

# ROTC: NAVAL SCIENCE

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## Chair

CAPT Christopher Adams, USN

The Naval Reserve Officers Training Corps (NROTC) offers an opportunity for young men and women to qualify for a commission in the U.S. Navy or U.S. Marine Corps while attending college. While pursuing their academic studies, midshipmen of the NROTC receive a professional education and the necessary specialized training to qualify them to become commissioned Navy or Marine Corps officers.

As commissioned officers in the United States Navy, graduates may serve in one of the various components of the U.S. Fleet, such as surface ships, the aviation community, or nuclear-powered submarines. Of particular interest is the opportunity to serve as an operating engineer aboard a nuclear or conventionally powered ship. The theoretical knowledge obtained at Illinois Institute of Technology is combined with practical knowledge and early responsibility in the operation and management of the latest in missile, aircraft, and high-performance ship propulsion systems.

Students may request the option to become officers in the U.S. Marine Corps. A commission in the Marine Corps may lead to a specialization in aviation, infantry, engineering, armor, communications, or supply.

## Faculty

### Professor

CAPT C. W. Adams, USN

### Associate Professor

CDR M. F. Gray, USN

### Assistant Professors

LT V. M. Fontana, USN

LT J. N. Smith, USN

CAPT A. M. North, USMC

## ROTC: Naval Science Undergraduate Study

The Illinois Institute of Technology Naval Reserve Officers Training Corps (NROTC) Unit was established in 1946 by congressional authorization to create a Naval Science department. The Professor of Naval Science (PNS) chairs Illinois Institute of Technology's Department of Naval Science. Department faculty members are commissioned officers serving on active duty in the United States Navy or Marine Corps. They are selected and nominated by their respective services and screened and approved by the university.

## Naval ROTC Programs

The Naval Reserve Officers Training Corps offers young men and women the opportunity to obtain leadership and management experience as commissioned officers in the United States Navy (Navy option) or Marine Corps after graduation from Illinois Institute of Technology, through either the Scholarship Program or the non-scholarship College Program.

At Illinois Institute of Technology, NROTC midshipmen lead essentially the same campus life as other students. They participate in campus activities of their choice and can participate in work-study programs including university-sponsored overseas study.

There are no prescribed academic majors for NROTC students, although scientific and technical studies are encouraged. NROTC students are required to complete the naval science curriculum, attend a weekly two-hour laboratory, and participate in four to six weeks of active duty for summer training at sea or ashore. Additionally, NROTC students will participate in physical training at least once a week, and will have the opportunity to travel with the unit drill team to regional competitions. College Program students attend training during the summer preceding their last academic year. Between their third and fourth years, Marine Corps NROTC students will attend a summer training program at the Marine Corps development and Education Command in Quantico, VA.

## Scholarship Program

NROTC scholarship students are selected by nationwide competition. The NROTC Scholarship pays for tuition, books, and fees, as well as providing a tax-free stipend each month for four years. Graduates are commissioned as naval or marine corps officers and incur a minimum obligation of four years of active duty service.

## College Program

Admission to the College Program is controlled by the Professor of Naval Science. Students incur no obligation to the naval services for participation in this program until their junior year. Qualified students enrolled in this program may be recommended for scholarships by the Professor of Naval Science. In addition to uniforms and some naval science books issued to students enrolled in this program, the Navy provides a tax-free stipend each month during the junior and senior years. Graduates are commissioned as Reserve naval officers and incur a minimum obligation of three years of active duty.

## Two-Year Programs

The Navy/Marine Corps offer two two-year programs; one of these is a Scholarship Program and the other is a two-year College Program. Students are selected before April 1 of their sophomore year and attend a six-week Naval Science Institute Course at Newport, RI in the summer before entering their junior year. Scholarship benefits for the junior and senior year are identical to those received by students in the four-year scholarship program during their junior and senior years.

## Academic Requirements

Scholarship Program students are encouraged to pursue majors in engineering and applied sciences to meet the technological demands of the modern Navy. Most other fields of study leading to a baccalaureate degree are permitted with the approval of the Professor of Naval Science. All Navy option scholarship program students are required to complete one year each of calculus and physics.

College Program students and students enrolled in the Marine Corps option are encouraged to take courses in calculus and physics or to pursue a science or engineering major. In addition to the prescribed naval professional academic courses, the naval faculty conducts laboratories all four academic years to give students experience in practical leadership.

All scholarship students are required to complete a course in American Military Affairs or National Security Policy and complete a cultural studies course. Naval science courses are not offered on a pass-fail basis.

## Optional Program

Students may select a minor in naval science. Course requirements can be found in the Sample Curriculum section (p. 3).

## Required Courses

Code	Title	Credit Hours
NS 101	Introduction to Naval Science	2
NS 102	Naval Ships Systems I (Engineering) (Navy option)	3
NS 201	Naval Ships Systems II (Weapons) (Navy option)	3
NS 202	Seapower and Maritime Affairs	3
NS 301	Navigation (Navy option)	3
NS 302	Naval Operations and Seamanship (Navy option)	3
NS 401	Leadership and Management	3
NS 402	Naval Leadership and Ethics	3
<b>Total Credit Hours</b>		<b>23</b>

Attendance at the Naval Science Institute may be substituted for NS 101, NS 102, NS 201, and NS 202. NS 497 (zero credit hours) is required every semester.

# ROTC: Naval Science Curriculum

Semester 1	Credit Hours	Semester 2	Year 1 Credit Hours
NS 101	2	NS 202	3
		<b>2</b>	<b>3</b>
Semester 1	Credit Hours	Semester 2	Year 2 Credit Hours
NS 401	3	NS 301	3
		<b>3</b>	<b>3</b>
Semester 1	Credit Hours	Semester 2	Year 3 Credit Hours
NS 102	3	NS 201	3
		<b>3</b>	<b>3</b>
Semester 1	Credit Hours	Semester 2	Year 4 Credit Hours
NS 302	3	NS 402	3
		<b>3</b>	<b>3</b>

Total Credit Hours: 23

# Marine Option

Semester 1	Credit Hours	Semester 2	Year 1 Credit Hours
NS 101	2	NS 202	3
		<b>2</b>	<b>3</b>
Semester 1	Credit Hours		Year 2
NS 401	3		
		<b>3</b>	
Semester 1	Credit Hours	Semester 2	Year 3 Credit Hours
NS 310	3	NS 410	3
		<b>3</b>	<b>3</b>
		Semester 2	Year 4 Credit Hours
		NS 402	3
		<b>3</b>	

Total Credit Hours: 17

## Course Descriptions

### NS 101

#### Introduction to Naval Science

A general introduction to the USN and USMC that emphasizes organizational structure, warfare components, and assigned roles/missions of USN/USMC, covers all aspects of Naval Science from its relative position within DoD to the specific warfare communities/career paths, and includes basic elements of leadership and Navy Core Values. The course will provide students with initial exposure to many elements of Naval culture and provides conceptual framework/working vocabulary for students to use on summer cruise.

**Corequisite(s):** NS 499

**Lecture: 2 Lab: 0 Credits: 2**

### NS 102

#### Naval Ships Systems I (Engineering)

Students learn detailed ship design, hydrodynamic forces, stability, propulsion, electrical theory and distribution, hydraulic theory and ship control, and damage control. The course includes basic concepts of theory/design of steam, gas turbine, diesel, and nuclear propulsion. Case studies on leadership/ethical issues in the engineering arena are also covered. Not required for Nurse and Marine Corps options.)

**Corequisite(s):** NS 499

**Lecture: 3 Lab: 0 Credits: 3**

### NS 201

#### Naval Ships Systems II (Weapons)

The course outlines the theory and employment of weapons systems. Students explore the processes of detection, evaluation, threat analysis, weapon selection, delivery, guidance, and explosives. Fire control systems and major weapon types are discussed, including capabilities and limitations. The physical aspects of radar and underwater sound are described. Facets of command, control, communications, computers, and intelligence are explored as a means of weapons systems integration. The tactical and strategic significance of command and control warfare and information warfare is discussed. This course is supplemented with review/analysis of case studies involving the moral and ethical responsibilities of leaders in the employment of weapons. Not required for Nurse and Marine Corps options.

**Corequisite(s):** NS 499

**Lecture: 3 Lab: 0 Credits: 3**

### NS 202

#### Seapower and Maritime Affairs

A study of the U. S. Navy and the influence of sea power upon history that incorporates both a historical and political science process to explore the major events, attitudes, personalities, and circumstances that have done the following: imbued the U. S. Navy with its proud history and rich tradition; deals with issues of national imperatives in peacetime, as well as war, varying maritime philosophies that were interpreted into Naval strategies/doctrines, budgetary concerns which shaped force realities, and the pursuit of American diplomatic objectives; and concludes with a discussion of the Navy's strategic and structural changes at the end of the Cold War and its new focus, mission, and strategy in the post September 11, 2001, world. For Nurse Corps only; course may be taken in sophomore year.

**Corequisite(s):** NS 499

**Lecture: 3 Lab: 0 Credits: 3**

**Satisfies:** Communications (C)

### NS 301

#### Navigation

In-depth study of the theory, principles, procedures, and application of plotting, piloting, and electronic navigation as well as an introduction to maneuvering boards. Students learn piloting techniques, the use of charts, the use of visual and electronic aids, and the theory of operation of both magnetic and gyrocompasses. Students develop practical skills in plotting and electronic navigation. Other topics include tides, currents, effects of wind/weather, voyage planning, and an application and introduction to the international/inland rules of navigation. The course is supplemented with a review/analysis of case studies involving moral/ethical/leadership issues pertaining to the concepts listed above. Not required for Nurse and Marine Corps options.

**Corequisite(s):** NS 499

**Lecture: 3 Lab: 0 Credits: 3**

### NS 302

#### Naval Operations and Seamanship

A continued study of relative motion, formation tactics, and ship employment. Introductions to naval operations and operations analysis, ship behavior and characteristics in maneuvering, applied aspects of ship handling, afloat communications, naval command and control, naval warfare areas, and joint warfare are also included. The course is supplemented with a review/analysis of case studies involving moral/ethical/leadership issues pertaining to the concepts listed above. Not required for Nurse and Marine Corps options.

**Corequisite(s):** NS 499

**Lecture: 3 Lab: 0 Credits: 3**

**NS 310****Evolution of Warfare**

Students trace the development of warfare to the present day. This course is designed to cover the causes of continuity and change in the means and methods of warfare. It addresses the influence of political, economic, and societal factors on the conduct of war with significant attention focused on the role of technological innovation in changing the battlefield. Students will explore the contribution of preeminent military theorists and battlefield commanders to our modern understanding of the art and science of war. Required for Marine option and MECEP students; optional for Navy students.

**Corequisite(s):** NS 499

**Lecture:** 3 **Lab:** 0 **Credits:** 3

**Satisfies:** Communications (C)

**NS 401****Leadership and Management**

The course introduces the student to many of the fundamental concepts of leading Sailors and Marines which shall be expanded upon during the continuum of leadership development throughout NROTC, and develops the elements of leadership vital to the effectiveness of Navy/Marine Corps officers by reviewing the theories and parameters of leadership and management within and outside of the Naval service and progressing through values development, interpersonal skills, management skills, and application theory. Practical applications are explored through the use of experiential exercises, readings, case studies, and laboratory discussions.

**Corequisite(s):** NS 499

**Lecture:** 3 **Lab:** 0 **Credits:** 3

**Satisfies:** Communications (C)

**NS 402****Naval Leadership and Ethics**

The course completes the final preparations of ensigns and second lieutenants for service in the Fleet and Marine Corps. The course integrates an intellectual exploration of Western moral traditions and ethical philosophy with a variety of topics such as the following: military leadership, core values, and professional ethics; the UCMJ and Navy regulations; and discussions relating to the roles of enlisted members, junior and senior officers, command relationships, and the conduct of warfare. The course provides midshipmen with a foundation of moral traditions combined with a discussion of actual current and historical events in the United States Navy and Marine Corps to prepare them for the role and responsibilities of leadership in the Naval Science of the 21st century.

**Corequisite(s):** NS 499

**Lecture:** 3 **Lab:** 0 **Credits:** 3

**Satisfies:** Communications (C), Ethics (E)

**NS 405****Leadership and Management Seminar**

A six-hour seminar augmenting Theory of Organization and Management (BUS 301). This seminar addresses leadership, management, and other organizational behavior issues facing junior officers, to include strategic and tactical planning, time-management, communication, counseling, team-building, and decision-making in a stressful environment. Required for Naval ROTC students. Normally taken concurrently with BUS 301 and in place of NS 401.

**Corequisite(s):** MGT 351

**Lecture:** 0 **Lab:** 1 **Credits:** 0

**NS 411****Fund of Maneuver Warfare**

This course introduces broad aspects of armed conflict and interactions using modern maneuver warfare doctrine. Students trace historical influences on the tactical, operational, and strategic implications of maneuver warfare practices in current and future operations. This course also covers the structure and capabilities of the present day U.S. Marine Corps organization as a forward deployed and rapid response force and its development of expeditionary maneuver warfare concepts. The focus is to train students to be practitioners of maneuver warfare and use lessons from the past as the basis for making practical judgments during armed conflict. Required for Marine options and MECEP students.

**Corequisite(s):** NS 499

**Lecture:** 3 **Lab:** 0 **Credits:** 3

**NS 497****Special Topics**

This course provides midshipmen with an opportunity to work under the supervision of an officer/instructor on projects related to professional development. Department permission required.

**Credit:** Variable

**NS 499****Naval Science Laboratory**

Topics deal with general Navy/Marine Corps mission and policies, force protection, operational security, watch standing, physical fitness, nutrition, stress management, and other professional development subjects.

**Lecture:** 2 **Lab:** 3 **Credits:** 1