboratory tests and x-rays within our facility. Prescribed medication is provided at an onsite pharmacy.

For specialty care, cadets are referred to civilian providers, and the Coast Guard pays for all necessary medical and dental care for you through the military health insurance system known as TRICARE. All specialties are represented nearby at Lawrence & Memorial Hospital in New London and Backus Hospital in Norwich. For certain subspecialty treatment other facilities can be utilized, to include University of Connecticut Health, Yale-New Haven Hospital, and Walter Reed National Military Medical Center.

## **LIBRARY**



*Waesche Hall*

The Library, located in Waesche Hall, provides the resources, spaces, and services for academic success and to encourage lifelong learning.

Library staff are available until 2200 five days a week to help with research, finding resources, and much more. Librarians collaborate with faculty to integrate information literacy skills into the curriculum.

Access is provided to over 900,000 books and e-books and 200,000 full text journals; and 69,000 streaming videos. Online resources, including subscriptions to over 250 academic databases, are available anywhere on-campus and off-campus. Items from other libraries can be requested through the interlibrary loan service.

Materials related to the history of the Coast Guard are collected and preserved to support the Academy's educational programs and to provide cadets with a connection to the traditions of their service.

A wide variety of spaces are available in the Library for individual and group learning, including large tables, collaboration workstations, study rooms, small group tables, and individual carrels for quiet study.

## **REGISTRAR**

The Registrar is responsible for the development of the master schedule of courses for each semester, the enrollment of cadets in classes and the generation of all academic reports which relate to cadet academic records. The Registrar is also responsible for the compilation, evaluation, safe retention, and appropriate use of cadet academic records, the preparation and issuance of transcripts, and certification of selected data from the records.

Additional responsibilities of the Registrar publishing a Catalog of Courses and to maintain an electronic version that is accessible via the Internet. It lists courses of study offered for that academic year and each course's description, credit value, format and projected offering. It also includes the appropriate policies, procedures and other information deemed appropriate by the Dean and the Registrar.

## **ALUMNI ASSOCIATION**

The mission of The Alumni Association is to provide services to, and promote fellowship among, the Alumni of the Coast Guard Academy. The Association raises funds to provide "margins of excellence" support to the Corps of Cadets, the Academy, and the Coast Guard in order to preserve the traditions and enhance the reputation of the Coast Guard Academy.

## ***CONTACTING THE ALUMNI ASSOCIATION***

To contact the Alumni Association use the information below or refer to listings on the website.

U.S. Mail: Alumni Association  
U.S. Coast Guard Academy  
47 Mohegan Avenue  
New London, CT 06320

Telephone: 1-(860) 442-2683

Web: [www.cgaalumni.org](http://www.cgaalumni.org)

## **PART III - EDUCATION PROGRAMS**

Academic programs leading to a Bachelor of Science Degree are designed to provide cadets with opportunities to major in one of nine disciplines that combine rigorous academic work and teamwork with leadership experiences that are relevant to a Coast Guard career and possible postgraduate work. The majors supplement a solid core academic program in engineering, science, mathematics, management, and the humanities, combined with unique curricula requirements in health and physical education and nautical science.

### **ACADEMICS**

Cadet academic work is guided by a historically proven philosophy; carefully selected objectives; endorsed Shared Learning Outcomes; and multifaceted academic, training and leadership experiences, leading to an opportunity for a successful career in the Coast Guard.

### **PHILOSOPHY OF EDUCATION**

With a foundation in science, engineering, and math as well as the liberal arts, the Coast Guard Academy provides a challenging outcomes-oriented curriculum focused on active student learning. Our goal is to facilitate the development of highly successful Coast Guard officers and to engender an appreciation and habit for lifelong learning. A focus on teamwork, leadership, commitment to service, and ethical practice informs the development of the Academy's curriculum.

The Coast Guard Academy is committed to the idea of a core curriculum, a common academic experience that provides a broad intellectual perspective. The breadth of a core curriculum encourages awareness of discipline interdependence and the limits of individual specialties. The Coast Guard Academy also believes that majoring in a specific discipline, one that has relevance to current and future Coast Guard missions, is a critical component of the academic program. Specialization encourages intellectual rigor and sophistication.

The framework for the educational program is steeped in leadership and a strong commitment to continuous quality improvement. No single teaching method or forum is given precedence. The educational experience at the Coast Guard Academy focuses on critical inquiry. Academic work is collaborative, a joint effort of faculty and students, experiential, interactive, and exciting.

Although we cannot know the future, we prepare students with a curriculum steeped in global history, as well as the history and tradition of the service. Our challenge is to prepare cadets to take their place in a complex, changing, and shrinking global community in a creative manner that enhances the ability of the Coast Guard to fulfill its obligation to the nation.

### **HONOR CONCEPT**

Cadets are expected to conduct themselves in accordance with an Honor Concept, which requires that "Cadets neither lie, cheat, steal, nor attempt to deceive." Each individual must integrate this concept into her or his way of life so that it becomes the foundation on which to base interactions with all people, both in the Coast Guard and in society as a whole.

The Honor Concept establishes an atmosphere of mutual trust and integrity within both the Corps of Cadets and the Coast Guard Officer Corps. It is essential that authentic relationships among Coast Guard personnel are established at the earliest point in time, and for this reason, the Corps of Cadets must be guided by the Concept:

#### **"CADETS REVERE HONOR"**

The Honor Concept is so fundamental to the qualifications of an individual aspiring to be an officer in the Coast Guard that a failure to adhere to its tenets is considered to be a major deficiency in a person's suitability for commissioning. For this reason, breaches of the Honor Concept are considered to be serious offenses that potentially results in disenrollment from the Academy.

### **MINIMUM COURSE LOAD**

All cadets are required to register for a minimum of fifteen credits (not including any HPE requirements) during each fall and spring semester. Cadets who are offered extended opportunity may register for a reduced course load (less than fifteen semester hours) as directed by the Dean of Academics.

## ACCEPTANCE INTO A MAJOR

Successfully completing a major is a graduation requirement at the Academy.

**Fourth Class Cadets** are assigned an academic advisor based on their intended major; whose role is to assist them in becoming successful cadets. The earliest a Fourth Class Cadet can voluntarily change intended major is mid-term of the Spring semester which may impact summer school courses and/or will adjust their fall schedule. The process is disseminated through Lead Advisors in each major.

**Third Class Cadets** must apply for and be formally accepted into a major before the start of their 2/c academic year. The criterion for acceptance into any of the majors is specified in this catalog and can include the attainment of a 2.00 average in the set of courses identified as prerequisites for each major and minimum acceptable grades in certain courses or satisfactory completion of qualifying projects or examinations. Cadets who fail to gain departmental acceptance into their chosen academic major may be granted provisional acceptance by the Dean or Department Head, with a specific plan for meeting the academic requirements of the major. A cadet who ultimately fails to gain acceptance to any academic major will be disenrolled.

## COURSE SUBSTITUTIONS

Department Heads, in consultation with their faculty, may accept substitutions for required courses for acceptance into their major, if, in their judgment, the alternatives provide evidence of ability to succeed in the major. When a cadet is accepted into a major without having satisfied the prerequisites or their authorized substitutions, the Department Head shall notify the Dean and Registrar in writing of the conditions waived and the rationale for the acceptance.

Course substitutions for major-specific course requirements may be made only when authorized for a specific major or when specifically approved by the Department Head. One course may not be used to satisfy two separate course requirements.

## ACADEMIC STANDING

Cadets are expected to make normal progress toward meeting the requirements for graduation in four years. The performance guidelines described below are designed to identify cadets who are not making the required minimal progress and to help them in obtaining the prompt assistance of their academic advisors and other members of the faculty and staff.

## ACADEMIC PERFORMANCE REVIEW

As part of the normal advising process, the academic record of every cadet is reviewed by his or her academic advisor at the end of each semester to assess performance and identify potential problems. At the end of each semester, the Director of Academic Advising applies certain criteria to cadet academic records and refers cadets who are having difficulty to the Academic Review Board (ARB). Academic Department Heads also review the files and make further recommendations when deemed appropriate. The Dean of Academics chairs the ARB which also consists of the Associate Dean for Academic Affairs and representatives from the Registrar's Office, the Office of Inclusion and Diversity, Admissions, Athletics, and the Commandant of Cadets. If the Dean believes that a cadet is in a position from which recovery is not possible, they will be referred to the Superintendent with a recommendation for disenrollment or extension. If a cadet is disenrolled and wishes to appeal the Superintendent's decision, the cadet must prepare and submit, via the chain of command, a formal request in accordance with the Regulations for the Corps of Cadets.

## PERFORMANCE GUIDELINES

1. Cadets are normally placed on Academic Intervention status if they meet any of the following criteria:
  - a. Midterm Grade Point Average (MTGPA) of 1.5 or lower
  - b. A significant event or events which leads to a reduction in course load for the semester
  - c. Cadets may also be placed on Academic Intervention status for other reasons by the Dean of Academics or the Associate Dean for Academic Affairs in consultation a cadet's Academic Advisor, GOLD team, and/or (intended) major Department Head.
2. Cadets are normally placed on academic probation at the end of a semester if they meet any of the following criteria:
  - a. Term Grade Point Average (TGPA) of less than 2.00
  - b. Cumulative Grade Point Average (CGPA) of less than 2.00
  - c. Grade Point average in required upper division courses in the major of less than 2.00
  - d. Two Fs in one semester or a total of 3 Fs accumulated overall
3. Cadets may also be placed on academic probation by the Dean of Academics in consultation with the Academic Review Board, the Associate Dean of Academic Affairs, Academic Advisors and Department Heads for other reasons.
4. Any 4/c cadet who receives three Fs in the fall semester will be referred to the Superintendent with a recommendation



for disenrollment.

5. Any cadet who accumulates a total of four or more Fs will be referred to the Superintendent with a recommendation for disenrollment.

**Good Standing:** A cadet whose academic performance indicates that they will fulfill all of the graduation requirements on schedule is said to be in “Good Standing.” This is ascertained at the end of each semester through the aforementioned Academic Performance Review process that involves the Dean of Academics, Academic Review Board, or GOLD Advisory team (the Guide for Officer Leadership Development-GOLD Team, consists of the cadet’s Academic Advisor, Company Officer/Chief, and Coach or physical education representative). A cadet found to not be in Good Standing is subject to probation (see below) or restrictions of eligibility for all extracurricular activities (e.g. sports, clubs, vocal and musical activities, band, etc.). These restrictions are subject to the approval of the Dean of Academics in coordination with the Director of Athletics (any sport activity restrictions), or the Commandant of Cadets (any vocal, music, band or club restrictions).

**Academic Intervention:** A cadet who is placed in Academic Intervention status will undergo heightened monitoring to ensure progress in the Academic Program. Assignment to Academic Intervention status is not designed to be punitive, but rather recognizes that an individual’s intellectual, emotional, and physical condition is affected by many factors, and may at times require coordinated support to ensure success in Academics. Normal requirements following assignment to Academic Intervention include a GOLD Team meeting and the completion of the Academic Intervention GOLD Team report, although additional requirements may be imposed by the Dean of Academics, Associate Dean for Academic Affairs, Academic Department Heads and/or GOLD Team. Cadets are automatically removed from Academic Intervention Status at the end of the semester.

**Academic Probation:** A cadet who is placed on Academic Probation is subject to restrictions imposed by the Dean of Academics, the Commandant of Cadets and the Director of Athletics. These will include, but are not necessarily limited to, a schedule of mandatory consultations with the academic advisor, and completion of the Academic Intervention Action Plan at the beginning of each semester. Each individual case will be reviewed to determine if restrictions should be placed on participation in sports or extracurricular activities. Academic Probationary status normally continues until graduation. However, a cadet on Academic Probation who earns a TGPA of 2.50 or greater for one semester or a 2.00 or greater for two successive semesters (not including the Summer Term) may petition the Associate Dean of Academic Affairs to be removed from academic probationary status provided they no longer meet the academic criteria for academic probation as outlined above. Additional details on procedures for petitioning for removal from Academic Probation are found in the Regulations for the Corps of Cadets.

**Extended Opportunity:** When exceptional circumstances exist, the Superintendent may elect to offer a cadet an opportunity to extend beyond the customary four-year course of study in lieu of disenrollment. Such cadets are normally registered for reduced course loads as directed by the Dean of Academics. Cadets on extended opportunity are automatically placed on Academic Probation and are reviewed by the ARB each semester that they remain at the Academy.

**Disenrollment:** A cadet who is disenrolled from the Academy is separated permanently unless they subsequently apply and are accepted for readmission. In the case of readmission with or without advanced standing, all courses taken previously are included in computations of the cumulative grade point average and “upper division” grade point average. For the purpose of determining eligibility for Academic Probation or disenrollment, however, any Fs received prior to the readmission are excluded. If a cadet is disenrolled and wishes to appeal the Superintendent’s decision, the cadet must prepare and submit, via the chain of command, a formal request in accordance with the Regulations for the Corps of Cadets.

## REGISTRATION FOR COURSES

Course offerings and specific instructions are distributed in advance by the Registrar’s office. During the spring semester cadets select the courses they wish to complete during the next academic year. Cadets, working with their academic advisor, may modify their schedule during a designated Add/Drop period.

The Registrar will administer registration of 4/c cadets for fall and spring semester courses. Individual course assignments are made based on the following: intended major, placement testing completed during the summer, and departmental course validations approved by the corresponding Department Head.

**Honors Courses:** Cadets desiring to take an honors-level course should contact the respective Department Head for further information.

**Directed Studies Courses:** Cadets desiring to pursue study in an area beyond available courses may select a departmental Directed Studies course. These may be substituted for any major requirement with the approval of the applicable Department Head. The Registrar must be informed in writing of all authorized substitutions.

**Service Academy Exchange Program (SAEP):** The Coast Guard Academy has a semester-long exchange program with the U.S. Air Force Academy at Colorado Springs, the U.S. Military Academy at West Point, and the U.S. Naval Academy at Annapolis. Cadets selected for this program attend the participating academy during the fall of their 2/c year. Academic grades received at other service academies transfer to USCGA and are included in the cumulative GPA. Cadets on exchange with other service academies may use a course taken during their exchange semester to meet a CGA course requirement provided it is of similar content/credit they have not previously taken the course at USCGA and it is approved by the applicable CGA Department Head. Cadets may take HPE courses while on exchange however HPE courses taken at the U.S. Naval Academy carry no credit so cannot be used to satisfy any HPE requirement at USCGA. Cadets may not take 4303, Personal Defense II: Maritime Law Enforcement Techniques, while on exchange. Cadets participating in the SAEP should discuss their HPE schedule with their advisor and the Registrar prior to departure.

**Connecticut College Exchange Program:** Full-time students at Connecticut College and the U.S. Coast Guard Academy may enroll in and receive credit for courses completed at the other institution. To qualify for this program, cadets must have: (1) valid academic reason for taking a course that is not available at the Academy and (2) approval of their academic advisor and the Dean of Academics. Enrollment in this program is normally limited to 1/c cadets who have demonstrated strong academic achievement. This is a single course exchange program. Enrollment is limited to a single course per student per semester.

**Academic Overloads:** Those 3/c, 2/c, or 1/c cadets in good academic standing may petition their Department Head to overload to carry more than nineteen credits (not including HPE or Peer Tutoring credits). To petition, cadets must submit a memo to the Department Head via their Academic Advisor. If approved, a copy of the memo is sent to the Registrar. Cadets on Academic Probation or Extended Opportunity wishing to overload or cadets requiring an overload to meet graduation requirements must obtain approval by the Dean. These cadets must route a memo requesting the overload to the Dean via the Academic Advisor and Department Head. If the Dean approves the overload, action copies are sent to the Registrar and the Director of Academic Advising. All overload memos must be submitted prior to the beginning of the semester for which the overload will take place.

**Credit Hour Definition:** One hour of classroom or direct faculty instruction and a minimum of two hours of out of class student work each week for approximately fifteen weeks for one semester. One semester credit hour equals 50 minutes of lecture or 150 minutes of laboratory per week.

**Add/Drop Period:** During the first week of classes each semester, cadets may add courses to their schedule or drop courses from their schedule in consultation with their Academic Advisor. Dropped courses do not appear on the academic transcript. Exceptions to this policy include dropping an additional course if the cadet is accepted into a course at Connecticut College (normally after the first week of classes at USCGA), and certain instances where, due to injury or unforeseen circumstance, the cadet is unable to complete an enrolled course. Cadets must maintain the minimum academic load as defined in this catalog.

## CLASSES AND GRADING

**Course Withdrawal:** Cadets requesting to withdraw from a course must work closely with their Academic Advisor to ensure they remain on track to meet the graduation requirements without an overload in future semesters. Cadets cannot withdraw from a course if they fall below the Minimum Course Load of fifteen credits (not including any HPE requirements) for the semester. The Course Withdrawal Request must be made to the respective Department Head, through the Academic Advisor, prior 1600 hours on Study and Conference day. In certain circumstances, a cadet may request to withdraw from a course and drop below the required Minimum Course Load. Such a request must be made to Dean of Academics through their Academic Advisor and Department Head and normally would include input from the cadet's GOLD Team.

If the Course Withdrawal Request is approved, the cadet will receive a "W" on their academic transcript for the withdrawn course. Cadets must complete the published course requirements for all remaining courses, including scheduled final exams.

In the case of a resignation that occurs prior to 1600 hours on Study and Conference day, the cadet will receive a "W" for all courses not completed prior to the resignation.

If a cadet is disenrolled from the Academy or otherwise resigns, the cadet may request to have grades assigned for the semester in which their disenrollment or resignation occurred. In this situation, grades will be assigned as follows:

- a. Only course material submitted up to and including the date of disenrollment or resignation will be included.
- b. Letter grades should be assigned based on the total course content completed up to the date listed in a. above relative to the entire course content. For example, if the cadet had completed 525 points of 600 points up to the date listed above and the total course content is out of 1000 points, the cadet will be assigned the letter grade that corresponds to 52.5% (525/1000).
- c. All policies listed in the course syllabus must be followed. For example, if the course syllabus requires a final exam



or a final project which was not completed by the cadet, a grade of “F” should be assigned.

Following the assignment of grades by course instructors, the requesting cadet will be advised of the entire slate of grades to be assigned for the semester, and will then be given the opportunity to accept those grades or have all grades remain as “W”. This process must occur for the entire slate of grades, i.e. either all course grades will be accepted or all grades will revert to “W”.

The cadet decision to accept course grades or have grades remain as “W” is final and may not be appealed.

**Class Attendance:** Section lists containing the names of cadets officially assigned to the courses and sections are distributed to the faculty at the beginning of each semester via the Registrar’s web site. Cadets are required to attend the specific lectures, laboratories, tests and review sessions to which they have been assigned. Cadets must inform instructors in advance of any authorized absences.

**Grading System:** The faculty member assigned to each course/section is responsible for evaluation of student course work and ultimately for accurate grade assignment and timely submission.

The following grades may be assigned as appropriate:

<i>Grade</i>	<i>Quality Points</i>	<i>Description</i>
H	4.00	Honors Quality
A	4.00	Excellent Quality
A-	3.70	Extremely Good Quality
B+	3.30	Very Good Quality
B	3.00	Good Quality
B-	2.70	Highly Satisfactory Quality
C+	2.30	Very Satisfactory Quality
C	2.00	Satisfactory Quality
C-	1.70	Barely Satisfactory Quality
D	1.00	Barely Passing
F	0.00	Failure of Course
I	0.00	Incomplete
W	0.00	Withdrawal from Course
Z	0.00	Audit of Course
V	0.00	Validation Credit
S	0.00	Satisfactory
U	0.00	Unsatisfactory

**Academic Averages:** All courses taken at any time for academic credit, with the exception of courses graded as Satisfactory/Unsatisfactory, are counted toward the term (TGPA) and cumulative grade point averages (CGPA). These include courses taken at the Coast Guard Academy and through the Service Academy and Connecticut College Exchange Programs. Each average is determined by dividing the term or cumulative quality point total by the number of term or cumulative semester hours. Quality point totals are derived by multiplying the credit hours assigned to each course by the number of quality points associated with the grade assigned by the instructor. Courses validated are listed as such on the transcript, but they are not included in computations of grade point averages.

**Repeating Courses:** Except for selected topics, research, projects, directed studies and certain designated academic and HPE courses, courses may not be repeated except under two circumstances: a course was failed or the earned grade does not meet the minimum grade requirements for Admission to Major. Cadets may not repeat courses to improve the previously earned grade unless repeating the course is approved by the Dean of Academics. For the Upper Division GPA calculation, only the highest grade earned for a repeated course will be used. All grades earned are included in the calculation for the term (TGPA) and cumulative grade point averages (CGPA).

## ACADEMIC, PHYSICAL, AND MILITARY RECOGNITION

Several honors have been established to recognize academic, physical, and military excellence within the Corps.

The **Board of Trustees List** recognizes cadets with superior performance in all three areas of the Academy: military, physical, and academic. Cadets making this list are recognized through a ceremony hosted by the Board of Trustees members.

The **Superintendent’s List** recognizes cadets named to both the Dean’s List and the Commandant of Cadets List.

The **Dean’s List** identifies cadets who achieve at least a 3.15 TGPA while taking at least a normal course load of fifteen

credit hours (not including HPE credits) and have no course grade less than a C in any course weighted more than one credit and no failing grade in any course.

Cadets who earn a minimum Military Precedence Index as prescribed by the Commandant of Cadets may qualify for the **Commandant of Cadets List**. Final listings will be based on Company Officer recommendations, and no more than 25% of each class will be named to this list. Cadets are not eligible if they are found in violation of a Class I offense of Cadet Regulations adjudicated during the term or receive a mark of less than 4 on any element of the cadet evaluation.

The **Military Precedence Average** (MPA) determines the military precedence within the class and the order in which a cadet's name will be placed on the Active Duty Promotion List in the Coast Guard Register of Officers after commissioning. The MPA is calculated using the cadet's Cumulative Grade Point Average (CGPA), Cumulative Military Precedence Index (CMPI), and the Cumulative Physical Development Competencies (CPDC) as follows:  $MPA = .70(CGPA) + .25(CMPI) + .05(CPDC)$ .

The **Athletic Director's List** recognizes those cadets who earn honors on the semester physical fitness examination (PFE).

The **Regimental Commander's List** recognizes cadets who have increased their TGPA by at least 0.50 over the previous semester's TGPA and have not failed any course. Their TGPA must be at least 2.00 but less than 3.15 (which would qualify them for the Dean's List).

**Honors at Graduation:** In recognition of high scholastic achievement, the Academy, upon recommendation of the faculty, awards the Bachelor of Science Degree with the following distinctions: High Honors for those who have earned a CGPA of 3.50 or higher; Honors for those earning a CGPA between 3.15 and 3.49. The Distinguished Graduate designation recognizes the cadet who graduates with the highest Military Precedence Average. The Honor Graduate designation recognizes the cadet who graduates with the highest Cumulative Grade Point Average.

## BACHELOR OF SCIENCE

Each major has specific academic requirements for acceptance, standards for validating courses taken externally, and specific course requirements. In addition, there are distribution requirements that apply to all majors and overall requirements for graduating with a Bachelor of Science degree.

## DEGREE AND GRADUATION REQUIREMENTS

Degree and graduation requirements are officially published in the Regulations for the Corps of Cadets. These requirements for the degree of Bachelor of Science and a commission as an Ensign in the United States Coast Guard are as follows:

- a. Pass or validate every course in the core curriculum.
- b. A cadet must complete at least 130 semester hours at USCGA (including those completed in the SAEP and the Connecticut College Exchange Programs, not to exceed 24 semester hours) to satisfy residency requirements, regardless of semester hours validated. Courses which do not fulfill residency requirements include those validated, courses carrying no semester hour credit, pass/fail or satisfactory/unsatisfactory graded courses, and failed courses.
- c. Attain an average of at least a 2.00 in all required upper-division courses in the major, as specified in the official Catalog of Courses. For repeated courses, all grades earned are included in the average.
- d. Satisfy the academic requirements for one of the majors as specified in the official Catalog of Courses.
- e. Attain a Cumulative Grade Point Average of at least a 2.00.
- f. Be in residence at the Academy for at least four academic years (a semester spent in the SAEP program counts as a semester in residence).
- g. Successfully complete all required portions of the physical education program, including meeting minimum swimming and physical fitness standards.
- h. Meet all military performance standards, demonstrating all aspects of personal and professional development necessary to serve as Ensigns in the United States Coast Guard, unless a commission will not be offered due to a medical disqualification.

International cadets must meet the same standards of personal and professional development as all other graduates, notwithstanding that they are not entitled to appointment in the U.S. Coast Guard.

The Superintendent confers the degree of Bachelor of Science on those cadets in good standing who have met these

requirements or revisions published since matriculation.

## **VALIDATIONS**

The validation procedure is a mechanism whereby cadets may request a course exemption, based on personal competency or academic work completed elsewhere. This procedure affords cadets the opportunity to enroll in additional courses that will further enrich their undergraduate education. Validated courses are not awarded credit hours or quality points, nor may they be used to satisfy the minimum semester course load requirement. Courses accepted for validation credit may not be taken at a subsequent time for academic credit. A validated course does count for purposes of meeting the ABET minimums for the combined math and sciences, engineering topics, and general education component -- the intent is that a validated course results in addition of a free elective to that cadet's individual curriculum.

## **VALIDATION REQUIREMENTS**

The requirements to validate a course are exclusively governed by the Academic Department responsible for offering that course.

Some accomplishments that may lead to granting of validation credit, provided they are acceptable to the Department, are:

- a. Score of 4 or better on the CEEB Advanced Placement examinations; or
- b. Grade of C or better in an equivalent college course at an accredited college or university as evidenced by a college transcript; or
- c. Grade of B or better in an Advanced Placement or college-level course that has been certified by an accredited college or university as noted on the high school transcript.

In addition to the general guidelines, Department Heads may apply specific requirements unique to the department's academic courses that supersede requirement (a), (b), or (c). The following unique requirements have been established:

### ***Engineering Department Validation***

Cadets may validate courses offered by the Engineering Department if they have accomplished requirements (b) or (c) above and gained the written approvals of the Program Chair in charge of that course, and the Engineering Department Head. Cadets may be required to take an oral or written exam to demonstrate adequate proficiency of the course material.

### ***Humanities Department Validation***

Cadets may validate courses offered by the Department of Humanities only if they have taken an accredited college course with a transcript grade of B or better and passed an examination administered by the CGA course coordinator. College Composition may NOT be validated. Cadets who have earned a score of 5 on an Advanced Placement Examination in American Government must pass an examination administered by the course coordinator to be placed out of the core course into a more advanced class in the same discipline.

### ***Health and Physical Education Department Validation***

The purpose of course validation in the Health and Physical Education (HPE) Curriculum is to permit any cadet the opportunity to validate selected HPE courses based upon work completed elsewhere or his / her capacity to meet the skill and the academic criteria of a specific course. Cadets may validate select HPE courses within the first week of the semester. All validations are to be conducted by the course instructors under the direction of the Department Head, and any changes shall be processed through the Registrar's Office in accordance with course Add/Drop procedures.

### ***Management Department Validation***

Cadets may validate courses offered by the Management Department if they have taken an accredited college course with a transcript grade of B or better, or if they have taken an equivalent AP high school course with a transcript grade of B or better and receive a score of 5 on the CEEB AP exam. To validate an economics course, cadets must meet with the Economics course coordinator who will further determine if there is a need for a written exam to demonstrate adequate proficiency of the subject.

### ***Mathematics Department Validation***

Cadets may validate courses offered by the Mathematics Department if they demonstrate adequate proficiency on a comprehensive validation exam administered by an exam coordinator designated by the Mathematics Department Head. Written approval by the Mathematics Department Head is also required.

## ***Sciences Department Validation***

The validation criteria for Chemistry I and II is an AP test score of 4 or 5, or satisfactory passage of the Chemistry Section's validation exam. Completion of an equivalent course at another accredited college as determined by the Chemistry Section Chief may also merit validation.

The validation criterion used for Physics I or II is demonstrated proficiency on a Physics I or II validation exam administered by the Physics Section.

Validation of other courses in the Science Department will be made on a case by case basis for courses completed at another accredited college.

## **DISTRIBUTION REQUIREMENTS**

Courses from the following programs, which satisfy broad academic and professional purposes, are integrated in each of the Majors (with substitutions to satisfy any unique program needs):

- Core curriculum
- Professional Maritime Studies Program
- Health and Physical Education Program

## **MAJORS REQUIREMENTS**

To earn the degree of Bachelor of Science, cadets must successfully complete the academic requirements for one of the following majors:

- Civil Engineering
- Cyber Systems
- Electrical Engineering
- Government
- Management
- Marine and Environmental Sciences
- Mechanical Engineering
- Naval Architecture and Marine Engineering
- Operations Research and Computer Analysis

Each major has specific course requirements, including the distribution courses, mandatory courses, area or related elective courses, designated course substitutions, and optionally, free elective courses. Given the breadth of study inherent in the Academy's core curriculum, free electives are not required for graduation. Therefore, they can be waived if at least 15 academic credits (not including Health and Physical Education credits) are taken each semester.

## **HISTORY OF THE UNITED STATES COAST GUARD**

The History of the United States Coast Guard (course number 0901) is a one-credit course designed to introduce Fourth Class cadets to the rich history and remarkable achievements of the USCG, while familiarizing students with the historical underpinnings of the Coast Guard missions and the Academy. Cadets enroll in the course during SWAB Summer. Successful completion of the course (earning an academic grade of D or better) is not a requirement for graduation.

## **SUMMER ACADEMIC TERM**

The Academy offers a single six-week summer academic term beginning approximately five weeks after the end of the spring semester. Enrollment is limited to the following:

- Cadets placed in the Foundation for Calculus and Introduction to College Communications courses as result of initial course placement;
- Cadets who have completed 3111, Calculus I, but not 3115, Calculus II, by the end of 4/c year and have an intended major that requires Calculus II at the start of 3/c fall in order to meet prerequisite requirements in that major's nominal plan of study;

- Cadets with an intended major that requires Calculus II at the start of 3/c fall in order to meet prerequisite requirements in that major's nominal plan of study who fail 3117, Calculus II, in their 4/c spring semester and are not required to change major by the spring Academic Review Board;
- Cadets with an intended major that requires Engineering Mechanics at the start of 3/c fall in order to meet prerequisite requirements in that major's nominal plan of study who have not yet passed 3118, Engineering Mechanics, in their 4/c year and are not required to change major by the spring Academic Review Board; and/or
- Cadets otherwise approved for summer school by the Dean of Academics.

Cadets will be registered for two academic classes during the summer term. Typically, 1118 (Engineering Mechanics), 3117 (Calculus II), 8115 (Macroeconomic Principles), and 8211 (Organizational Behavior and Leadership) are offered during the Summer Academic Term.

## **APPLICABILITY**

The Academic Standards and Requirements defined in this Catalog apply in full to the Class of 2024, effective Fall 2020.

Any cadet who is either extended or readmitted to the Academy is subject to the academic regulations that apply to the new class to which they are assigned. The Catalog also includes the appropriate policies, procedures and other information deemed appropriate by the Dean and the Registrar.

## PART IV – PROGRAMS OF STUDY

### CORE CURRICULUM

*(Dean of Academics)*

Core Curriculum Requirements		Credits
1104	Introduction to Computing	3.00
	or 1105 Introduction to Computing (Honors)	3.00
	or 2142 Computer Problem Solving	3.00
2111	College Composition	3.00
	or 2121 The Art of Effective Writing	3.00
2131	Cultural Perspectives: American Social Movements	3.00
	or 2132 Cultural Perspectives: U.S. Ethnic Lit	3.00
	or 2133 Cultural Perspectives: Intro to Latin Amer Culture	3.00
	or 2134 Cultural Perspectives: Gender & Sexual Orientation in Lit	3.00
2163	American Government	3.00
2293	Moral, Ethical, and Political Philosophy	3.00
	or 2394 Introduction to Moral and Ethical Phil	2.00
	and 1493 Engineering Ethics, 5493 Science Ethics Seminar, or 7294 Cyber Policy, Compliance, and Ethics	1.00
2398	Principles of Criminal Justice and Maritime Operational Law	4.00
2485	Global Studies	3.00
3111	Calculus I	4.00
3213	Probability and Statistics	3.00
	or 3301 Advanced Engineering Mathematics	4.00
	or 3341 Probability Theory	3.00
5102	Chemistry I	4.00
5162	Physics I	4.00
5206	Chemistry II	4.00
	or 5208 Chemistry II (Honors)	4.00
or		
5266	Physics II	4.00
5444	Atmospheric and Marine Sciences	1.50
7310	Introduction to Cyber Technology	1.50
	or 1226 Computer Communications and Networking	3.50
8115	Macroeconomic Principles	3.00
	or 8313 Essentials of Economics for Engineering Majors	2.00
8211	Organizational Behavior and Leadership	3.00

### PROFESSIONAL MARITIME STUDIES PROGRAM

*(Dean and Commandant of Cadets)*

Professional Maritime Studies Program - Core Requirements		Credits
6101	Fundamentals of Navigation	4.00
6201	Ships and Maritime Systems	3.00
6202	Applications in Navigation	1.00
6301	The Maritime Watch Officer	4.00
6401	Professional Maritime Officer	3.00
6402	Professional Maritime Officer Lab	1.00

## HEALTH AND PHYSICAL EDUCATION PROGRAM

### *(Director of Athletics)*

The Mission states: “To graduate young men and women with sound bodies, stout hearts, and alert minds...” To this end, the Athletics Division not only supports shared learning outcomes but also has developed its own set of specific outcomes. At the end of the four-year physical education program, graduates are expected to demonstrate their ability to:

- Maintain a personal fitness program that allows them to meet the physical demands required of Coast Guard officers; be capable of counseling others in the methods, concepts, and materials used in developing and maintaining a healthy lifestyle;
- Function successfully in an aquatics environment; defend themselves and others; and provide emergency aid to those in need;
- Set individual and team level goals for short and long term planning, and assess and analyze results; and
- Perform as a group member in achieving a common goal, and persist in an ethical and disciplined manner when faced with adverse conditions in striving to achieve the goal.

Cadets are required to complete health or physical education courses each year as part of the total curriculum, and to maintain a high degree of general physical fitness. During their years at the Academy, cadets are provided with the program and facilities that will assist them in the development of their physical potential. In order to assess their physical development competencies, cadets must successfully complete all Physical Fitness Examination requirements each semester while at the Academy. Cadets are required to be active in co-curricular physical activities such as intercollegiate athletics or intercompany or club sports each semester where they develop psychosocial and sport skills through their participation.

The Health and Physical Education (HPE) curriculum includes six semesters of required courses. For the first three years, the curriculum is focused on the development of professional competencies and fitness/wellness knowledge and skills. In the first class year, cadets choose from a variety of lifetime physical activities.

Cadets must normally satisfactorily complete or validate all core HPE courses before taking any elective physical education courses. As a graduation requirement, each cadet must pass or validate a minimum of six (6) academic credits in HPE.

### *Course Requirements*

<b>HPE Mandatory Core Courses</b>		<b>Credits</b>
4102	Principles of Fitness and Wellness I	1.00
4103	Personal Defense I	0.25
4111	Swimming	0.25
4112	Principles of Fitness and Wellness II	1.00
4204	Lifetime Sports I: Badminton	0.25
4214	Lifetime Sports II: Golf	0.25
4222	Professional Rescuer	2.00
4303	Personal Defense II: Maritime Law Enforcement Techniques	0.25
4304	Lifetime Sports III: Tennis	0.25

### **First Class cadets select one (or more) of the following:**

4405	Adventure Sports I: Rock Climbing	0.50
4407	Dance	0.50
4411	Scuba Diving	0.50
4414	Advanced Golf	0.25
4415	Adventure Sports II	0.50
4439	Theory of Coaching	1.00
4444	Indoor Recreational Sports	0.50
4459	Sport/Wellness Leader	0.50
4464	Strength and Conditioning	0.50
4489	Selected Topics in Health and Physical Education	0.50 - 2.00



## DEPARTMENTAL PROGRAMS

The following sections for each major include a statement about the major, and criteria for acceptance into the major, along with Course Requirements, and a sample eight-semester Program of Study.

### CIVIL ENGINEERING

Civil Engineering (CE) provides a solid background in mathematics and basic sciences applied toward the study and design of engineered systems. As a broad field encompassing many disciplines, Civil Engineering offers a challenging and fulfilling career to individuals with a wide variety of interests. Upper level courses in the major include study in structural engineering, geotechnical engineering, construction management, water resources, transportation and environmental engineering. The program emphasizes development of open-ended problem solving, team building skills, creativity, and communication ability. Particular emphasis is placed on balancing theory and practice of engineering so that graduates are intellectually and professionally prepared to provide engineering services to the Coast Guard. In the senior level capstone design course, students integrate what they have learned in the design of a Civil Engineering system. Most capstone projects involve work on Coast Guard related projects. Graduates of the major are well prepared to pursue a variety of career opportunities and graduate programs in and out of the Coast Guard. The program is accredited by the ABET Engineering Accreditation Commission, <http://www.abet.org>.

In addition to the common departmental mission and common Student Outcomes, the Civil Engineering Major produces graduates who:

- Can apply knowledge in the areas of structural, construction, environmental, and geotechnical engineering.
- Can conduct fundamental civil engineering experiments, analyze and interpret data, and prepare engineering reports.
- Can design a sustainable and resilient system, component, or process in the context of structural, construction, environmental, and geotechnical engineering.
- Can explain basic concepts in project management, business, public policy, and leadership; analyze issues in professional ethics; and can explain the importance of professional licensure.

#### Civil Engineering Program Educational Objectives:

Within 7 years after graduation, graduates of the Civil Engineering Program:

- perform effectively in a variety of career paths as Junior Officers in the Coast Guard
- provide appropriate Engineering expertise to the Coast Guard while serving in Civil Engineering related billets
- demonstrate a commitment to intellectual and professional growth through activities and accomplishments such as graduate study, professional licensure, professional society activity, and/or continuing education

#### *Acceptance into the Major*

Acceptance requires attainment of a minimum of 2.00 average in all Mathematics, Science, and Engineering courses taken prior to the beginning of the Spring semester 3/c year.

In addition, a grade of C or above is required in the following courses:

- 1118 Engineering Mechanics - Statics
- 1206 Mechanics of Materials

If a student has validated a course, no grade for that course is included in the average. For failed courses, only retake grades will be included in acceptance into major GPA calculations. A passing grade must be earned for all required courses.

#### I. Core Requirements:

Probability Theory (3341) or Advanced Engineering Mathematics (3301) may be substituted for Probability and Statistics (3213).

#### II. Major Requirements:

1118	Engineering Mech - Statics	1206	Mech of Materials
1210	Mat'ls Civil/Constr Engr	1304	Soil Mechanics
1309	Environmental Engr I	1312	Transportation Engineering
1313	Steel Design	1317	Struct Analysis
1321	Elec Cir & Machines	1340	Fluid Mechanics



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1401	Construction Project Mgmt	1402	Civil Engineering Design
1404	Geotechnical Engr Design	1407	Environmental Engr II
1411	Reinf Concrete Design	3117	Calculus II
3211	Multivariable Calculus	3215	Differential Equations
5206	Chemistry II	5266	Physics II
—	Engineering Elective		

### III. Civil Engineering Elective:

Engineering elective courses for the CE major are defined as Engineering courses, 1200 level or higher, of 3 credits or greater. In special cases (and with prior approval by the Civil Engineering Section Chief), Directed Studies in Civil Engineering (1419) may be considered a major area elective. Below is a list of common engineering electives.

1211	Dynamics
1351	Thermodynamics
1406	Coastal Resiliency
1409	Water Resources Engr
1414	Struct Dsgn Extreme Events

### IV. Upper Division Courses:

1304	Soil Mechanics	1309	Environmental Engr I
1312	Transportation Engineering	1313	Steel Design
1317	Struct Analysis	1321	Elec Cir & Machines
1340	Fluid Mechanics	1401	Construction Project Mgmt
1402	Civil Engineering Design	1404	Geotech Engr Design
1406	Coastal Resiliency	1407	Environmental Engr II
1411	Reinf Concrete Design	1409	Water Resources Eng
1419	Dir Studies in Civil Engr	1414	Struct Dsgn Extreme Events

**CIVIL ENGINEERING**

<b>Fall Semester</b>			<b>Spring Semester</b>		
<i>Fourth Class Year</i>			<i>Credits</i>		
1104	Intro to Computing	3.00 *	1118	Engineering Mech - Statics	3.00 *
2111	College Composition	3.00 *	213X	Cultural Perspectives	3.00 *
3111	Calculus I	4.00	2163	American Government	3.00 *
4102	Prin Fitness/Wellness I	1.00	3117	Calculus II	4.00
4111	Swimming	0.25	4103	Personal Defense I	0.25
5102	Chemistry I	4.00	4112	Prin Fitness/Wellness II	1.00
6101	Fndamntls of Navigation	4.00 *	5162	Physics I	4.00
* These courses may be scheduled during the Fall or Spring Semester.					
<i>Third Class Year</i>			<i>Credits</i>		
1206	Mech of Materials	3.50	1210	Mat'ls Civil/Constr Engr	4.00
3211	Multivariable Calculus	3.00	2394	Intro Moral & Ethical Phil	2.00
3213	Probability & Statistics	3.00	3215	Differential Equations	3.00
4222	Professional Rescuer	2.00	4204	Lifetime Sports I: RQB	0.25
5266	Physics II	4.00	4214	Lifetime Sports II: Golf	0.25
6202	Apps in Navigation	1.00	5206	Chemistry II	4.00
8211	Org Behavior/Ldrship	3.00	6201	Ships & Maritime Sys	3.00
			8313	Essentials of Economics	2.00
<i>Second Class Year</i>			<i>Credits</i>		
1304	Soil Mechanics	4.00	1312	Transportation Engineering	3.00
1309	Environmental Engr I	4.00	1313	Steel Design	3.00
1317	Struct Analysis	3.00	1407	Environmental Engr II	3.00
1340	Fluid Mechanics	3.00	4303	Personal Defense II	0.25
5444	Atmosphere & Mar Sci	1.50	4304	Lifetime Sports III: Tennis	0.25
7310	Intro to Cyber Tech	1.50	6301	Maritime Watch Officer	4.00
			_____	Engineering Elective	3.00-4.00
<i>First Class Year</i>			<i>Credits</i>		
1321	Elec Cir & Machines	4.00	1402	Civil Engr Design	4.00
1401	Const Proj Mgmt	3.00	1493	Engineering Ethics	1.00
1404	Geotechnical Engr Design	3.00	2398	Prin CJ & Maritime Op Law	4.00
6402	Professional Maritime Officer Lab	1.00	2485	Global Studies	3.00
1411	Reinf Concrete Dsgn	3.00	6401	Professional Maritime Officer	3.00
_____	Free Elective **	3.00-4.00	_____	Free Elective **	3.00-4.00
_____	Physical Education	0.50	_____	Physical Education	See Note

Note: First class cadets must take 0.50 credit hours of health and physical education. As a graduation requirement, each cadet must pass or validate a minimum of six (6) academic credits in HPE.

\*\* Given the breadth of study inherent in the Academy's core curriculum, free electives are not required for graduation. Therefore, they can be waived if at least 15 academic credits (not including Health and Physical Education credits) are taken each semester.

## ELECTRICAL ENGINEERING

The Electrical Engineering (EE) major prepares future officers to be the leaders in designing, developing, implementing, and evaluating new technologies in the Coast Guard. The student who completes this program will be thoroughly ready for professional practice as an electrical engineer and a wide spectrum of postgraduate studies. Major prescribed courses provide an integrated understanding of the core disciplines of electrical engineering. These include circuit design, digital communications, signal processing, control systems, computer programming, and computer networking. In addition to this comprehensive foundation, students select Major Area Electives from a list of courses that provide additional breadth to their study as well as Engineering Electives from an even broader list of courses. The degree granted is the Bachelor of Science in Electrical Engineering. This program is accredited by ABET (<http://www.abet.org>). In the capstone senior design course, students creatively apply knowledge to solve challenging real-world problems, often sponsored by Coast Guard units and personnel. These Electrical Engineering capstone projects generally fall in one of four areas:

1. Autonomous Systems and Robotics
2. Communications and Signal Processing
3. Cyber-Physical Systems
4. Power and Renewable Energy

### Electrical Engineering Program Educational Objectives:

The U.S. Coast Guard Academy Electrical Engineering program produces graduates who, within several years of graduation:

1. Demonstrate proficiency in the professional practice of engineering as USCG junior officers.
2. Demonstrate intellectual or professional growth as evidenced by post-graduate education, licensing, certification, promotion, and participation in pertinent professional societies
3. Contribute electrical engineering expertise and ethical leadership to U.S. Coast Guard engineering challenges within the framework of current practices for engineering lifecycle management.

### Electrical Engineering Program Student Outcomes:

Our graduates will have:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of 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.

### *Acceptance into the Major*

Acceptance requires passing each and attaining a 2.00 average in all Mathematics, Science, and Engineering courses in the Electrical Engineering program of study during the 3/c and 4/c year.

In addition, a grade of C or above is required in the following courses:

- |      |                                  |
|------|----------------------------------|
| 1104 | Introduction to Computing        |
| 1218 | Electrical Engineering I         |
| 1222 | Signals, Systems, and Transforms |

If a student has validated a course, no grade for that course is included in the average. All grades for failed or repeated courses will be included in the acceptance into major GPA calculation.

**I. Core Requirements:**

Electrical Engineering majors shall take Physics II (5266) as their third lab science course and are not required to take Introduction to Cyber Technology (7310). Substitute Probability Theory (3341) for Probability and Statistics (3213).

**II. Major Requirements:**

1118	Engineering Mech – Statics	1212	Analytl Methods Engr
1218	Elec Engineering I	1220	Trans to Obj Ori Prog
1222	Signals, Systems & Trnsfrms	1225	Digital Circ/Comp Systems
1226	Computer Comms & Ntwrkng	1322	Linear Circuits
1329	Digital Signal Process	1331	Automatic Control Systems
1422	Communication Systems	1426	Capstone Proj/EE I
1436	Capstone Proj/EE II	3117	Calculus II
			or 3115 Calc II (V)
3211	Multivariable Calculus	_____	Major Area Elective (2)
_____	Engineering Elective (2)	_____	Math/Sci Elective

**III. Major Area Electives:**

Electrical Engineering majors shall choose two Major Area Electives from the following list:

1323	Antennas and Propagation	1328	Software Engineering
1330	Computer and Network Security	1420	Electric Energy and Machines
1431	Electronic Nav Systems		

**IV. Engineering Electives:**

Engineering elective courses for the EE major are defined as Engineering courses, 1200 level or higher, of 3 credits or greater, other than Electric Circuits and Machines (1321), and Modeling and Control of Dynamic Systems (1460). In special cases (and with prior approval by the Electrical Engineering and Cyber Systems Section Chief), Directed Studies in Electrical Engineering (1439) may be considered an Engineering Elective. Below is a list of common engineering electives.

1206	Mech of Materials
1211	Dynamics
1323	Antennas and Propagation ( <i>if not counted as a Major Area Elective</i> )
1328	Software Engineering ( <i>if not counted as a Major Area Elective</i> )
1330	Computer and Network Security ( <i>if not counted as a Major Area Elective</i> )
1340	Fluid Mechanics
1351	Thermodynamics
1420	Electric Energy and Machines ( <i>if not counted as a Major Area Elective</i> )
1431	Electronic Nav Systems ( <i>if not counted as a Major Area Elective</i> )

**V. Mathematics/Science Elective:**

Students must choose one course from the following list:

3221	Linear Algebra	3237	Discrete Mathematics
3343	Mathematical Statistics	5206	Chemistry II
5475	Intro to Geospatial Sciences	5477	Optics

**VI. Upper Division Courses:**

For the purposes of USCGA graduation requirements, upper-division courses in the Electrical Engineering major are defined as those courses specified for the major that a cadet, following the published nominal program of study, would take during the 1/c and 2/c years. Each cadet must satisfy the graduation requirements with a set of courses that includes those courses required of all EE majors. If a student has validated a course, no grade for that course is included in the average. If a course is repeated, only the highest final grade earned in that course will be included in the Upper-division GPA calculation.

1322	Linear Circuits
1329	Digital Signal Processing

1331	Automatic Control Systems
1422	Communication Systems
1426	Capstone Projects in Electrical Engineering I
1436	Capstone Projects in Electrical Engineering II
3341	Probability Theory
_____	Major Area Elective (2)
_____	Engineering Elective (2)
_____	Mathematics/Science Elective

**ELECTRICAL ENGINEERING**

<b>Fall Semester</b>			<b>Spring Semester</b>		
<i>Fourth Class Year</i>			<i>Credits</i>		
2111	College Composition	3.00 *	1104	Intro to Computing	3.00 *
2163	American Government	3.00 *	1118	Engineering Mech - Statics	3.00 *
3111	Calculus I	4.00	213X	Cultural Perspectives	3.00 *
4102	Prin Fitness/Wellness I	1.00	3117	Calculus II	4.00
4111	Swimming	0.25	4103	Personal Defense I	0.25
5102	Chemistry I	4.00	4112	Prin Fitness/Wellness II	1.00
6101	Fndamntls of Navigation	4.00 *	5162	Physics I	4.00

\* These courses may be scheduled during the Fall or Spring Semester.

<i>Third Class Year</i>			<i>Credits</i>		
1212	Analytl Methods Engr	4.00	1222	Sgnls, Sys & Trnsfrms	4.00
1218	Elec Engineering I	4.00	1225	Digital Circ/Comp Sys	4.00
1220	Trans to Obj Ori Prog	2.00	1226	Comptr Comms & Ntwks	3.50
4222	Professional Rescuer	2.00	3211	Multivariable Calculus	3.00
5266	Physics II	4.00	4204	Lifetime Sports I: RQB	0.25
6202	Apps in Navigation	1.00	4214	Lifetime Sports II: Golf	0.25
8211	Org Behavior/Ldrship	3.00	6201	Ships & Maritime Sys	3.00

<i>Second Class Year</i>			<i>Credits</i>		
1322	Linear Circuits	4.00	1329	Digital Signal Process	3.00
2394	Intro Moral & Ethical Phil	2.00	1331	Automatic Control Sys	3.50
3341	Probability Theory	3.00	4303	Personal Defense II	0.25
8313	Essentials of Economics	2.00	4304	Lifetime Sports III: Tennis	0.25
_____	Major Area Elective	3.00-4.00	6301	Maritime Watch Officer	4.00
_____	Free Elective **	0.00-4.00	_____	Math/Sci Elective	3.00-4.00
			_____	Engineering Elective	3.00-4.00

<i>First Class Year</i>			<i>Credits</i>		
1422	Communication Systems	4.00	1436	Capstone Proj/EE II	4.00
1426	Capstone Proj/EE I	4.00	1493	Engineering Ethics	1.00
2398	Prin CJ & Maritime Op Law	4.00	2485	Global Studies	3.00
_____	Major Area Elective	3.00-4.00	5444	Atmosphere & Mar Sci	1.50
_____	Free Elective **	0.00-4.00	6401	Professional Maritime Officer	3.00
_____	Physical Education	0.50	6402	Professional Maritime Officer Lab	1.00
			_____	Engineering Elective	3.00-4.00
			_____	Physical Education	See Note

Note: First class cadets must take 0.50 credit hours of health and physical education. As a graduation requirement, each cadet must pass or validate a minimum of six (6) academic credits in HPE.

\*\* Given the breadth of study inherent in the Academy's core curriculum, free electives are not required for graduation. Therefore, they can be waived if at least 15 academic credits (not including Health and Physical Education credits) are taken each semester.

## MECHANICAL ENGINEERING

The Mechanical Engineering (ME) major provides a solid foundation for service as a Coast Guard Officer, professional engineering practice, and further study in Mechanical Engineering or many other related fields. The major requirements develop the students' ability to apply scientific principles in the design and analysis of mechanical and energy conversion systems. Students are challenged with design problems in most of the major courses that provide opportunities for developing creativity solving real-world problems. The program culminates with a hands-on capstone design project where teams of students use their acquired knowledge to design, build, and test a practical device. This program is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>.

In addition to the common departmental mission and common Student Outcomes, the Mechanical Engineering Major produces graduates who have an ability to develop as leaders in the Coast Guard.

### **Mechanical Engineering Program Educational Objectives:**

The Educational Objectives of the Mechanical Engineering Program are to produce graduates who, within 4-6 years of graduation:

1. Attain professional competence as an engineer in a U.S. Coast Guard Operational or Mission Support role.
2. Demonstrate evidence of intellectual growth in engineering such as engineering licensure, graduate education, publications and Coast Guard certifications and credentials
3. Attain recognition of professional accomplishment as a Coast Guard Officer in any field.

### ***Acceptance into the Major***

Acceptance requires attainment of a 2.00 average in all Mathematics, Science, and Engineering courses taken prior to the beginning of the 2/c year.

In addition, a grade of C or above is required in the following courses:

- |      |   |
|------|---|
| 1118 | Engineering Mechanics - Statics               |
| 1206 | Mechanics of Materials                        |
| 1208 | Introduction to Mechanical Engineering Design |
| 1211 | Dynamics                                      |

If a student has validated a course, no grade for that course is included in the average. All grades for failed or repeated courses will be included in the acceptance into major GPA calculation.

### **I. Core Requirements:**

Substitute Advanced Engineering Mathematics (3301) for Probability and Statistics (3213).

### **II. Major Requirements:**

- |       |                             |      |                           |
|-------|-----------------------------|------|---------------------------|
| 1118  | Engineering Mech - Statics  | 1204 | Engr Material Science     |
| 1206  | Mech of Materials           | 1208 | Intr to Mech Engr Dsgn    |
| 1211  | Dynamics                    | 1321 | Elect Circuits & Machines |
| 1340  | Fluid Mechanics             | 1351 | Thermodynamics            |
| 1353  | Thermal Systems Design      | 1370 | Mechanisms                |
| 1437  | Engineering Experimentation | 1440 | Machine Design            |
| 1446  | Mechanical Engr Dsgn        | 1459 | Heat Transfer             |
| 1460  | Mod & Cntrl of Dyn Sys      | 1480 | Design Project Management |
| 3117  | Calculus II                 | 3211 | Multivariable Calculus    |
| 3215  | Differential Equations      | 3301 | Adv Engineering Math      |
| 5162  | Physics II                  | 5206 | Chemistry II              |
| _____ | Major Area Elective         |      |                           |

### **III. Major Area Electives:**

A major area elective may consist of any Mechanical Engineering or Naval Architecture and Marine Engineering technical elective OR any technical upper level (13xx or 14xx) required course for another Engineering program course of study OR other courses as specifically approved by the Mechanical Engineering Section Chief. Cadets may make requests for such other substitution courses in writing. Examples of technical electives include, and are not limited to: 1461 Mechatronics; 1466 Heating Ventilation and Air Conditioning; 1457 Small Craft Design; 1435 Intro to Aerodynamics.

1242	Applied Nav Arch/Mar Eng	1304	Soil Mechanics
1309	Environmental Engr I	1312	Transportation Engr
1313	Steel Design	1317	Struct Analysis
1322	Linear Circuits	1329	Digital Signal Prcss
1331	Automatic Cntrl Sys	1355	Marine Engineering
1356	Ship Structures	1401	Constructn Proj Mgt
1402	Civil Engr Design	1404	Geotech Engr Design
1407	Environmentl Engr II	1411	Reinf Concrete Dsgn
1422	Communication Syst	1435	Aerodynamics
1442	Prin of Ship Design	1444	Ship Dsgn/Sys Intgr
1447	Casualty Response	1453	Ship Propulsion Dsgn
1457	Small Craft Design	1461	Mechatronics
1466	HVAC Principles	1469	Dir Studies/NAME
1479	Dir Studies/Mech Eng	7385	Cyber Risk Management

#### IV. Upper Division Courses:

All 13XX and 14XX level courses listed under Major Requirements above and Advanced Engineering Math (3301) are considered as Upper Division Courses.



**MECHANICAL ENGINEERING**

<b>Fall Semester</b>			<b>Spring Semester</b>		
<i>Fourth Class Year</i>			<i>Credits</i>		
1118	Engineering Mech - Statics	3.00 *	1104	Intro to Computing	3.00 *
2111	College Composition	3.00 *	2163	American Government	3.00 *
213X	Cultural Perspectives	3.00 *	3117	Calculus II	4.00
3111	Calculus I	4.00	4103	Personal Defense I	0.25
4102	Prin Fitness/Wellness I	1.00	4112	Prin Fitness/Wellness II	1.00
4111	Swimming	0.25	5162	Physics I	4.00
5102	Chemistry I	4.00	6101	Fndamntls of Navigation	4.00 *
* These courses may be scheduled during the Fall or Spring Semester.					
<i>Third Class Year</i>			<i>Credits</i>		
1206	Mech of Materials	3.50	1208	Intro Mech Engr Design	3.00
3211	Multivariable Calculus	3.00	1211	Dynamics	3.00
4222	Professional Rescuer	2.00	1321	Elec Cir & Machines	4.00
5266	Physics II	4.00	3215	Differential Equations	3.00
6201	Ships & Maritime Sys	3.00	4204	Lifetime Sports I: RQB	0.25
6202	Apps in Navigation	1.00	4214	Lifetime Sports II: Golf	0.25
8211	Org Behavior/Ldrship	3.00	5206	Chemistry II	4.00
<i>Second Class Year</i>			<i>Credits</i>		
1204	Engr Material Science	4.00	1440	Machine Design	4.00
1340	Fluid Mechanics	3.00	1459	Heat Transfer	3.00
1351	Thermodynamics	3.00	2394	Intro Moral & Ethical Phil	2.00
1370	Mechanisms	4.00	3301	Adv Engineering Math	4.00
6301	Maritime Watch Officer	4.00	4303	Personal Defense II	0.25
			4304	Lifetime Sports III: Tennis	0.25
			8313	Essentials of Economics	2.00
			—	Free Elective **	3.00-4.00
<i>First Class Year</i>			<i>Credits</i>		
1353	Thermal Systems Design	3.00	1446	Mech Engr Design	4.00
1437	Engr Experimentation	3.00	1493	Engineering Ethics	1.00
1460	Mod & Cntrl of Dyn Sys	3.00	2398	Prin CJ & Maritime Op Law	4.00
1480	Design Project Mgt	4.00	2485	Global Studies	3.00
6401	Professional Maritime Officer	3.00	5444	Atmosphere & Mar Sci	1.50
6402	Professional Maritime Officer Lab	1.00	7310	Intro to Cyber Tech	1.50
—	Physical Education	0.50	—	Major Area Elective	3.00-4.00
			—	Physical Education	See Note

\Note: First class cadets must take 0.50 credit hours of health and physical education. As a graduation requirement, each cadet must pass or validate a minimum of six (6) academic credits in HPE.

\*\* Given the breadth of study inherent in the Academy's core curriculum, free electives are not required for graduation. Therefore, they can be waived if at least 15 academic credits (not including Health and Physical Education credits) are taken each semester.

## NAVAL ARCHITECTURE AND MARINE ENGINEERING

The Naval Architecture and Marine Engineering (NA&ME) major provides a strong undergraduate educational program in engineering, mathematics and the sciences. Graduates from this program are prepared for service as Coast Guard Officers across a wide spectrum of Coast Guard missions. The NA&ME program provides a solid educational basis for professional engineering practice in both the Coast Guard and commercial industry, and affords the graduate considerable latitude for postgraduate study in Naval Architecture, Marine Engineering, Mechanical Engineering and other related fields. This program emphasizes the development of the student's ability to understand and apply engineering principles to the design and analysis of U.S. Coast Guard and Navy, commercial, and recreational vessels. Practical hands-on engineering applications blended with computer-aided design and analysis methods provide students with a coordinated mix of theoretical and practical engineering education with an emphasis on ship and small craft design.

The program emphasizes the solution of open-ended design problems, teamwork, creativity and effective communication. The NA&ME capstone design project presents the ultimate design challenge – the team-based design, development and integration of a conceptual ship design. This effort involves the design and analysis of the ship's hull (form and structure), propulsion and auxiliary systems, general arrangements, stability assessment, structural design, etc. This year-long project is aligned with the strategic focus and needs of the Coast Guard and maritime industry. The major is accredited by the Engineering Accreditation Commission of ABET.

In addition to the common Departmental mission and common Student Outcomes, the Naval Architecture and Marine Engineering program produces graduates who have:

- the ability to apply probability and statistical methods to naval architecture and marine engineering problems
- basic knowledge of fluid mechanics, dynamics, structural mechanics, materials properties, hydrostatics, and energy-propulsion systems in the context of marine vehicles
- familiarity with instrumentation appropriate to naval architecture and/or marine engineering

### Naval Architecture and Marine Engineering Program Educational Objectives:

The U.S. Coast Guard Academy Naval Architecture and Marine Engineering program produces graduates who, within several years of graduation:

1. Demonstrate competency in professional practice in U.S. Coast Guard Naval Engineering or Marine Safety Engineering positions.
2. Demonstrate intellectual and professional growth such as post-graduate education, licensing, certification, and participation in pertinent professional societies.
3. Contribute NA&ME expertise to the solution of U.S. Coast Guard engineering challenges, specifically including the design, construction, safety, operation, and repair of U.S. Coast Guard, commercial and recreational vessels.

### *Acceptance into the Major*

Acceptance into the Naval Architecture and Marine Engineering major requires attainment of a 2.00 average in the Mathematics, Science, and Engineering courses from the list below that have been taken prior to the beginning of the 2/c year.

These courses include:

- 1104 Intro to Computing
- 1118 Engineering Mechanics - Statics
- 1206 Mechanics of Materials
- 1211 Dynamics
- 1212 Analytl Methods Engr
- 1241 Laboratory in Naval Arch
- 1242 Applied Nav Arch & Mar Eng
- 1321 Elec Cir & Machines
- 3111 Calculus I
- 3117 Calculus II
  - or 3115 Calculus II (V)
- 3211 Multivariable Calculus
- 5102 Chemistry I
- 5206 Chemistry II
  - or 5208 Chemistry II (H)
- 5162 Physics I
- 5266 Physics II

If a student has validated a course, no grade for that course is included in the average. Failed courses prior to 2/c year will only have their retaken grades included in the acceptance to major GPA calculation.

In addition, a grade of C or above is required in the following courses:

1118	Engineering Mechanics - Statics
1206	Mechanics of Materials
1242	Applied Nav Arch & Mar Eng
6201	Ships and Maritime Systems

#### I. Core Requirements:

No substitutions are required.

#### II. Major Requirements:

1118	Engineering Mech - Statics	1204	Engr Material Science
1206	Mech of Materials	1211	Dynamics
1212	Analytl Methods Engr	1321	Elec Cir & Machines
1241	Laboratory in Naval Arch	1242	Applied Nav Arch & Mar Eng
1340	Fluid Mechanics	1351	Thermodynamics
1355	Marine Engineering	1356	Ship Structures
1437	Engineering Experimentation	1442	Prin of Ship Design
1444	Ship Design/Sys Intgr	1453	Ship Propulsion Design
1459	Heat Transfer	3117	Calculus II
3211	Multivariable Calculus	5162	Physics II
5206	Chemistry II	_____	Technical Elective

#### III. Technical Elective:

The purpose of this elective is to offer students the opportunity to explore a wider variety of technical topics. Any Engineering, Math, or Science course (12XX, 32XX, 52XX or above, not already taken) qualifies as a technical elective with the following exceptions:

1. Any management or project management course, regardless of course number, is generally not considered technical in nature and does not satisfy the technical elective requirement without the approval of the NA&ME Section Chief.
2. Courses specifically prohibited as technical electives include: 1218 Elec Engineering I and 1210 Materials for Civil and Construction Engineers as they significantly overlap existing required courses.

Below is a common list of technical electives:

1208	Intro Mech Eng Design	1304	Soil Mechanics
1420	Electric Energy & Machines	1435	Intro Aerodynamics
1447	Marine Casualty Response	1457	Small Craft Design
1466	HVAC Principles	1469	Directed Studies in NA&ME
3221	Linear Algebra	5232	Marine Biology
5234	Marine Geochemistry	5302	Organic Chemistry I
5441	Petroleum & Oil Spill Sci		

#### IV. Upper Division Courses:

All 13XX and 14XX level courses, excluding 1321 Elec Cir & Machines, required by the Major and one Technical Elective (or approved substitutes for any of these courses) are considered as Upper Division Courses.

**NAVAL ARCHITECTURE AND MARINE ENGINEERING**

<b>Fall Semester</b>			<b>Spring Semester</b>		
<i>Fourth Class Year</i>			<i>Credits</i>		
2111	College Composition	3.00 *	1104	Intro to Computing	3.00 *
2163	American Government	3.00 *	1118	Engineering Mech - Statics	3.00 *
3111	Calculus I	4.00	213X	Cultural Perspectives	3.00 *
4102	Prin Fitness/Wellness I	1.00	3117	Calculus II	4.00
4111	Swimming	0.25	4103	Personal Defense I	0.25
5102	Chemistry I	4.00	4112	Prin Fitness/Wellness II	1.00
6101	Fndamntls of Navigation	4.00 *	5162	Physics I	4.00

\* Theses course may be scheduled during the Fall or Spring Semester.

<i>Third Class Year</i>			<i>Credits</i>		
1206	Mech of Materials	3.50	1211	Dynamics	3.00
1212	Analytl Methods Engr	4.00	1242	Applied Nav Arch & Mar Eng	4.00
1241	Laboratory in Naval Arch	1.00	1321	Elec Cir & Machines	4.00
4222	Professional Rescuer	2.00	3211	Multivariable Calculus	3.00
5266	Physics II	4.00	4204	Lifetime Sports I: RQB	0.25
6201	Ships & Maritime Sys	3.00	4214	Lifetime Sports II: Golf	0.25
8211	Org Behavior/Ldrship	3.00	5206	Chemistry II	4.00
			6202	Apps in Navigation	1.00

<i>Second Class Year</i>			<i>Credits</i>		
1204	Engr Material Science	4.00	1355	Marine Engineering	3.50
1340	Fluid Mechanics	3.00	1356	Ship Structures	3.50
1351	Thermodynamics	3.00	1459	Heat Transfer	3.00
3213	Probability & Statistics	3.00	2394	Intro Moral & Ethical Phil	2.00
4303	Personal Defense II	0.25	6301	Maritime Watch Officer	4.00
4304	Lifetime Sports III: Tennis	0.25			
8313	Essentials of Economics	2.00			

<i>First Class Year</i>			<i>Credits</i>		
1437	Engr Experimentation	3.00	1444	Ship Dsgn/Sys Intgr	4.00
1442	Prin of Ship Design	4.00	1493	Engineering Ethics	1.00
1453	Ship Propulsion Design	3.00	2485	Global Studies	3.00
2398	Prin CJ & Maritime Op Law	4.00	5444	Atmospherc & Mar Sci	1.50
—	Technical Elective	3.00-4.00	6401	Professional Maritime Officer	3.00
—	Physical Education	0.50	6402	Professional Maritime Officer Lab	1.00
			7310	Intro to Cyber Tech	1.50
			—	Free Elective **	3.00-4.00
			—	Physical Education	See Note

Note: First class cadets must take 0.50 credit hours of health and physical education. As a graduation requirement, each cadet must pass or validate a minimum of six (6) academic credits in HPE.

\*\* Given the breadth of study inherent in the Academy's core curriculum, free electives are not required for graduation. Therefore, they can be waived if at least 15 academic credits (not including Health and Physical Education credits) are taken each semester.

## GOVERNMENT

The Government (GOVT) major develops leaders for the 21st Century who think critically about global peoples, civil societies, and political systems and who possess the analytical abilities to explore their cultural, theoretical, and jurisprudential foundations. Government Major Requirements offer a solid foundation in the political science discipline. A required concentration in either Politics, Policy, and Law; Security Studies; or International Relations enables future leaders to develop in depth understanding of how cultures, theories, institutions, and political processes influence the evolution of domestic, international, and global peoples, systems, and institutions. A required cognate concentration in the Humanities expands cadets' understanding of the human condition and human societies. All cadets in the Government major are required to complete a minimum of one First Class seminar and a research-based capstone experience. Select cadets in the major may pursue advanced studies, senior theses, and advanced research projects involving original research related to their concentration. The Government major is an affiliate of the American Political Science Association and sponsors cadet membership in Pi Sigma Alpha, the National Political Science Honor Society. Government majors compete successfully for Fulbright, Truman, Gates, and other prestigious post-graduate fellowships.

### Elements of Degree Completion for Government Major:

To successfully earn the degree of Government, a cadet must:

1. Complete all Major Requirement Courses with the grade of C- or higher; including a 2400 level capstone requirement.\*
2. Complete 4 courses in Humanities Studies (including a minimum of one Literature of Humanity and Conflict course and at least one world language course.)
3. Complete 1 law course in addition to the core law course.
4. Complete 1 Maritime Studies course.
5. Complete 6 courses in one political science concentration area (Politics, Policy and the Law; International Relations; or Security Studies), at least one of which must be a 2400 level course.
6. Complete 2 courses offered by the Department outside the cadet's primary concentration area (i.e., the "Non-Concentration Requirements").
7. All Government Majors must successfully complete a capstone experience.

\*Note: 2269 and 2265 are Major Requirements that are also courses required for acceptance into the major; therefore Government Majors must earn a C in those courses as denoted below.

### *Acceptance into the Major*

Acceptance into the Government major is contingent upon meeting the following requirements:

A grade of C or higher in

- |      |   |
|------|---|
| 2111 | College Composition                     |
|      | or 2121 The Art of Effective Writing    |
| 2142 | Computer Problem Solving*               |
| 2163 | American Government                     |
| 2265 | Comparative Politics                    |
| 2269 | National Security Policy                |
| 2293 | Moral, Ethical and Political Philosophy |

\* A grade of C or better in 1104 Introduction to Computing will be accepted as completing the 2142 acceptance to major requirement.

#### I. Core Requirements:

Government majors should take 2142 Computer Problem Solving instead of 1104 Introduction to Computing although a C in 1104 will be accepted as completing the 2142 requirement. Government majors do not take 2485 Global Challenges as successful passage of 2265 and 2367 serve as equivalency. Government majors take 2293. Alternatively, a combination of the 2-credit 2394, plus either the 1-credit 1493, 5493, or 7294, can serve as a substitute.

#### II. Major Requirement Courses:

- |      |                      |      |                          |
|------|----------------------|------|--------------------------|
| 2265 | Comparative Politics | 2269 | National Security Policy |
| 2355 | Public Policy Making | 2361 | Political Theory         |

2367 International Relations

23/4XX Law Course

Maritime Studies Course \*

24XX Capstone Course

\* 2392 Maritime Studies: Selected Topics, 2467 Environmental Policy and Ethics; 2463 Maritime Policy and Strategy; 5445 Fisheries Management; 5441 Petroleum and Oil Spill Science; and 1309 Environmental Engineering I and other courses as designated by the Department Head may be used to fulfill the Maritime Studies requirement. These additionally designated courses will be listed as such in the “Concentration Requirement” offerings list promulgated each spring by the Department.

### Capstone Course

All Government majors are required to successfully complete a research-based capstone requirement their First Class Year. Capstone options require a focused research paper or project in the selected Major Concentration. The capstone requirement may be fulfilled through an Advanced Research Project, Senior Thesis, Advanced Studies, or a 2400 level course specifically designated for that purpose. Cadets wishing to be considered for an Advanced Research Project, Senior Thesis or Advanced Studies experience will submit an “Academic Excellence Opportunity” application to the Government Section Chief prior to spring break of the cadet’s second class year. Descriptions of all capstone experiences appear below:

1. *Advanced Research Projects* (2499) are year-long original research projects for Coast Guard and interagency sponsors undertaken by Government major or interdisciplinary research teams aligned with the Major Concentrations. The Advanced Research Project option is normally limited to cadets with a GPA of 3.0 or higher in the Government Major. Cadets selected for the Advanced Research Project should register for the course during their last two semesters. The two-semester sequence will satisfy the Capstone course requirement and fulfill one of the six Major Concentration requirements.
2. *Advanced Studies* (2495) are one-semester experiences that either include development of a research project for delivery at a national or international student conference or that involve an internship in the spring semester. Cadets selected for this experience will be assigned to work with a Departmental Faculty Advisor. This course will count as the cadet’s capstone. The Advanced Studies option is normally limited to cadets with a GPA of 3.0 or higher in the Government major.
3. *Senior Theses* (2497) are one-semester individual research projects in the Major Concentration. Senior Theses require that the cadet submit a request memo routed through the academic advisor, thesis advisors and Department Head, which includes a/an: research area of interest, CGPA and GPA in the major, identification of two faculty members who agreed to sponsor the work (at least one of whom must be a permanent faculty member with terminal degree), and explanation of how the proposed thesis will fit into the cadet’s plan or study. Cadets will normally deliver the final product presentation of the Senior Thesis at Senior Symposium Day. This experience will count as the cadet’s capstone. The Senior Thesis option is rarely granted, and is limited to cadets with demonstrated sustained interest and aptitude in a specific topic area. Applicants wishing to undertake a Senior Thesis must have a GPA of 3.0 or higher in the Government major.
4. *Capstone-eligible courses* - These courses, conducted as research seminars, are normally specifically designated 2400 level offerings, and will be identified as capstone-eligible in the “Concentration Requirements” list promulgated by the Department each academic year during registration. Performance expectations and course requirements for cadets utilizing a capstone-eligible course to satisfy their capstone requirement will differ from those taking the same course to meet other graduation and major requirements (e.g., as a concentration requirement or free elective). Regardless of what the course syllabus and instructor otherwise require, to satisfy the capstone requirement you will author a substantial paper or undertake a unique project of similar rigor that is based upon individual, original research and which draws from the entirety of your experience in the major. Course instructors, at their discretion, may allow relief from other course requirements in consideration of the additional effort required of those undertaking their capstone experience (e.g., a student using a 2400-level seminar as a capstone experience may request to have their original research paper or project counted in place of a final exam or lesser class project, or may “build out” an existing class assignment to meet the Capstone requirement.) 2400-level courses will be paired with the 1-credit 2491 to account for the additional workload and heightened expectations.

### Humanities Studies Requirements

Government majors are required to take a minimum of four Humanities Studies courses.

1. All majors are required to take a Literature of Humanity and Conflict course (2324, 2325, or 2326).
2. World Language - All Government majors are required to demonstrate intermediate competency in a language other than English. This is normally done by passing Spanish I/II, Spanish II or a higher level Spanish course. Cadets who wish to fulfill this requirement in another language through approved Academy exchange programs or through Connecticut College may petition to do so by memo through the Chief, English and World Languages Section and the

Head, Department of Humanities. Specific details outlining the policies for doing so are available through the Department's Lead Advisor.

3. After satisfying the two requirements above, cadets must fulfill the remaining Humanities requirements (i.e., 4 courses total) with History, Ethics, Philosophy, Literature, Language, Speech, or other Writing offerings. If a cadet starts in Spanish I, they must take Spanish II to fulfill the language requirement, but Spanish I will count as one of their Humanities Requirements.

#### *HR 2200 Level Courses*

2235 Spanish I  
2236 Spanish I/II  
2237 Spanish II  
2241 Modern European Civilization  
2242 World Civilizations

#### *HR 2300 Level Courses*

2324 Literature of Humanity and Conflict: U.S. Latinos  
2325 Literature of Humanity and Conflict: World Epics and Myths  
2326 Literature of Humanity and Conflict: African American Literature  
2328 Public Speaking in a Diverse Society  
2335 Spanish III  
2337 Spanish IV  
2341 The Civil War Era  
2343 Latin Am Exp: Cultural App  
2360 Selected Topics in Philosophy

#### *HR 2400 Level Courses*

2429 The Craft of Creative Writing  
2439 Advanced Spanish

NOTE: Enrollment in Spanish courses is determined by placement, not class year. All Government majors should take the Spanish placement exam, available at: <http://webcape.byuhtsc.org/nwregister.php?acct=uscga>, as early as possible during 4/c year to ensure proper placement. Passwords may be obtained by contacting the World Language instructors within the Department of Humanities. Transfers to the major must take the placement exam prior to formal application to the major. Spanish course placement is determined by placement examination.

### **Law Requirement**

Government Majors must take one additional law offering in addition to the core Principles of Criminal Justice and Maritime Operational Law course (2398).

Note: As with other requirements, courses may not be “double counted” – the same course cannot be used to meet multiple graduation or major requirements. Thus, the second law course cannot be counted to satisfy the concentration or non-concentration requirement (see below).

### **Maritime Studies Requirement**

Government Majors must take at least one course in maritime studies. This is generally 2463 Maritime Policy and Strategy, but can include any course designated as a “maritime studies” course by the Department.

Note: As with other requirements, courses may not be “double counted” – the same course cannot be used to meet multiple graduation or major requirements.

### **III. Major Concentration Descriptions and Requirements:**

A minimum of six courses in one of three Major Concentrations in Politics, Policy and Law; International Relations; or Security Studies; including at least one 2400 level seminar, are required for all Government majors. Descriptions and requirements of each option appear below:

#### **Politics, Policy, and Law (PPL) Concentration**



The PPL concentration investigates how political systems are organized as well as how politics, policy processes, and the law shape and support those political systems. Special emphasis is placed on democracies as a form of civil society, government, and legal systems, and as manifestations of various political theories. The concentration analyzes the origins of democratic values, as well as contemporary questions about political participation, civic engagement, church-state relations, and the role of the military. Considered as well are how configurations of race, class, gender, religion, and ethnicity are pivotal to the roles, responsibilities and processes of the institutions of democratic governance. Courses in this concentration investigate the parameters of constitutional law, significant policy issues facing democracies, and the legal and cultural constructions of citizenship, including the practices which shape, transform, and destabilize democracies.

Requirements: All cadets are required to take a minimum of six courses in their concentration. No more than two may be taken at the 2200-level unless a third 2200-level course is taken as a free elective. All cadets must take at least one Concentration course at the 2400-level course, which are reserved for first class only.

*PPL 2200 Courses (Third and Second Class Cadets. \*)*

2267 American Congress  
2272 Political Participation

*PPL 2300 Courses (Second and First Class Cadets. \*)*

2362 Homeland Security Policy  
2363 Contemporary Political Theory  
2370 American Presidential Policy  
2397 Constitutional Law and Homeland Security

*PPL 2400 Seminars (First Class Cadets only. Minimum of one seminar required.)*

2463 Maritime Policy and Strategy\*\*  
2465 U.S. Military Policy  
2467 Environmental Policy and Ethics\*\*  
2468 Religion, Politics, and Globalization  
2469 International Development  
2494 International Law  
2499 Advanced Research Project\*\*\*

\* Unless approved by the course instructor and cognizant curricular supervisor, i.e. Law Section Chief, Program Coordinator for Language, or the Program Chair for Government.

\*\*If 2463 Maritime Policy and Strategy or 2467 Environmental Policy and Ethics is used to satisfy the Maritime Studies requirement, it cannot be counted as a Concentration Requirement.

\*\*\*2499 Advanced Research Project is a two semester course. One semester may be used as a 2400 Concentration Requirement. The other would fulfill the Capstone requirement.

### **International Relations (IR) Concentration**

The International Relations concentration provides a solid foundation in international affairs, comparative politics, and global political theory. Courses examine historic and contemporary challenges confronting global societies through the study of social, political, economic, and cultural transformations and forces in comparative perspective. Such changes are evaluated in light of their relationship to the dynamic roles of governments, regional and international organizations, and non-state actors. The concentration also focuses on the way institutions, social movements, and ethnic communities influence the international system and considers the roles that religion, race, nationalism, and gender play in shaping relationships among international actors. The International Relations concentration is designed to develop future leaders and citizens who understand today's complex global environment, possess the cross-cultural competencies to function effectively within it, and assume leadership roles in shaping its future.

Requirements: All cadets are required to take a minimum of six courses in their concentration. No more than two may be taken at the 2200-level unless a third 2200-level course is taken as a free elective. All cadets must take at least one at the 2400-level course, which are reserved for first class only.

*IR 2200 Courses (Third and Second Class cadets. \*)*

2243 Modern Diplomacy  
2272 Political Participation



- 2274 International Political Economy
- IR 2300 Courses (Second and First Class cadets. \*)*
- 2338 Culture and Politics of Latin America
  - 2352 Conflict Resolution, Diplomacy and Negotiation
  - 2358 Politics of North Africa and the Middle East
  - 2359 African Politics
  - 2363 Contemporary Political Theory
  - 2369 Contemporary U.S. Foreign Policy
  - 2371 Area Studies
  - 2373 The Religion and Political Philosophy of Islam
  - 2377 Politics of China
  - 2378 Asia in World Affairs
- IR 2400 Seminars (First Class Cadets only. Minimum of one seminar required.)*
- 2463 Maritime Policy and Strategy\*\*
  - 2467 Environmental Policy and Ethics\*\*
  - 2468 Religion, Politics, and Globalization
  - 2469 International Development
  - 2472 Transnational Threats and Challenges
  - 2494 International Law
  - 2499 Advanced Research Project\*\*\*

\*Unless approved by the course instructor and cognizant curricular supervisor, i.e. Law Section Chief, Program Coordinator for Language, or the Program Chair for Government.

\*\*If 2463 Maritime Policy and Strategy or 2467 Environmental Policy and Ethics is used to satisfy the Maritime Studies requirement, it cannot be counted as a Concentration Requirement.

\*\*\*2499 Advanced Research Project is a two semester course. One semester may be used as a 2400 Concentration Requirement. The other would fulfill the Capstone requirement.

### **Security Studies (SS) Concentration**

The Security Studies concentration challenges future leaders to develop a broad conceptualization of security—from its traditional state-centric interpretation to a 21st century view which includes global, homeland, human, and environmental security threats and challenges. The concentration fosters development of a nuanced understanding of both the inter-relationship and core differences among individual, national, and international levels of security. It emphasizes the causes and prevention of war, protection of the homeland, military operations, security of maritime systems, intelligence studies and grand strategy. The Security Studies concentration enhances understanding of the wide range of security challenges and develops critical thinking abilities essential to analysis of security policy processes and outcomes.

Requirements: All cadets are required to take a minimum of six courses in their concentration. No more than two may be taken at the 2200-level unless a third 2200-level course is taken as a free elective. All cadets must take at least one at the 2400-level course, which are reserved for first class only.

- SS 2200 Courses (Third and Second Class Cadets. \*)*
- 2281 Intelligence and Democracy
- SS 2300 Courses (Second and First Class Cadets. \*)*
- 2352 Conflict Resolution, Diplomacy and Negotiation
  - 2362 Homeland Security Policy
  - 2369 Contemporary U.S. Foreign Policy
  - 2371 Area Studies
  - 2375 Strategic Intelligence: Collection and Analysis
  - 2397 Constitutional Law and Homeland Security
- SS 2400 Seminars (First Class Cadets only. Minimum of one seminar required.)*
- 2463 Maritime Policy and Strategy\*\*
  - 2465 U.S. Military Policy
  - 2467 Environmental Policy and Ethics\*\*
  - 2468 Religion, Politics, and Globalization

2469 International Development  
2472 Transnational Threats and Challenges  
2494 International Law  
2499 Advanced Research Project\*\*\*

\*Unless approved by the course instructor and cognizant curricular supervisor, i.e. Law Section Chief, Program Coordinator for Language, or the Program Chair for Government.

\*\*If 2463 Maritime Policy and Strategy or 2467 Environmental Policy and Ethics is used to satisfy the Maritime Studies requirement, it cannot be counted as a Concentration Requirement.

\*\*\*2499 Advanced Research Project is a two semester course. One semester may be used as a 2400 Concentration Requirement. The other would fulfill the Capstone requirement.

### **Non-Concentration Requirement**

Cadets in the Government Major must complete two courses offered by the Department outside the cadet's primary concentration area. For example, a cadet pursuing the Politics, Policy, and Law Concentration would need to take two courses designated as International Relations, Security Studies, or Humanities courses. Cadets are free to choose courses from the same or different non-primary concentration areas to satisfy this requirement. If a course happens to count for multiple concentrations (including the cadet's primary concentration area), it may be counted to help satisfy the non-concentration requirement.

### **Free Electives**

Two free electives enable Government majors to pursue cognate interests in other CGA academic disciplines or to develop greater depth or breadth within the Government major including Humanities courses.

### **Special Academic Opportunities**

Select Second Class Cadets may compete for:

- a. The Service Academy Exchange program, undertaking one semester of study at the U.S. Military Academy, U.S. Naval Academy, or U.S. Air Force Academy.

Select First Class Cadets may compete for:

- a. The Fund for American Studies summer study abroad programs in democracy and development.
- b. The 1/c Summer Internship Program administered by the Department of Humanities which offers internships in legislative, executive, and intelligence agencies.
- c. Capstone opportunities, including Advanced Research Projects, Advanced Studies, and Senior Thesis options.

### **Exceptions to normal course of study**

1. Validation Policy. No Major Requirement Courses or Concentration Requirements in the Government major may be validated unless *all* of the following requirements are met.
  - a. Completion of a course with a grade of "B" or higher from an accredited four-year institution of higher education offering a political science or government major.
  - b. Validation by the USCGA course coordinator and Chief, Government Section that the course meets USCGA Government major learning objectives and graded requirements equivalency.
  - c. Approval of the Head, Department of Humanities.
2. Advanced Placement Credit. Credit for Advanced Placement courses is not available for Government Major or Concentration Requirements.

### **IV. Upper Division Courses:**

Upper Division courses are those listed under Major Requirement Courses above; and courses taken to satisfy the Humanities Studies Requirement; Concentration Requirement, and Non-Concentration Requirement.

**GOVERNMENT**

<b>Fall Semester</b>			<b>Spring Semester</b>		
<i>Fourth Class Year</i>			<i>Credits</i>		
2111	College Composition	3.00 *	213X	Cultural Perspectives	3.00 *
2163	American Government	3.00	2142	Comp Prob Solving	3.00
3111	Calculus I	4.00	3213	Probability & Statistics	3.00
4102	Prin Fitness/Wellness I	1.00	4103	Personal Defense I	0.25
4111	Swimming	0.25	4112	Prin Fitness/Wellness II	1.00
5102	Chemistry I	4.00	5162	Physics I	4.00
8115	Macroeconomic Prin	3.00 *	6101	Fndmntals of Navigation	4.00 *

\* These courses may be scheduled during the Fall or Spring Semester.

<i>Third Class Year</i>			<i>Credits</i>		
2269	National Security Policy	3.00	2265	Comparative Politics	3.00
2293	Moral/Ethcl/Pol Phil	3.00	4204	Lifetime Sports I: RQB	0.25
4222	Professional Rescuer	2.00	4214	Lifetime Sports II: Golf	0.25
52X6	Lab Science	4.00 **	6201	Ships & Maritime Sys	3.00 **
22XX	Concentration Reqrmt 1	3.00	6202	Apps in Navigation	1.00 **
—	Humanities Reqrmt 1	3.00	8211	Org Behavior/Ldrship	3.00
			22/23XX	Concentration Reqrmt 2	3.00
			—	Humanities Reqrmt 2	3.00-4.00

\*\* These courses may be taken during the Fall or Spring Semester depending on which Lab Science (5206 or 5266) is requested.

<i>Second Class Year</i>			<i>Credits</i>		
2355	Public Policymaking	3.00	2361	Political Theory	3.00
2367	International Relations	3.00	6301	Maritime Watch Officer	4.00
2398	Prin CJ & Maritime Op Law	4.00	23XX	Concentration Reqrmt 4	3.00
4303	Personal Defense II	0.25	23/24XX	Law Requirement	3.00
4304	Lifetime Sports III: Tennis	0.25	—	Humanities Reqrmt 3	3.00-4.00
23XX	Concentration Reqrmt 3	3.00			
—	Maritime Studies Reqrmt	3.00			

<i>First Class Year</i>			<i>Credits</i>		
6401	Professional Maritime Officer	3.00	5444	Atmosphere & Mar Sci	1.50
6402	Professional Maritime Officer Lab	1.00	7310	Intro to Cyber Tech	1.50
23/24XX	Concentration Reqrmt 5	3.00	24XX	Capstone Requirement	3.00
2XXX	NC Requirement 1	3.00	24XX	Concentration Reqrmt 6	3.00
—	Humanities Reqrmt 4	3.00-4.00	2XXX	NC Requirement 2	3.00
—	Free Elective	3.00-4.00	—	Free Elective	3.00-4.00
—	Physical Education	0.50	—	Physical Education	See Note

Note: First class cadets must take 0.50 credit hours of health and physical education. As a graduation requirement, each cadet must pass or validate a minimum of six (6) academic credits in HPE.

## OPERATIONS RESEARCH AND COMPUTER ANALYSIS

The Operations Research and Computer Analysis (ORCA) major provides graduates a background in mathematics, probability, statistics, deterministic and non-deterministic modeling, and computer programming and analysis. The primary focus is to enable our cadets to conceptualize and describe reality using the tools of mathematics and statistics, analyze possible models and solutions, use appropriate computer technology, apply these skills to specific Coast Guard problems, and effectively communicate solutions. The study of Operations Research and Computer Analysis highlights the means by which mathematics and computers can be used to analyze complex problems and improve decision-making.

The Department of Mathematics emphasizes the understanding of mathematical concepts and the practical application of mathematics to everyday problems. Courses concentrate on the fundamentals of mathematical reasoning and analysis as well as the theory and tools of operations research, statistics, and computer analysis. Our graduates have a strong background in computer programming and data analysis as well as experience utilizing a computer algebra system, along with other statistics, optimization, and simulation packages.

One of the highlights of the Operations Research and Computer Analysis major is the cadet capstone experience. To meet this major requirement, each first class cadet must put into practice what they have learned in the classroom throughout their 4-year education in operations research by completing one of the capstone designated course offerings. The capstone designated courses are designed to cover multiple aspects of the analytics project/problem framework, and will require students to draw upon multiple aspects from across the Operations Research & Computer Analysis (ORCA) curriculum. The capstone designated course offerings always include the opportunity for cadets to work as consulting teams on projects submitted by various Coast Guard units. In addition to providing consulting benefits to the Coast Guard, these projects strengthen the connectivity between the Academy, the service, and the field of operations research. Recent cadet projects as part of this capstone experience, with the sponsoring office shown in parentheses, include:

- Coast Guard MK Station Staffing Analysis (USCG Headquarters Office of Requirements and Analysis)
- USCG District 9 Aviation Search and Rescue Plan (USCG Air Station Traverse City)
- Recreational Boating Safety Analysis (USCG Headquarters Office of Auxiliary and Boating Safety)
- Workforce Skills Management (USCG Headquarters Office of Strategic Workforce Planning and HR Analytics)
- Fisheries Enforcement by Quantifying Risk (USCG Sector Southeastern New England)

The Department of Mathematics sponsors a Summer Internship Program for first class cadets who have displayed exceptional abilities both academically and militarily. This program provides an opportunity for the educational and professional growth of these cadets as they perform operations research work for the Coast Guard or other government agencies. Recent internships have been offered at: the National Security Agency, the Coast Guard Office of Requirements and Analysis (CG-771), the Coast Guard Office of Strategic Workforce Planning and HR Analytics (CG-126), the Coast Guard Special Missions Training Center, and Massachusetts Institute of Technology (MIT) Lincoln Labs.

In support of the United States Coast Guard Academy's Statement of Vision and Missions, Guiding Principles, and Shared Learning Outcomes, the Department of Mathematics' outcomes include producing graduates who:

- understand and demonstrate proficiency in all mathematics coursework required for their CGA degree;
- effectively communicate mathematical information in many contexts including reading, writing, listening, and presenting;
- interpret, critically analyze, model, and provide solutions to relevant problems that may involve mathematics, data analysis, software applications, or mathematical proofs;
- appreciate and practice effective team membership and leadership, constructive assessment of self and others, and lifelong learning;

and producing ORCA graduates who also

- appreciate and practice the use of mathematics and operations research techniques to improve processes and solve applied problems for the Coast Guard.

### *Acceptance into the Major*

Acceptance requires attainment of a 2.00 average in all courses taken in the Department of Mathematics prior to the 2/c year. If a course is retaken, both the original and the retake credits/grades are included in the Acceptance into the Major GPA calculation. Late transfers into the major may receive provisional acceptance until sufficient math classes on the ORCA general schedule for third class year have been taken to assess mathematical aptitude.

### I. Core Requirements:

Substitute Probability Theory (3341) for Probability and Statistics (3213).

**II. Major Requirements:**

All Operations Research and Computer Analysis Upper Division Courses listed below in section IV along with 3117 Calculus II and 3211 Multivariable Calculus. The Capstone Course requirement can be met with either course 3471 Operations Analysis or 3473 Problem Solving with Operations Research. In addition, 3470 Operations Analysis Preparation is required unless a waiver is granted in writing by the Mathematics Department Head. If a course is retaken, both the original and the retake credits/grades are included in the Upper Division GPA calculation. If more than two Major Area Electives are taken, the two with the highest grades earned are used for the Upper Division GPA calculation.

**III. Major Area Electives:**

Courses which emphasize the application or theory of mathematics, statistics, computer analysis or operations research. Such courses are typically taken in the Department of Mathematics and must be documented and approved by the Mathematics Department Head.

**IV. Upper Division Courses:**

3221	Linear Algebra	3231	Linear Optimization
3235	Comp Model Languages	3236	Information Systems
3237	Discrete Mathematics	3333	Ntwrk & Nonlin Optim
3334	Intermediate Det Models	3238	Algorithms w/Applications
3341	Probability Theory	3343	Mathematical Statistics
3447	Linear Regression	3449	Statistical Learning
3453	Decision Models	3463	Simulation w/Risk Analysis
34XX	Capstone Course	_____	Major Area Elective (2)

**OPERATIONS RESEARCH AND COMPUTER ANALYSIS**

<b>Fall Semester</b>			<b>Spring Semester</b>		
<i>Fourth Class Year</i>			<i>Credits</i>		
1104	Intro to Computing	3.00 *	213X	Cultural Perspectives	3.00 *
2111	College Composition	3.00 *	3117	Calculus II	4.00
2163	American Government	3.00 *	4103	Personal Defense I	0.25
3111	Calculus I	4.00	4112	Prin Fitness/Wellness II	1.00
4102	Prin Fitness/Wellness I	1.00	5162	Physics I	4.00
4111	Swimming	0.25 *	6101	Fndmntls of Navigation	4.00 *
5102	Chemistry I	4.00	8115	Macroeconomic Prin	3.00 *
<i>Third Class Year</i>			<i>Credits</i>		
3211	Multivariable Calculus	3.00 *	2293	Moral/Ethcl/Pol Phil	3.00 *
3221	Linear Algebra	3.00	3231	Linear Optimization	3.00
3235	Comp Model Languages	3.00	3237	Discrete Mathematics	3.00
4204	Lifetime Sports I: RQB	0.25 *	3238	Algorithms w/Applications	3.00
4214	Lifetime Sports II: Golf	0.25 *	4222	Professional Rescuer	2.00 *
52X6	Lab Science	4.00 **	6201	Ships & Maritime Sys	3.00 *
8211	Org Behavior/Ldrship	3.00 *	6202	Apps in Navigation	1.00 *
<i>Second Class Year</i>			<i>Credits</i>		
2398	Prin CJ & Maritime Op Law	4.00 *	3334	Intermediate Det Models	3.00
3333	Network & Nonlin Optim	3.00	3343	Mathematical Stats	3.00
3336	Information Systems	3.00	3347	Linear Regression	3.00
3341	Probability Theory	3.00	6301	Maritime Watch Officer	4.00 *
_____	Major Area Elective	3.00-4.00 *	_____	Free Elective ***	3.00-4.00
4303	Personal Defense II	0.25 *			
4304	Lifetime Sports III: Tennis	0.25 *			
<i>First Class Year</i>			<i>Credits</i>		
2485	Global Studies	3.00 *	34XX	Capstone Course	4.00
3449	Statistical Learning	3.00	5444	Atmosphere & Mar Sci	1.50 *
3453	Decision Models	3.00	6401	Professional Maritime Officer	3.00 *
3463	Simulatn w/Risk Anlys	3.00	6402	Professional Maritime Officer Lab	1.00 *
3470	Operations Analysis Prep	1.00	7310	Intro to Cyber Tech	1.50 *
_____	Free Elective ***	3.00-4.00	_____	Major Area Elective	3.00-4.00 *
_____	Physical Education	See Note *	_____	Free Elective ***	3.00-4.00

Note: First class cadets must take 0.50 credit hours of health and physical education. As a graduation requirement, each cadet must pass or validate a minimum of six (6) academic credits in HPE.

\* These courses may be taken during the Fall or Spring Semester.

\*\* This course may be taken during the Fall or Spring Semester depending on which Lab Science (5206 or 5266) is requested.

\*\*\* These courses may be taken during the Fall or Spring Semester. Given the breadth of study inherent in the Academy's core curriculum, free electives are not required for graduation. Therefore they can be waived if at least 15 academic credits (not including Health and Physical Education credits) are taken each semester.

## MARINE AND ENVIRONMENTAL SCIENCES

The Marine and Environmental Sciences (MES) major focuses on physical, chemical, and biological aspects of the marine environment. Specific topics include meteorology; wind-driven and deep ocean circulation; estuarine processes; marine geochemistry; chemistry of oil; the safe transport and storage of hazardous materials; survey of marine life, biological productivity; fisheries management; remote sensing of environmental conditions; and human influence on the marine environment. Laboratories, which include field studies on the Thames River in the Marine Science boat, allow students to gain hands-on experience in weather forecasting, computer modeling of the wind-driven ocean circulation, collecting and analyzing oceanographic data, chemical identification of unknown compounds, identification of marine organisms, analysis of commercial fishing techniques and use of geospatial technologies to study the marine environment. Applications of theory to solving Coast Guard problems are emphasized throughout the curriculum. Courses are primarily quantitative in nature and require a good understanding of physics, chemistry, and calculus. The student's academic experience culminates in a Capstone project. Through this project, students will reinforce classroom theory with real-world application in an effort to tackle complex problems and provide solutions relevant to Coast Guard missions.

In addition to the Academy's Shared Learning Outcomes, the Marine and Environmental Sciences Program Educational Objectives include producing graduates who:

1. Are Knowledgeable and Competent
  - Demonstrate scientific and technical proficiency
  - Synthesize information from data, knowledge from information, and wisdom from knowledge and experience
2. Think and Are Aware
  - Exhibit critical and other forms of thinking
  - Be aware of self, situation, and surroundings (changing conditions)
3. Communicate Effectively
  - Communicate results of one's work, as an oral presentation, scientific poster presentation, and technical or non-technical writing
4. Are Leaders and Role Models
  - Demonstrate Coast Guard Core Values
  - Exhibit character and integrity
  - Be self-sufficient and self-confident

### *Acceptance into the Major*

Acceptance requires attainment of a 2.00 average in all Mathematics and Science courses taken prior to the beginning of the 2/c year.

If a student has validated a course, no grade for that course is included in the average. For failed courses only their retake grades will be included in the acceptance to major GPA calculation. A passing grade must be earned for all courses unless validated.

### I. Core Requirements:

Marine and Environmental Sciences majors are not required to take Atmospheric and Marine Sciences (5444).

### II. Major Requirements:

3117	Calculus II	3211	Multivariable Calculus
3215	Differential Equations	5206	Chemistry II
5232	Marine Biology	5266	Physics II
5236	Oceans I: Air and Sea	5355	Env Policy and Law
5330	Geospatial Sciences I	5443	Marine Ecology
5381	Capstone Research Experience 1	5480	Capstone Research Experience 2
5480	Capstone Research Experience 3	5493	Science Ethics Seminar

### III. Major Area Electives:

Complete courses for one of the following three subject areas:

#### **Environmental Science:**

5233 Environmental Science



- 5237 Organic Chemistry I
  - 5312 Analytical Methods in Chemistry
  - 5419 Biochemistry
  - 5435 Emergency Management
  - 5415 Fate & Transport of Chemicals in the Environment
- 3 Course Elective Track approved by Chemistry Section Chief

The following tracks are pre-approved:

**Mass and Energy**

- 1118 Engineering Mechanics: Statics
- 1340 Fluid Mechanics
- 1351 Thermodynamics

**Environmental Health**

- 5417 Toxicology
- 54xx Organic Chemistry II
- 5440 Microbiology

**Environmental Policy**

- 2355 Public Policymaking
- 2392 Maritime Studies: Selected Topics
- 2463 Maritime Policy and Strategy

**Water and Soil**

- 1309 Environmental Engineering I
- 1407 Environmental Engineering Design II
- 1409 Water Resources Engineering

**Marine Science:**

- 5241 Oceans II: Land and Sea
- Two of the following three tracks

**Biological Environmental**

- 5334 Fisheries Biology
- 5342 Bio & Chem Oceanography
- \_\_\_\_\_ Science Elective
- 5445 Fisheries Management

**GEOINT**

- 2282 Intel & Cyber Ops
- 5367 Remote Sensing
- 5430 Geospatial Sciences II
- 5435 Emergency Management **or**
- 5454 Operational Oceanography

**Physical Oceanography**

- 5350 Ocean Dynamics
- 5338 Marine Forecasting
- 5450 Waves, Tides & Coastal Processes
- 5447 Polar Oceanography

**Marine & Environmental Physics:**

- 5233 Environmental Science
- 5241 Oceans II: Land and Sea
- 5312 Analytical Methods in Chemistry
- 5350 Ocean Dynamics
- 5367 Remote Sensing
- 53xx Climate Change Physics\*
- 54xx Energy Physics\*
- 5450 Waves, Tides & Coastal Processes
- 5454 Operational Oceanography

\*or other course approved by the Physics Section Chief

**IV. Upper Division Courses:**

Upper Division courses are those courses assigned in each of the Concentrations as well as those below:

- 5355 Environmental Policy and Law
- 5330 Geospatial Sciences I
- \_\_\_\_\_ Capstone Project (5 credits)
- 5443 Marine Ecology
- 5493 Science Ethics Seminar

**V. Capstone Requirement:**

Each student of the MES Major must submit a proposal for and receive approval for a 5 credit – Capstone research experience (5381, 5480, 5481). At the conclusion of this experience, students will provide a summary of their research.



**MARINE AND ENVIRONMENTAL SCIENCES - ENVIRONMENTAL SCIENCE**

<b>Fall Semester</b>			<b>Spring Semester</b>		
<i>Fourth Class Year</i>		<i>Credits</i>			<i>Credits</i>
2111	College Composition	3.00 *	1104	Intro to Computing	3.00 *
2163	American Government	3.00 *	213X	Cultural Perspectives	3.00 *
3111	Calculus I	4.00	3117	Calculus II	4.00
4102	Prin Fitness/Wellness I	1.00	4103	Personal Defense I	0.25
4111	Swimming	0.25	4112	Prin Fitness/Wellness II	1.00
5102	Chemistry I	4.00	5162	Physics I	4.00
6101	Fndmntls of Navigation	4.00 *	5206	Chemistry II	4.00

\* These courses may be scheduled during the Fall or Spring Semester.

<i>Third Class Year</i>			<i>Credits</i>		
3211	Multivariable Calculus	3.00	3215	Differential Equations	3.00
4204	Lifetime Sports I: Bdmntn	0.25	4222	Professional Rescuer	2.00
4214	Lifetime Sports II: Golf	0.25	5233	Environ Science	3.50
5232	Marine Biology	4.00	5237	Organic Chem I	4.00
5236	Oceans I: Air and Sea	4.00	6201	Ships & Maritime Sys	3.00
5266	Physics II	4.00	8211	Org Behavior/Ldrship	3.00
6202	Apps in Navigation	1.00			
8115	Macroeconomic Prin	3.00			

<i>Second Class Year</i>			<i>Credits</i>		
2394	Intro Moral & Ethical Phil	2.00	4303	Personal Defense II	0.25
6301	Maritime Watch Officer	4.00	4304	Lifetime Sports III: Tennis	0.25
3213	Probability & Statistics	3.00	5330	Geospatial Sciences I	3.50
5312	Analytl Methods Chem	4.00	5355	Environ Policy & Law	3.00
5419	Biochemistry	4.00	5381	Capstone 1	1.00
			2398	Military Justice & Op Law	4.00
			_____	Track Elective 1	3.00-4.00
			_____	Free Elective	3.00-4.00

<i>First Class Year</i>			<i>Credits</i>		
2485	Global Studies	3.00	5415	Fate/Transport Chems Env	3.00
5443	Marine Ecology	3.50	5435	Emergency Management	3.00
5480	Capstone 2	3.00	5481	Capstone 3	1.00
_____	Track Elective 2	3.00-4.00	5493	Science Ethics Seminar	1.00
_____	Free Elective	3.00-4.00	6401	SelTps 100 Ton Master	3.00
			6402	SelTps 100 Ton Master Lab	1.00
			7310	Intro to Cyber Tech	1.50
			_____	Track Elective 3	3.00-4.00
_____	Physical Education	0.50	_____	Physical Education	See Note

Note: First class cadets must take 0.50 credit hours of health and physical education. As a graduation requirement, each cadet must pass or validate a minimum of six (6) academic credits in HPE.

**MARINE AND ENVIRONMENTAL SCIENCES - MARINE SCIENCE**

<b>Fall Semester</b>			<b>Spring Semester</b>		
<i>Fourth Class Year</i>		<i>Credits</i>			<i>Credits</i>
2111	College Composition	3.00 *	1104	Intro to Computing	3.00 *
2163	American Government	3.00 *	213X	Cultural Perspectives	3.00 *
3111	Calculus I	4.00	3117	Calculus II	4.00
4102	Prin Fitness/Wellness I	1.00	4103	Personal Defense I	0.25
4111	Swimming	0.25	4112	Prin Fitness/Wellness II	1.00
5102	Chemistry I	4.00	5162	Physics I	4.00
6101	Fndmntls of Navigation	4.00 *	5206	Chemistry II	4.00

\* These courses may be scheduled during the Fall or Spring Semester.

<i>Third Class Year</i>					
		<i>Credits</i>			<i>Credits</i>
3211	Multivariable Calculus	3.00	3215	Differential Equations	3.00
4204	Lifetime Sports I: Bdmntn	0.25	4222	Professional Rescuer	2.00
4214	Lifetime Sports II: Golf	0.25	5241	Oceans II: Land and Sea	3.50
5232	Marine Biology	4.00	5330	Geospatial Sciences I	3.50
5236	Oceans I: Air and Sea	4.00	6201	Ships & Maritime Sys	3.00
5266	Physics II	4.00	8211	Org Behavior/Ldrship	3.00
6202	Apps in Navigation	1.00			
8115	Macroeconomic Prin	3.00			

<i>Second Class Year</i>					
		<i>Credits</i>			<i>Credits</i>
6301	Maritime Watch Officer	4.00	2394	Intro Moral & Ethical Phil	2.00
3213	Probability & Statistics	3.00	4303	Personal Defense II	0.25
_____	Track Elective 1	3.00-4.00	4304	Lifetime Sports III: Tennis	0.25
_____	Track Elective 2	3.00-4.00	2398	Military Justice & Op Law	4.00
_____	Free Elective	3.00-4.00	5381	Capstone 1	1.00
			_____	Track Elective 3	3.00-4.00
			_____	Track Elective 4	3.00-4.00
			_____	Free Elective	3.00-4.00

<i>First Class Year</i>					
		<i>Credits</i>			<i>Credits</i>
2485	Global Studies	3.00	5355	Environ Policy & Law	3.00
5443	Marine Ecology	3.50	5481	Capstone 3	1.00
5480	Capstone 2	3.00	5493	Science Ethics Seminar	1.00
_____	Track Elective 5	3.00-4.00	6401	SelTps 100 Ton Master	3.00
_____	Track Elective 6	3.00-4.00	6402	SelTps 100 Ton Master Lab	1.00
			7310	Intro to Cyber Tech	1.50
			_____	Track Elective 7	3.00
			_____	Track Elective 8	3.00
_____	Physical Education	0.50	_____	Physical Education	See Note

Note: First class cadets must take 0.50 credit hours of health and physical education. As a graduation requirement, each cadet must pass or validate a minimum of six (6) academic credits in HPE.

**MARINE AND ENVIRONMENTAL SCIENCES – MARINE AND ENVIRONMENTAL PHYSICS**

<b>Fall Semester</b>			<b>Spring Semester</b>		
<i>Fourth Class Year</i>		<i>Credits</i>			<i>Credits</i>
2111	College Composition	3.00 *	1104	Intro to Computing	3.00 *
2163	American Government	3.00 *	213X	Cultural Perspectives	3.00 *
3111	Calculus I	4.00	3117	Calculus II	4.00
4102	Prin Fitness/Wellness I	1.00	4103	Personal Defense I	0.25
4111	Swimming	0.25	4112	Prin Fitness/Wellness II	1.00
5102	Chemistry I	4.00	5162	Physics I	4.00
6101	Fndmntls of Navigation	4.00 *	5206	Chemistry II	4.00

\* These courses may be scheduled during the Fall or Spring Semester.

<i>Third Class Year</i>		<i>Credits</i>			<i>Credits</i>
3211	Multivariable Calculus	3.00	3215	Differential Equations	3.00
4204	Lifetime Sports I: Bdmntn	0.25	4222	Professional Rescuer	2.00
4214	Lifetime Sports II: Golf	0.25	5330	Geospatial Sciences I	3.50
5232	Marine Biology	4.00	5241	Oceans II: Land and Sea	3.50
5236	Oceans I: Air and Sea	4.00	6201	Ships & Maritime Sys	3.00
5266	Physics II	4.00	8211	Org Behavior/Ldrship	3.00
6202	Apps in Navigation	1.00			
8115	Macroeconomic Prin	3.00			

<i>Second Class Year</i>		<i>Credits</i>			
6301	Maritime Watch Officer	4.00	2394	Intro Moral & Ethical Phil	2.00
3213	Probability & Statistics	3.00	4303	Personal Defense II	0.25
5312	Analytl Methods Chem	4.00	4304	Lifetime Sports III: Tennis	0.25
5350	Ocean Dynamics	3.50	5233	Environ Science	3.50
53xx	Climate Change Physics	3.00	5367	Remote Sensing	3.50
			2398	Military Justice & Op Law	4.00
			5381	Capstone 1	1.00
			—	Free Elective	3.00-4.00

<i>First Class Year</i>		<i>Credits</i>			<i>Credits</i>
2485	Global Studies	3.00	5355	Environ Policy & Law	3.00
5443	Marine Ecology	3.50	5454	Operational Oceans	3.00
5450	Waves/Tides/Coast Proc	3.50	5481	Capstone 3	1.00
5480	Capstone 2	3.00	5493	Science Ethics Seminar	1.00
54xx	Energy Physics	3.00	6401	SelTps 100 Ton Master	3.00
			6402	SelTps 100 Ton Master Lab	1.00
			7310	Intro to Cyber Tech	1.50
			—	Free Elective	3.00-4.00
—	Physical Education	0.50	—	Physical Education	See Note

Note: First class cadets must take 0.50 credit hours of health and physical education. As a graduation requirement, each cadet must pass or validate a minimum of six (6) academic credits in HPE.

## CYBER SYSTEMS

The Cyber Systems (CYS) major prepares future officers for exciting careers in cybersecurity within the Coast Guard with a focus on developing and implementing cutting-edge computing technologies in an interconnected cyber world. Cyber technology is inextricably linked with all aspects of Coast Guard mission performance. The Cyber Systems major comprises a strong academic foundation in secure technical computing balanced with a managerial cyber emphasis. This major's curriculum encompasses the interdisciplinary knowledge required by the National Security Agency/Department of Homeland Security Center of Academic Excellence in Cyber Defense Education (NSA/DHS CAE-CDE) program. The major provides students with the necessary foundations for the design and development of assured, secure computer systems in order to defend computer networks, enable Coast Guard missions, and protect critical national infrastructure. The program challenges cadets to become critical thinkers who can design and implement computer systems and software to solve real-world technical problems. This major includes managing information technology, understanding a systems approach, and achieving fluency with information systems. Research and capstone areas include such dynamic and diverse fields as security, physical systems, risk management, intelligence, policy, geospatial science, secure software development, and network security all within a cyber context.

This program is being launched for the first time with the graduating Class of 2022 and at the earliest opportunity, following normal accreditation processes, will seek retroactive accreditation for all graduates under the Cybersecurity program criteria by the ABET Computing Accreditation Commission, the premiere U.S. computing accreditation agency.

### Cyber Systems Program Educational Objectives:

The U.S. Coast Guard Academy Cyber Systems program produces graduates who, within several years of graduation:

1. Demonstrate proficiency in the professional practice of computing and cybersecurity as Coast Guard junior officers.
2. Demonstrate intellectual or professional growth as evidenced by post-graduate education, licensing, certification, promotion, and participation in pertinent professional societies.
3. Contribute cyber expertise to U.S. Coast Guard technical challenges, specifically in the Command, Control, Communications, Computers, Cyber, and Intelligence (C5I) community.

### Cyber Systems Program Student Outcomes:

Graduates of this program will have an ability to:

1. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
2. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
3. Communicate effectively in a variety of professional contexts.
4. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
5. Function effectively as a member or leader of a team engaged in cyber related activities.
6. Apply security principles and practices to maintain operations in the presence of risks and threats.

### *Acceptance into the Major*

Acceptance requires passing each and attaining 2.00 average in all Computing (7000), Science (5000), Mathematics (3000), and Engineering (1000) courses listed in the notional plan of study prior to the beginning of 2/c year. In addition, a grade of C or above in the following courses:

- |      |  |
|------|--|
| 1220 | Transitions to Object Oriented Programming |
| 1226 | Computer Communications and Networking     |
| 7218 | Fundamentals of Information Security       |
| 7294 | Cyber Policy, Compliance, and Ethics       |

If a student has validated a course, no grade for that course is included in the average. Failed courses and their retake grades will both be included in the acceptance to major GPA calculation.

### I. Core Requirements

Cyber Systems majors shall take Physics II (5266) as their third lab science, Introduction to Computing (1104),

Introduction to Moral and Ethical Phil (2394) and Cyber Policy, Compliance, and Ethics (7294), and are not required to take Introduction to Cyber Technology (7310). Probability Theory (3341) and Mathematical Statistics (3343) together may be substituted for Probability and Statistics (3213).

## II. Major Requirements:

1118	Engineering Mech – Statics	1220	Trans to Obj Ori Prog
1225	Digital Circ/Comp Sys	1226	Comptr Comms & Ntwks
1328	Software Engineering	1330	Comp & Net Security
1426	Capstone Proj/EECyS I	1436	Capstone Proj/EECyS II
2282	Intel & Cyber Ops	3117	Calculus II
3237	Discrete Mathematics	7218	Fundamentals of Info Security
7238	Intro to Cryptography	7294	Cyber Policy, Compliance, and Ethics
7345	Operating Systems	7381	Intro to Databases
7385	Cyber Risk Management	8419	Info Tech in Orgs
8453	Systems Analysis & Design		

## III. Major Area Electives:

Students must select three Major Area Electives (MAEs). Cyber Systems is an interdisciplinary program. MAEs for the CYS major provide an opportunity for students to further explore related academic disciplines to provide additional context and/or depth to the plan of study. MAEs also provide flexibility for students to customize their major based upon their particular interests. While this list is intentionally broad, other courses may be considered as MAEs with the prior approval of the Cyber Systems Program Chair. Any course listed here can serve as an approved MAE and these courses have been laid out in such a way to provide a sequence of courses for depth in different fields. Students are not required to complete any sequence (and can even take one course from three different sequences) but they are offered to assist cadets and academic advisors in identifying approved and possible paths.

Area	Fall 2/c	Spring 2/c	Fall 1/c	Spring 1/c
<b>Dynamics</b>			Electric Circuits & Machines (1321) and Diff Equations (3215)	Dynamics (1211)
<b>Industrial Control Systems</b>			Cyber Physical Systems & Security Essentials (1421)	Mechatronics (1461)
<b>Electronic Navigation</b>			[AME (121) and EEI (1218)] or EC&M (1321)	Electronic Navigation Systems (1431)
<b>Signals</b>			EEI (1218) or EC&M (1321) and AME (1212) or Diff Equations (3215)	Signals, Systems, and Transforms (1222)
<b>Strategic Intelligence</b>	National Security Policy (2269)	Intel and Democracy (2281)	Strategic Intelligence (2375)	
<b>Security Policy</b>			National Security Policy (2269)	Homeland Security Policy (2362)
<b>War and Diplomacy</b>		Comparative Politics (2265)	International Relations (2367)	Conflict Res'n, Dipl, and Negot'n (2352) Irregular War (2374) Transntnl Threats and Challenges (2472)
<b>The Constitution and Security</b>		Intro to Political Theory (2361)		Constitutional Law and Homeland Sec (2397)
<b>Data Modeling and Structures</b>			Comp Model Languages (3235)	Algorithms with Applications (3337)
<b>Linear Programming</b>			Linear Algebra (3221)	Linear Optimization (3231)
<b>Mathematical Simulation*</b>	Probability Theory (3341)	Mathematical Statistics (3343)	Simulation with Risk Analysis (3463)	
<b>Geospatial Science</b>	Geospatial Science I (5330) (Intro preferred)	Intro to Geospatial Science (5475) (or GSI)	Remote Sensing (5367)	Geospatial Science II (5430)
<b>Forensic Science</b>	Emergency Management (5435)	Chemistry II (5206)	Toxicology (5417)	Analytical Methods in Chemistry (5312)
<b>Transportation</b>	Microeconomic Principles (8217)	Supply Chain Management (8461)		Transportation Engineering (1312)
<b>Accounting</b>		Financial Accounting (8246)	Managerial Accounting (8348)	Auditing and Internal Controls (8447)
<b>Business Management and Leadership</b>			Negotiations and Conflict Management (8458)	Legal Env of Bus (8241) Marketing (8342) Diversity and Ldrship (8439)
<b>Computer Science</b>			COMXXX (Connecticut College)	COMXXX (Connecticut College)

\*Note that 3341 and 3343 replace Probability and Statistics (3213) and 3211 would need to be taken 3/c Year

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#### IV. Upper Division Courses:

For the purposes of USCGA graduation requirements, upper-division courses in the Cyber Systems major are defined as those major required courses specified below and three courses that serve as the Major Area electives. If a student has validated a course, no grade for that course is included in the average. Failed courses and their retake grades will both be included in the upper-division GPA calculation.

1220	Trans to Obj Ori Prog	1225	Digital Circ/Comp Sys
1226	Comptr Comms & Ntwks	1328	Software Engineering
1330	Comp & Net Security	1426	Capstone Proj/EECyS I
1436	Capstone Proj/EECyS II	2282	Intel & Cyber Ops
3237	Discrete Mathematics	7218	Fundamentals of Information Security
7238	Intro to Cryptography	7294	Cyber Policy, Compliance, and Ethics
7345	Operating Systems	7381	Intro to Databases
7385	Cyber Risk Management	8419	Info Tech in Orgs
8453	Systems Analysis & Design	_____	Major Area Electives (3)

**CYBER SYSTEMS**

<b>Fall Semester</b>			<b>Spring Semester</b>		
<i>Fourth Class Year</i>			<i>Credits</i>		
1104	Intro to Computing	3.00	1118	Engineering Mech - Statics	3.00
2111	College Composition	3.00 *	213X	Cultural Perspectives	3.00 *
3111	Calculus I	4.00	2163	American Government	3.00 *
4102	Prin Fitness/Wellness I	1.00	3117	Calculus II	4.00
4111	Swimming	0.25	4103	Personal Defense I	0.25
5102	Chemistry I	4.00	4112	Prin Fitness/Wellness II	1.00
6101	Fndamntls of Navigation	4.00 *	5162	Physics I	4.00
* These courses may be scheduled during the Fall or Spring Semester.					
<i>Third Class Year</i>			<i>Credits</i>		
1220	Trans to Obj Ori Prog	2.00	1225	Digital Circ/Comp Sys	4.00
2394	Intro Moral & Ethical Phil	2.00	1226	Comptr Comms & Ntwks	3.50
4204	Lifetime Sports I: RQB	0.25	3237	Discrete Mathematics	3.00
4214	Lifetime Sports II: Golf	0.25	4222	Professional Rescuer	2.00
5266	Physics II	4.00	6202	Apps in Navigation	1.00
6201	Ships & Maritime Sys	3.00	7294	Cyber Policy, Compl, & Ethics	1.00
7218	Fund of Information Security	3.00	8115	Macroeconomic Prin	3.00
8211	Org Behavior/Ldrship	3.00			
<i>Second Class Year</i>			<i>Credits</i>		
1330	Comp & Net Security	4.00	1328	Software Engineering	4.00
3213	Probability & Statistics	3.00	4303	Personal Defense II	0.25
7345	Operating Systems	2.00	4304	Lifetime Sports III: Tennis	0.25
7238	Intro to Cryptography	2.00	6301	Maritime Watch Officer	4.00
7381	Intro to Databases	2.00	7385	Cyber Risk Management	3.00
8453	Systems Analysis & Design	3.00	8419	Info Tech in Orgs	3.00
				Major Area Elective	3.00-4.00
<i>First Class Year</i>			<i>Credits</i>		
1426	Capstone Proj/EE I	4.00	1436	Capstone Proj/EE II	4.00
2398	Prin CJ & Maritime Op Law	4.00	2282	Intel & Cyber Ops	3.00
6401	Professional Maritime Officer	3.00	2485	Global Studies	3.00
_____	Major Area Elective	3.00-4.00	5444	Atmosphere & Mar Sci	1.50
_____	Free Elective **	0.00-4.00	6402	Professional Maritime Officer Lab	1.00
_____	Physical Education	0.50	_____	Major Area Elective	3.00-4.00
			_____	Free Elective **	0.00-4.00
			_____	Physical Education	See Note

Note: First class cadets must take 0.50 credit hours of health and physical education. As a graduation requirement, each cadet must pass or validate a minimum of six (6) academic credits in HPE.

\*\* Given the breadth of study inherent in the Academy's core curriculum, free electives are not required for graduation. Therefore they can be waived if at least 15 academic credits (not including Health and Physical Education credits) are taken each semester.



## MANAGEMENT

The Management (MGT) degree program prepares students to become effective managers and adept stewards of Coast Guard fiscal, human, and information resources. Students receive a broad undergraduate education in all major business disciplines: accounting, behavioral/organizational science, finance, human resource management, economics, management, marketing, operations management, management of information systems, quantitative methods, and strategic management. The program of study culminates with an engaging capstone experience where teams of students are paired with Coast Guard, non-profit and other public-sector clients with a management problem. Students learn the fundamentals of management consulting and draw upon their knowledge of the major business disciplines to scope, analyze, and deliver a management consulting project with a real-world impact. This degree program is accredited by AACSB International – the Association to Advance Collegiate Schools of Business.

The following are the learning outcomes for graduates of the management degree program:

- **Leadership Abilities:** Management graduates are leaders. Graduates shall be military and civilian leaders of character who understand and apply sound leadership principles and competencies. This includes the ability to direct, develop, and evaluate diverse groups; to function effectively and ethically as a leader, follower, facilitator or member of a team; and to conduct constructive assessment of self and others.
- **Acquire, Integrate, and Expand Business Knowledge:** Management graduates are managers. Graduates shall understand and demonstrate the following business competencies: (a) accounting, (b) economics, (c) management, (d) quantitative analysis, (e) finance, (f) marketing, (g) international issues, (h) legal and social environment issues, and (i) management of information systems. Graduates shall have developed the motivations and skills for “lifelong learning.” Graduates shall be able to create a working conceptual framework that lends itself to continued expansion. To accomplish this, graduates shall be able to efficiently access a broad range of information sources, locate and interpret desired data reliably, employ appropriate technology, and integrate knowledge.
- **Communication Effectiveness:** Management graduates are good listeners. Graduates shall be able to: write clearly, concisely, persuasively and grammatically; prepare and deliver well-organized and polished oral presentations; read and understand a variety of written materials; listen thoughtfully to oral arguments; respect diverse opinions; and formulate reasoned alternatives and responses.
- **Critical Thinking Ability:** Management graduates integrate and apply their leadership ability, business competency, and effective communication skills. Graduates shall be able to accomplish complex tasks in a broad range of contexts by applying the basic skills of critical analysis, systems thinking, quantitative reasoning, risk management, creative problem solving, and value-based decision-making.

### *Acceptance into the Major*

Acceptance requires attainment of a grade of C or above in the following courses:

2111	College Composition or Equivalent
3213	Probability and Statistics
8211	Organizational Behavior and Leadership
8246	Financial Accounting

### **I. Core Requirements:**

Management majors should take Computer Problem Solving (2142) instead of Introduction to Computing (1104) although 1104 will be accepted as completing the 2142 requirement.

Cadets who change from an Engineering major to Management must take Macroeconomic Principles (8115).

### **II. Major Requirements:**

Major Area Requirements are in addition to the Management-related courses required as part of the core curriculum.

8201	Intro to Mgmt & Bus	8217	Microeconomic Principles
8241	Legal Environ Business	8246	Financial Accounting
8331	Management Info Systems	8342	Marketing
8348	Managerial Accounting	8349	Financial Management
8351	Research Methods	8357	Human Resources Mgmt
8363	Operations & Project Mgmt	8366	Ldrship/Org Dev/Chg
8443	Strategic Management	8444	PMC Prep

8445 Public Mgmt Consulting \_\_\_\_\_ Major Area Electives (4)

### III. Major Area Electives:

Select four of the following courses as Major Area Electives. Note: Other courses may be accepted as Major Area Electives if explicitly approved in writing by the Department Head prior to the beginning of the semester in which taken.

1226	Comp Comms & Network*	1328	Software Engineering*
3235	Comp Model Languages*	8413	Managerial Economics
8417	Investment Theory	8419	Info Technology in Orgs*
8423	Management Control	8425	Global Business & Econ
8429	Managerial Psychology	8439	Diversity & Leadership
8440	Federal Budgeting	8442	Public Sector Economics
8446	Interm Financial Acct	8447	Auditing & Intrnl Cntrl
8448	Select Topics in Fin/Acct/Ec	8449	Select Topics in IS/DS*
8450	Select Topics in Mgmt	8453	Systems Analysis & Design*
8458	Negt & Conflict Mgmt	8460	Cost Accounting
8461	Supply Chain Management	8468	Drctd Studies in Fin/Acct/Ec
8469	Directed Studies in Mgmt	8470	Directed Studies in IS/DS*

\* Cadets who wish to pursue graduate studies in Information Systems are encouraged to take Software Engineering (1328) as an MAE in the spring semester of their 1/c year. These students should take either Information Technology in Organizations (8419) or Computer Communications and Networking (1226), plus one more of the other IS related MAE's marked with an asterisk as a free elective. This sequence of courses fulfills the prerequisite undergraduate requirements as suggested by the Special Interest Group for Management Information Systems (SIGMIS).

### IV. Upper Division Courses:

All 83XX and 84XX level courses listed under Major Requirements above and any four Major Area Electives are considered as Upper Division Courses.

**MANAGEMENT**

<b>Fall Semester</b>			<b>Spring Semester</b>		
<i>Fourth Class Year</i>			<i>Credits</i>		
2111	College Composition	3.00 *	213X	Cultural Perspectives	3.00 *
2163	American Government	3.00 *	2142	Comp Prob Solving	3.00
3111	Calculus I	4.00	3213	Probability & Statistics	3.00
4102	Prin Fitness/Wellness I	1.00	4103	Personal Defense I	0.25
4111	Swimming	0.25	4112	Prin Fitness/Wellness II	1.00
5102	Chemistry I	4.00	5162	Physics I	4.00
6101	Fndmntls of Navigation	4.00 *	8115	Macroeconomic Prin	3.00 *

\* These courses may be scheduled during the Fall or Spring Semester.

<i>Third Class Year</i>			<i>Credits</i>		
4204	Lifetime Sports I: RQB	0.25	2293	Moral/Ethcl/Pol Phil	3.00 **
4214	Lifetime Sports II: Golf	0.25	2398	Prin CJ & Maritime Op Law	4.00
52X6	Lab Science	4.00 **	4222	Professional Rescuer	2.00
6201	Ships & Maritime Sys	3.00	5444	Atmosphere & Mar Sci	1.50
6202	Appls in Navigation	1.00	7310	Intro to Cyber Tech	1.50
8201	Intro to Mgmt & Bus	3.00	8241	Legal Environ Business	3.00
8211	Org Behavior/Ldrship	3.00	8246	Financial Accounting	3.00
8217	Microeconomic Prin	3.00			

\*\* These courses may be taken during the Fall or Spring Semester depending on which Lab Science (5206 or 5266) is requested.

<i>Second Class Year</i>			<i>Credits</i>		
6301	Maritime Watch Officer	4.00	4303	Personal Defense II	0.25
8331	Management Info Sys	3.30	4304	Lifetime Sports III:Tennis	0.25
8348	Managerial Accounting	3.00	8342	Marketing	3.00
8351	Research Methods	3.00	8349	Financial Management	3.00
8357	Human Resources Mgmt	3.00	8363	Operations & Proj Mgmt	3.00
			8366	Ldrship/Org Dev/Chg	3.00
			_____	Major Area Elective	3.00-4.00

<i>First Class Year</i>			<i>Credits</i>		
6401	Professional Maritime Officer	3.00	2485	Global Studies	3.00
6402	Professional Maritime Officer Lab	1.00	8445	Public Mgmt Consulting	3.00
8443	Strategic Management	3.00	_____	Major Area Elective	3.00-4.00
8444	PMC Prep	3.00	_____	Major Area Elective	3.00-4.00
_____	Major Area Elective	3.00-4.00	_____	Free Elective	3.00-4.00
_____	Free Elective	3.00-4.00	_____	Physical Education	See Note
_____	Physical Education	0.50			

Note: First class cadets must take 0.50 credit hours of health and physical education. As a graduation requirement, each cadet must pass or validate a minimum of six (6) academic credits in HPE.

## PART V - COURSES

### **0901 THE HISTORY OF THE UNITED STATES COAST GUARD**

The History of the U.S. Coast Guard is a one-credit course designed to introduce swabs to the rich history and remarkable achievements of the USCG, while familiarizing students with the historical underpinnings of the CG missions and the Academy. The course will target specific college skills, learning competencies, and communication abilities through information literacy assignments, several short writing projects, and at least one group research project.

Credit Hours: 1.00

Format: Class/Tutorial/Project/Independent Study/Teams/Lecture/Workshop/Online/Off-Site

Prerequisites: None

Projected Offering: SWAB Summer

### **0924 CONNECTICUT COLLEGE**

Single-course exchange program with Connecticut College. Offers cadets an opportunity to enhance their background by enrolling in a free elective. Enrollment is normally limited to one semester and to a course not available at CGA.

Credit Hours:

Format:

Prerequisites: None

Projected Offering: Fall and Spring

### **0925 SCHOLAR'S PROJECT**

Independent study and research in an area of interest to the highly qualified cadet. It requires a major academic commitment of the cadet to problem definition, analysis, and evaluation. An oral presentation and written reports are required.

Credit Hours:

Format:

Prerequisites: None

Projected Offering: Spring

### **0933 JUNIOR HONORS COLLOQUIUM**

Introduction to the standards of excellence and requirements for prestigious post-graduate fellowships such as the Rhodes, Marshall, Fulbright, Mitchell, Truman, Gates Cambridge, and Hertz. Grading is Satisfactory/Unsatisfactory.

Credit Hours: 1.00

Format:

Prerequisites: Recommendation by Academic Advisor and Honors Director

Projected Offering: Fall and Spring

### **0935 SENIOR HONORS COLLOQUIUM**

Information, advising, and support for first-class cadets who are applying for prestigious postgraduate fellowships. Grading is Satisfactory/Unsatisfactory.

Credit Hours: 1.00

Format:

Prerequisites: Recommendation by Academic Advisor and Honors Director

Projected Offering: Fall and Spring

### **0940 PEER TUTORING**

Satisfactory/Unsatisfactory Option

This one-credit course introduces 3/c though 1/c cadets to the theory and practice of tutoring, learning strategies across disciplines, and ways to guide students to become independent learners. Enrollment in the course requires cadets to complete 8 hours of training, to tutor for 8 hours, and to maintain a tutoring log. A course grade of satisfactory will be awarded to those who complete the requirements. Advisor approval is required prior to enrolling in the course. The course may be repeated up to six times.

Credit Hours: 1.00

Format: Seminar, workshops, tutorials

Prerequisites: Faculty recommendation for courses to be tutored

Projected Offering: Fall and Spring

**0941 PEER TUTORING**

Letter- grade Option

This one-credit course introduces 3/c through 1/c cadets to the theory and practice of tutoring, learning strategies across disciplines, and ways to guide students to become independent learners. Enrollment in the course requires cadets to complete 8 hours of training, to maintain a tutoring log, to complete 24 hours of tutoring, and to complete response essays at the end of the semester. A letter grade will be awarded to those who complete the requirements. Advisor approval is required prior to enrolling in the course. The course may be repeated up to six times.

Credit Hours: 1.00

Format: Seminar, workshops, tutorials

Prerequisites: Faculty recommendation for courses to be tutored

Projected Offering: Fall and Spring

**1104 INTRODUCTION TO COMPUTING**

The world is full of questions - many of which cannot be answered without the aid of computing resources. This course explores the fundamental aspects of computer-based problem solving (ex. modeling and algorithms) and engages students in solving real world problems reflecting a diverse array of fields spanning mathematics, engineering, and the sciences (including Coast Guard applications). Solving these problems will reinforce quantitative reasoning skills and teach students fundamental programming concepts using Excel and Matlab. By the end of this course, students will be able to extend the foundational knowledge acquired in this course to future learning in application and computer programming and solving more complex problems of any academic discipline.

Credit Hours: 3.00

Format: Class

Prerequisites: None

Projected Offering: Fall and Spring

**1105 INTRODUCTION TO COMPUTING (HONORS)**

The world is full of questions - many of which cannot be answered except with the aid of computing resources. This course covers the same topics as 1104, Introduction to Computing, but at a pace and depth consistent with the ability of the class. Students review the fundamental aspects of computer-based problem solving (ex. modeling and algorithms) and engage in solving real world problems reflecting a diverse array of fields spanning mathematics, engineering, and the sciences (including Coast Guard applications). Solving these problems will reinforce quantitative reasoning skills and teach students fundamental programming concepts using Excel and Matlab. By the end of this course, students will be able to extend the knowledge acquired in this course to future learning in application programming and in solving more complex problems of any academic discipline.

Credit Hours: 3.00

Format: Class

Prerequisites: None

Projected Offering: Fall

**1118 ENGINEERING MECHANICS - STATICS**

Develop an understanding of the principles of statics and the ability to construct a free body diagram. Introduce the concepts of forces, resolution and composition of forces and moments as applied to free body diagrams. Solve equilibrium problems (two-dimensional and three-dimensional) involving trusses, frames, beams, and other rigid bodies. Understand the concept of internal forces in members and be able to draw the shear and moment diagrams for beams. Apply the laws of dry friction in equilibrium analyses. Understand properties of areas and be able to calculate centroids and moments of inertia for areas. Develop critical thinking skills necessary to formulate strategies for solving engineering problems.

Credit Hours: 3.00

Format: Class

Prerequisites: None

Co-requisite: 3111

Projected Offering: Fall and Spring

**1204 ENGINEERING MATERIAL SCIENCE**

Introduction to materials science and engineering for engineers with an emphasis in crystalline structure and defects, dislocation theory, diffusion, mechanical properties, fracture, strengthening mechanisms, phase transformations, fatigue, creep, corrosion, and welding for various materials, such as metal alloys and composite materials. Lab experiments and demonstrations include: cold rolling and annealing, Charpy impact testing, Jominy end-quench, casting, forging, welding, composites, and non-

destructive testing.

Credit Hours: 4.00

Format: Class/Laboratory

Prerequisites: 5206 or 5208

Co-requisite: 1206

Projected Offering: Fall

### **1206 MECHANICS OF MATERIALS**

The study of stress, strain and deformations resulting from loads applied to deformable bodies. Major topics include stress-strain relationships, torsion, normal stress, shear stress, combined stresses, beam deflection, column buckling, and design of beams and shafts.

Credit Hours: 3.50

Format: Class/Laboratory

Prerequisites: 3117 and 1118

Projected Offering: Fall and Spring

### **1208 INTRODUCTION TO MECHANICAL ENGINEERING DESIGN**

Techniques of engineering design and problem solving. Introduction to computer use in the design process including analytical tools and computer-aided design and some exposure to introductory programming. Engineering drawing, sketching and visualization. Familiarization with manufacturing techniques. Study and practice of the design process through individual and group projects. Fundamental physical and mathematical concepts used in the design process, as well as the ethical and sociological considerations of technology. Design assignments address idea generation, modeling, and project management techniques including scheduling and economic analysis. Projects apply all of the aspects of problem solving, design, and reporting results.

Credit Hours: 3.00

Format: Class/Laboratory

Prerequisites: None

Projected Offering: Spring

### **1209 MATERIALS FOR CIVIL AND CONSTRUCTION ENGINEERS (TRANSFERS)**

Special course in Material Science - aggregates, concrete, and asphalt - to accommodate transfers into the Civil Engineering Major for students who have completed 1204.

Credit Hours: 2.00

Format: Class/Laboratory

Prerequisites: 1204

Projected Offering: Spring

### **1210 MATERIALS FOR CIVIL AND CONSTRUCTION ENGINEERS**

The study of the civil engineering and construction materials such as aggregates, concrete, asphalt concrete, steel, wood and geosynthetics. Emphasis is placed on understanding the engineering properties of these materials and how they affect material selection, construction methods and performance. The relevant aspects of the science and technology of the engineering properties are discussed, but focus is on practical applications, construction practices and quality control. Placement and construction methods/procedures, especially for Portland cement concrete (PCC), asphalt concrete (AC) and major applications of geosynthetic materials are addressed. Students will be exposed to the use of standard specifications and methods of testing for the determination or evaluation of the engineering properties of these materials. Course includes a pavement design project and two field trips.

Credit Hours: 4.00

Format: Class/Laboratory

Prerequisites: 1118

Projected Offering: Spring

### **1211 DYNAMICS**

Kinematics and kinetics of particles and rigid bodies in two dimensions under the effects of unbalanced force systems. Principles of force and acceleration; work and energy; impulse and momentum; damped and undamped single degree of freedom vibration. Engineering applications.

Credit Hours: 3.00

Format: Class

Prerequisites: 1118 and 5162

Projected Offering: Spring

### **1212 ANALYTICAL METHODS IN ENGINEERING**

An intermediate course in the study of analytical methods applied to engineering problems. Topics include first order ordinary differential equations; complex numbers and functions; second and higher order linear differential equations; Fourier series; Laplace transforms; vectors, matrices and determinants; linear systems of equations; and matrix eigenvalue problems.

Credit Hours: 4.00

Format: Class

Prerequisites: 3115 or 3117

Projected Offering: Fall

### **1218 ELECTRICAL ENGINEERING I**

An introductory course in linear circuit analysis that develops the fundamental tools necessary for further success in the EE field. Students are introduced to the following topics: models of circuit elements; circuit analysis using Ohm's and Kirchoff's laws; nodal and mesh analysis; basic ideal operational amplifier circuits; Thevenin and Norton equivalent circuits, solution of first and second order circuits; phasor-based solutions to AC circuits; elementary frequency response. MATLAB is introduced and used throughout the course. An emphasis is placed on the formulation and solution of linear systems of equations, including a system of differential equations, through traditional and computer aided methods.

Credit Hours: 4.00

Format: Class/Laboratory

Prerequisites: 3115 or 3117

Corequisite: 1212

Projected Offering: Fall

### **1220 TRANSITIONS TO OBJECT ORIENTED PROGRAMMING**

Building upon the procedural and high level programming introduced in I2C, this course launches into the world of Object Oriented Programming and Design using the lower level language of C++. Key concepts of OOP are covered including classes, properties, methods, constructors, destructors, overloading, and inheritance. This treatment is conducted within the Linux operating system to expand the students' exposure to another operating system and in preparation for further study of Operating Systems, Computer & Network Security, and potential use in Capstone Projects.

Credit Hours: 2.00

Format: Class

Prerequisites: 1104 or 1105 or Permission of Instructor

Projected Offering: Fall

### **1222 SIGNALS, SYSTEMS AND TRANSFORMS**

The study of continuous and discrete linear systems through signal analysis, singularity functions, convolution, Fourier transforms, Laplace transforms and Z-transforms. The formulation and solution of differential (and difference) equations by using transform techniques. The time and frequency domain analysis of linear systems via calculations, theoretical computer simulations using MATLAB software, and physical laboratory systems is examined.

Credit Hours: 4.00

Format: Class/Laboratory

Prerequisites: 1218 or 1321 and 1212 or 3215

Projected Offering: Spring

### **1225 DIGITAL CIRCUITS AND COMPUTER SYSTEMS**

Principles of digital systems design. Topics include number systems, Boolean algebra, Karnaugh maps, decoders, multiplexers, flip-flops, registers, counters, programmable logic devices, analysis and design of combinational and sequential circuits. Computers are used extensively in lab to control and monitor digital circuits designed and constructed by students. Labs focus on computer I/O, MultiSIM modeling, MATLAB programming, and graphical user interfaces. Top-down design is introduced, culminating in an intensive design project including a computer interface.

Credit Hours: 4.00

Format: Class/Laboratory/Project

Prerequisites: None

Projected Offering: Spring



### **1226 COMPUTER COMMUNICATIONS AND NETWORKING**

This course is an introduction to computer communications and networks and examines the application, transport, network, link, and physical layers of the OSI reference model. Web (including HTTP), E-mail (including SMTP), the Domain Name System (DNS), Transport Layer (UDP and TCP), IPv4/IPv6, Routing, and Media Access Control protocols are all discussed and experienced in lab. The course concludes with a brief overview of wireless and mobile networks. Laboratory work also introduces the students to network administration including the analysis of network communications at the hardware and logical levels.

Credit Hours: 3.50

Format: Class/Laboratory

Prerequisites: None

Projected Offering: Spring

### **1241 LABORATORY IN NAVAL ARCHITECTURE**

A once-weekly introductory laboratory for Naval Architecture & Marine Engineering majors that combines lectures with hands-on activities, group problem solving, and basic NA&ME software experiences. This lab builds directly on the Ships and Maritime Systems course to advance the material beyond the level of a Professional Mariner, to the level of a novice Naval Architect. Topics include vessel design, drawing of ship's lines, computation of hull quantities, design & stability software, visits to vessels, design & 3-D print activities, hull form selection, flooding, ship structures, shipboard power-plants, introduction to planing and sailing craft, and hands-on experience with floating models.

Credit Hours: 1.00

Format: Laboratory

Prerequisites: 1118 and 5162

Corequisite: 6201

Projected Offering: Fall

### **1242 APPLIED NAVAL ARCHITECTURE AND MARINE ENGINEERING**

This course builds on introductory naval architecture skills to allow students to perform vessel concept design and analysis. Design and analysis theory is presented and paired with hands-on experiences with floating models, design/analysis software, and design competition to teach about flooding, stability, hull resistance, and motions in a seaway. Students are introduced to hand drawing, vessel propulsion, shipboard systems, ship structures, and review of ship's plans. Students build proficiency with NA&ME design and analysis software - Rhinoceros/ORCA for hull design, GHS for stability and loading analysis, and NAVCAD for resistance prediction.

Credit Hours: 4.00

Format: Class/Laboratory

Prerequisites: 1241 and 6201

Projected Offering: Spring

### **1304 SOIL MECHANICS**

This course involves the study of the engineering characteristics of soils. The fundamentals of soil behavior, its use as a construction material, effect of water movement through soil including flow nets, effective stress principle, one-dimensional settlement analysis, shear strength, lateral earth pressure, soil bearing capacity for shallow foundations and stability of slopes are covered.

Credit Hours: 4.00

Format: Class/Laboratory

Prerequisites: 1118

Projected Offering: Fall

### **1309 ENVIRONMENTAL ENGINEERING I**

Introduction to the field of environmental engineering. Students learn the fundamental scientific principles used by environmental engineers to understand, analyze, and design systems and apply these principles to the study of water quality engineering, solid waste, hazardous waste, and air pollution. Legal, political, and ethical aspects of the field are examined throughout the course. The laboratory component of the course is designed to provide students with experimental design, data analysis, and technical report writing. The laboratory also allows students to learn about water quality parameters, analytical techniques, and educates them on proper interpretation and use of environmental quality data.

Credit Hours: 4.00

Format: Class/Laboratory

Prerequisites: 5206



Projected Offering: Fall

### **1310 ENVIRONMENTAL ENGINEERING LAB**

This course is required and only available to students who took AFA CE 362 while on exchange. The overload course consists of the laboratory portion of 1309 Environmental Engineering I.

Credit Hours: 1.00

Format: Laboratory

Prerequisites: 5206, AFA CE 362

Projected Offering: Fall

### **1311 SOIL MECHANICS LAB**

This course is required and only available to students who took AFA CE 390 while on exchange. This overload course will primarily consist of topics in lateral earth pressure, retaining wall, some aspects of shallow foundations, theory of soil consolidation, training in the Geoslope/Geostudio analysis software package, and the technical paper and presentation to be completed within the framework of 1304 Soil Mechanics in the spring semester.

Credit Hours: 1.00

Format: Class

Prerequisites: 1118, AFA CE 390

Projected Offering: Spring

### **1312 TRANSPORTATION ENGINEERING**

Transportation is essential for all economic, recreational, and social activities. The field of transportation engineering encompasses several modes including, rail, water, highways and air. Transportation engineers are responsible for the planning, design, operation, and maintenance of such infrastructure. This is an introductory course on the fundamentals and concepts of transportation engineering with a focus on the highway mode of transportation. Special emphasis is placed on the planning, design, operation, safety and maintenance of highway infrastructure. Students will be exposed to the tools and concepts required to analyze and design transportation systems.

Credit Hours: 3.00

Format: Class

Prerequisites: 1118, 3111, 5162

Projected Offering: Spring

### **1313 STEEL DESIGN**

Determination of building loads including dead, live, snow, and wind in accordance with ASCE Standard 7. Structural behavior and design of steel members including beams, columns, beam-columns, and tension members. Design of bolted and welded connections. All design is based on the provisions of the AISC Specification for Structural Steel Buildings.

Credit Hours: 3.00

Format: Class

Prerequisites: 1317

Projected Offering: Spring

### **1317 STRUCTURAL ANALYSIS**

Analysis of statically determinate plane structures including internal forces and moments of members. Deflection analysis using the conjugate beam and virtual work methods. Analysis of moving loads using influence lines. Statically indeterminate structural analysis using consistent deformations, slope deflection, and moment distribution. Computer applications included.

Credit Hours: 3.00

Format: Class

Prerequisites: 1206

Projected Offering: Fall

### **1321 ELECTRIC CIRCUITS AND MACHINES**

An introduction to electric circuit analysis using Ohm's and Kirchoff's laws, Thevenin and Norton equivalents, nodal analysis of DC and AC circuits, solution of first order circuits, and the use of phasors in the solution of AC and three phase circuits. The principles and applications of electromechanical energy conversion and power systems, including transformers, DC and AC machines, induction motors, and synchronous generators.

Credit Hours: 4.00

Format: Class/Laboratory

Prerequisites: 3115 or 3117

Projected Offering: Fall and Spring

### **1322 LINEAR CIRCUITS**

The design of filters in both continuous and discrete time is examined. Particular emphasis is placed on the relationship between the poles and zeros of transfer functions and the resulting frequency responses of networks. Extensive computer use for the design and analysis of filters. State of the art laboratory instruments are used to measure the frequency responses of the filters designed and constructed. Final project emphasizes the design and use of digital filters.

Credit Hours: 4.00

Format: Class/Laboratory

Prerequisites: 1222

Projected Offering: Fall

### **1323 ANTENNAS AND PROPAGATION**

Fundamentals of electromagnetic theory are presented. Maxwell's equations are developed from physical phenomenon. Plane electromagnetic wave propagation in various media. Propagation of waves on transmission lines, including computer simulations on ideal and practical lines. Antenna fundamentals are described. Performance of simple antennas and arrays. Design of simple antenna arrays and broad band antennas is presented. Computer aided design of antenna arrays, structures, and shipboard antennas is presented. A final design project gives each student the opportunity to analyze a problem or specification requirement and craft a solution using computer modeling.

Credit Hours: 4.00

Format: Class/Laboratory

Prerequisites: 1218, 3211, and 5266

Projected Offering: Fall

### **1328 SOFTWARE ENGINEERING**

This course builds upon the programming skills learned in Introduction to Computer Programming to a comprehensive understanding of object-oriented programming and design using the C# language in the contexts of the Software Engineering discipline. Class time focuses on such software engineering topics as modeling, planning, requirements, architecture, design, implementation, testing, maintenance, evaluation, and improvement. The lab focuses on using industry best practices to design and implement object-oriented software applications, often with web presentation or database data tiers. The course concludes with a significant team software engineering assignment that provides an opportunity to put what has been learned into practice.

Credit Hours: 4.00

Format: Class/Laboratory

Prerequisites: 1220 or 3235

Projected Offering: Spring

### **1329 DIGITAL SIGNAL PROCESSING**

The development of basic DSP concepts to support an exposure to DSP applications is examined. Sampling theory, quantization, digital filters, Z-domain analysis, and Discrete Fourier Transforms serve as a foundation for applications such as: speech compression, recognition, modeling and synthesis; digital audio processing; adaptive noise cancellation; and, digital image processing. An integrated approach of theory and hands-on learning is used. Student projects based on Matlab™ (or DSP hardware) plus weekly homework are used to reinforce classroom theory and application.

Credit Hours: 3.00

Format: Class

Prerequisites: 1222 and 1322

Projected Offering: Spring

### **1330 COMPUTER AND NETWORK SECURITY**

Extending the basic knowledge gained in Introduction to Computer Programming and Computer Communications and Networking, this course introduces students to the fundamentals of computer and network security. Threats, vulnerabilities, exploits, and mitigations are examined within the context of a computer as well as the network. The role of cryptography and its mathematical foundations are explored. Students study the principles of confidentiality, integrity, and availability and work hands on with modern security techniques including hashes, firewalls, intrusion prevention systems, public key infrastructure, and transport layer security. Students are also provided the opportunity to place their education into practice as participants in the NSA's annual Cyber Defense Exercise.

Credit Hours: 4.00

Format: Class/Laboratory

Prerequisites: 1226, 7218, 7294, and (1220 or 3235)

Corequisites: 7238 and 7345

Projected Offering: Fall

### **1331 AUTOMATIC CONTROL SYSTEMS**

This course presents the fundamental concepts of modeling, analysis, and controller design in the frequency and time domains. For modeling linear systems, this course introduces the principles of transfer function, state space, and reduction of multiple subsystems. Analysis of stability and steady state error is presented. Proportional, integral, and derivative controllers are designed using root locus and frequency response techniques. The laboratory exercises are based on applying course concepts to real world applications. An introduction to digital control systems is presented as time permits.

Credit Hours: 3.50

Format: Class/Laboratory

Prerequisites: 1218 and 1222

Projected Offering: Spring

### **1340 FLUID MECHANICS**

The study of forces produced by fluids and their effects on bodies. Fundamental fluid mechanics principles: fluid properties, fluid statics stability of floating and submerged bodies, fluid flow equations relating to the conservation of mass, momentum and energy, dimensional analysis, viscous effects related to pipe and open channel flow, lift, drag, resistance, and fluid power applications. The exploration of design for fluids systems.

Credit Hours: 3.00

Format: Class

Prerequisites: 1118 and 3211

Projected Offering: Fall

### **1351 THERMODYNAMICS**

Fundamental principles of classical equilibrium thermodynamics. Modeling of gas and fluid properties. Thermodynamic processes. Development and application of the first and second laws of thermodynamics to steady flow, transient flow and non-flow processes. Applications of thermodynamics to power and refrigeration cycles, psychometrics, and to the design of thermal processes.

Credit Hours: 3.00

Format: Class

Prerequisites: 3211, 5206, and 5162

Projected Offering: Fall

### **1353 THERMAL SYSTEMS DESIGN**

Principles of thermodynamic power cycles, including variations from the simple cycles. Combustion fundamentals. Principles of steam turbine, gas turbine, and diesel engine prime movers and their operating characteristics. System modeling and optimization, air pollution emissions and control. Design project based on course fundamentals, completed as a Heat Transfer – Thermal Systems Design course activity.

Credit Hours: 3.00

Format: Class

Prerequisites: 1351

Projected Offering: Fall

### **1355 MARINE ENGINEERING**

This is a first course in Marine Engineering. It addresses the design and operation of machinery onboard ships and boats. Thermodynamics and electricity are reviewed and applied to shipboard propulsion and electric power. Energy conversion, power plant concepts, and shipboard main machinery are studied. Diesel engines, gas turbines, and shipboard auxiliary systems are studied.

Credit Hours: 3.50

Format: Class/Laboratory

Prerequisites: 1340 and 1351

Projected Offering: Spring

### **1356 SHIP STRUCTURES**

This course introduces the design and analysis of ship structures. The course includes still water and wave induced vessel loading. The analysis of primary, secondary, and tertiary hull stresses and the application of ABS rules to ship structural design

are addressed. Longitudinal bending and shear are discussed as well as elastic and plastic plate bending and buckling. Fatigue is introduced, as well as hull materials and vessel construction methods. The course includes homework, exams, and a model scale structural design and construction project. The model scale project provides an opportunity to apply and integrate the basic principles of buoyancy, stability, and ship structures. Computer analysis of ship structures is introduced and applied to the model scale project.

Credit Hours: 3.50

Format: Class/Laboratory

Prerequisites: 1204, 1206 and 1242 or Permission of Instructor

Projected Offering: Spring

### **1370 MECHANISMS**

Fundamentals of mechanisms and machinery design through introduction of the synthesis and analysis of mechanisms and machines. Rigid-body kinematics, kinetics, and dynamics as applied to linkage analysis and design. Position, velocity, acceleration, and force analyses. Weekly labs are devoted to hands-on designs, use of synthesis/analysis software, and design-build-test workshops.

Credit Hours: 4.00

Format: Class/Laboratory

Prerequisites: 1208 and 1211

Projected Offering: Fall

### **1395 PROJECTS IN ENGINEERING**

Projects in Engineering under the direct supervision of a faculty member. The projects can be direct participation in laboratory projects, research, or individual projects requiring periodic instructor review. Specific projects can involve construction of hardware, computer software, experimental work, or a paper study. Final written report required. May be taken only as an overload.

Credit Hours: 1.00

Format: Project

Prerequisites: Approval of Advisor and Major Coordinator

Projected Offering: Fall and Spring

### **1401 CONSTRUCTION PROJECT MANAGEMENT**

This course provides an introduction to the management practices of the construction industry, specifically focusing on how projects are planned and executed. Topics include design and contracting methods, reading and understanding construction drawings and specifications, scheduling, cost estimation, life-cycle cost analysis, construction productivity, and engineering ethics. Contemporary issues of the industry, including sustainable design, will be analyzed. This course also serves to introduce students to the Senior Research and Design (Capstone) Project. Students will initiate the design process by defining the project's problem statement, and conducting research to support their solution. Students from outside the CE major will be expected to produce equivalent work.

Credit Hours: 3.00

Format: Class/Project

Prerequisites: Senior Status

Projected Offering: Fall

### **1402 CIVIL ENGINEERING DESIGN**

The Senior Research and Design (Capstone) course for the Civil Engineering major requires students to plan, design, and manage a complex open-ended civil engineering project. Students apply a variety of knowledge from a broad range of technical, managerial, and humanities coursework to produce solutions that consider the economic, socio-political, ethical, and environmental aspects of real-world problems. Students will produce engineering calculations, construction drawings, project schedules, cost estimates and any other necessary project specific documents. In addition, students communicate the results of their project via a final report and presentation to their client.

Credit Hours: 4.00

Format: Project

Prerequisites: 1401

Projected Offering: Spring

### **1404 GEOTECHNICAL ENGINEERING DESIGN**

This course provides students with the tools required for the design of geotechnical support systems. The focus is on the design

of these systems through the completion of several project assignments. Course components include subsurface exploration, design of shallow foundations, design of pile foundations, design of drilled shafts foundations, lateral earth pressure and design of rigid and flexible retaining structures, construction dewatering, soil improvement, and ground modification.

Credit Hours: 3.00

Format: Class

Prerequisites: 1304

Projected Offering: Fall

### **1406 COASTAL RESILIENCY**

There is evidence of changes in climatic conditions that have resulted in increases in atmospheric and ocean temperatures, extreme precipitations, global-sea level rise, and other environmental impacts. Due to these changes, the civil engineering community is faced with the challenge of ensuring that structures can withstand the loading imposed by these previously unaccounted for conditions. Assessing the risk for damage (as well as failure and loss of life) and forecasting the probability of occurrence are particularly challenging. Civil Engineering infrastructure in coastal regions and waterfront facilities are particularly vulnerable. This course addresses ways of incorporating climate science into engineering practice and provides exposure to best practices used in the civil engineering practice to promote infrastructure resiliency in a changing climate.

Credit Hours: 3.00

Format: Class

Prerequisites: None

Projected Offering: Spring

### **1407 ENVIRONMENTAL ENGINEERING DESIGN II**

This course applies fundamental concepts from environmental engineering, hydrology, and fluid mechanics to the analysis and design of systems for water distribution, storm water/wastewater collection, and water and wastewater treatment. Water and wastewater treatment are not covered separately in this class. Rather, systems are grouped based on the type of process (biological, chemical, or physical). This approach recognizes that many systems are used in both water and wastewater treatment and that the underlying concepts are the same regardless of the application.

Credit Hours: 3.00

Format: Class

Prerequisites: 1309

Projected Offering: Spring

### **1409 WATER RESOURCES ENGINEERING**

This course offers a basic introduction to the field of Water Resources Engineering. Topics include surface and groundwater hydrology, rainfall-runoff analysis, reservoir and river routing, probability and frequency analysis, water excess management/control, and watershed management.

Credit Hours: 3.00

Format: Class

Prerequisites: 1407 or permission of the Instructor

Projected Offering: Spring

### **1411 REINFORCED CONCRETE DESIGN**

This course provides students with the fundamental theory and application of reinforced concrete design in buildings. Detailed coverage of behavior and design of singly and doubly reinforced concrete beams, T-beams, slabs, beam-columns, and spread footings. Additional topics: placing of reinforcement, bar cutoffs, bonds, and deflections. Design and detailing based on current ACI 318 building code. Course includes Excel programming, analysis and design of various components of a multi-story building, and the design, construction and testing of a full-scale reinforced concrete beam.

Credit Hours: 3.00

Format: Class

Prerequisites: 1206 and 1210

Projected Offering: Spring

### **1414 STRUCTURAL DESIGN FOR EXTREME EVENTS**

Consistent with homeland security concerns, course examines the analysis and design of structures for extreme events, including blast and earthquake loads. Background in fundamental concepts of structural dynamics theory necessary to predict structural response and performance under extreme events, including: dynamics of single and multiple degree-of-freedom systems for various load functions; approximation methods for dynamic analysis; dynamic material behavior; elasto-plastic

structural response. Study of blast and earthquake load characteristics. Design philosophies for building security and strategies to enhance earthquake and blast-resistant performance. As a side topic, control of building floor vibrations under conventional loads is also addressed.

Credit Hours: 3.00

Format: Class

Prerequisites: 1313, 1411, and 3215, or permission of Instructor

Projected Offering: Spring

#### **1418 SELECTED TOPICS IN CIVIL ENGINEERING**

This course will explore topics in civil engineering to expand upon the basic curriculum at the Academy. Instructors will select topics from subjects such as structural, environmental, geotechnical, and construction engineering. Course material will include instruction and practical projects related to the selected topic. Cadets may repeat this course for credit with a different topic.

Credit Hours: 3.00

Format: Class

Prerequisites: Varies according to the specific topic

Projected Offering: Fall and Spring

#### **1419 DIRECTED STUDIES IN CIVIL ENGINEERING**

Individual Projects in Civil Engineering involving reading, design, analysis, or applications. Oral briefing and final research report are required.

Credit Hours: 3.00

Format: Directed Studies

Prerequisites: Permission of Project Advisor and Civil Engineering Section Chief

Projected Offering: Fall and Spring

#### **1420 ELECTRIC ENERGY AND MACHINES**

Principles and applications of electrical power systems, energy storage and electromechanical conversion including machines such as motors and generators. Topics include 3-phase power, transformers, induction motors, synchronous machines, DC machines, electrical power distribution, renewable energy solutions and power electronics. Laboratory experiments include transformers, testing rotating machinery, and practical applications of power electronics. The course covers the theory and principles of shipboard power systems and examines future technologies including hybrid propulsion systems.

Credit Hours: 3.50

Format: Class/Laboratory

Prerequisites: 1218

Projected Offering: Fall

#### **1421 INDUSTRIAL CONTROL SYSTEM SECURITY**

Description: TBD

Credit Hours: 3.00

Format:

Prerequisites:

Projected Offering: Spring

#### **1422 COMMUNICATION SYSTEMS**

An analysis and design of communication systems with an emphasis on digital systems. Baseband and passband transmission systems are investigated. Coherent and noncoherent modulation/demodulation schemes are presented. Error correction coding, line codes, correlation, and intersymbol interference are also reviewed. Modulation techniques include analog AM and FM as well as digital BPSK, FSK and MSK. Related laboratory exercises make extensive use of Digital Signal Analyzers, Digital Storage Oscilloscopes and computers to study properties of communication signals and system.

Credit Hours: 4.00

Format: Class/Laboratory

Prerequisites: 1222, 1322 and 3341

Projected Offering: Fall

#### **1426 CAPSTONE PROJECTS IN ELECTRICAL ENGINEERING I**

This is the first of two capstone courses in Electrical Engineering during the senior year. The focus of this course will be taking students through the first half of the Engineering Design Cycle. Classroom discussions will focus on the engineering design process including needs identification, system requirements, system design process and engineering ethics. Additional lectures



will center on contemporary electrical engineering topics. In the lab, cadets begin a two-semester major engineering design project. Working as an apprentice engineer alongside faculty members and contractors as part of a small Coast Guard project team, students are confronted with real-world engineering problems that require formal resolution with no predetermined outcome. A typical project includes requirements definition, computer programming, computer algorithm design and system implementation, data gathering and analysis, and presentation of results in a paper and oral presentation. Field trips to Coast Guard labs and project related trips to various locations are included.

Credit Hours: 4.00

Format: Class/Laboratory/Project

Prerequisites: 1/c EE major or EE Section Chief approval

Projected Offering: Fall

### **1431 ELECTRONIC NAVIGATION SYSTEMS**

This course is an engineering study of primary electronic navigation systems used throughout the world for positioning, navigation, and timing (PNT). The mathematics of positioning for “ranging type” systems is presented. Electronic navigation signals and systems are compared in both time and frequency domains, and are examined in the contexts of accuracy, availability, integrity, and vulnerability. Specific systems and augmentations considered are NAVSTAR GPS, Wide Area Augmentation System (WAAS), Differential GPS (DGPS), eLoran, ILS, VOR, and DME. Other possible topics include: GLONASS, Galileo, BeiDou, Inertial Navigation, Indoor Navigation, and Kalman Filtering.

Credit Hours: 3.00

Format: Class

Prerequisites: 1218 or 1321 or permission of the Instructor

Projected Offering: Spring

### **1435 INTRODUCTION TO AERODYNAMICS**

This course provides the necessary tools to understand the dynamics of flow fields and their impact on solid (aerodynamic) bodies. The course uses the fundamental laws of conservation (mass, momentum and energy) to develop the necessary equations of motion for inviscid, incompressible flows. Lifting theory for flow over 2-D airfoils (symmetric and cambered) and finite wings is presented. References and comparisons are made to surface ship hydrodynamics. Software tools are introduced and implemented in solving more complex problems. Preliminary aspects of compressible flow are introduced.

Credit Hours: 3.00

Format: Class

Prerequisites: 1340 and 1351

Projected Offering: Spring

### **1436 CAPSTONE PROJECTS IN ELECTRICAL ENGINEERING II**

This is the second senior-year capstone course in Electrical Engineering and completes the cadet’s electrical engineering program of instruction. The focus of this course will be taking students through the second half of the Engineering Design Cycle, and Project Management. Classroom discussions will cover system testing, system reliability, team management, budgeting and scheduling. Additional lectures will cover engineering ethics, engineering economics and contemporary electrical engineering topics. During the Laboratory periods, cadets bring their two-semester major engineering project to a close, and present the results to Academy faculty and to professionals from Coast Guard Headquarters and various Coast Guard engineering commands. Field trips to Coast Guard labs and project-related trips to various locations are included.

Credit Hours: 4.00

Format: Class/Laboratory/Project

Prerequisites: 1426

Projected Offering: Spring

### **1437 ENGINEERING EXPERIMENTATION**

Experimental data analysis using uncertainty theory, curve-fitting, and statistical criteria. Data acquisition with electronic instrumentation and commercial software, analog to digital conversion, operation amplifiers, and signal conditioning. Instrumentation for flow, temperature, pressure, force, torque, strain and vibration is presented. Test planning, data point spacing, and professional society standard test procedures. The role of computer data acquisition systems to collect, analyze and display data is stressed,. Weekly labs expand on the concepts of experimental design learned in class, and focus on the analysis of mechanical, fluid and thermal systems. The course includes an experimental design project where cadets reproduce results described in professional literature.

Credit Hours: 3.00

Format: Class/Laboratory

Prerequisites: 1211, 1321, 1340, 1351, and 3213 or 3301

Projected Offering: Fall

### **1439 DIRECTED STUDIES IN ELECTRICAL ENGINEERING**

Individual or group study of topics involving design, analysis, or applications of electric and electronics devices, systems, or principles.

Credit Hours: 3.00

Format: Directed Studies

Prerequisites: 1218 and 1222 and EE Section Chief approval

Projected Offering: Fall and Spring

### **1440 MACHINE DESIGN**

Design of machine elements, including considerations such as material strength, manufacturing processes, safety, reliability, stress concentration, fatigue, corrosion, and tribology. Mechanical power transmission devices, including shafts, gears, belts, springs, fasteners, bearings and couplings. Introduction to mechanical component integration and design-build-test projects.

Credit Hours: 4.00

Format: Class/Laboratory

Prerequisites: 1206, 1370

Projected Offering: Spring

### **1442 PRINCIPLES OF SHIP DESIGN**

This course involves extensive use of the design process to produce the preliminary design a U.S. Coast Guard or Commercial vessel. The application of estimation and iteration procedures are applied to topics such as: similar ships analysis, preliminary hull dimensions, watertight subdivision, development of general arrangements, weight estimation and intact stability analysis. Computer Aided Design software and state-of-the-art analysis tools are implemented to develop ship lines and hydrostatic characteristics and well as assess ship intact stability in various loading conditions. This course runs concurrently with the Ship Propulsion Design course (1453). The project is completed in the Ship Design/System Integration (1444) course.

Credit Hours: 4.00

Format: Class/Project

Prerequisites: 1242, 1355 and 1356

Projected Offering: Fall

### **1444 SHIP DESIGN/SYSTEM INTEGRATION**

This course focuses on the completing the ship design initiated in Principles of Ship Design (1442) course with an emphasis on ship and system integration. Topics include: longitudinal ship strength, ship structural design, geometrically scaled model hull construction and resistance testing, damage stability, seakeeping and operability, crewing and cost. Project management, engineering economics, engineering ethics and technical risk assessment are also covered.

Credit Hours: 3.00

Format: Class/Project

Prerequisites: 1356, 1442 and 1453

Projected Offering: Spring

### **1446 MECHANICAL ENGINEERING DESIGN**

Integrated design of mechanical systems including consideration of system performance, safety, reliability, cost, project management, and socio-ecological impacts. Engineering economy in design. Engineering ethics case studies and engineering standards. Advanced topics in modeling and testing of system components, numerical simulation of system characteristics, and system design optimization. The utilization of CAD design system. Capstone design projects require the application of the design process, including idea generation, concept design, prototype design and detailed design.

Credit Hours: 4.00

Format: Class/Project

Prerequisites: 1440 and 1480

Projected Offering: Spring

### **1447 MARINE CASUALTY RESPONSE**

Provides a basic application of engineering principles used during marine casualty response operations, i.e., ship collisions, allisions, groundings, and marine firefighting. The course expands on the basic fundamentals of naval architecture, marine structures, and statics to solve real-world engineering problems created by marine casualties. Hands-on learning and case studies of real-world marine casualties are used as the backdrop for applying engineering fundamentals. Basic concepts include:



vessel nomenclature, hydrostatics, intact and damaged stability, trim, hull girder strength, evaluation of secondary and local structural strength, basic damage control, and environmental factors, as well as USCG roles and responsibilities.

Credit Hours: 3.00

Format: Class

Prerequisites: 1118, 1206, and 6201

Projected Offering: Fall

### **1453 SHIP PROPULSION DESIGN**

An advanced marine engineering design course requiring the application of sound judgment and analysis to engineering decisions. Working concurrently in the Principles of Ship Design course (1442), students optimize and design a propulsion system for their senior design that meets specific operating specifications. Significant emphasis is placed on technical/scientific/professional writing through design reports, as well as multiple individual homework assignments. Topics covered include hull resistance, hull vibration, propulsor selection, engine selection, engine and propulsor matching, electric drive and integrated power systems, electrical load analysis, reduction gear selection and design, engine room layout, shafting design and shaft vibration analysis. The project is completed in the Ship Design/System Integration course (1444).

Credit Hours: 3.00

Format: Class/Project

Prerequisites: 1353 or 1355

Projected Offering: Fall

### **1457 SMALL CRAFT DESIGN**

Small Craft Design offers the opportunity to create a comprehensive first design of a small sailboat and powerboat. Tailored to the amateur sailing or boating enthusiast with an engineering background, this course will build upon the prerequisite stability, structural, resistance, and computational analysis techniques as applied to the Design Spiral. Boat design and construction will be discussed in theory and in practice to provide the student with an expanded understanding of the boat and sea interface. The course balances engineering and creativity through the design of a small craft from scratch. Computer Aided Design (CAD) will be relied on heavily, with reference to classical boat design methodology and current classification society rules and guidance. A final design will be created through an understanding of the necessary relationships between hull geometry, hydrostatics, stability, resistance/power, keel/rudder/sail design, structure, hull and rig construction, and materials.

Credit Hours: 3.00

Format: Class/Project

Prerequisites: 1242 and 1340

Projected Offering: Spring

### **1459 HEAT TRANSFER**

Application of Fourier's law of conduction to one and two dimensional steady and non-steady state heat flow problems. Radiation heat transfer with black and gray surfaces. Newton's Law of Cooling applied to problems of forced convection. Analysis of heat transfer systems and engineering design using mass and energy continuity concepts. Design applications. Design project based on course fundamentals.

Credit Hours: 3.00

Format: Class

Prerequisites: 1340, 1351, and 1212 or 3215

Projected Offering: Spring

### **1460 MODELING AND CONTROL OF DYNAMIC SYSTEMS**

The course introduces fundamental concepts of automatic control systems in the time and frequency domains. Classical control theory approach to modeling is addressed with emphasis in mechanical and electromechanical systems. Content of open and closed loop feedback control systems include: feedback analysis, stability, tracking, and regulation of complex systems. Steady state and transient system response is evaluated for static and dynamic compensation. Controller tuning rules are presented, together with treatment of practical PID implementation.

Credit Hours: 3.00

Format: Class

Prerequisites: 1211, 1321, and 3215

Projected Offering: Fall

### **1461 MECHATRONICS**

The course introduces fundamental concepts of mechatronic systems via the combined study of mechanisms, electronics,

actuators, sensors and control. Topics are presented in a practical, simplified manner, with the use of a widely available microcontroller. Subjects covered include digital and analog sensors, pulse width modulation, actuator control, basic electronic circuitry, microprocessor programming, and classical control theory. Static and dynamic performance is evaluated utilizing empirical PID algorithms. A fully automated mechanism, merging hardware and software components serves as the final design project.

Credit Hours: 3.00

Format: Class

Prerequisites: None

Projected Offering: Spring

#### **1466 HEATING, VENTILATION, AND AIR CONDITIONING PRINCIPLES**

Fundamentals of heating, ventilating and air conditioning systems for buildings. Qualitative and quantitative study topics include psychrometric properties, space air conditioning for design and off-design conditions, air contaminant control, human comfort, heat transfer U-values, heat and mass transfer in buildings, transmission and infiltration losses, solar radiation fundamentals and irradiation modeling, fenestration heat gains, cooling loads, heat extraction rate, fuel estimation, air distribution, fan selection and duct design basics. The Department of Energy simulation software may be used.

Credit Hours: 3.00

Format: Class

Prerequisites: 1351

Projected Offering: Spring

#### **1468 PROJECTS IN NAVAL ARCHITECTURE AND MARINE ENGINEERING**

Projects under the direct supervision of a NA&ME faculty member. The projects can be direct participation in NA&ME laboratory projects, research, or individual projects requiring periodic instructor review. Specific projects can involve construction of hardware, computer software, experimental work, or a paper study. Final written report required.

Credit Hours: 1.00

Format: Project

Prerequisites: Approval of Advisor and NA&ME Section Chief

Projected Offering: Fall and Spring

#### **1469 DIRECTED STUDIES IN NAVAL ARCHITECTURE AND MARINE ENGINEERING**

Individual Projects in Naval Architecture and Marine Engineering involving reading, design, analysis, or applications. Oral briefing and final research report are required.

Credit Hours: 3.00

Format: Directed Studies

Prerequisites: Approval of Advisor and NA&ME Section Chief

Projected Offering: Fall and Spring

#### **1479 DIRECTED STUDIES IN MECHANICAL ENGINEERING**

Individual or group projects in Mechanical Engineering involving design analysis, or applications. Preparation of a project report or presentation is required.

Credit Hours: 3.00

Format: Directed Studies

Prerequisites: Approval of Advisor and ME Section Chief

Projected Offering: Fall and Spring

#### **1480 DESIGN PROJECT MANAGEMENT**

Principles and techniques for creative idea generation and problem solving. Design processes applicable to engineering projects. Techniques for project scheduling and management. Technical communication skills for oral presentations, proposals, written reports and video production. CAD applications. Preliminary planning for capstone projects.

Credit Hours: 4.00

Format: Class/Laboratory

Prerequisites: 1208 and 1/c Engineering Major

Corequisite: 1440

Projected Offering: Fall

#### **1489 SELECTED TOPICS IN ELECTRICAL ENGINEERING**

This course will explore topics in electrical engineering and computing that expand upon the basic curriculum at the Academy.

Instructors will select topics from subjects such as developing software for distributed computing on a network, processor architecture and assembly language programming, operating systems, or numerical methods in computation. Course material will include instruction and practical projects related to the selected topic. Cadets may repeat this course for credit with a different topic.

Credit Hours: 1.00

Format: Class/Laboratory

Prerequisites: Varies according to the specific topic

Projected Offering: Fall and Spring

### **1491 FUNDAMENTALS OF ENGINEERING EXAM REVIEW**

This course, offered as a review, guides 1/c cadets in the engineering majors through a series of topics with the goal of assisting them in their preparation for the Fundamentals of Engineering (FE) exam. Because this exam is the first step toward professional licensure for these engineering graduates, all 1/c engineers are encouraged to take the FE exam. Course review topics follow guidelines established by the National Council of Examiners for Engineering and Surveying. Example review topics include: Statics, Mechanics of Materials, Dynamics, Fluid Mechanics, Mathematics, Thermodynamics, Chemistry, Electric Circuits, Material Science, Engineering Economics and Probability and Statistics.

Credit Hours: 1.00

Format: Class

Prerequisites: 1/c Engineering Major

Projected Offering: Fall

### **1493 ENGINEERING ETHICS**

Description: TBD

Credit Hours: 1.00

Format:

Prerequisites:

Projected Offering: Spring

### **2101 INTRODUCTION TO COLLEGE COMMUNICATIONS**

Introduction to persuasive and informative writing to selected audiences for given purposes. Shorter and longer essays develop students' ability to write thesis statements, select evidence, and document sources within a process that supports revision. Writing practice and analysis of readings develop skills to improve coherence, diction, syntax, and conventions (grammar, punctuation, and spelling). Course also emphasizes public speaking and requires formal and informal speeches.

Credit Hours: 3.00

Format: Class

Prerequisites: Placement by English faculty

Projected Offering: Fall

### **2111 COLLEGE COMPOSITION**

Provides an introduction to principles of academic writing, emphasizing development of analytical reading skills and application of rhetorical strategies. The course covers style, principles of research, documentation, revision, synthesis, and cultural and critical literacies.

Credit Hours: 3.00

Format: Class

Prerequisites: Placement by English faculty

Projected Offering: Fall and Spring

### **2121 THE ART OF EFFECTIVE WRITING**

Academic writing, focusing on rhetoric (art of persuasion), composition, and public speaking at an advanced level. Reading and discussion of arguments.

Credit Hours: 3.00

Format: Class

Prerequisites: Placement by English faculty

Projected Offering: Fall

### **2131 HUMANITIES CULTURAL PERSPECTIVES: AMERICAN SOCIAL MOVEMENTS**

This course is one of an array of offerings that fulfill the Humanities Cultural Perspective requirement, which challenges cadets to explore concepts of identity, the role of power structures, and the impact of social contexts on the individual through the

eyes of an “othered” group. This particular course studies the history of the United States through the “Other,” as outsiders and marginalized groups sought to gain access to the promise of America. Using a demographic-thematic historical narrative, this course focuses on the grass-roots level of activism and leadership, and exposes students to dispossessed groups in American history, the causes of their marginalization, and the decisions and actions that constituted efforts to gain admittance to American Freedom. The course will employ significant primary documents, reading, speaking, and writing to plumb the meaning and evolution of American social-cultural history.

Credit Hours: 3.00

Format: Lecture/Discussion

Prerequisites: None

Projected Offering: Fall and Spring

### **2132 HUMANITIES CULTURAL PERSPECTIVES: UNITED STATES ETHNIC LITERATURE**

This course is one of an array of offerings that fulfill the Humanities Cultural Perspective requirement, which challenges cadets to explore concepts of identity, the role of power structures, and the impact of social contexts on the individual through the eyes of an “othered” group. This particular course examines race and ethnicity in American literature, and the ways in which traditionally marginalized authors have addressed identity. Students will engage in a variety of formal and informal writing and speaking exercises.

Credit Hours: 3.00

Format: Lecture/Discussion

Prerequisites: None

Projected Offering: Spring

### **2133 HUMANITIES CULTURAL PERSPECTIVES: INTRODUCTION TO LATIN AMERICAN CULTURAL STUDIES**

This course is one of an array of offerings that fulfill the Humanities Cultural Perspective requirement, which challenges cadets to explore concepts of identity, the role of power structures, and the impact of social contexts on the individual through the eyes of an “othered” group. This particular course introduces students to the cultures and societies of Latin America, through the exploration of their literature, film, and visual arts. By studying a wide selection of short stories, film productions, and art works, it surveys the region from colonial times to the present, focusing on key issues and relevant aspects of the Latin American world. Through a cross-disciplinary perspective, the course aims to educate cadets about the rich and diverse tapestry of Latin American countries and cultures, and familiarize students with notions and perceptions of global affairs that may differ from their own.

Credit Hours: 3.00

Format: Lecture/Discussion

Prerequisites: None

Projected Offering: Fall and Spring

### **2134 HUMANITIES CULTURAL PERSPECTIVES: GENDER AND SEXUAL ORIENTATION IN LITERATURE**

This course is an introduction to issues and ideas related to gender: femininity, masculinity, and transgenderism as well as sexual orientation: lesbianism and homosexuality. Through literature, this course critically examines cultural representations of gender and sexual orientation that shape perceptions and experiences. Drawing from fiction (poetry, short stories, plays, and a graphic novel), students will develop a deeper understanding of the changing negative/positive roles that gender plays in literature.

Credit Hours: 3.00

Format: Lecture/Discussion

Prerequisites: None

Projected Offering: Fall and Spring

### **2142 COMPUTER PROBLEM SOLVING**

This course is designed to help you use computers to find, organize, analyze, and communicate quantitative data to solve problems and answer questions of interest to a variety of disciplines. In doing so, it will introduce you to the ways in which computer technology has revolutionized how academic research is conducted. This version of "Computer-Based Problem Solving" is intended for Government and Management Majors. Accordingly, emphasis will be placed on data used in the Social Sciences and in developing baseline proficiency with internet-based resources, open access programs, and common Microsoft software packages that you will have ready access to for the balance of your cadet and Coast Guard career. It will also survey an array of software platforms used by a variety of academic disciplines and professions. At its core, though, this course is designed to help you think critically about what questions to ask when using data, how to use computers to organize and analyze it, and how to leverage technological tools to effectively communicate it, regardless of the specific context, programs, or

platforms involved.

Credit Hours: 3.00

Format: Class

Prerequisites: None

Projected Offering: Spring

### **2163 AMERICAN GOVERNMENT**

Through open discussion of political issues and controversies, this course examines the framework of our democracy. We will explore the history, founding, development and structure of our system of government, and come to understand why we continue to “approach democracy.” In doing so, students will be given the opportunity to examine the strengths and weaknesses of American national government. We will also explore such topics as political parties, voting, elections, interest groups, the media, civil liberties, civil rights, domestic policy and foreign policy. The course is divided into five parts. Part I presents the foundations of American government. Part II explores the institutions of American democracy. Part III focuses on the processes of American Government and democracy. Part IV provides a detailed analysis of various issues of civil rights and liberties. Finally, Part V addresses the policymaking processes and its consequences.

Credit Hours: 3.00

Format: Class

Prerequisites: None

Projected Offering: Fall and Spring

### **2235 SPANISH I**

Introduction to the basics of the Spanish language. Requires composition and oral classroom drill sessions. Includes introduction to Spanish and Hispanic cultures and civilizations. Only students with no previous Spanish should register for this course.

Credit Hours: 4.00

Format: Class/Laboratory

Prerequisites: None

Projected Offering: Fall

### **2236 SPANISH I/II**

A one semester review of Elementary Spanish. All major topics covered in Spanish I and Spanish II will be reviewed. The course is aimed at students with any of the following backgrounds: 1. 2+ years of high school Spanish; 2. Lived in/near Latino community where Spanish language was often spoken; 3. Native/near-native speakers of another Romance Language (French, Italian, Portuguese, Catalán). Students must take online placement test: <http://webcape.byuhtsrc.org/?acct=uscga>. Password may be obtained by contacting either Dr. Rivero or Dr. Waid in the Department of Humanities.

Credit Hours: 4.00

Format: Class/Laboratory

Prerequisites: None

Projected Offering: Spring

### **2237 SPANISH II**

A continuation of Spanish I. Requires compositions and oral classroom drill sessions. Includes introduction to Spanish and Hispanic cultures and civilizations.

Credit Hours: 4.00

Format: Class/Laboratory

Prerequisites: 2235

Projected Offering: Spring

### **2241 MODERN EUROPEAN CIVILIZATION**

Explores the meaning and nature of three words: what is "modern?" What is "European?" What is "civilization?" The course examines the major social, cultural, economic, political, and international developments in Europe, from roughly 1700 through the end of World War II. Students will wrestle with issues of identity (national, cultural, and ethnic), evaluate the cultural and political elements that led to cooperation and conflict; and examine the causes/consequences of European interaction with Africa, Asia, and the western hemisphere. Course requirements include exams, papers, presentations, and substantial reading of primary sources.

Credit Hours: 3.00

Format: Lecture

Prerequisites: 2163

Projected Offering: Spring – Even Years

### **2242 WORLD CIVILIZATIONS**

Exposes cadets to grand forces that shape human civilization as we know it, while parsing out thematic similarities/differences across cultures, time and space. Course explores development of religion; concepts of security vs. freedom; role of government; evolution of economic systems; definition of citizen; relationship between human society and the environment; development of science and technology; communication/exchange between cultures; globalization/urbanization.

Credit Hours: 3.00

Format: Lecture/Discussion

Prerequisites: 2131 or 2132 or 2133 or 2134

Projected Offering: TBD

### **2243 MODERN DIPLOMACY**

Through study of the Department of State's bureaucratic structure, history, past and current foreign policies approaches, unfolding current events, and significant players, students will understand the challenges US diplomats face in forming American strategies and advancing its diplomatic goals. Course objectives: appreciate how and why the State Department functions the way it does; develop an ability to analyze, assess and articulate the whys behind diplomatic responses to multi-time frame foreign policy events and issues; understand the Inter-Agency process in Washington and in the field, especially Civilian-Military issues and the Department of State and Coast Guard relationship.

Credit Hours: 3.00

Format: Class

Prerequisites: None

Projected Offering: Fall

### **2265 COMPARATIVE POLITICS**

Compares foreign political systems, ideologies and movements. Worldwide trends are explored and selected country studies undertaken.

Credit Hours: 3.00

Format: Seminar

Prerequisites: 2163

Projected Offering: Spring

### **2267 AMERICAN CONGRESS**

This course is designed to immerse students in the theory and practice of the United States Congress. Structured around the core functions of the legislative branch - representation, legislation, and oversight - this course begins with an intensive look at the conceptual foundations of Congress and transitions into a congressional simulation where students play the role of elected Members of Congress. Through the simulation, students will internalize theory while building an awareness of their role, as citizens and Coast Guard officers, in the American law-making process. This course will be offered every other year.

Credit Hours: 3.00

Format: Seminar

Prerequisites: 2163

Projected Offering: Spring - Even

### **2269 NATIONAL SECURITY POLICY**

Addresses the topic of U.S. national security policy from a historical, as well as contemporary, perspective. The course begins with the National Security Act of 1947, proceeds through the impact of the 1986 Goldwater-Nichols reforms, and ends with a consideration of the post-September 11, 2001 security environment.

Credit Hours: 3.00

Format: Class

Prerequisites: 2163, or Instructor approval

Projected Offering: Fall

### **2272 POLITICAL PARTICIPATION**

Survey of the dominant modes of citizen participation in the American democratic system, including political parties, elections, interest groups, the media, social movements, and civil disobedience. Case studies include the media and the military; federal campaigns and elections; and violence in the American political tradition.

Credit Hours: 3.00



Format: Seminar/Project  
 Prerequisites: 2163  
 Projected Offering: Fall

### **2274 INTERNATIONAL POLITICAL ECONOMY**

Following a survey of the primary IPE Paradigms (Realism, Liberalism, Structuralism) and history of the Bretton Woods Institutions (IMF, World Bank, GATT→WTO, FX regimes), the course focuses on topics and debates within the study of IPE: International Trade, LDC Debt, Multinational Corporations, International Monetary Issues, Energy and Oil, Sustainability/Green Politics, Food and Hunger, the Politics of Development and Globalization. Upon completion of the course, students are expected to: 1. Understand the logic and critique of the main theoretical perspectives of IPE; 2. Understand the policy aims of the IMF, World Bank, and WTO as well as the fiscal and monetary tools available to all central governments; and 3. Be conversant on a range of key issues within the field of IPE, including trade, debt, international monetary relations and development.

Credit Hours: 3.00

Format: Seminar

Prerequisites: None

Projected Offering: Fall

### **2281 INTELLIGENCE AND DEMOCRACY**

This course is intended for Government majors. Exploration of the missions, organization, and processes of the U.S. Intelligence Community; the major debates about the roles, practices and problems of national intelligence; and the Coast Guard's multi-mission intelligence roles. The course includes an examination of the various functions of intelligence including collection systems (both human and technical), critical analysis, intelligence writing, espionage and counterintelligence, covert action, and the role of intelligence in counterterrorism, trans-national and asymmetric threat.

Credit Hours: 3.00

Format: Seminar/Class

Prerequisites: 2163 and 2269

Projected Offering: Fall

### **2282 INTELLIGENCE AND CYBER OPERATIONS**

This course is specially designed for cadets from all majors, including Government majors who are not in the Security Studies Concentration, who are interested in improving their understanding of national security policy and the national security process, with particular consideration given to the impact of current "cyber" challenges within our multi-discipline, multi-mission Coast Guard, and for the nation more broadly. The course reviews the evolution, organization, and responsibilities of the Intelligence Community, the modern national security process, and the role played by the Intelligence Community, homeland security, and law enforcement entities -- as well as other key policy actors and overseers -- within it. The course will explore how technology has affected intelligence collections, analysis, and dissemination. A special focus of this course will be the CG Cyber Strategy and study of cyber issues within the Coast Guard's operational environment, including: port security, information assurance/protection, and infrastructure protection. Case studies and examples will be used to illustrate the processes, concepts, and debates regarding intelligence and its role in protecting American security. A secret security clearance is required.

Credit Hours: 3.00

Format: Seminar

Prerequisites: 2163

Projected Offering: Spring

### **2293 MORAL, ETHICAL, AND POLITICAL PHILOSOPHY**

Examination of a range of philosophical views on what makes our actions right or wrong and our characters good or bad. Students are encouraged to develop their own moral voice, decision-making abilities, and a respect for the place of reasoned argument in the treatment of ethical problems.

Credit Hours: 3.00

Format: Class

Prerequisites: None

Projected Offering: Fall and Spring

### **2324 LITERATURE OF HUMANITY AND CONFLICT: U.S. LATINOS**

This course examines how wars, revolutions, and social conflicts involving U.S. Latinos have been portrayed in American literature and film. Emphasizing the experiences of Cuban American, Mexican American, Puerto Rican, and Dominican groups,

this course looks at how Latino fiction, poetry, drama, and essays are influenced by conflicts in the U.S., Latin America, and the Caribbean.

Credit Hours: 3.00

Format: Class

Prerequisites: 2111 or 2121 and one of the following: 2131, 2132, 2133, or 2134

Projected Offering: Spring - Odd

### **2325 LITERATURE OF HUMANITY AND CONFLICT: EPICS AND MYTHS**

This course explores how war, revolutions, and social conflicts have involved citizens of diverse cultures: Chinese, Egyptian, Greek, Hebrew, Nordic, Native American, Roman, and others. Discussions examine the humanistic side of military and personal conflicts through these early and modern narratives. Drawing from literature outside the traditional Western canon primarily, these studies emphasize the ways narratives unite and divide culture while touching upon gender, politics, ethnicity, and mythology. Using media (film, art, and Music) and literature (short stories, essays, epics, and plays), the course supports an analysis of the past and its intersection with present global cultures.

Credit Hours: 3.00

Format: Class

Prerequisites: 2111 or 2121 and one of the following: 2131, 2132, 2133, or 2134

Projected Offering: Spring - Even

### **2326 LITERATURE OF HUMANITY AND CONFLICT: AFRICAN AMERICAN LITERATURE**

This course examines how conflicts involving African Americans have been portrayed in African-American literature.

Credit Hours: 3.00

Format: Class

Prerequisites: 2111 or 2121 and one of the following: 2131, 2132, 2133, or 2134

Projected Offering: Fall - Even

### **2328 PUBLIC SPEAKING IN A DIVERSE SOCIETY**

Provides instruction and experience in principles of oral communication, focusing on developing public speaking skills and delivering speeches related to civil rights, race, immigration, identity, gender, and other contemporary topics dealing with diversity.

Credit Hours: 3.00

Format: Class

Prerequisites: 2111 or 2121 and one of the following: 2131, 2132, 2133, or 2134

Projected Offering: Spring

### **2331 COAST GUARD SPANISH**

Introduction to Coast Guard, military, nautical and other pertinent vocabulary in Spanish. Includes a review of basic Spanish.

Credit Hours: 1.00

Format: Class

Prerequisites: 2236, 2237 or equivalent

Projected Offering: Spring - Even

### **2335 SPANISH III**

Includes grammar review; speaking and writing; selections from Spanish literature. Students not coming into this course from Spanish II or Spanish I/II at the Coast Guard Academy must take placement test at: <http://webcape.byuhtsrc.org/?acct=uscga>. Password may be obtained by contacting either Dr. Rivero or Dr. Waid in the Department of Humanities.

Credit Hours: 3.00

Format: Class

Prerequisites: 2236 or 2237

Projected Offering: Fall

### **2336 CONVERSATIONAL SPANISH**

A course designed to help students maintain language proficiency and develop stronger conversational skills. Weekly reflection journals are required in addition to active contributions to classroom conversation. Grades are based on quality of journals, class participation, and audio recordings evaluated for breadth of vocabulary, fluidity, pronunciation and grammatical sophistication.

Credit Hours: 1.00

Format: Class



Prerequisites: 2335 or equivalent

Projected Offering: Spring - Odd

### **2337 SPANISH IV**

Continuation of Spanish III.

Credit Hours: 3.00

Format: Class

Prerequisites: 2335

Projected Offering: Spring

### **2338 CULTURE AND POLITICS OF LATIN AMERICA**

This course will examine recent and current U.S. foreign policy toward Latin America, how strategic goals are made and implemented, and how policies and/or procedures (change or do not change) in the aftermath of a crisis. After a brief review of Latin American history and relations between the region and the United States, the course will examine U.S. reaction to recent political events and review and analyze current programs designed to carry out U.S. foreign policy. The course will also examine the importance of past U.S. actions and historical context in formulating and implementing – and a country's reaction to – new goals and programs.

Credit Hours: 3.00

Format: Class

Prerequisites: 2111 or 2121, and 2265 (or concurrent, or instructor permission)

Projected Offering: Fall

### **2341 THE CIVIL WAR ERA**

Evaluation of the causes, course and consequences of the American Civil War. Themes include the development of America in the 19th century, the impact of slavery, expansion, and social change, and interrelationship of social, economic, political, military, and diplomatic factors in the war.

Credit Hours: 3.00

Format: Class

Prerequisites: 2163

Projected Offering: Fall – Odd Years

### **2343 THE LATIN AMERICAN EXPERIENCE: A CULTURAL APPROACH**

This course offers a panoramic view of Latin American issues, from pre-Hispanic cultures to the present, from an interdisciplinary perspective. Issues of identity, gender, race, ethnicity, human rights, environment, etc. will be approached through the study of Latin American literature, film and visual art. Weekly discussions of current affairs will allow cadets to make connections between the past and the present of Latin America. Classes will be enriched by presentations from guest speakers, as well as a field trip to an area museum/event. For students with sufficient fluency in Spanish (see 2344 course description for details), this course can be complemented with a one-credit course conducted in Spanish and taught simultaneously to further explore the topics discussed in class.

Credit Hours: 3.00

Format: Class

Prerequisites: Either 2131, 2132, 2133, or 2134

Projected Offering: Spring

### **2344 INTRODUCTION TO LATIN AMERICAN STUDIES: LITERATURE, FILM AND VISUAL ART**

This is a one-credit course conducted entirely in Spanish that complements the three-credit course The Latin American Experience: A Cultural Approach (2343). It is aimed at students currently enrolled in the three-credit course but also at students who want to enhance their knowledge of Spanish and Latin American culture. It offers a panoramic view of Latin American issues, from pre-Hispanic cultures to the present, from an interdisciplinary perspective. Issues of identity, gender, race, ethnicity, human rights, environment, etc. will be approached through the study of Latin American literature, film and visual art. Besides further exploring the topics discussed in the three-credit class, students will be able to practice and improve their Spanish communication skills. In order to take this course, students must fulfill one of these language requirements: a) a minimum of a low-intermediate level of Spanish – Spanish III (2335) course offered at CGA or equivalent; b) a score in the Spanish placement test that indicates a low-intermediate level of Spanish or above; c) native/heritage speakers; d) instructor's permission.

Credit Hours: 1.00

Format: Class

Prerequisites: 2335 or equivalent, or Instructor approval

Projected Offering: Spring

### **2352 CONFLICT RESOLUTION, DIPLOMACY, AND NEGOTIATION**

Conflict Resolution serves as an upper division offering in the International Relations concentration. This course begins by considering the origins and nature conflict and explores potential ways of addressing areas of instability. Negotiation and mediation literatures undergird our study and frame our two main approaches to conflict resolution: positional bargaining versus principled negotiation. We use these basic ideas to inform our understanding of effective negotiation and diplomacy and enable us to improve our competencies as practical negotiators. To cement the theoretical precepts, we use case studies and simulation exercises to put our new learning to the test. Perhaps Dean Acheson said it best in his rumination that "He who has learned to disagree without being disagreeable has discovered the most valuable secret of a diplomat."

Credit Hours: 3.00

Format: Seminar

Prerequisites: 2367

Projected Offering: Spring – Even Years

### **2355 PUBLIC POLICYMAKING**

A seminar evaluating the American policymaking process. Focusing on the interrelationship between policymaking institutions (the Presidency, Congress, courts, bureaucracy, and regulatory agencies) and individual and organizational participants (interest groups, political parties, stakeholders, media, and citizens), it identifies and evaluates the policy processes and politics that characterize American national government. Case studies focus on environmental, regulatory, immigration and economic policy areas.

Credit Hours: 3.00

Format: Class

Prerequisites: 2163

Projected Offering: Fall

### **2358 POLITICS OF NORTH AFRICA AND THE MIDDLE EAST**

Following a survey of history and politics that covers the vast geographical region between North Africa (Marrakech) and the Melanesian Crescent (Jakarta), we delve into case studies under the following regional headings: 1) the Maghreb; 2) Egypt and the Sudan; 3) the Levant; and 4) the Arabian peninsula and beyond (including Afghanistan, Pakistan and some of the Asia-Pacific regions that have been influenced by Islamic religion and culture), with an emphasis on the littoral/security concerns of the region. Upon completion of this course, students are expected to: have a general knowledge of the history of North Africa & the Middle East and appreciate the historical ties and ongoing influences of Islamic religion and culture further east, i.e. through to the Philippines, Indonesia, etc.; be familiar with the terminology used within the subfield of North African & Middle Eastern ("Orientalist") studies; retain an "intellectual framework" for many of the ongoing scholarly debates within the subfield of North African & Middle Eastern studies; and be well prepared for further study within this subfield.

Credit Hours: 3.00

Format: Class

Prerequisites: 2265

Projected Offering: Spring – Even Years

### **2359 AFRICAN POLITICS**

Following a survey of the pre-colonial history of the African continent, 2359 reviews the impacts of the colonial era and the history of African state formation, African political practices and ideas, recent events in North Africa, and ongoing debates regarding the politics of development in the sub-Saharan African region. Particular emphasis is placed on areas of possible interest to the U.S. Coast Guard and the new (2008) U.S. Africa Command including the Gulf of Guinea and the Horn of Africa.

Credit Hours: 3.00

Format: Class

Prerequisites: 2265

Projected Offering: Fall

### **2360 SELECTED TOPICS IN PHILOSOPHY**

Seminar on topics drawn from historical and contemporary philosophical thought. Topics will vary each semester, and will be determined by a survey of student interests. Topics may include Eastern philosophy, American philosophy, 20th century philosophy, existentialism, philosophy of religion, philosophy in literature and drama, theory of knowledge, metaphysics, or any philosophical field other than ethics and political philosophy.

Credit Hours: 3.00  
 Format: Seminar  
 Prerequisites: None  
 Projected Offering: Spring

### **2361 INTRODUCTION TO POLITICAL THEORY**

This course is designed to introduce students to political theory; that is, to learn how to think theoretically about political issues. Students will be taught to examine how worldviews are constructed, how different conceptions of human nature inform political perspectives as well as how to adjudicate the tension between theoretical insights and chaotic lived complexities. Together, we will read both influential theorists (e.g. Sophocles, Machiavelli, Marx, Arendt, Freud and Fanon) as well as consider contemporary applications of their observations. In order to organize a vast amount of political history and theory, we will focus our understanding on the various ways political theorists have conceived and debated what constitutes political freedom. We will ask not only what it means to be free, but even whether we want to be free. Further, we will examine the obstacles to freedom, as well as what kind of political authority helps to insure freedom. We will pursue these questions, in part, through examinations of Nazi Germany and the trial of Adolf Eichmann, the US civil rights movement and the construction of racial identity and the economic configurations of freedom under global capitalism. Further, students will be encouraged to consider as secondary themes in the readings: the relationship between vision and knowledge as well as between travel and theory. Finally, students will explore how the various genres of political theory (i.e. theatre, treatise, music and film) influence the kind of political life imagined and the theoretical possibilities developed.

Credit Hours: 3.00  
 Format: Class  
 Prerequisites: None  
 Projected Offering: Spring

### **2362 HOMELAND SECURITY POLICY**

Across a range of challenges to the United States – immigration and border security, critical infrastructure protection, maritime counterterrorism, disaster preparedness and response – this course integrates the theory and practice of homeland security. Recognizing the unique and evolving environment that future Coast Guard officers will face, heavy emphasis is given to the policy, strategic, operational, and tactical dimensions of securing the homeland. Beyond the statutory missions of the Coast Guard, careful study is given to key actors, institutions, and processes – federal, state, local, private, and international – that comprise the homeland security policy space. Through an emphasis on policy analysis and critical thinking, the course explores the challenges and opportunities posed by homeland security, and examines how our government is evolving to adapt to them. This course will be offered every other year.

Credit Hours: 3.00  
 Format: Class  
 Prerequisites: 2163 and 2355 (or concurrent)  
 Projected Offering: Spring – Even Years

### **2363 CONTEMPORARY POLITICAL THEORY**

Political theory brings together two seemingly incompatible realms– the messy, contingent world of human beings living in community and the interpretations, understanding and meanings human beings construct for how to do so productively, happily and with minimal conflict. This course is an exploration of some of the contemporary configurations of that juxtaposition in a post 9/11 world. The course will focus this semester on contemporary (and historical) understandings of revolution and the transition to democracy. Readings will include Hannah Arendt's *On Revolution* as well as contemporary thinkers Paul Gilroy, John Fornan and Tariq Ramadan. We will consider, also, how we live with the pluralism in our American midst and what, if any, are our responsibilities to those who are far away. Readings on this issue will include a novel on Mexican/American immigration and contemporary debates about race and incarceration as the "new Jim Crow." Finally, we will explore the ethos and possibilities of reconciliation and the role of national apologies post 9/11. Here readings will focus on the work of South African Archbishop Desmond Tutu as well as political theorist Anthony Appiah on the ethics of humanitarian intervention.

Credit Hours: 3.00  
 Format: Seminar  
 Prerequisites: 2163  
 Projected Offering: Fall

### **2367 INTERNATIONAL RELATIONS**

A critical examination of the classical and contemporary international relations theories. The conditions that enhance or diminish security in the international system are explored and the influence of individuals, states, and nongovernmental,

regional, and international organizations on each other and the overall global community are compared and discussed.

Credit Hours: 3.00

Format: Seminar

Prerequisites: 2265

Projected Offering: Fall

### **2369 CONTEMPORARY UNITED STATES FOREIGN POLICY** *(formerly 2276, effective AY2019-20)*

Explores U.S. foreign policy from the late Cold War period to the present. Using historical events as our guide, we examine the foreign policy decision making process and its major actors, including the President, Congress, bureaucracy and the news media. We will conclude the course by taking a regionally organized look at foreign policy challenges confronted by the current administration. Readings for the course will include both text chapters and journal articles.

Credit Hours: 3.00

Format: Seminar

Prerequisites: 2265 (can be concurrent with instructor approval)

Projected Offering: Spring

### **2370 AMERICAN PRESIDENTIAL POLICY**

This course examines the roles of the President, the Cabinet departments, White House staff and Executive Office agencies in making foreign and domestic policy. It examines the organization and management of the executive branch's policymaking processes as well as executive-congressional relations, and their dynamic impact on the policy-making process. This course will be offered every other year.

Credit Hours: 3.00

Format: Seminar

Prerequisites: 2163

Projected Offering: Spring - Odd

### **2371 AREA STUDIES**

The role of historic, social, economic, and cultural forces in framing the political system of a nation or a geographic area is examined. The area studied is based upon teaching resources in the department.

Credit Hours: 3.00

Format: Seminar

Prerequisites: 2163, 2265

Projected Offering: Fall or Spring

### **2373 THE RELIGION AND POLITICAL PHILOSOPHY OF ISLAM**

Provides an introduction to Islam by exploring its historical development, with a particular emphasis on Islamic theology and philosophy, up to and including contemporary developments. Students will become familiar with the origin and development of Islam, with the unity and diversity of Islam, with classical Islamic philosophy and theology, with the rise and fall of Islamic dynasties and empires, and with the rise of fundamentalist Islam. Students will explore key contemporary issues within Islam, especially the issues of war, women, and democracy, and will examine predominantly Islamic nations in light of what they have studied.

Credit Hours: 3.00

Format: Seminar

Prerequisites: None

Projected Offering: Spring – Even Years

### **2375 STRATEGIC INTELLIGENCE: COLLECTION AND ANALYSIS**

The global environment of the past decade raises new questions about American security and America's vulnerability to global threats. It also focused new attention on the U.S. Intelligence Community (IC): its interactions with policymakers, how it is organized, how it works, and the products it generates in support of homeland and national security decision and policy makers. This course is designed to explore the "how it works" aspect of the IC, the "business" of intelligence, most notably the intelligence process with specific emphasis on collection systems (both human and technical) and the critical thinking, analysis, writing and dissemination of finished intelligence analysis specifically in the areas of transnational asymmetric threats. Finally it provides a look at how intelligence analysis supports policymakers in a democratic society. A special focus of the course is Coast Guard Intelligence, its binary role as both a law enforcement agency and a member of the U.S. Intelligence Community, and its roles related to homeland and national security.

Credit Hours: 3.00

Format: Class  
 Prerequisites: 2269, 2281  
 Projected Offering: Fall

### **2377 POLITICS OF CHINA**

The Politics of China course serves as an upper division offering in the International Relations concentration. The course is designed to provide a background for one's understanding of modern Chinese politics with an emphasis on the mainland in the post-Mao reform era while examining major challenges confronting China today. Key topics include modern political history, political culture and ideology, political institutions, political processes, the Chinese Communist Party, the role of the military, foreign affairs, economic development, and special regions such as Hong Kong, Taiwan, and Tibet. By the end of the semester, students should be able to gain a better understanding of the current developments in Chinese politics.

Credit Hours: 3.00  
 Format: Class  
 Prerequisites: 2367 (or concurrent, with instructor approval)  
 Projected Offering: Fall – Odd Years

### **2378 ASIA IN WORLD AFFAIRS**

This course is a general survey of the politics of Asia, with an emphasis on contemporary Pacific Asia. Starting with the general environment of Asia, this course covers the history, politics, and international relations of major Asian powers and discusses the main economic and security issues that concern Asian countries today. Upon completion of the course, students are expected; 1) to be familiarized with the international and domestic politics of Asia; 2) to gain a better understanding of the historical and current developments of Asian countries; and 3) to apply international relations concepts and theories to the study of Asia.

Credit Hours: 3.00  
 Format: Class  
 Prerequisites: 2367 (or concurrent, with instructor approval)  
 Projected Offering: Fall

### **2379 STUDY OF THE KORAN**

In this 1-credit course, students will read the entire Koran, in addition to an easy secondary source which helps to explain the Koran. Topics discussed will include differences in translations, views regarding the nature of the Koran, the importance of revelation order, different interpretations and interpretive strategies (including the debate over abrogation) and the relation of the Koran to other sacred scriptures. There are no prerequisites for this course, which does not presuppose any background in Islam. This course is normally taken by non-Government majors; Government majors may take it only with instructor permission.

Note: Cadets may take either 2373 or 2379, but may not take both.  
 Credit Hours: 1.00  
 Format: Seminar  
 Prerequisites: None  
 Projected Offering: Spring – Even Years

### **2392 MARITIME STUDIES: SELECTED TOPICS**

First Class seminar on maritime cultures, history, economics, politics, law, governance, geopolitics, transportation, safety, or security topics that vary each semester and span different disciplinary perspectives. Topics determined annually. Seminar requires exploration of the maritime domain through readings, seminar discussions, and research and writing requirements.

Credit Hours: 3.00  
 Format: Seminar  
 Prerequisites: 2163  
 Projected Offering: Fall and Spring

### **2394 INTRODUCTION TO MORAL AND ETHICAL PHILOSOPHY**

Examination of a few major philosophical views on what makes our actions right or wrong and our characters good or bad. Students are encouraged to develop their own moral voice, decision-making abilities, and respect for the place of reasoned argument in the treatment of ethical problems, particularly within the field of military ethics.

Credit Hours: 2.00  
 Format: Seminar  
 Prerequisites: None

Projected Offering: Fall and Spring

### **2395 RHETORIC AND COURTROOM ADVOCACY**

A year-long (fall and spring semester) course to promote your public speaking and advocacy skills, which will be honed while preparing for and representing one party in mock trials. At the conclusion of this course, the student will: (1) be a more refined speaker; (2) be skilled at persuasively advocating a particular viewpoint before a decision-maker; (3) be familiar with the fundamentals of litigation in a courtroom setting; and (4) be more comfortable speaking in front of a group of people. Extensive out of class preparation is required, as is mandatory attendance at the off-site mock-trial competitions (usually two/semester).

Credit Hours: 1.00 per semester; full-year course

Format: Seminar

Prerequisites: None

Projected Offering: Fall and Spring

### **2397 CONSTITUTIONAL LAW AND HOMELAND SECURITY**

A study of the principal provisions of the U.S. Constitution and the methods by which American government officials, including judges, legislators, and Presidents, give meaning to those provisions. The course will specifically emphasize civil liberty concepts and the function of the Constitution in the realm of Homeland Security.

Credit Hours: 3.00

Format: Seminar

Prerequisites: 2361

Projected Offering: Spring

### **2398 PRINCIPLES OF CRIMINAL JUSTICE AND MARITIME OPERATIONAL LAW**

This course will introduce students to the U.S. domestic legal system and educate them in criminal justice and operational law concepts essential for Coast Guard officers. It will first cover fundamental legal principles and nomenclature, as well as how law is created and implemented in the U.S. The course will then address broad criminal law concepts and how these principles apply within the Uniform Code of Military Justice and the traditions of military service. The second half of the course will build on the first but focus on maritime law enforcement and Coast Guard operational law, including international law concepts, the Law of the Sea and maritime jurisdiction, use of force, and the legal authorities and issues related to several key Coast Guard mission areas.

Credit Hours: 4.00

Format: Class

Prerequisites: None

Projected Offering: Fall and Spring

### **2421 SPECIAL STUDIES IN THE HUMANITIES**

Advanced tutorial concentrating on a specific topic in literature, philosophy, history, the arts or foreign language. Intensive reading and consultation with a faculty member culminating in a major project or portfolio. Limited to advanced students with previous significant course work in the humanities.

Credit Hours: 3.00

Format: Class/Seminar

Prerequisites: None; 1/c only

Projected Offering: Fall or Spring

### **2429 THE CRAFT OF CREATIVE WRITING**

This course provides students with the opportunity to learn the craft of writing creative works, and provides them with an understanding of critical elements necessary for the creation of effective short stories, poems, and short plays. Students will share their writing in a group setting in order to improve skills through constructive criticism and supportive comment. Grading criteria will mostly be based on students' ability to use literary tools (e.g., metaphor, setting, irony . . . ) in their own creative works.

Credit Hours: 3.00

Format: Class

Prerequisites: 2111 or 2121

Projected Offering: Fall or Spring

### **2439 ADVANCED SPANISH**

Rotating topics. This is an advanced conversation course. Students will be responsible for in-depth reading and analyses of literary, cultural, artistic or cinematic works. Grading based on in-class participation, papers and tests.



Credit Hours: 3.00  
Format: Class/Seminar  
Prerequisites: 2337 or equivalent  
Projected Offering: Fall

### **2463 MARITIME POLICY AND STRATEGY**

Focuses on national and international policy processes, institutions, and dimensions that comprise maritime policy systems at the national and international levels. Influences and constraints that affect policy formulation and implementation are investigated, including how human values, institutions, cultures, and history shape maritime issues and policy responses. Theoretical and methodological frameworks in public policy, such as the tragedy of the commons and public choice theory, are used to assess the efficiency, effectiveness, and efficacy of U.S. and international maritime policies and policy systems at the beginning of the 21<sup>st</sup> century. Topics include developments in ocean and waterways use since mid-century and contemporary challenges in maritime governance, safety, and security.

Credit Hours: 3.00  
Format: Seminar  
Prerequisites: 2355; 1/c only  
Projected Offering: Fall

### **2465 UNITED STATES MILITARY POLICY**

Examine American military strategy from the colonial period to the present. Course background originates with definitions of key ideas and terms, and the historical antecedents and influences of the colonial era. The course then moves into a chronological discussion of the major events, periods, and influences pertaining to American military affairs. We cover policy and strategy; we will see a bit on operations, but no tactics. Course themes include the relationship between American culture and war making; the links between national policy, foreign policy, military policy, and military strategy; and the issue of civil-military relations, including not only civilian control of the military, but also the influence of American society upon the military as an institution. This course hopes to explain - and question-the nature and motives of American war making, the roles of a variety of players in policy making (public, private, civilian and military), and the connections between society's values/goals and the use of the military.

Credit Hours: 3.00  
Format: Seminar  
Prerequisites: 2163, 2355, and 1/c standing; or Instructor Approval for non-Government Majors  
Projected Offering: Spring – Even Years

### **2467 ENVIRONMENTAL POLICY AND ETHICS**

Examines environmental ethics and U.S. environmental policy, both separately and in terms of how the two interact. We will examine U.S. environmental policies, with particular focus on policies regarding biodiversity, pollution control, waste disposal, and maritime environmental protection. We will look at various policymaking frameworks, especially administrative rationalism, democratic pragmatism, economic rationalism, and ecological democracy. We will cover both anthropocentric approaches to environmental ethics (such as human rights, sustainability, future generations, and environmental justice) and non-anthropocentric approaches (such as deep ecology, ecofeminism, biocentrism, and bioregionalism). We will consider both policy implications of various ethical approaches to the environment and the ethical foundations of various ways of evaluating environmental policies, with a particular focus on market-based policies (such as “cap-and-trade”) and regulatory policies (such as the Marine Mammal Protection Act).

Credit Hours: 3.00  
Format: Seminar  
Prerequisites: 2355; 1/c only  
Projected Offering: Spring

### **2468 RELIGION, POLITICS AND GLOBALIZATION**

This course is an examination of the complex matrix of globalization, religion and contemporary political issues. To begin to understand this terrain, we will read theories of globalization exploring the movement of people, ideas and capital as well as various theories of the relation between religion and violence as well as between religion and reconciliation. Specifically, we will examine the ways in which the forces of globalization have created both more religious tolerance as well as in some instances more religious conflict. We will also spend time at the end of the semester thinking through the religious grounding of human rights discourse as well as the theo-political claims for humanitarian intervention.

Credit Hours: 3.00  
Format: Seminar

Prerequisites: 2361; 1/c only

Projected Offering: Fall

### **2469 INTERNATIONAL DEVELOPMENT**

In the course, we consider the many ways international development has become central to international relations. Following a survey of colonial encounters in world history, we discuss the era of nationalism and independence, and the politics of post-colonial development, in two time frames: The Cold War and Post-Cold War. We survey how, during the Cold War, many working in international development tried to look beyond ideology to achieve various forms of “development” and how, at least initially, much of the focus was on increasing Gross National Product and the overall output of goods and services, as valued by markets. We consider how these and other developmental aims were often thwarted by a broader ideological conflict with the Soviet Union and concerns over US security. Through a consideration of the extant literature, we consider how/why many say the Post-Cold War world is different and how this could well translate to greater developmental success in the twenty-first century. Pro and anti-aid arguments are considered as well as some of the Post-Cold War critiques of Cold War developmental practice. With this background students are asked to consider, through case studies, some of the policy changes that have taken place since the fall of the Berlin Wall, to include the ongoing challenges to many dictatorships throughout the world. Particular emphasis is placed on areas of strategic interest to the U.S.

Credit Hours: 3.00

Format: Seminar

Prerequisites: 2367; 1/c only

Projected Offering: Fall

### **2472 TRANSNATIONAL THREATS AND CHALLENGES**

This course educates Coast Guard Officers of the 21<sup>st</sup> Century by providing an overview of transnational security, challenges and their effects on the political, economic and security elements of society. For the purposes of this course, threats are construed as those issues which promote instability and for which current policy, management and leadership paradigms struggle to successfully coordinate action and mitigate effects. The course examines an array of threats including criminal enterprises that traffic in people, weapons, and drugs as well as non-criminal challenges including public health threats and environmental and energy security. The course closely examines the legal, political, policy and law enforcement responses employed at the national and international level to mitigate transnational threats within the context of globalization.

Credit Hours: 3.00

Format: Seminar

Prerequisites: 2163, 2367, or Permission of Instructor; 1/c only

Projected Offering: Spring

### **2482 CYBER CRISIS AND CONFLICT**

This course is designed for 1/c cadets from all majors interested in deepening their studies in national security, intelligence, and cyber policy. Cadets will prepare for and take part in national and international cyber challenges that will enable them to think critically, respond to, and manage high-tempo cybersecurity crises and conflicts. Extensive out of class preparation is required and cadets must participate in all scheduled off-site competitions.

Credit Hours: 1.00

Format: Seminar

Prerequisites/Corequisites: 2269, 2281, or 2282

Projected Offering: Spring

### **2485 GLOBAL CHALLENGES**

This course will 1) help developed a clear understanding of the differences among individual, national, state, international, and global goals; 2) enhance global awareness; 3) help cadets participate in world affairs as a critical and informed citizen; 4) ensure cadets critically assess their own perspectives and recognize how different social and historical circumstances may impact one’s own viewpoint in the world and 5) better understand the relevance of global affairs to the missions of the U.S. Coast Guard/Department of Homeland Security and to the maritime domain in which they will operate.

Credit Hours: 3.00

Format: Class/Lecture

Prerequisites: 2163

Projected Offering: Fall and Spring



**2491 GOVERNMENT CAPSTONE EXPERIENCE**

Cadets choosing, with instructor permission, to use an existing course as a venue within which to satisfy the Government Major capstone requirement should register for this one-credit government capstone experience during the same semester as their chosen 3-credit capstone-eligible course. This additional credit captures the time and effort required for completing the capstone that are in addition to what the course syllabus and instructor would otherwise require of those taking the course without conducting capstone work.

Credit Hours: 1.00

Format: Seminar

Prerequisites: 1/c Government Major

Projected Offering: Fall and Spring

**2494 INTERNATIONAL LAW**

The study of the principles of international law and the role(s) of international organizations. The emphasis will be on the function of international law in international relations and the effectiveness of international law in regulating the actions of state and non-state actors. The course will also take an in-depth look at sovereignty and the law of armed conflict.

Credit Hours: 3.00

Format: Seminar

Prerequisites: 2163 and 2398; 1/c only

Projected Offering: Fall

**2495 ADVANCED STUDIES IN GOVERNMENT**

Advanced Studies in Government allows students to undertake original scholarship and research on political systems and governmental institutions, programs, and policies both domestically and internationally. Two alternatives comprise this senior level study. First, cadets may be selected for an externally sponsored and nationally recognized scholars program such as the Center for the Study of the Presidency or Joint Service conference scholars program. The second option is for cadets to compete for an internship with Connecticut State government. Past placements for Connecticut internships have included the Office of the Attorney General and the Governor's Office. This course requires the production of an original research paper or participation in the internship. This course will count as the cadet's Capstone Requirement.

Credit Hours: 3.00

Format: Class/Project/Seminar

Prerequisites: Placement through Academic Excellence Opportunity application only

Projected Offering: Fall or Spring (Fall preferred)

**2497 SENIOR THESIS IN GOVERNMENT**

The Senior Thesis facilitates specialization within the Major Concentration through an independent research project under the supervision of a two-person faculty committee, at least one of whom must be a member of the permanent faculty with terminal degree. The Senior thesis results in a substantial written product and an oral defense of the thesis. This course will count as the cadet's Capstone requirement.

Credit Hours: 3.00

Format: Class/Project/Seminar

Prerequisites: Placement through Academic Excellence Opportunity application only

Projected Offering: Fall or Spring (Fall preferred)

**2499 ADVANCED RESEARCH PROJECTS**

Team-based original research projects entailing field and/or applied research for highly qualified cadets. Project requires a major academic commitment to the design and/or assessment of governmental strategies, policies, programs, capabilities, and/or organizations at the national or international level. Project also requires development of advanced research competencies. Oral briefings and final research reports are required. Cadet projects are supervised jointly by faculty and sponsoring agency teams.

Credit Hours: 3.00 per semester

Format: Directed Study

Prerequisites: Permission of supervising team, CGPA of 3.00 or higher

Projected Offering: Fall and Spring

**3107 FOUNDATION FOR CALCULUS**

Study of mathematical foundation material as preparation for 3111, Calculus I. Topics include mathematical notation, function families, algebra, trigonometry, exponentials, logarithms and the use of mathematical software.

Credit Hours: 4.00

Format: Class/Project

Prerequisites: Department Head approval

Projected Offering: Fall

### **3111 CALCULUS I**

Presentation of the fundamental concepts of functions, limits and differential calculus with an introduction to integral calculus. Techniques and applications of differentiation and calculating areas as limits are explored. A computer algebra system is utilized for both technical computations and computer analysis during the course.

Credit Hours: 4.00

Format: Class/Project

Prerequisites: Department Head approval

Projected Offering: Fall and Spring

### **3115 CALCULUS II (V)**

Same topics as Calculus II (3117) treated in depth and at a pace consistent with the ability of the class. A computer algebra system is utilized for both technical computations and computer analysis during the course.

Credit Hours: 4.00

Format: Class/Project

Prerequisites: Department Head approval

Projected Offering: Fall

### **3117 CALCULUS II**

Further extensive study of the fundamental concepts of differential and integral calculus. Topics include logarithmic, exponential, inverse trigonometric functions, vectors, vector valued functions, integration techniques, applications of the definite integral, improper integrals, and infinite series. A computer algebra system is utilized for both technical computations and computer analysis during the course.

Credit Hours: 4.00

Format: Class/Project

Prerequisites: 3111

Projected Offering: Spring and Summer

### **3211 MULTIVARIABLE CALCULUS**

An introduction to differential and integral calculus for functions of several variables. Topics include surfaces in three dimensional space, partial differentiation, multiple integration, and vector calculus. A computer algebra system is utilized for both technical computations and computer analysis during the course.

Credit Hours: 3.00

Format: Class

Prerequisites: 3115 or 3117

Projected Offering: Fall and Spring

### **3213 PROBABILITY AND STATISTICS**

An exploration of the basic concepts and rules of probability, as well as the fundamentals of statistics. Utilizing a data analysis computer program, students learn to explore, describe and summarize data. Statistical methods are presented and applied to contexts including opinion polls, financial management and engineering applications. Emphasis is placed on the development of proper statistical reasoning and how it applies to the analysis of data, with particular attention paid to the validity of necessary assumptions.

Credit Hours: 3.00

Format: Class/Project

Prerequisites: 3111

Projected Offering: Fall and Spring

### **3215 DIFFERENTIAL EQUATIONS**

An intermediate course in the methods of solving ordinary differential equations. Topics include first order equations, higher order linear equations, Laplace transforms, systems of equations, power series solutions, numerical methods and applications.

Credit Hours: 3.00

Format: Class

Prerequisites: 3115 or 3117

Projected Offering: Spring

**3221 LINEAR ALGEBRA**

The study of mathematical systems with emphasis on vector spaces, linear transformations and matrices. Topics include systems of linear equations, vector spaces, linear mappings, determinants and eigenvalue problems. Computer analysis is utilized.

Credit Hours: 3.00

Format: Class/Project

Prerequisites: 3115 or 3117

Projected Offering: Fall

**3231 LINEAR OPTIMIZATION**

The theory and application of deterministic models of operations research used in the optimization of linear functions of several variables subject to linear constraints. Topics include linear programming, simplex-based methods, sensitivity analysis, and integer programming. Computer analysis is utilized.

Credit Hours: 3.00

Format: Class/Project

Prerequisites: 3115 or 3117

Projected Offering: Spring

**3235 COMPUTER MODELING LANGUAGES**

An introduction to programming languages for computer modeling. Topics include programming fundamentals, decision structures, data structures, algorithms, objects and software design. Exercises with an emphasis on mathematical applications enable students to design and build effective computer programs.

Credit Hours: 3.00

Format: Class/Project

Prerequisites: 3115 or 3117, and 1104 or permission of instructor

Projected Offering: Fall

**3237 DISCRETE MATHEMATICS**

An introduction to discrete methods and selected applications. Topics include fundamentals of logic, methods of proof, elementary number theory, set theory, mathematical induction, counting techniques, recursion, and O-notation.

Credit Hours: 3.00

Format: Class/Project

Prerequisites: 3115 or 3117

Projected Offering: Spring

**3238 ALGORITHMS WITH APPLICATIONS** *(formerly 3337, effective AY2019-20)*

This course is designed to further the student's ability to solve mathematical applications via computer programming. New programming concepts and structures will be introduced, such as Linked Lists, Stacks, Queues, Trees, Sorting, Graphs, and Recursion. An emphasis will be placed on a student's ability to implement a mathematical application using a computer language.

Credit Hours: 3.00

Format: Class/Project

Prerequisites: 3235 or permission of instructor

Projected Offering: Fall

**3301 ADVANCED ENGINEERING MATHEMATICS**

An upper division course for Engineering majors designed to provide a background and working knowledge of Linear Algebra and Probability and Statistics. The primary objectives are to develop a basic understanding of matrix algebra techniques and probability and statistical theory, utilize these concepts in solving a variety of Engineering applications, and the ability to read and discuss the fundamentals of the topics introduced. Computer projects will be assigned to enable students to solve more complex problems further demonstrating the application of the concepts to Engineering applications.

Credit Hours: 4.00

Format: Class

Prerequisites: 3215

Projected Offering: Spring

### **3333 NETWORK AND NONLINEAR OPTIMIZATION**

The theory and application of network problems, nonlinear programming, and dynamic programming. Computer analysis is utilized.

Credit Hours: 3.00

Format: Class/Project

Prerequisites: 3211, 3231 or permission of instructor

Projected Offering: Fall

### **3334 INTERMEDIATE DETERMINISTIC MODELS**

In this course, students will increase their capabilities for solving problems in Operations Research. This course will focus on problem statements that may be ambiguous or incomplete, large-scale project formulation, and computer based solution techniques. Tools to be used in solving the projects will be drawn from the following areas: linear programming, mixed-integer programming, combinatorial optimization, multiple-objective optimization, nonlinear optimization, network optimization and others.

Credit Hours: 3.00

Format: Class/Project

Prerequisites: 3235 and 3333, or permission of instructor

Projected Offering: Spring

### **3336 INFORMATION SYSTEMS** *(formerly 3236, effective AY2019-20)*

An introduction to computer information systems development utilizing databases. Topics include computer hardware and software, software design and development processes, database concepts, database design, and database applications development with Access and Excel. Exercises and a project with an emphasis on decision support applications enable cadets to develop information systems that are well structured and exploit database technology.

Credit Hours: 3.00

Format: Class/Project

Prerequisites: 3235 or permission of instructor

Projected Offering: Spring

### **3338 ADVANCED CRYPTOGRAPHY**

Description: TBD

Credit Hours: 3.00

Format:

Prerequisites:

Projected Offering: Spring

### **3341 PROBABILITY THEORY**

A rigorous development of probability theory necessary for advanced work in mathematics, statistics, operations research, and engineering. Topics covered include combinatorial methods, probability rules, discrete and continuous random variables, multi-dimensional distributions, moments and moment generating functions, special distributions, functions of random variables, and the central limit theorem. Computer analysis is utilized.

Credit Hours: 3.00

Format: Class

Prerequisites: 3211

Projected Offering: Fall

### **3343 MATHEMATICAL STATISTICS**

A mathematical development of sampling distributions and the methods and theory of statistical procedures such as point estimation, confidence intervals, and hypothesis tests design. Topics include the Neyman-Pearson Lemma, generalized likelihood ratio testing, contingency tables, and goodness of fit. Computer analysis is utilized.

Credit Hours: 3.00

Format: Class

Prerequisites: 3341

Projected Offering: Spring

### **3347 LINEAR REGRESSION** *(formerly 3447, effective AY2019-20)*

The fundamental development of simple and multiple linear regression models is discussed with emphasis on estimation and

inference techniques and the associated assumptions. Forecasting models are also discussed. Computer analysis is utilized.

Credit Hours: 3.00

Format: Class/Project

Corequisite: 3343

Projected Offering: Spring

### **3449 STATISTICAL LEARNING**

This course will provide an introduction to supervised and unsupervised statistical learning methods. Supervised methods include advanced linear regression topics (subset selection, shrinkage methods, dimension reduction methods, and others) and classification methods (logistic regression, linear discriminant analysis, and others). Unsupervised learning methods discussed include principal components analysis and clustering methods. Other topics include resampling methods such as cross-validation and the bootstrap. The course builds on the material in Mathematical Statistics and Linear Regression and the focus is on analyzing and understanding complex data sets. Computer analysis is utilized.

Credit Hours: 3.00

Format: Class/Project

Prerequisites: 3347, 3343

Projected Offering: Fall

### **3453 DECISION MODELS**

An introduction to decision analysis, risk, utility theory, Markov chains, game theory, and other topics in decision modeling. Computer analysis is utilized.

Credit Hours: 3.00

Format: Class/Project

Prerequisites: 3221, 3341

Projected Offering: Fall

### **3463 SIMULATION WITH RISK ANALYSIS**

Introduction to computer simulation and modeling of real-world systems. Design, implementation, and validation of computer models of discrete and continuous systems are considered. Topics include principles of computer simulation methodologies, data collection and analysis, selecting distributions, and analysis of results. Individual and group projects are an integral part of this course.

Credit Hours: 3.00

Format: Class/Project

Prerequisites: 3343

Projected Offering: Fall

### **3470 OPERATIONS ANALYSIS PREPARATION**

A capstone preparation course including familiarization with software and prior capstone reports, project selection and interaction with project sponsors. Skills related to formulation of problem statements, identifying data requirements as well as reading, writing and presenting technical reports are emphasized. Required for all Operations Research and Computer Analysis majors during the fall semester of first class year unless waived by the Head, Department of Mathematics.

Credit Hours: 1.00

Format: Class/Project

Prerequisites: None

Projected Offering: Fall

### **3471 OPERATIONS ANALYSIS**

A capstone project course applying mathematical, statistical, computer programming and/or operations research techniques to problems related to Coast Guard missions and other areas of interest. This course meets the capstone requirement.

Credit Hours: 4.00

Format: Class/Project

Prerequisites: 3347, 3470

Projected Offering: Spring

### **3473 PROBLEM SOLVING WITH OPERATIONS RESEARCH**

A project-based capstone course applying mathematical, statistical, computer programming and/or operations research techniques applicable to solving various real-world problems. This course meets the capstone course requirement.

Credit Hours: 4.00  
Format: Class/Project  
Prerequisites: 3449, 3470  
Projected Offering: Spring

### **3479 DIRECTED STUDIES IN OPERATIONS RESEARCH**

A semester of individual work on a topic approved by the Head, Department of Mathematics.

Credit Hours: 1.00-3.00  
Format: Directed Studies  
Prerequisites: Topic Dependent  
Restrictions: Permission of Instructor  
Projected Offering: Fall and Spring

### **3482 SELECTED TOPICS IN MATHEMATICS**

This course will explore advanced topics in mathematics. Potential topics include advanced calculus, complex variables, intermediate differential equations, and topology. Specific course content will vary based on institutional and organizational needs, student and faculty interest, and current topics in the field.

Credit Hours: 3.00  
Format: Class  
Prerequisites: Topic Dependent  
Restrictions: Permission of Instructor  
Projected Offering: Fall or Spring

### **3483 SELECTED TOPICS IN OPERATIONS RESEARCH**

This course will explore advanced topics in operations research. Potential topics include continuous time simulation, game theory, and advanced topics in optimization. Specific course content will vary based on institutional and organizational needs, student and faculty interest, and current topics in the field.

Credit Hours: 3.00  
Format: Class  
Prerequisites: Topic Dependent  
Restrictions: Permission of Instructor  
Projected Offering: Fall or Spring

### **3484 SELECTED TOPICS IN STATISTICS**

This course will explore advanced topics in statistics. Potential topics include statistical learning, non-parametric statistics, Bayesian statistics, robust statistics and exploratory data analysis. Specific course content will vary based on institutional and organizational needs, student and faculty interest, and current topics in the field.

Credit Hours: 3.00  
Format: Class  
Prerequisites: Topic Dependent  
Restrictions: Permission of Instructor  
Projected Offering: Fall or Spring

### **3485 SELECTED TOPICS IN COMPUTER ANALYSIS**

This course will explore advanced topics in computer analysis. Potential topics include algorithms, complexity, numerical analysis and programming languages. Specific course content will vary based on institutional and organizational needs, student and faculty interest, and current topics in the field.

Credit Hours: 3.00  
Format: Class  
Prerequisites: Topic Dependent  
Restrictions: Permission of Instructor  
Projected Offering: Fall or Spring

### **4101 DEVELOPMENTAL SWIMMING**

Developmental Swimming is designed to provide cadets who have been identified as weak swimmers with supplemental instruction in swimming.

Credit hours: 0.00  
Format: Laboratory

Prerequisites: None  
Projected Offering: Fall

#### **4102 PRINCIPLES OF FITNESS AND WELLNESS I**

This course introduces cadets to the basic concepts and principles of lifelong fitness and wellness. Special attention will be given to the areas of cardiorespiratory fitness, muscular strength and endurance, and flexibility. Cadets will be expected to apply basic exercise physiology principles in the development and maintenance of personal fitness programs.

Credit Hours: 1.00  
Format: Class/Laboratory/8-Week  
Prerequisites: None  
Projected Offering: Fall

#### **4103 PERSONAL DEFENSE I**

Personal Defense I is an introductory level course designed to foster the development of personal defense skills. Upon completion of the course, cadets will be able to anticipate potentially unsafe situations and be able to better protect themselves. This course serves as the foundation for maritime law enforcement skills (Personal Defense II).

Credit Hours: 0.25  
Format: Laboratory/8-Week  
Prerequisites: None  
Projected Offering: Fall and Spring

#### **4111 SWIMMING**

Swimming is an introductory level course designed to develop fundamental skills in both survival and competitive strokes. By the end of the course, cadets should be competent swimmers and comfortable in the water.

Credit Hours: 0.25  
Format: Laboratory/8-Week  
Prerequisites: None  
Projected Offering: Fall and Spring

#### **4112 PRINCIPLES OF FITNESS AND WELLNESS II**

This course introduces cadets to the basic concepts and principles of lifelong fitness and wellness. Special attention will be given to the areas of nutrition, stress management, and the adoption of healthy lifestyle behaviors.

Credit Hours: 1.00  
Format: Class/Laboratory/8-Week  
Prerequisites: 4102  
Projected Offering: Spring

#### **4204 LIFETIME SPORTS I: BADMINTON**

This course provides instruction in the fundamentals of badminton. Cadets will receive instruction in technique, rules and tactical play for both singles and doubles.

Credit Hours: 0.25  
Format: Laboratory/8-Week  
Prerequisites: None  
Projected Offering: Fall and Spring

#### **4214 LIFETIME SPORTS II: GOLF**

Golf is an introductory level course designed to foster the development of fundamental skills in golf and to support cadet commitment to lifelong participation in physical activity.

Credit Hours: 0.25  
Format: Laboratory/8-Week  
Prerequisites: None  
Projected Offering: Fall and Spring

#### **4222 PROFESSIONAL RESCUER**

The Professional Rescuer course is designed to provide each cadet with the knowledge and skills to effectively respond to emergency situations in both aquatic and land-based settings. Practical scenarios will be utilized to elicit problem solving and application of rescue principles. Successful completion of this course will lead to selected certification.

Credit Hours: 2.00



Format: Class/Laboratory/16 weeks

Prerequisites: 4111

Projected Offering: Fall and Spring

### **4303 PERSONAL DEFENSE II: MARITIME LAW ENFORCEMENT TECHNIQUES**

Personal Defense II exposes cadets to maritime law enforcement techniques. Upon completion of the course, cadets will be able to execute fundamental defensive techniques and prisoner control methods used by the U.S. Coast Guard.

Credit Hours: 0.25

Format: Laboratory/8-Week

Prerequisites: 4103

Projected Offering: Fall and Spring

### **4304 LIFETIME SPORTS III: TENNIS**

Tennis is an introductory level course designed to foster the development of fundamental tennis skills and to support cadet commitment to lifelong participation in physical activity.

Credit Hours: 0.25

Format: Laboratory/8-Week

Prerequisites: None

Projected Offering: Fall and Spring

### **4400 REMEDIAL PHYSICAL TRAINING**

Remedial Physical Training is designed to provide cadets who score below their class standard on the PFE with supplemental information and training in physical fitness.

Credit Hours: 0.00

Format: Laboratory

Prerequisites: None

Projected Offering: Fall and Spring

### **4405 ADVENTURE SPORTS I: ROCK CLIMBING**

This course provides instruction in basic belaying, rappelling and climbing techniques. Climbing safety is a major focus. Fee required.

Credit Hours: 0.50

Format: Laboratory

Prerequisites: None

Projected Offering: Fall

### **4407 DANCE**

This course provides instruction in different forms of dance. Offerings include ballet, jazz, modern, tap and hip hop. This course is conducted off campus. Fee required.

Credit Hours: 0.50

Format: Laboratory

Prerequisites: None

Projected Offering: Fall and Spring

### **4411 SCUBA DIVING**

This course provides instruction in basic scuba diving safety and techniques and includes open water dive experience. N.A.U.I. certification is possible with successful completion of the course. Fee required.

Credit Hours: 0.50

Format: Laboratory/16 weeks

Prerequisites: 4111 and 4222

Projected Offering: Fall and Spring

### **4414 ADVANCED GOLF**

This course provides advanced instruction in golf and offers cadets the opportunity to play on local courses. This course is conducted at local golf courses. Fee required for golf course play.

Credit Hours: 0.25

Format: Laboratory/8 weeks

Prerequisites: 4214

Projected Offering: Fall and Spring

#### **4415 ADVENTURE SPORTS II**

This course provides instruction in outdoor recreational sports such as orienteering, mountain biking, hiking and boating (canoe/kayak). Some elements of this course are conducted off campus. Fees may be required.

Credit Hours: 0.50

Format: Laboratory/16 weeks

Prerequisites: None

Projected Offering: Spring

#### **4439 THEORY OF COACHING**

This course provides instruction in the theory and techniques of coaching as well as opportunities for discussion on issues in contemporary athletics.

Credit Hours: 1.00

Format: Class/Laboratory/16 weeks

Prerequisites: None

Projected Offering: Fall and Spring

#### **4444 INDOOR RECREATIONAL SPORTS**

This course will provide instruction in popular recreational activities such as badminton, pickle ball and bowling.

Credit Hours: 0.50

Format: Laboratory/16 weeks

Prerequisites: None

Projected Offering: Fall and Spring

#### **4459 SPORT/WEELLNESS LEADER**

This course provides an opportunity for cadets to acquire and utilize teaching and leadership skills in a physical activity setting. Cadets may choose to assist with instruction in a physical education class or provide guidance to cadets in the Remedial Physical Training program.

Credit Hours: 0.50

Format: Class/Laboratory/16 weeks

Prerequisites: None

Projected Offering: Fall and Spring

#### **4464 STRENGTH AND CONDITIONING**

This course provides instruction in the various theories and principles of strength and conditioning and follows the guidelines of the National Strength and Conditioning Association.

Credit Hours: 0.50

Format: Class/Laboratory/16 weeks

Prerequisites: 4102 and 4112

Projected Offering: Spring

#### **4489 SELECTED TOPICS IN HEALTH AND PHYSICAL EDUCATION**

This course will explore topics in wellness and physical activity that extend skills and concepts presented in the Health and Physical Education program. Topics will vary based on instructor and student interest.

Credit Hours: 0.5 – 2.0

Format: Dependent on topic

Prerequisites: Permission of the Department Head

Projected Offering: Fall and Spring

#### **5102 CHEMISTRY I**

Chemistry I is the first half of a one-year curriculum in general chemistry. The course presents an introduction to elementary concepts of chemistry, covering topics of matter and measurement, atomic theory and inorganic nomenclature, mass relationships, reactions in aqueous solution, gas laws and reactions, enthalpy, quantum theory, periodic trends in the elements, chemical bonding, and intermolecular forces. Comprehensive laboratory program.

Credit Hours: 4.00

Format: Class/Laboratory

Prerequisites: None

Projected Offering: Fall

### **5162 PHYSICS I**

Basic concepts of Newtonian mechanics, particle kinematics and dynamics, rotational kinematics and dynamics, conservation laws, oscillations, fluids, and wave motion.

Credit Hours: 4.00

Format: Combined Class and Laboratory

Prerequisites: None

Corequisite: 3111

Projected Offering: Spring

### **5206 CHEMISTRY II**

Chemistry II is the second half of a one-year curriculum in general chemistry. The course presents an introduction to elementary concepts of chemistry, covering the following topics: physical properties of gases, physical properties of solutions, chemical kinetics, chemical equilibrium, acids and bases, nuclear chemistry, organic chemistry, and biochemistry.

Credit Hours: 4.00

Format: Class/Laboratory

Prerequisites: 5102

Projected Offering: Spring

### **5208 CHEMISTRY II (HONORS)**

The follow on course to Chemistry I. Coverage of required General Chemistry topics usually concludes around Spring Break so that the remainder of the semester can be dedicated to special topics chosen by the instructor. Taught as a single class and lab section with a great deal of student/instructor interaction and a continued emphasis on critical thinking skills. Intended for students with a strong chemistry background, an interest in environmental science or engineering, and particularly ideal for Marine and Environmental Sciences and Engineering majors.

Credit Hours: 4.00

Format: Class/Laboratory

Prerequisites: 5102 and Chemistry Section Chief approval

Projected Offering: Spring

### **5232 MARINE BIOLOGY**

Consideration of the marine biosphere, marine life, and habitats with emphasis on interaction in food chains and human impacts. Review of plant and animal kingdoms in terms of the adaptations and ecological adjustments for marine habitats with detailed laboratory examination of specific forms.

Credit Hours: 4.00

Format: Class/Laboratory

Prerequisites: Instructor's approval for non-majors

Projected Offering: Fall

### **5233 ENVIRONMENTAL SCIENCE**

This course is a survey of important concepts in Environmental Science. Topics will include water, soil, and atmospheric issues, focusing in on the chemical and biological implications and the effects on ecosystems. The overall objective of the course is to use scientific analysis in understanding the environment.

Credit Hours: 3.50

Format: Class/Laboratory

Prerequisites: None

Projected Offering: Spring

### **5236 OCEANS I: AIR AND SEA**

Oceans I: Air & Sea is a 4-credit entry level course in the Marine and Environmental Science Major. The course provides a fundamental background in descriptive and dynamical atmospheric and ocean circulation. The course begins with a discussion of fundamental concepts including composition, structure and radiative balances of the atmosphere and ocean. General ocean and atmosphere circulation is described and explained in terms of the forces responsible for fluid motion. The equations of motion for a fluid on a rotating earth are introduced and geostrophic and ageostrophic (Ekman) flows are investigated. Laboratory work expands on concepts presented in lecture and emphasizes data collection, analysis, and real-world applications.

Credit Hours: 4.00

Format: Class/Laboratory

Prerequisites: None

Corequisites: 5162

Projected Offering: Fall

### **5241 OCEANS II: LAND AND SEA**

Oceans II: Land & Sea is a 3.5-credit course in the Marine and Environmental Science Major. The course is designed to be a follow-on to Oceans I: Air & Sea, and in conjunction with the previous course provides the foundations for understanding the marine environment. The goal of the course is to provide the student with a basic background in geochemical processes, as well as physical oceanographic processes that impact the geological, chemical, nutrient distributions in the ocean. An emphasis is placed on coastal environments and tidal impacts.

Credit Hours: 3.50

Format: Class/Laboratory

Prerequisites: 5162, 5206 or 5208, 5236

Projected Offering: Spring

### **5247 PROJECTS IN MARINE SCIENCE**

Start-up, completion, or involvement in ongoing research projects as an assistant in data collection or analysis. Final project is required.

Credit Hours: 1.00

Format: Directed Studies

Prerequisites: Approval of Project Advisor and Marine Science Section Chief

Projected Offering: Fall and Spring

### **5257 PROJECTS IN PHYSICS**

Start-up, completion, or involvement in ongoing research projects as an assistant in data collection or analysis. Final project is required.

Credit Hours: 1.00

Format: Directed Studies

Prerequisites: Approval of Project Advisor and Physics Section Chief

Projected Offering: Fall and Spring

### **5266 PHYSICS II**

A study of basic concepts of electromagnetism is presented, including the study of electrostatics, magnetostatics, circuit theory, motions of particles in fields, electromagnetic waves, Faraday's law, and Ampere's law.

Credit Hours: 4.00

Format: Combined Class and Laboratory

Prerequisites: 3111 and 5162

Projected Offering: Fall

### **5302 ORGANIC CHEMISTRY I**

Chemical reactivity of organic compounds from a functional group perspective. Hydrocarbons, alkyl halides, aromatics, alcohols, ethers, carbonyl compounds, and amines. Laboratory introduction to important techniques of organic chemistry; the preparation of simple compounds; and analysis using mass spectrometry, nuclear magnetic resonance, infrared spectroscopy, and computer modeling.

Credit Hours: 4.00

Format: Class/Laboratory/Project

Prerequisites: 5206

Projected Offering: Fall

### **5310 ILLICIT DRUGS; SYNTHESIS, DETECTION AND BIOLOGICAL EFFECTS**

The history, chemical nature, botanical origins, and effects on the human body and behavior of drugs such as stimulants, depressants, psychedelics, analgesics, antidepressants, antipsychotics, steroids, and other psychoactive substances of both natural and synthetic origin is covered from the perspective of a future law enforcement officer. This will include covering pertinent government regulations as well as tools currently used by the law enforcement agencies to test for their presence and effect the interdiction of drugs will be covered. This course will consist of lectures, student presentations, guest speakers, and

case studies on the tools the Coast Guard uses to detect these drugs and the science behind those tools.

Credit Hours: 3.00

Format: Class

Prerequisites: 5106

Projected Offering: Fall

### **5312 ANALYTICAL METHODS IN CHEMISTRY**

The course focuses on the theory, technology, design, function, and application of modern analytical instrumentation including liquid and gas chromatography separations and emission, absorption, mass, and nuclear magnetic resonance spectroscopies for detection and identification of organic and inorganic chemicals in air, water, soil, or biological samples. Cadets will develop scientific research and communications skills during the course that will be applied to conduct an end-of-semester original experiment with a research team. Experiments emphasize current Coast Guard and Homeland Security applications in environmental and forensic science.

Credit Hours: 4.00

Format: Class/Laboratory

Prerequisites: 5206

Projected Offering: Spring

### **5330 GEOSPATIAL SCIENCES I**

This course is designed to introduce students in the Marine and Environmental Science major to the fundamental concepts of Geographic Information Systems (GIS). We will explore modeling the real world within a GIS, coordinate systems (including datum and projections), sources of spatial data, entering and editing the data within a GIS, GIS spatial data analysis techniques, and cartography. Relevance of geospatial technologies to the Coast Guard will be demonstrated through the use of case studies and guest lecturers. The laboratory portion of the course will emphasize hands-on applications of principles discussed in lecture. Students will apply GIS principles learned in the lecture and laboratory portions of the course to a professional quality end of semester GIS project.

Credit Hours: 3.50

Format: Class/Laboratory

Prerequisites: 1104

Projected Offering: Fall

### **5334 FISHERIES BIOLOGY**

This course addresses Ichthyology and some aspects of Fisheries Techniques. Emphasis is placed on fish classification, fish internal and external anatomy, morphology, adaptive characteristics of fishes to their habitats, and human causes of aquatic biodiversity decline. Identification of important commercial and recreational species will be learned throughout the course and with the use of keys. Indoor, outdoor labs and a field trip are designed to provide hands-on familiarity with fishes and fisheries techniques. This course requires writing of a scientific paper based on the collection and analysis of students' data and a Hewitt paper and oral presentation.

Credit Hours: 4.00

Format: Class/Laboratory

Prerequisites: 5232 or Instructor's approval for non-majors

Projected Offering: Fall

### **5338 MARINE FORECASTING**

An advanced meteorology course with an emphasis on forecasting, especially at sea. After reviewing concepts from 5236, students will learn advanced concepts, skills, and techniques in marine forecasting; and master them during weekly weather briefs. Regional studies will include the Gulf of Alaska; West, East, and Gulf Coasts of the Continental U.S.; and the Caribbean Sea. Advanced concepts will include wave development, hurricanes, nor'easters, and use of National Weather Service facsimile charts at sea.

Credit Hours: 3.50

Format: Class

Prerequisites: 5236 or 5444

Projected Offering: As Required

### **5342 BIOLOGICAL AND CHEMICAL OCEANOGRAPHY**

An ecological approach to life in the seas, with particular emphasis on energy flow through the food chain as shown by productivity of both producers and consumers. Discussion of the effects of natural vs. human-induced changes in marine

ecosystems. Discussion of the data needed for mathematical modeling of specific ecosystems. Labs focus on up-to-date techniques for measuring seawater constituents relevant to the course; the last month of lab is devoted to a project/experiment designed and carried out by the student using techniques learned earlier in the semester.

Credit Hours: 3.50

Format: Class/Laboratory

Prerequisites: 5206, 5232, and 5241, or Instructor's approval for non-majors

Projected Offering: Spring

### **5350 OCEAN DYNAMICS**

This course emphasizes the mathematical description of the ocean's response to the various forces that affect its motion. Emphasis is placed on the assumptions and approximations used in developing these mathematical descriptions, and on the physical understanding of the fluid characteristics represented by the equations. The basic concepts of fluid dynamics are first presented with an emphasis on total acceleration and continuity of volume. The equations of motion for fluids on a rotating earth are derived, and effects of turbulent motion are introduced. Steady-state solutions to the equations of motion, including Ekman dynamics, are examined. The geostrophic approximation, its consequences, and applications are discussed in detail. Theory is related to the real world through discussion of oceanic observations documented in the literature. Labs provide students the opportunity to investigate the properties and behavior of rotating fluids and to apply the equations of motion to real-world flows modeled in rotating fluid tanks.

Credit Hours: 3.50

Format: Class/Laboratory

Prerequisites: 3211, 5241, and 5162

Projected Offering: Fall

### **5355 ENVIRONMENTAL POLICY AND LAW**

The course will offer students of environmental science an introduction to the ethical underpinnings of why we protect our environment, the public policymaking process in an environmental science context, and an overview of the laws and policies most relevant to the Coast Guard's marine environmental protection mission. A significant portion of the course will focus on legal and policymaking cases that illustrate environmental policy concepts.

Credit Hours: 3.00

Format: Class

Prerequisites: None

Projected Offering: Spring

### **5366 ASTRONOMY**

Historical and modern topics in astronomy are presented including the Solar System, stellar structure and evolution, galaxies, and cosmology. Includes night observations at the astronomical observatory and physical astronomical measurements.

Credit Hours: 3.00

Format: Class

Prerequisites: 5266, 5206

Projected Offering: Fall – Odd

### **5367 REMOTE SENSING**

Explore fundamentals of remote & in-situ sensing for the land and sea environment, emphasis is placed on applications to various scientific fields, the Coast Guard and Homeland Security.

Credit Hours: 3.00

Format:

Prerequisites:

Projected Offering: Fall

### **53XX CLIMATE CHANGE PHYSICS**

Investigate the causes and effects of anthropogenic climate change. Begin with thermal radiation laws, discuss the greenhouse effect, climate forcing and feedback mechanisms (e.g. ice-albedo feedback), and ultimately delve into global climate models and climate prediction.

Credit Hours: 3.00

Format: Class

Prerequisites: 5266

Projected Offering: Spring

### **5379 DIRECTED STUDIES IN MARINE SCIENCE**

Individual program of advanced readings or laboratory projects in marine science.

Credit Hours: 3.00

Format: Directed Studies

Prerequisites: Instructor's approval

Projected Offering: Fall and Spring

### **5381 CAPSTONE RESEARCH EXPERIENCE 1**

Cadets develop a research proposal and a timeline for their project. Faculty advisors discuss the rubric and expectations of research at the beginning of the semester.

Credit Hours: 1.00

Format:

Prerequisites:

Projected Offering: Spring

### **5389 DIRECTED STUDIES IN PHYSICS**

Individual program of advanced readings or laboratory projects in physics.

Credit Hours: 3.00

Format: Directed Studies

Prerequisites: 5266 and Instructor's approval

Projected Offering: Fall and Spring

### **5399 DIRECTED STUDIES IN CHEMISTRY**

Individual program of advanced readings or laboratory projects in chemistry.

Credit Hours: 3.00

Format: Directed Studies

Prerequisites: 5206 and Instructor's approval

Projected Offering: Fall and Spring

### **5406 PHYSICAL CHEMISTRY**

Study of the states of matter and their properties, including ideal and real gases, kinetic theory, laws of thermodynamics, phase equilibria, chemical equilibrium, electrochemistry, chemical kinetics, atomic structure, the chemical bond, cohesion and structure, and molecular spectroscopy.

Credit Hours: 3.50

Format: Class/Laboratory

Prerequisites: 5206 or 5208, and 5266

Projected Offering: Fall

### **5415 FATE AND TRANSPORT OF CHEMICALS IN THE ENVIRONMENT**

An investigation of investigates the behavior of organic chemicals when they are released to the multimedia environment of air, water, soil, dissolved organic matter and biota. Quantitative multimedia distribution models based on fundamental chemical and physical properties are developed. Estimates of environmental effects are determined from the distribution models. A comprehensive final project requires that students behave as professional military scientists to solve a risk assessment problem.

Credit Hours: 3.00

Format: Class

Prerequisites: Instructor's approval for non-majors

Projected Offering: Fall

### **5417 TOXICOLOGY**

Survey of the most important concepts in Toxicology. Effects of xenobiotic substances on the most important physiological systems will be covered with examples relevant to Homeland Security such as chemical warfare agents and industrial products. Exposure assessment, aerosol bio-dynamics, and dose response concepts will also be covered. Subject matter will include review of physiology as it pertains to effects of xenobiotics on the body.

Credit Hours: 3.00

Format: Lecture

Prerequisites: 5206 or equivalent

Projected Offering: Fall



**5419 BIOCHEMISTRY**

A survey of the principles of biochemistry and molecular biology, including the structure and function of molecules important for life, such as amino acids, sugars, nucleic acids, lipids, and carbohydrates. Topics will include concepts of catabolism and metabolism, biological macromolecule structure/function relationships, DNA structure and replication, and protein synthesis. An overview of laboratory techniques important in modern biochemistry will also be covered including computational biology.

Credit Hours: 4.00

Format: Lecture

Prerequisites: None

Projected Offering: Spring – Odd Year

**5420 CHEMOMETRICS**

A workshop-style course focused on the theory and application of multivariate and multi-way pattern recognition, curve resolution, classification, and regression. Linear algebra concepts necessary for discussion of these topics will be covered. The theory of methods including Principal Components Analysis, Parallel Factor Analysis, and Partial Least Squares regression will be covered and applied by students to instrumental and survey data sets including images.

Credit Hours: 1.00

Format: Lecture

Prerequisites: None

Projected Offering: Fall – Even Year

**5421 PROJECTS IN CHEMISTRY**

Start-up, completion, or involvement in ongoing research projects as an assistant in data collection or analysis. Final project is required.

Credit Hours: 1.00

Format: Directed Studies

Prerequisites: Approval of Project Advisor and Chemistry Section Chief

Projected Offering: Fall and Spring

**5429 RESEARCH IN CHEMISTRY**

Individual or team laboratory projects in chemistry. Final project report and presentation at Cadet Research Symposium are required.

Credit Hours: 3.00

Format: Directed Studies

Prerequisites: Approval of Research Advisor and Chemistry Section Chief

Projected Offering: Fall and Spring

**5430 GEOSPATIAL SCIENCES II**

This course examines advanced topics in geospatial sciences, including the physics and technology of remote sensing theory and advanced GIS analytical techniques. The principles of physical radiation, which form the foundation for remotely measuring surface processes, are first discussed in detail. Advanced GIS analytical techniques such as spatial, geostatistical, three-dimensional, and network analysis are then discussed. Hands-on activities allow for further application and exploration of these techniques. The lab portion of the course will emphasize hands-on applications of principles discussed in lecture. Students will be expected to apply GIS principles learned in lecture and lab portions of course in order to complete an end-of-semester GIS project.

Credit Hours: 4.00

Format: Class/Laboratory

Prerequisites: 5330 or 5475

Projected Offering: Spring

**5435 EMERGENCY MANAGEMENT**

This course introduces students to the history, principles and applications of emergency management. Through discussions, readings, and exercises students will learn about the all-hazards approach to emergency management taken by local, state, and federal agencies and non-governmental organizations, including the private sector. Topics include the roles and responsibilities of stakeholders in all four stages in the emergency management cycle: hazard mitigation, emergency preparedness, emergency response, and disaster recovery. Field trips, case studies, and guest speakers will provide opportunities for cadets to connect principles to past and current events in emergency management and explore related career paths in the Coast Guard.

Credit Hours: 3.00

Format: Class

Prerequisites: None

Projected Offering: Fall – Even Years

#### **5440 MICROBIOLOGY**

A survey of the microbiology and the applications of microbiology to human health. Topics include cell structure and function, metabolism, growth, genetics, and classification of prokaryotes, fungi, and viruses. Special attention will be paid to microbiological agents that are potential weapons of mass destruction, such as *Bacillus anthracis* (anthrax), *Yersinia pestis* (plague), *Francisella tularensis* (tularemia), and *Variola major* (smallpox). The mechanisms of human immunological Defense will also be covered.

Credit Hours: 3.00

Format: Class

Prerequisites: None

Projected Offering: Fall - Even

#### **5441 PETROLEUM AND OIL SPILL SCIENCE**

A broad and thorough study of the petroleum production technology and also oil spill science. Topics will include petroleum exploration, production and shipping systems. The composition of crude oil and petroleum products will be studied as will a basic description of measurement techniques for studying crude oil, distilled petroleum products, and oil found in the environment including oil spill fingerprinting techniques. The sources, fate and transport of petroleum pollution will be studied in depth, including modeling techniques used by modern pollution responders. Oil spill clean-up technology will be described, and nationally prominent guest speakers will describe the current state of oil spill response and science.

Credit Hours: 3.00

Format: Class

Prerequisites: 5206

Projected Offering: Spring

#### **5443 MARINE ECOLOGY**

As the capstone course in the Biological-Environmental track of the Marine and Environmental Science major, this course builds upon principles explored in previous courses. Specifically, it examines ways in which biological communities interact with their physical environment to produce observed patterns in the abundance and distribution of organisms in the world's oceans. Students undertake an in-depth study of important biological interactions in nature, such as competition, predation, and mutualism, and their roles in population growth, ecological succession, and patterns in biological diversity. Attention is paid to the role of natural and anthropogenic sources of disturbance in marine ecosystems. Course projects include dynamic computer modeling to evaluate the role of resource management tools in marine conservation.

Credit Hours: 3.50

Format: Class/Laboratory

Prerequisites: 5232 and 5334

Projected Offering: Fall

#### **5444 ATMOSPHERIC AND MARINE SCIENCES**

Atmospheric and Marine Science is a survey course covering the fundamentals of meteorology (with an emphasis on weather forecasting), oceanography (including the circulation, waves, and tides), and the biology of the oceans (with an emphasis on protecting marine resources). Topics of Coast Guard interest, such as marine weather forecasting, search and rescue, pollution response, and fisheries management, are specifically addressed.

Credit Hours: 1.50

Format: Class

Prerequisites: 5102 and 5162

Projected Offering: Fall and Spring

#### **5445 FISHERIES MANAGEMENT**

This is a capstone course, which examines issues associated with the management and conservation of fisheries. The interaction between social, biological, economic, and political aspects of fisheries management is the focus of this course. The course is a combination of lectures, discussion, student presentations, and guest speakers. Guest speakers are invited from a variety of backgrounds including Coast Guard officers, National Marine Fisheries Service scientists, fisheries scientists, fisheries managers, and commercial fishermen, to expose students to various perspectives on fishing issues.

Credit Hours: 3.00

Format: Class

Prerequisites: Instructor's approval for non-majors

Projected Offering: Spring

### **5447 POLAR OCEANOGRAPHY**

Polar Oceanography is a three-credit elective course in the Marine and Environmental Sciences major that focuses on the physical processes in the Arctic and Antarctic regions. The concepts of polar climate, meteorology, and physical oceanography are discussed in order to establish a basic level of knowledge required to study the recent changes in polar dynamics. Emphasis is placed on the Arctic region and its expanding Coast Guard missions, including search and rescue, oil spill response, and ice breaking. Sea ice formation and dynamics and the remote sensing of Arctic sea ice are discussed in detail.

Credit Hours: 3.00

Format: Class

Prerequisites: None

Projected Offering: Spring

### **54XX ENERGY PHYSICS**

Examine energy from solar, nuclear, wind, water, and fossil fuels, its conversion into electrical power through heat engines and electrical generation, and its uses in society. Study energy flow through the environment, energy storage and distribution, efficiency and conservation.

Credit Hours: 3.00

Format: Class

Prerequisites: 3211, 3215, 5266

Projected Offering: Fall

### **5449 RESEARCH IN PHYSICS**

Individual or team laboratory projects in physics. Final project report and presentation at Cadet Research Symposium are required.

Credit Hours: 3.00

Format: Directed Studies

Prerequisites: Faculty Research Advisor and Physics Section Chief approval

Projected Offering: Fall and Spring

### **5459 RESEARCH IN MARINE SCIENCE**

Individual or team laboratory projects in marine science. Final project report and presentation at Cadet Research Symposium are required.

Credit Hours: 3.00

Format: Directed Studies

Prerequisites: Faculty Research Advisor and Marine Science Section Chief approval

Projected Offering: Fall and Spring

### **5469 RESEARCH IN GEOSPATIAL SCIENCES**

Individual or team laboratory projects in geospatial sciences. Final project report and presentation at Cadet Research Symposium are required.

Credit Hours: 3.00

Format: Directed Studies

Prerequisites: Faculty Research Advisor and Marine Science Section Chief approval

Projected Offering: Fall and Spring

### **5475 INTRODUCTION TO GEOSPATIAL SCIENCES**

This course introduces students not in the Marine and Environmental Sciences major to the fundamental concepts of geospatial sciences, including modeling the real world within a Geographic Information Systems (GIS), coordinate systems (including datum and projections), sources of spatial data, entering and editing the data within a GIS, GIS spatial data analysis techniques, and cartography. Relevancy of geospatial technologies to the Coast Guard will be demonstrated throughout the course through the use of several Case Studies. Students will be expected to apply GIS principles learned in lecture and lab portions of course in order to complete an end-of-semester GIS project. Students in the Marine and Environmental Sciences major cannot take this course in lieu of 5330, Geospatial Sciences I.

Credit Hours: 3.00

Format: Class/Laboratory

Prerequisites: None

Projected Offering: Spring, as required

### **5477 OPTICS**

An introductory course in optics designed to provide a working knowledge of electromagnetic theory. The fundamental principles of geometrical (e.g., reflection, refraction) and physical optics (interference, polarization, diffraction) are introduced. The emphasis of the course is on understanding the basic physical principles underlying practical photonic devices through the use of hands-on, in-class activities.

Credit Hours: 3.00

Format: Class

Prerequisites: 5266

Projected Offering: Fall - Even

### **5480 CAPSTONE RESEARCH EXPERIENCE 2**

The second capstone course will allow cadets to evaluate relevant data and resources, and develop methodology to address questions of interest and/or test hypotheses. Faculty advisor discusses rubric and expectations of research at the beginning of the semester.

Credit Hours: 3.00

Format:

Prerequisites: 5381

Projected Offering: Fall

### **5481 CAPSTONE RESEARCH EXPERIENCE 3**

The third capstone course will allow 1/c cadet (group) to finalize results, submit a final report, and prepare for presentation. Faculty advisor discusses rubric and expectations of research at the beginning of the semester.

Credit Hours: 1.00

Format:

Prerequisites: 5480

Projected Offering: Spring

### **5489 SELECTED TOPICS IN CHEMISTRY**

Description: TBD

Credit Hours: 3.00

Format:

Prerequisites:

Projected Offering: Fall and Spring

### **5493 SCIENCE ETHICS SEMINAR**

Description: TBD

Credit Hours: 1.00

Format:

Prerequisites:

Projected Offering: Spring

### **5495 SELECTED TOPICS IN PHYSICS**

Description: TBD

Credit Hours: 3.00

Format:

Prerequisites:

Projected Offering: Fall and Spring

### **5498 SELECTED TOPICS IN MARINE SCIENCE**

Description: TBD

Credit Hours: 3.00

Format:

Prerequisites:

Projected Offering: Fall and Spring

**6101 FUNDAMENTALS OF NAVIGATION**

Fundamentals of Navigation is an exploration of the basic principles of earth's characteristics and terrestrial navigation for which a Deck Watch Officer or entry level officer will be responsible. In the earth's characteristics module, the emphasis is on earth's coordinate system, magnetism of the earth, chart projections, chart preparation, and various distance, speed, and time relationships. The terrestrial navigation module focuses on positioning techniques, compass computation, calculation of tides and currents, tactical characteristics, coastal and transoceanic voyage planning, and aids to navigation. The celestial navigation module focuses on time of phenomena, coordinate systems, celestial and navigational triangles, gyrocompass error by azimuth and amplitude, and solving for latitude by observations of local apparent noon and Polaris. This course is required to prepare cadets for experiential learning afloat as a navigation team member during the common portion of the 3/c summer training program. A short research project covering selected navigational topics integrates course material and primary source research that the students submit in a written form.

Credit Hours: 4.00

Format: Class/Laboratory

Prerequisites: None

Projected Offering: Fall and Spring

**6201 SHIPS AND MARITIME SYSTEMS**

Provides fundamental technical knowledge of ships and maritime systems. A baseline understanding is developed to support future assessment of impact, benefit, and risk of decisions involving design, acquisition, operation, regulation, law enforcement, damage control, maintenance, and salvage of ships and maritime systems. Specific subject areas include international/domestic rules and regulations, intact and damage stability, marine structures, ship propulsion, primary and auxiliary ship systems, marine salvage, ship motions, ship handling, and offshore structures.

Credit Hours: 3.00

Format: Class/Laboratory

Prerequisites: 5102, 5162, 6101 and 3/c Summer Training Program

Projected Offering: Fall and Spring

**6202 APPLICATIONS IN NAVIGATION**

Applications of Navigation is a lab based course that meets three times per week. This course continues the developmental journey by building upon the fundamental navigation preparation of 6101 and the common experience of 3/c summer. The goal is to build proficiency in relative motion fundamentals, navigation evaluation, and voyage planning. The first module introduces cadets to the basics of relative motion theory with the initial exploration of maneuvering boards for course, speed, closest point of approach, avoidance and intercepts, secondary effects, true wind and desired apparent wind. The second module improves the navigation team skills learned in 6101 and the proficiency required to navigate a ship through restricted, coastal and open ocean environments. The third module focuses on voyage planning through the research of applicable publications prior to transiting through an unfamiliar port. The introduction to the navigation brief as a tool for risk mitigation is discussed. This course is a prerequisite for the 2/c Summer Training Program.

Credit Hours: 1.00

Format: Laboratory

Prerequisites: 6101

Projected Offering: Fall and Spring

**6210 PRIVATE PILOT GROUND SCHOOL**

The Private Pilot Ground School course covers the material needed to successfully pass the FAA Private Pilot Knowledge Test. Completion of the course qualifies the student to take that FAA Private Pilot Knowledge Test which is one of the requirements for a private Pilot License. The subjects covered include aerodynamics, aircraft systems, flight instruments, weight and balance, aircraft performance, weather, airspace, navigation, aeromedical factors, and FAA and NTSB regulations.

Credit Hours: 3.00

Format: Class

Prerequisites: None

Projected Offering: Fall and Spring

**6301 THE MARITIME WATCH OFFICER**

The Maritime Watch Officer course focuses on the knowledge and skills vital to successful performance as a Maritime Watch Officer. This course builds upon individual navigation proficiency gained during the prerequisite courses and summer training programs and introduces new watch team skills applicable to maritime watches. In addition to refreshing navigation team skills taught in Nautical Science I and II, students will develop new skills such as: advanced navigation coordination, advanced

relative motion theory and practice coupled with collision avoidance and briefing the command, electronic navigation theory and practice, basic, routine and emergency ship handling procedures and practice, external communications, and Bridge Resource Management knowledge, skills and techniques. Classroom theoretical discussions are reinforced and applied in the various visual and radar simulators and CGA training vessels within a watch team construct. Risk based decision making concepts are further analyzed in group projects wherein cadets present the causal factors and potential corrective actions surrounding selected Coast Guard Cutter mishaps.

Credit Hours: 4.00

Format: Class/Laboratory

Prerequisites: 6101, 6201, 6202

Projected Offering: Fall and Spring

### **6310 MARINE SAFETY PROFESSIONAL**

This course provides a detailed overview of Coast Guard Marine Safety missions that are executed at Sectors through marine inspectors, waterways management, and casualty investigations. Cadets will learn about the Coast Guard's roles and authorities for ensuring the safety and security of federal waterways and improve their critical thinking about real-world maritime challenges that exist in the Marine Transportation System. Specifically, this course will help cadets appreciate the importance of the Coast Guard's role in international maritime trade and facilitating commerce throughout the United States. Emphasis is placed on the knowledge and skill sets, e.g., risk management, decision making, etc., required for junior officers and provides cadets direct exposure to career opportunities in the Marine Safety program.

Credit Hours: 3.00

Format: Class

Prerequisites: 6201

Projected Offering: Spring

### **6401 PROFESSIONAL MARITIME OFFICER**

This capstone course integrates previous nautical science topics in Professional Maritime Studies to prepare cadets to pass the National Maritime Center approved Master – 100 gross tons near coastal licensing examination. This course will focus on four major areas of study from 46 CFR 11.910, which governs the required subjects of instruction for deck officer endorsements. The four areas of study are Deck – Safety, Deck – General, Navigation – General and Navigation Problems – Chart Plot.

Credit Hours: 3.00

Format: Class

Prerequisites: 6101, 6201, 6202, 6301

Projected Offering: Fall and Spring

### **6402 PROFESSIONAL MARITIME OFFICER LABORATORY**

Lab assignments in the bridge simulators and aboard 65-foot training vessels will develop critical thinking and decision-making skills in navigation and ship handling while also reinforcing Bridge Resource Management concepts through effective leadership and communication. Upon completion of this course and successfully passing the final examination, cadets will be eligible to apply for a Master – 100 gross tons near coastal license.

Credit Hours: 1.00

Format: Laboratory

Prerequisites: 6101, 6201, 6202, 6301

Projected Offering: Fall and Spring

### **6459 SELECTED TOPICS IN PROFESSIONAL MARITIME STUDIES**

In depth examination of a terrestrial, celestial, or electronic navigation topic or a stability, damage control, ship handling, shipboard leadership framework or ship related training system topic. Specific course content will vary based upon emerging and relevant navigation, training, or leadership issues, institutional and organizational needs, and students' interests. Includes additional reading, writing, research, and/or casework.

Credit Hours: 1.00

Format:

Prerequisites: 6101

Projected Offering: Fall and Spring

### **6469 PROJECTS IN PROFESSIONAL MARITIME STUDIES**

Start-up, involvement, or completion in a project involving data collection, synthesis and/or analysis. Specific course content will vary based upon emerging and relevant navigation, training, leadership, institutional or organizational topics. A final

project is required.

Credit Hours: 1.00

Format: Project

Prerequisites: 6101, 6201, 6202

Projected Offering: Fall and Spring

### **6489 DIRECTED STUDIES IN PROFESSIONAL MARITIME STUDIES**

Advanced tutorial concentrating on specific topics in the area of cutter, sector or aviation operations. Cadets will develop a proposal for a research paper or project, which must be completed by the end of the semester under the guidance of a Professional Maritime Studies faculty member. Limited to advanced students who have completed course work and shown significant interest in Professional Maritime Studies.

Credit Hours: 3.00

Format: Directed Studies

Prerequisites: 6101, 6201, 6202, 6301

Projected Offering: Fall and Spring

### **7218 FUNDAMENTALS OF INFORMATION SECURITY**

Fundamentals of Information Security is designed to provide an introduction to information security, information assurance, and cyber systems. The Course will help students to begin to develop a common lexicon and to start to delve into the threats to information systems, the risk those threats pose to systems, the vulnerabilities that may be exploited, and the mitigations to those vulnerabilities.

Credit Hours: 3.00

Format: Class

Prerequisites: None

Projected Offering: Fall

### **7238 INTRODUCTION TO CRYPTOGRAPHY**

This course is a comprehensive introduction to modern applied cryptography. It explores a deep understanding of how modern cryptographic schemes work while presenting the mathematical concepts required as needed. Assignments are designed to be very hands-on. The main goal of this course is to make a student conversant in most of the modern cryptographic schemes and the mathematics upon which their security is based.

Credit Hours: 2.00

Format: Class

Prerequisites: 3237

Projected Offering: Spring

### **7294 CYBER POLICY, COMPLIANCE, AND ETHICS**

The world of cyber is complex and full of questions. This course is designed to delve into some of these questions and challenge students to explore their value system in a digitally connected world. The course is designed in two parts. Part one provides students with some understanding of information assurance in the context and the myriad laws, rules, regulations, and guidelines that impact compliance. Part two provides students an opportunity to build on their foundation in ethics by applying lessons learned in the cyber domain. This course will give students a chance to reflect on the social and professional impacts of computer technology by focusing on the rules and the ethical issues faced in our evolving cyber world.

Credit Hours: 1.00

Format: Class

Prerequisites: 2394 or 2293

Projected Offering: Spring

### **7310 INTRODUCTION TO CYBER TECHNOLOGY**

Upon completion of this course, the successful student will have gained an understanding of the basic principles used in many of the Coast Guard's common Cyber systems. The following topics are covered: information theory, computer systems and networks, Cyber security principles, and an introduction to select maritime electronic navigation and communication systems. Class will meet three times each week for half a semester.

Credit Hours: 1.50

Format: Class/8-Week

Prerequisites: None

Projected Offering: Fall and Spring



**7345 OPERATING SYSTEMS**

This is an introductory course that examines important problems in operating system design and implementation. The operating system provides an established, convenient, and efficient interface between user programs and the hardware of the computer on which they run. It is also responsible for sharing resources (e.g., CPU, disks, and networks), providing common services needed by many different programs (e.g., file service, print service), and protecting individual programs from interfering with one another. The course will start with a brief historical perspective of the evolution of operating systems followed by introduction of OS structures and components of most operating systems. The course will then proceed to evaluate the trade-offs that can be made between performance and functionality during the design and implementation of an operating system. Particular emphasis will be given to two major OS subsystems: process management (processes, threads, CPU scheduling, synchronization, and deadlock), memory management (segmentation, paging, swapping).

Credit Hours: 2.00

Format: Class

Prerequisites: 1220

Projected Offering: Fall

**7381 INTRODUCTION TO DATABASES**

This course comprises three broad areas of intellectual inquiry: Part 1 focuses on introductory concepts and real life applications of databases. Part 2 familiarizes the student with advances in vulnerabilities and security issues of database management systems (DBMS). Part 3 concentrates on the design and development of databases and their security needs along with few concepts in advanced DBMS and the structured query language (SQL).

Credit Hours: 2.00

Format: Class

Prerequisites: None

Projected Offering: Fall

**7385 CYBER RISK MANAGEMENT**

This course is designed to introduce students to Systems Engineering concepts in order to assess risks of cyber related vulnerabilities especially in the Maritime Transportation System (MTS). The course will help students to understand how computers and cyber dependent technologies in large-scale systems on vessel and in ports enable the MTS to operate, as well as, how exploitation, misuse, or failure could disrupt the national defense and homeland security. This course will cover the Vulnerability Analysis, Security Risk Assessment, Security Program Management, and Cybersecurity Planning & Management knowledge units from the DHS/NSA CAE Cyber Defense designation. This course will culminate in innovative hands-on simulations modeled after case studies provided by the Department of Homeland Security's Cybersecurity and Infrastructure Security Agency (CISA), Coast Guard, and industry/academic partners.

Credit Hours: 3.00

Format: Class

Prerequisites: 7218 and 8453

Projected Offering: Spring

**7478 PROJECTS IN CYBER SYSTEMS**

Projects under the direct supervision of a faculty member. The projects can be direct participation in cyber laboratory projects, research, or individual projects requiring periodic instructor review. Specific projects can involve construction of hardware, computer software, experimental work, or a paper study. Project proposals must be submitted in writing for approval using the form from the registrar prior to the beginning of the semester. Final written report required. Cadets may repeat this course for credit for different work.

Credit Hours: 1.00

Format: Project

Prerequisites: Depends on Subject Matter

Projected Offering: Fall and Spring

**7479 DIRECTED STUDIES IN CYBER SYSTEMS**

Individual or group study in Cyber Systems topics (including devices, systems, and principles) involving reading, design, analysis, or applications. Directed Studies proposals must be submitted in writing for approval using the form from the registrar prior to the beginning of the semester. A final research report is required. Cadets may repeat this course for credit provided new material is researched.

Credit Hours: 1.00 – 3.00

Format: Directed Study

Prerequisites: Depends on Subject Matter

Projected Offering: Fall and Spring

### **7489 SELECTED TOPICS IN CYBER SYSTEMS**

This course provides instruction on topics in Cyber Systems that expand upon the basic curriculum at the Academy. Instructors will select topics from various aspects of the cyber domain. This course will meet for at least 50 minutes per credit hour per week and cadets are expected to spend an additional two to three hours per credit hour per week learning about this topic. Cadets may repeat this course for credit with a different topic.

Credit Hours: 1.00 – 4.00

Format: Class

Prerequisites: Depends on Subject Matter

Projected Offering: Fall and Spring

### **8115 MACROECONOMIC PRINCIPLES**

Examination of basic concepts, methodology and problems of macroeconomic measurement and aggregate economic activity, money, banking, international trade and finance. Macroeconomic policy for economic stability and growth.

Credit Hours: 3.00

Format: Class

Prerequisites: None

Projected Offering: Fall and Spring

### **8201 INTRODUCTION TO MANAGEMENT AND BUSINESS**

Provides an overview of the history and development of management and business including the areas of planning, organizing and control. Provides an introduction to the functional areas of business as well as an introduction to the Management major.

Credit Hours: 3.00

Format: Class/Project

Prerequisites: None

Restriction: Management majors only

Projected Offering: Fall and Spring (Spring is only for late entrants into major)

### **8211 ORGANIZATIONAL BEHAVIOR AND LEADERSHIP**

Using leadership as its focus, this course examines the relationship of individual and group behavior in organizations to organizational effectiveness. Uses case studies, classroom exercises, lecture, and discussion to develop an understanding of motivation, group/team effectiveness, communications, and performance management with particular attention to the practical leadership implications of current theory.

Credit Hours: 3.00

Format: Class/Group Work/Project

Prerequisites: None

Projected Offering: Fall, Spring and Summer

### **8217 MICROECONOMIC PRINCIPLES**

Basic analysis of individual economic decision making in a market economy. Consumer behavior and theory of demand; production cost, theory of supply and firm behavior in different market structures. Public policy to improve market performance. Resource markets.

Credit Hours: 3.00

Format: Class

Prerequisites: None

Projected Offering: Fall

### **8241 LEGAL ENVIRONMENT OF BUSINESS**

This course introduces you to the fundamental principles of business law and will address legal issues that impact managerial decision making in the public, private and non-profit sectors. You will explore the interplay of those legal principles with operations, government regulations, and the ethical and social responsibilities inherent in business decision-making. Topics include: sources of law, business ethics, commercial transactions, torts, intellectual property, business entities, employment law and environmental law.

Credit Hours: 3.00

Format: Class

Prerequisites: None

Projected Offering: Spring

### **8246 PRINCIPLES OF FINANCIAL ACCOUNTING**

Accounting process as a system for communicating financial information to internal and external users in both profit-based and non-profit setting. Fundamental financial accounting concepts related to the balance sheet, income statement, and statement of cash flows. Introduction to government and not-for-profit accounting and application of basic cost accounting concepts. Focus on the decision-usefulness of accounting information from the perspective of the user. Extensive analytical problem-solving, both structured and unstructured.

Credit Hours: 3.00

Format: Class

Prerequisites: None

Projected Offering: Spring

### **8313 ESSENTIALS OF ECONOMICS FOR ENGINEERING MAJORS**

This course is an accelerated introduction in both Microeconomics and Macroeconomics. It covers the essentials of material otherwise taught in less than a single semester. The section on Microeconomics focuses on studying the behavior of individual economic agents, including consumers and firms, in a market system. This includes learning about supply and demand, taxes, government influences on markets, externalities, and production and cost, along with a summary of output and pricing decisions in different market settings like perfect competition and monopoly. The section on Macroeconomics focuses on an analysis of the behavior of the national economy as a whole, together with such issues as the determination of gross domestic product, the unemployment rate, the inflation rate, interest rates, and the long-term economic growth rate. This is a fast-paced course designed for students whose preparation in the requisite quantitative skills is above average. At the end of the semester, students will have a solid understanding of modern microeconomics, markets, and the macro-economy.

Credit Hours: 2.00

Format: Class

Prerequisites: Engineering Majors

Projected Offering: Fall and Spring

### **8331 MANAGEMENT INFORMATION SYSTEMS**

Prepares managers to function in a technological environment. The roles of information processing in managerial decision making. The structure of information systems; development; management computing technology, data processing, and information assurance. Applications within major functional subsystems of management. The class will also discuss the role of technology in today's society, with an emphasis on the use by the Coast Guard and Homeland Security and the ethical issues raised by the misuse of technology. Laboratory work will focus on applications of the topics discussed in class. A research project on current technology topics is required.

Credit Hours: 3.30

Format: Class/Project/Laboratory

Prerequisites: None

Projected Offering: Fall

### **8342 MARKETING**

Marketing concepts and their relationship to strategic management of private, public, and not-for-profit organizations. Marketing mix, market segmentation, product differentiation, demographics, and advertising, promotion, distribution. Marketing of services and marketing's role in governmental organizations.

Credit Hours: 3.00

Format: Class/Cases

Prerequisites: None

Projected Offering: Spring

### **8348 MANAGERIAL ACCOUNTING**

Students will be introduced to the wide variety of management models, basic costing models, and analytical approaches used by organizations. Emphasis will be placed on behavior of cost, tactical decision-making models, product costing, budgeting, control systems, and performance measurement. Analytical problem solving, both structured and unstructured, is required and will involve the application of fundamental financial accounting methods and knowledge.

Credit Hours: 3.00

Format: Class

Prerequisites: 8246

Projected Offering: Fall

### **8349 FINANCIAL MANAGEMENT**

Application of financial theory, tools and methods to managerial decision-making with a goal of value maximization through effective cash flow management. Focus is on the investment decision (asset risk, time-value of money, cost of capital, discounted cash flow analysis) and the financing decision (financial risk, use of leverage, capital structure). Some coverage of financial markets. Extensive analytical problem solving, including the use of cases.

Credit Hours: 3.00

Format: Class

Prerequisites: 3213, 8246 or permission of the instructor

Projected Offering: Spring

### **8351 RESEARCH METHODS**

Examination of quantitative analysis techniques and concepts that builds upon the numeracy, measurement, and proportional reasoning learned in Computer-Based Problem Solving, and upon the descriptive statistics and basic probability theory learned in Probability and Statistics. Qualitative analysis techniques and concepts including survey methods are introduced. Students learn how to conceptualize an object and an attribute of it so that the attribute has a unit of measure, to interpret models to discover trends and make predictions, and to create representations to explain a phenomenon and revise them based on fit to reality. Case studies and a research project.

Credit Hours: 3.00

Format: Class

Prerequisites: 2142, 3213

Projected Offering: Fall

### **8357 HUMAN RESOURCES MANAGEMENT**

Examination of the fundamentals of Human Resource management theory as it pertains to supervisors and managers. Topic coverage includes recruitment, selection, performance evaluations, retention, training issues, and EEO guidelines. Emphasis on applications of the theory. Use of student presentations and term paper.

Credit Hours: 3.00

Format: Seminar/Cases/Project

Prerequisites: 8211

Projected Offering: Fall

### **8363 OPERATIONS AND PROJECT MANAGEMENT**

The study of operations management and industrial applications: maintenance and production scheduling, project planning and management. Emphasis on problem solving, computer applications and case studies.

Credit Hours: 3.00

Format: Class/Cases

Prerequisites: 3213

Projected Offering: Spring

### **8366 LEADERSHIP, ORGANIZATIONAL DEVELOPMENT AND CHANGE**

Examination of leadership issues in an organizational framework. Topics include a historical review of organizational management thought; leadership theories with organizational applications; organizational diagnosis and analysis; organizational culture, change, and improvement; and concepts that relate to leading public organizations (such as organizational vision, parallel systems, and quality concepts).

Credit Hours: 3.00

Format: Class/Seminar

Prerequisites: 8211

Projected Offering: Spring

### **8413 MANAGERIAL ECONOMICS**

Analysis of microeconomic forces in managerial decision making. Topics include: consumer demand and indifference curves; production functions and cost theories; producer behavior in different market structures; pricing theories: multiproduct pricing, pricing to deter entry; and transfer pricing; vertical integration. Evaluation of alternative firm objectives, and the non-traditional firm. Cost-benefit analysis.

Credit Hours: 3.00

Format: Class

Prerequisites: 8217

Projected Offering: On demand

### **8415 PERSONAL FINANCE**

A study of issues relevant to personal finance. Topics include budgets, insurance, taxes, markets, investments, retirement, and estate planning.

Credit Hours: 1.00

Format: Class

Prerequisites: None

Projected Offering: Fall and Spring

### **8417 INVESTMENT THEORY**

This course is an introduction to the modern investment theory. Major topics include utility theory, mean-variance portfolio construction, the Capital Asset Pricing model (CAPM), Arbitrage Pricing Theory (APT), efficient market hypotheses, interest rate theories, valuation of financial assets and their derivatives, as well as investment analysis and asset allocation to meet investment objectives.

Credit Hours: 3.00

Format: Class

Prerequisites: 3213, 8217, 8349 or equivalent courses, or permission of the instructor

Projected Offering: Spring

### **8418 FUNDAMENTALS OF PERSONAL FINANCIAL PLANNING**

This course seeks to develop a level of financial literacy necessary to avoid financial mistakes that can derail a career. Financial planning seeks to develop a level of financial literacy necessary to manage all aspects of an individual's financial affairs, both immediate and long-term needs. Topics covered include career selection, budgeting, taxes, retirement planning, the use and management of credit, the management of risk (through the use of insurance and non-insurance means), and estate planning. Special attention is given to large purchases, such as automobiles and real estate.

Credit Hours: 3.00

Format: Class

Prerequisites: 8349 (or concurrent, with instructor approval)

Projected Offering: On Demand

### **8419 INFORMATION TECHNOLOGY IN ORGANIZATIONS**

In-depth examination of fundamental technological and managerial issues relevant to information technology management in the U.S. Coast Guard. Topics of emphasis include: computer architecture, network theory, and system administration, analytical processes in determining an organization's information technology needs, and the Coast Guard's IT plan. Structured to address state of the market and research developments in IT. A project with emphasis on real-world applicability is required.

Credit Hours: 3.00

Format: Class/Project/Laboratory

Prerequisites: 8331 or permission of the Instructor

Projected Offering: Spring

### **8423 MANAGEMENT CONTROL**

Study of the management control function in public, private, and governmental organizations: planning, programming, budgeting, operating and measurement, reporting and evaluation. Managerial accounting issues related to cost analysis and its role in decision-making and control.

Credit Hours: 3.00

Format: Seminar/Class

Prerequisites: 8115, 8217

Corequisites: 8246

Projected Offering: On demand

### **8425 GLOBAL BUSINESS AND ECONOMIC ISSUES**

Introduction to the concepts, framework and issues of global business: multinational firms; international trade; and the cultural, political, institutional, social, and economic environment of the global marketplace.

Credit Hours: 3.00

Format: Class

Prerequisites: None

Projected Offering: On demand

### **8429 MANAGERIAL PSYCHOLOGY**

A rigorous reading-intensive study of advanced behavioral science topics such as the MBTI, positivist psychology, transactional analysis, commitment, motivation, and emotional intelligence. Emphasis on theoretical understanding and application. Extensive student participation and class leadership.

NOTE: A significant reading assignment and entrance exam are required for admission to the course.

Credit Hours: 3.00

Format: Class/Seminar

Prerequisites: 8211

Projected Offering: Fall

### **8439 DIVERSITY AND LEADERSHIP**

The course will examine diversity as a complex phenomenon and provide students with the understanding necessary to lead effectively in an increasingly diverse workplace. The course will demand serious, critical engagement in order to develop the awareness, knowledge, and skills necessary to create and lead inclusive, multicultural organizations.

Credit Hours: 3.00

Format: Seminar

Prerequisites: 8211

Projected Offering: On demand

### **8440 FEDERAL BUDGETING**

This course covers selected topics in federal budgeting. Since this a broad subject, our focus is on governmental accounting and budgeting standards. Students are exposed to the basics of how the federal budget is formulated, resolved, and executed at the national level, in the Coast Guard, and at the Coast Guard field level. Government accounting methods, government accounting standards, economic and agency-specific policy are central to understanding budget analysis and formulation. Students will begin the semester learning about the process of how the federal budget is passed and identification of specific budget laws that define how we formulate and pass our nation's budget. Students will also be required to demonstrate an understanding of breakeven analysis, applying different costing models, and revenue forecasting models, as it pertains to federal budgeting. Near the end of the course, students are also exposed to the basics of appropriations law and procurement policies specific to the Coast Guard. Last, students will have an opportunity to prepare and pursue testing for parts of the Certified Government Financial Manager (CGFM) exams, which is backed by the Association of Government Accountants.

Credit Hours: 3.00

Format: Class

Prerequisites: 8246 and 8348

Projected Offering: Spring

### **8442 PUBLIC SECTOR ECONOMICS**

Application of Economic logic to public sector issues; market failure and the economic rationale for government intervention; public choice and public goods; analysis of taxation and government expenditure policy; examination of selected taxes and expenditure classifications.

Credit Hours: 3.00

Format: Class

Prerequisites: 8115, 8217

Projected Offering: On demand

### **8443 STRATEGIC MANAGEMENT**

Strategy and policy development in the private and public sectors. Emphasis on environmental analysis, strategic advantage profile, social responsibility, and ethics. The relationships of finance, personnel, marketing, and structure to policy decisions. Case studies/simulation.

Credit Hours: 3.00

Format: Class/Cases/Project

Prerequisites: 8115, 8217, 8246, 8349, and 8366

Restrictions: 1/c Management majors only

Projected Offering: Fall

### **8444 PUBLIC MANAGEMENT CONSULTING PREPARATION**

The course is designed to add to and focus student skills needed to excel in the Public Management Consulting (PMC) capstone

course of the Management degree program. Students learn professional consulting skills, how to apply the DMAIC framework, and effective, ethical and legal ways to use information to accomplish a specific purpose. Students demonstrate the ability to integrate current research into a literature review, to apply relevant data analysis methodologies, competent presentation skills, and competent project management skills. Deliverables include a letter of engagement, a literature review, and a work plan for completing a PMC capstone project in the spring semester.

Credit Hours: 3.00

Format: Class/Cases/Project

Prerequisites: 8115, 8217, 8246, 8349, and 8366

Restrictions: 1/c Management majors only

Projected Offering: Fall

#### **8445 PUBLIC MANAGEMENT CONSULTING**

The capstone course for the Management Major teaches the fundamentals of management consulting as part of a project-based experience. Students learn the basics of internal and career consulting. Topics include the consulting process; the ethics of consulting; and issues surrounding the use of consultants. Exploring the nature of consulting from the vantage points of both consultant and client, the course is designed for students who find themselves serving as an internal consultant, do occasional consulting, or need to hire or work with external consultants.

Credit Hours: 3.00

Format: Project/Seminar

Prerequisites: 8357, 8443, 8444

Restrictions: 1/c Management majors

Projected Offering: Spring

#### **8446 INTERMEDIATE FINANCIAL ACCOUNTING**

This course is a continuation of 8246, Principles of Financial Accounting. This course will delve more deeply into the technical aspects of accounting, stressing the role played by International Standards on US GAAP, as well as greater depth in the treatment of complex accounting issues, such as revenue recognition, stock and stock options, pensions, and related advanced topics. The focus will be on how various accounting policy choices affect the formal financial statements and how assumptions can radically change these reported outcomes.

Credit Hours: 3.00

Format: Class

Prerequisites: 8246

Projected Offering: Fall

#### **8447 AUDITING AND INTERNAL CONTROL**

This course is the capstone offering in the Financial Management concentration, placing its emphasis on the auditing activity and how internal controls can be used to reduce the operational risk of an organization. Students will increase their analytical skills in addition to gaining a more realistic understanding of the role of internal control in curbing undesirable or dysfunctional behavior in organizations and to safeguard the assets of the organization. The course will convey existing U.S. Audit Standards (GAS) as well as established audit and control procedures as detailed in the COSO Framework and the Sarbanes-Oxley (SOX) Acts.

Credit Hours: 3.00

Format: Project/Seminar

Prerequisites: 8246 and 8348

Projected Offering: Spring

#### **8448 SELECTED TOPICS IN FINANCE, ACCOUNTING, AND ECONOMICS**

In depth examination of advanced finance, accounting, or economics topics. Specific content of course will vary based upon emerging and relevant finance, accounting, and economics theory, institutional and organizational needs, and students interests. Includes extensive reading, writing, research, and/or casework.

Credit Hours: 3.00

Format: Class

Prerequisites: None

Restrictions: 1/c cadets

Projected Offering: Fall and Spring



**8449 SELECTED TOPICS IN INFORMATION SYSTEMS AND DECISION SCIENCES**

In depth examination of advanced information system or decision science topics. Specific content of course will vary based upon emerging and relevant information and decision science theory, institutional and organizational needs, and students interests. Includes extensive reading, writing, research, and/or casework.

Credit Hours: 3.00

Format: Class

Prerequisites: None

Restrictions: 1/c cadets

Projected Offering: On demand

**8450 SELECTED TOPICS IN MANAGEMENT AND LEADERSHIP**

In depth examination of advanced management and/or leadership topics. Specific course content will vary based on emerging management and leadership theory, institutional and organizational needs, and student desires. Potential topic areas include intrinsic vs. extrinsic motivation, commitment vs. compliance, transformational leadership, visionary leadership, responsibility and accountability, strategic leadership, establishing and communicating a vision, communication and decision-making. Includes extensive reading, research, case writing, and a comprehensive writing assignment.

Credit Hours: 3.00

Format: Class

Prerequisites: 8366

Restrictions: 1/c cadets

Projected Offering: On demand

**8453 SYSTEMS ANALYSIS AND DESIGN**

Examination of the concepts, tools, and development methodologies used in information systems analysis and design. Feasibility study, requirements analysis, design, and development documentation are covered. The system development life cycle, prototyping, data modeling, and user involvement are also covered. Course prepares students to improve organizational functions through the System Development Life-Cycle in roles varying from System Analyst to System User. A real-world application is conducted through a term project.

Credit Hours: 3.00

Format: Class/Project/Cases

Prerequisites: 8331 or equivalent

Projected Offering: Fall

**8458 NEGOTIATIONS AND CONFLICT MANAGEMENT**

Designed for relevance to the broad spectrum of bargaining problems faced by the manager and professional. Provides understanding of the theory and processes of negotiation as practiced in a variety of settings, including government, commercial and labor negotiations. Special emphasis on sources of power in negotiations. Covers conflict management as a first party and as a third party (third party skills include helping others deal directly with their conflicts, mediation, investigation, arbitration, and helping the system itself to change as a result of a dispute. Allows students an opportunity to develop negotiations skills experientially and to understand negotiation in a useful analytical framework. Emphasizes simulations, exercises, role playing, and cases.

Credit Hours: 3.00

Format: Class/Seminar

Prerequisites: 8211

Projected Offering: On demand

**8460 COST ACCOUNTING**

This course provides a comprehensive study of the field of cost accounting, one of the critical accounting skill sets required for all practicing financial managers. Topics covered briefly in Managerial Accounting will be expanded upon, while additional advanced topics, such as joint cost allocation, will be introduced. Students will increase their analytical skills and ability to work with complex cost problems including the development of budgets and capital budgeting procedures. Topics will be explored from several perspectives: for-profit versus governmental standards, integration with financial accounting, and international vs. US standards and practices. Successful completion of Financial Accounting (8246) and Managerial Accounting (8348) are required for admittance to this course.

Credit Hours: 3.00

Format: Class

Prerequisites: 8246, 8446, and 8348 or permission of Instructor

Projected Offering: Fall

### **8461 SUPPLY CHAIN MANAGEMENT**

The concepts, issues, and techniques for managing supply chains. Topics include transportation economics, material and distribution requirements, electronic communication and tracking systems, and international supply chain planning.

Credit Hours: 3.00

Format: Class/Seminar

Prerequisites: 8115, 8217

Projected Offering: On demand

### **8462 CERTIFIED GOVERNMENT FINANCIAL MANAGER PART I**

This class prepares you for the Exam 1: Certified Governmental Financial Management (CGFM) exam. The CGFM is a professional certification based on accounting fundamentals and policies in the public sector. This one-credit course is offered by the Association of Government Accountants (AGA). A CGFM certification is recognized nationwide and is advocated by the Department of Homeland Security and the Coast Guard's Office of the Assistant Commandant for Resources, Chief Financial Officer (CG-8). Last, this class provides you the opportunity and experience to earn a professional credential and to experience earning a credential via standardized and official testing centers.

Credit Hours: 1.00

Format: Class/Seminar

Prerequisites: 8246, 8348

Projected Offering: Fall

### **8463 CERTIFIED GOVERNMENT FINANCIAL MANAGER PART II**

This class prepares you for the Exam 2 and 3: Certified Governmental Financial Management (CGFM) exam. Exam 2 is complemented by Federal Budgeting (8440). Exam 3 is complemented by Auditing and Internal Control (8447). The CGFM is a professional certification based on accounting fundamentals and policies in the public sector. This one-credit course is offered by the Association of Government Accountants (AGA). A CGFM certification is recognized nationwide and is advocated by the Department of Homeland Security and the Coast Guard's Office of the Assistant Commandant for Resources, Chief Financial Officer (CG-8). Last, this class provides you the opportunity and experience to earn a professional credential and to experience earning a credential via standardized and official testing centers.

Credit Hours: 1.00

Format: Class/Seminar

Prerequisites: 8246, 8348

Projected Offering: Spring

### **8468 DIRECTED STUDIES IN FINANCE, ACCOUNTING, AND ECONOMICS**

Provides the student an opportunity to work closely with a faculty member in an area of mutual interest. Potential topics include, but are not limited to, investment theory, risk management, option pricing, and advanced topics in corporate finance. Directed Studies proposal must be submitted in writing and approved by the Department Head, applicable Section Head, and sponsoring faculty member prior to the beginning of the semester.

Credit Hours: 3.00

Format: Directed Studies

Prerequisites: 8217, 8348, 8349, or equivalent courses

Restrictions: 1/c Management majors and approval of Department Head

Projected Offering: On demand

### **8469 DIRECTED STUDIES IN MANAGEMENT AND LEADERSHIP**

An in-depth, major research effort in an area of mutual interest to cadet and faculty member directing study. Potential topics include, but are not limited to leadership, consumer behavior, real estate phenomenon, nature of military organizations, etc. Directed Studies proposal must be submitted in writing and approved by the Department Head, applicable Section Head, and sponsoring faculty member prior to the beginning of the semester.

Credit Hours: 3.00

Format: Directed Studies

Prerequisites: 8366

Restrictions: 1/c Management majors and approval of Department Head

Projected Offering: On demand

**8470 DIRECTED STUDIES IN INFORMATION SYSTEMS AND DECISION SCIENCES**

Provides the student with an opportunity to work closely with a faculty member in an area of mutual interest. Potential topics include, but are not limited to, development of database applications, web applications, understanding and application of new technologies, and advanced topics in information systems and decision sciences. Directed Studies proposal must be submitted in writing and approved by the Department Head, applicable Section Head, and sponsoring faculty member prior to the beginning of the semester.

Credit Hours: 3.00

Format: Directed Studies

Prerequisites: 8331, 8363 or equivalent courses

Restrictions: 1/c Management majors and approval of Department Head

Projected Offering: On demand

## PROJECTED OFFERINGS

Course	Course Title	'20-'21		'21-'22		'22-'23		'23-'24	
0901	History USCG	Taken During SWAB Summer							
0924	Connecticut College	F	S	F	S	F	S	F	S
0925	Scholar's Project		S		S		S		S
0933	Jr Hnrs Colloquium	F	S	F	S	F	S	F	S
0935	Sr Hnrs Colloquium	F	S	F	S	F	S	F	S
0940	Peer Tutoring	F	S	F	S	F	S	F	S
0941	Peer Tutoring	F	S	F	S	F	S	F	S
1104	Intro to Computing	F	S	F	S	F	S	F	S
1105	Intro to Computing (H)	F		F		F		F	
1118	Engineering Mech-Statics	F	S	F	S	F	S	F	S
1204	Eng Material Science	F		F		F		F	
1206	Mechncs of Materials	F	S	F	S	F	S	F	S
1208	Into Mech Engr Dsgn		S		S		S		S
1209	Materials for Civil Engr (T)		S		S		S		S
1210	Materials for Civil Engr		S		S		S		S
1211	Dynamics		S		S		S		S
1212	Analytl Methods Engr	F		F		F		F	
1218	Elec Engineering I	F		F		F		F	
1220	Trans to Obj Ori Prog	F		F		F		F	
1222	Sgnls/Sys & Trnsfrms		S		S		S		S
1225	Digital Circ/Cmp Sys		S		S		S		S
1226	Computer Comms & Ntwks		S		S		S		S
1241	Lab in Nav Arch	F		F		F		F	
1242	Applied Nav Arch/Mar Eng		S		S		S		S
1304	Soil Mechanics	F		F		F		F	
1309	Environmental Engr I	F		F		F		F	
1310	Environmental Engr Lab	F		F		F		F	
1311	SpclTpcs Geotech Engr		S		S		S		S
1312	Transportation Engr		S		S		S		S
1313	Steel Design		S		S		S		S
1317	Struct Analysis	F		F		F		F	
1321	Elec Cir & Machines	F	S	F	S	F	S	F	S
1322	Linear Circuits	F		F		F		F	
1323	Antennas & Propagatn	F		F		F		F	
1328	Software Engineering		S		S		S		S
1329	Digital Signal Prcss		S		S		S		S
1330	Comp & Net Security	F		F		F		F	
1331	Automatic Cntrl Sys		S		S		S		S
1340	Fluid Mechanics	F		F		F		F	
1351	Thermodynamics	F		F		F		F	
1353	Thermal Systems Dsgn	F		F		F		F	

Course	Course Title	'20-'21		'21-'22		'22-'23		'23-'24	
1355	Marine Engineering		S		S		S		S
1356	Ship Structures		S		S		S		S
1370	Mechanisms	F		F		F		F	
1395	Projects in Engr	F	S	F	S	F	S	F	S
1401	Const Proj Mgmt	F		F		F		F	
1402	Civil Eng Design		S		S		S		S
1404	Geotech Engr Design	F		F		F		F	
1406	Coastal Resiliency		S		S		S		S
1407	Enviromntl Engr II		S		S		S		S
1409	Water Resources Engr		S		S		S		S
1411	Reinf Concrete Dsgn		S		S		S		S
1414	Struct Dsgn Extreme Events		S		S		S		S
1418	SelTpcs in CE	F	S	F	S	F	S	F	S
1419	Dir Studies in CE	F	S	F	S	F	S	F	S
1420	Electric Energy/Machines	F		F		F		F	
1421	Indust Cntrl Sys Security				S		S		S
1422	Communication Sys	F		F		F		F	
1426	Capstone Proj/EE I	F		F		F		F	
1431	Electronic Nav Sys		S		S		S		S
1435	Intro Aerodynamics		S		S		S		S
1436	Capstone Proj/EE II		S		S		S		S
1437	Engr Experimentation	F		F		F		F	
1439	Dir Studies/EE	F	S	F	S	F	S	F	S
1440	Machine Design		S		S		S		S
1442	Prin of Ship Design	F		F		F		F	
1444	Ship Dsgn/Sys Intgr		S		S		S		S
1446	Mechanical Engr Dsgn		S		S		S		S
1447	Marine Casualty Resp	F		F		F		F	
1453	Ship Propulsion Dsgn	F		F		F		F	
1457	Small Craft Design		S		S		S		S
1459	Heat Transfer		S		S		S		S
1460	Mod&Ctrl of Dyn Sys	F		F		F		F	
1461	Mechatronics		S		S		S		S
1466	HVAC Principles		S		S		S		S
1468	Projects in NA&ME	F	S	F	S	F	S	F	S
1469	Dir Studies/NA&ME	F	S	F	S	F	S	F	S
1479	Dir Studies/ME	F	S	F	S	F	S	F	S
1480	Design Project Mgt	F		F		F		F	
1489	Sel Topics Elec Engr	F	S	F	S	F	S	F	S
1491	FE Review	F		F		F		F	
1493	Engineering Ethics		S		S		S		S
2101	Intro College Comm	F		F		F		F	
2111	College Composition	F	S	F	S	F	S	F	S

Course	Course Title	'20-'21		'21-'22		'22-'23		'23-'24	
2121	Art of Effectv Wrtnng	F		F		F		F	
2131	Amer Social Movements	F	S	F	S	F	S	F	S
2132	Ethnic Lit in America		S		S		S		S
2133	Intro Latin Amer Culture	F	S	F	S	F	S	F	S
2134	Gender & Sexual Orient Lit	F	S	F	S	F	S	F	S
2142	Comp Problem Solving		S		S		S		S
2163	American Government	F	S	F	S	F	S	F	S
2235	Spanish I	F		F		F		F	
2236	Spanish I/II		S		S		S		S
2237	Spanish II		S		S		S		S
2241	Modern European Civ		S				S		
2242	World Civilizations	F		F		F		F	
2243	Modern Diplomacy	F		F		F		F	
2265	Comparative Politics		S		S		S		S
2267	American Congress		S				S		
2269	Natl Security Policy	F		F		F		F	
2272	Political Partcptn	F		F		F		F	
2274	Intl Political Econ	F		F		F		F	
2281	Intell & Democracy	F		F		F		F	
2282	Intell & Cyber Ops		S		S		S		S
2293	Moral/Ethcl/Pol/Phil	F	S	F	S	F	S	F	S
2324	Lit Hum/Cnf: US Latinos				S				S
2325	Lit Hum/Cnf: Epics/Myths		S				S		
2326	Lit Hum/Cnf: Afr/Am Lit	F				F			
2328	Public Speak Diverse Soc		S		S		S		S
2331	CG Spanish				S				
2335	Spanish III	F		F		F		F	
2336	Cnverstonal Spanish		S				S		S
2337	Spanish IV		S		S		S		S
2338	Cultr/Pol Latin Am	F		F		F		F	
2341	The Civil War Era			F				F	
2343	Latin Am Exp: Cultural App		S		S		S		S
2344	Intro Latin Am Studies		S		S		S		S
2352	Cnf Res/Diplmcy/Nego				S				S
2355	Public Policymaking	F		F		F		F	
2358	Pol N Afr & MidEast		S		S		S		
2359	African Politics	F		F		F		F	
2360	Sel Topics in Phlsphy		S				S		
2361	Intro Political Theory		S		S		S		S
2362	Homeland Sec Pcly		S				S		
2363	Contem Pol Theory	F		F		F		F	
2367	Interntl Relations	F		F		F		F	

Course	Course Title	'20-'21		'21-'22		'22-'23		'23-'24	
2369	Contem. U.S. For. Policy		S		S		S		S
2370	Amer President Policy				S				S
2371	Area Studies	F	S	F	S	F	S	F	S
2373	Religion/Phil/Islam		S				S		
2375	Strategic Intell	F		F		F		F	
2377	Politics of China			F				F	
2378	Asia in World Affairs	F		F		F		F	
2379	Study of the Koran		S				S		
2392	Maritime Std: SelTpc	F	S	F	S	F	S	F	S
2394	Intro Moral & Ethical Phil	F	S	F	S	F	S	F	S
2395	Rhtic & CrtRm Advocacy	F	S	F	S	F	S	F	S
2397	Constit Law & H. S.		S		S		S		S
2398	Military Justice/Op Law	F	S	F	S	F	S	F	S
2421	Spcl Stds/Humanities	F	S	F	S	F	S	F	S
2429	Craft of Creative Writing	F	S	F	S	F	S	F	S
2439	Advanced Spanish	F		F		F		F	
2463	Maritime Policy/Strat	F		F		F		F	
2465	U.S. Military Policy		S		S		S		
2467	Environ Pol & Ethics		S		S		S		S
2468	Relg Pol & Globalztn	F		F		F		F	
2469	International Dev	F		F		F		F	
2472	Transntnl Threats		S		S		S		S
2482	Cyber Crisis and Conflict		S		S		S		S
2485	Global Challenges	F	S	F	S	F	S	F	S
2491	Govt Capstone Exp	F	S	F	S	F	S	F	S
2494	International Law	F		F		F		F	
2495	Adv Studies/Govt	F	S	F	S	F	S	F	S
2497	Senior Thesis Govt	F	S	F	S	F	S	F	S
2499	Adv Research Proj	F	S	F	S	F	S	F	S
3107	Foundation for Calculus	F		F		F		F	
3111	Calculus I	F	S	F	S	F	S	F	S
3115	Calculus II (V)	F		F		F		F	
3117	Calculus II		S		S		S		S
3211	Multivariable Calc	F	S	F	S	F	S	F	S
3213	Probability & Stat	F	S	F	S	F	S	F	S
3215	Differential Eqtns		S		S		S		S
3221	Linear Algebra	F		F		F		F	
3231	Linear Optimization		S		S		S		S
3235	Comp Model Languages	F		F		F		F	
3237	Discrete Mathematics		S		S		S		S
3238	Algorithms w/Applications	F		F		F		F	
3301	Adv Engineering Math		S		S		S		S
3333	Network & Nonlin Optim	F		F		F		F	
3334	Intermediate Det Models		S		S		S		S



Course		'20-'21	'21-'22	'22-'23	'23-'24
3336	Information Systems	S	S	S	S
3338	Advanced Crypto	S	S	S	S
3341	Probability Theory	F	F	F	F
3343	Mathematical Stats	S	S	S	S
3347	Linear Regression	S	S	S	S
3351	Probability Models	S	S	S	S
3453	Decision Models	F	F	F	F
3463	Simulation w/Risk Anlys	F	F	F	F
3470	Operations Analysis Prep	F	F	F	F
3471	Operations Analysis	S	S	S	S
3473	Problem Solving with OR	S	S	S	S
3479	Dir Studies/OR	F S	F S	F S	F S
3482	SelTpcs: Mathematics	F S	F S	F S	F S
3483	SelTpcs: Ops Research	F S	F S	F S	F S
3484	SelTpcs: Statistics	F S	F S	F S	F S
3485	SelTpcs: Comp Analysis	F S	F S	F S	F S
4101	Dvlmntl Swimming	F	F	F	F
4102	Prin Fitness/Well I	F	F	F	F
4103	Personal Defense I	F S	F S	F S	F S
4111	Swimming	F S	F S	F S	F S
4112	Prin Fitness/Well II	S	S	S	S
4204	Lifetime Sports I/Bdmntn	F S	F S	F S	F S
4214	Lifetime Sports II: Golf	F S	F S	F S	F S
4222	Professional Rescuer	F S	F S	F S	F S
4303	Personal Defense II	F S	F S	F S	F S
4304	Lifetime Sports III: Tennis	F S	F S	F S	F S
4400	Remdial Physic Tng	F S	F S	F S	F S
4405	Adventure Sports I:RC	F	F	F	F
4407	Dance	F S	F S	F S	F S
4411	Scuba Diving	F S	F S	F S	F S
4414	Advanced Golf	F S	F S	F S	F S
4415	Adventure Sports II	S	S	S	S
4439	Theory of Coaching	F S	F S	F S	F S
4444	Indoor Recrtnl Sports	F S	F S	F S	F S
4459	Sport/Wellness Leader	F S	F S	F S	F S
4464	Strength & Conditioning	S	S	S	S
4489	Sel Topics/HPE	F S	F S	F S	F S
5102	Chemistry I	F	F	F	F
5162	Physics I	S	S	S	S
5206	Chemistry II	S	S	S	S
5208	Chemistry II (H)	S	S	S	S
5232	Marine Biology	F	F	F	F
5233	Environmental Science	S	S	S	S
5236	Oceans I: Air & Sea	F	F	F	F
5242	Oceans II: Land & Sea	S	S	S	S

Course	Course Title	'20-'21		'21-'22		'22-'23		'23-'24	
5247	Proj: Marine Sci	F	S	F	S	F	S	F	S
5257	Proj: Physics	F	S	F	S	F	S	F	S
5266	Physics II	F		F		F		F	
5302	Organic Chemistry I	F		F		F		F	
5310	Illicit Drugs	F	S	F	S	F	S	F	S
5312	Analytl Methods/Chem		S		S		S		S
5330	Geospatial Sciences I	F		F		F		F	
5334	Fisheries Biology	F		F		F		F	
5338	Marine Forecasting	As Required		As Required		As Required		As Required	
5342	Bio/Chemical Oceans		S		S		S		S
5350	Ocean Dynamics	F		F		F		F	
5352	Waves & Tides		S		S		S		S
5366	Astronomy			F					
5367	Remote Sensing			F		F		F	
5379	Dir Studies/MarSci	F	S	F	S	F	S	F	S
5381	Capstone 1		S		S		S		S
5389	Dir Studies/Physics	F	S	F	S	F	S	F	S
5399	Dir Studies/Chem	F	S	F	S	F	S	F	S
5406	Physical Chemistry	F		F		F		F	
5415	Fate/Transport Chems Env	F		F		F		F	
5417	Toxicology	F		F		F		F	
5419	Biochemistry		S				S		S
5420	Chemometrics	F				F		F	
5421	Projects in Chem	F	S	F	S	F	S	F	S
5429	Research in Chem	F	S	F	S	F	S	F	S
5430	Geospatial Sciences II		S		S		S		S
5435	Emergency Management	F				F		F	
5436	Coastal Oceanography	F		F		F		F	
5440	Microbiology	F				F		F	
5441	Petroleum & Oil Spill Sci		S		S		S		S
5443	Marine Ecology	F		F		F		F	
5444	Atmospheric & Mar Sci	F	S	F	S	F	S	F	S
5445	Fisheries Management		S		S		S		S
5447	Polar Oceans		S		S		S		S
5449	Research in Physics	F	S	F	S	F	S	F	S
5459	Research in Mar Sci	F	S	F	S	F	S	F	S
5469	Research in GS	F	S	F	S	F	S	F	S
5475	Intro Geospatial Sci		S		S		S		S
5477	Optics	F				F		F	
5480	Capstone 2	F		F		F		F	
5481	Capstone 3		S		S		S		S
5489	SelTpcs: Chemistry	F	S	F	S	F	S	F	S
5493	Science Ethics Seminar		S		S		S		S
5495	SelTpcs: Physics	F	S	F	S	F	S	F	S
5498	SelTpcs: Mar Science	F	S	F	S	F	S	F	S

Course	Course Title	'20-'21		'21-'22		'22-'23		'23-'24	
6101	Fund of Navigation	F	S	F	S	F	S	F	S
6201	Ships & Maritime Sys	F	S	F	S	F	S	F	S
6202	Apps in Nav Lab	F	S	F	S	F	S	F	S
6210	Pvt Pilot Grnd Sch	F	S	F	S	F	S	F	S
6301	Maritime Watch Offer	F	S	F	S	F	S	F	S
6310	Marine Safety Prof		S		S		S		S
6401	Prof Maritime Officer	F	S	F	S	F	S	F	S
6402	Prof Maritime Officer Lab	F	S	F	S	F	S	F	S
6459	Sel Tpcs ProMarStds	F	S	F	S	F	S	F	S
6469	Proj in Pro Mar Dev	F	S	F	S	F	S	F	S
6489	Dir Stds ProMarDev	F	S	F	S	F	S	F	S
7218	Fund Info Security	F		F		F		F	
7238	Intro Cryptography		S		S		S		S
7294	Cyber Policy, Compl, Ethics		S		S		S		S
7310	Intro to Cyber Tech	F	S	F	S	F	S	F	S
7345	Operating Systems	F		F		F		F	
7381	Intro to Databases	F		F		F		F	
7385	Cyber Risk Management		S		S		S		S
7478	Proj: Cyber Systems	F	S	F	S	F	S	F	S
7479	DirStd: Cyber Systems	F	S	F	S	F	S	F	S
7489	SelTpcs: Cyber Systems	F	S	F	S	F	S	F	S
8115	Macroeconomic Prin	F	S	F	S	F	S	F	S
8201	Intro to Mgmt & Bus	F	S	F	S	F	S	F	S
8211	Org Behavior/Ldrshp	F	S	F	S	F	S	F	S
8217	Microeconomic Prin	F		F		F		F	
8241	Legal Environ Bus		S		S		S		S
8246	Financial Accounting		S		S		S		S
8313	Essentials of Economics	F	S	F	S	F	S	F	S
8331	Management Info Sys	F		F		F		F	
8342	Marketing		S		S		S		S
8348	Managerial Accounting	F		F		F		F	
8349	Financial Management		S		S		S		S
8351	Research Methods	F		F		F		F	
8357	Human Resources Mgt	F		F		F		F	
8363	Operations/Project Mgmt		S		S		S		S
8366	Ldrship/Org Dev/Chg		S		S		S		S
8413	Managerial Econ	On demand		On demand		On demand		On demand	
8415	Personal Finance	F	S	F	S	F	S	F	S
8417	Investment Theory		S		S		S		S
8418	Personal Financial Plan	F		F		F		F	
8419	Info Tchnlgy in Orgs		S		S		S		S
8423	Management Control	On demand		On demand		On demand		On demand	
8425	Global Bus & Econ	On demand		On demand		On demand		On demand	
8429	Managerial Psychology	F		F		F		F	
8439	Diversity and Leadership	On demand		On demand		On demand		On demand	

Course	Course Title	'20-'21	'21-'22	'22-'23	'23-'24
8440	Federal Budgeting	S	S	S	S
8442	Public Sector Economics	On demand	On demand	On demand	On demand
8443	Strategic Management	F	F	F	F
8444	PMC Prep	F	F	F	F
8445	Public Mgmt Consult	S	S	S	S
8446	Interm Financial Acct	F	F	F	F
8447	Auditing&IntrnlCntrl	S	S	S	S
8448	Sel Tpcs Fin/Acct/Ec	F S	F S	F S	F S
8449	Sel Tpcs IS/DS	F S	F S	F S	F S
8450	Sel Topics in Ldrshp	F S	F S	F S	F S
8453	Systms Analy & Desgn	F	F	F	F
8458	Negt & Conflict Mgmt	On demand	On demand	On demand	On demand
8460	Cost Accounting	F	F	F	F
8461	Supply Chain Mgmt	On demand	On demand	On demand	On demand
8462	CGFM Part I	F	F	F	F
8463	CGFM Part II	S	S	S	S
8468	DirStd: Fin/Acct/Econ	On demand	On demand	On demand	On demand
8469	DirStd: Mgmt	On demand	On demand	On demand	On demand
8470	DirStd: IS/DS	On demand	On demand	On demand	On demand

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 Andrew Ray, Lieutenant, USCG, Charlie Company Officer  
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 Morgan Fowler, Lieutenant Commander, USCG, Echo Company Officer  
 Timothy Bonner, Lieutenant Commander, USCG, Foxtrot Company Officer  
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 Calley Jones, Chief Petty Officer, USCG, Alfa Company Chief  
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Vacant, Assistant Offshore Sailing Coach  
David Thompson, Head Inter-collegiate Sailing Coach  
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