

## Officer Education

Captain Donald J. Meyer, U.S.N., Officer Education Coordinator

Military instruction began at Cornell University in 1868 under the provisions of the Morrill Act of 1862. Since that time, officer education has been highlighted by the construction of Barton Hall in 1914, establishment of a formal Reserve Officers Training Corps (ROTC) Unit in 1916, and the evolution of a program that emphasizes the development of leadership and managerial skills and, in addition, includes an appropriate level of drill and ceremony. Throughout the years, Cornell's program of officer education has produced many outstanding military and civilian leaders who were well equipped for success by the knowledge and skills gained from their involvement in ROTC.

The programs of officer education allow the student to prepare for a commission as an officer in either regular military services or the reserves of the United States. The Army, Navy, Marines, and Air Force offer such opportunities, and each service program is headed by a senior military officer who also serves as a full professor on the Cornell faculty.

## Military Science

Lieutenant Colonel Gerald J. Hone, Air Defense Artillery, United States Army, Professor of Military Science and Commanding Officer, U.S. Army ROTC Detachment

Major Richard L. Slinkard, Adjutant General Corps, United States Army

Captain John V. Cecalupo, Infantry, United States Army

Captain Gary S. Terhune, Chemical Corps, United States Army

### United States Army ROTC Program

The primary objective of the Army Officer Education Program at Cornell is to develop and commission men and women who have the qualifications and potential for service as officers in the reserve and active components of the United States Army. Intermediate objectives are to provide students with an understanding of the fundamentals of responsibility, integrity, and self-discipline, as well as an appreciation of the citizen's role in national defense. The application of the decision-making process to a variety of situations is given major emphasis as a valuable aid in developing leadership potential.

These objectives are achieved through a program normally covering four years. However, a two-year program is available and is discussed in a later section. The program includes specific courses in military science, more general academic subjects that assure a well-rounded education, practical training in leadership through participation in the Cadet Corps (including attendance at a six-week summer camp at an Army installation), and the opportunity to participate in a number of extracurricular activities such as those described below. The combination prepares the student for commissioning and effective performance in most of the many branches of the Army. The student's academic major, academic performance, leadership ability, personal desires, and the needs of the Army determine the branch of the Army in which he or she is commissioned upon graduation.

### Requirements for Enrolling

Applicants must be citizens of the United States. (Non-citizens may enroll and will receive certificates acknowledging completion of the course, but do not receive commissions.)

An applicant's vision must be correctable to a minimum of 20/20 in one eye and 20/400 in the other eye. Height must be at least sixty inches for men, fifty-eight inches for women, and no more than eighty inches for men and seventy-two inches for women, although exceptions will be considered. The weight requirement varies according to height and sex. Overall sound mental and physical condition is essential and students are required to undergo periodic physical examinations. Enrollment in the program is subject to the approval of the professor of military science.

Enrollment in specific courses by students not formally enrolled in the program must be approved by course instructors.

### Four-Year Program

The Four-Year Program is open to students in their freshman year, or with the approval of military and University authorities, to sophomores in a five-year degree program. Veterans of the Armed Forces of the United States and students entering Cornell with AROTC credit from secondary or military schools (Junior Division AROTC) may receive advanced standing.

Under the Four-Year Program, students pursue the Basic Phase (Mil S I and II) during the first two years and during the next two years the Advanced Phase (Mil S III and IV). A total of twelve credits of military subjects is required. In addition, a number of non-officer education academic enrichment subjects are recommended. These enrichment courses are in such fields as communication arts, psychology, sociology, political science, mathematics, and philosophy. Specific requirements are determined by the student and his or her adviser after initial enrollment. Throughout the four years, cadets spend an additional 1½ hours each week each semester in practical leadership training for which there is no academic credit. All cadets attend a six-week camp, with pay, between the junior and senior years.

#### Basic Phase (Mil S I and Mil S II)

Students in the first year of the Basic Phase take one classroom course in military science in the fall semester for which they receive academic credit. This course includes study of the United States organization for defense, principles and techniques of leadership and management, the evolution of warfare, and the nature of armed conflict in society. Students also participate in leadership modules which include rappelling, orienteering, and rifle marksmanship. They are designed to promote personal development and enrichment. While these activities do not receive academic credit, students can elect to receive physical education credit. In the spring semester the student takes a leadership module other than the one taken in the fall and can elect to receive physical education credit. Typical freshman participation in Army Officer Education is 48½ program-related hours.

During the fall of the second year, the student takes a one-credit class in map reading and a one-credit class in military history. In the spring, the student takes a one-credit course in leadership and management and spends approximately two hours a week in practical leadership training as preparation for the Advanced Phase.

Students in the Basic Phase are also required to take six credits of University academic course work in communication arts. Frequently, these courses can be taken as electives to meet other University or degree requirements. With proper planning, the enrichment requirement usually does not entail work beyond normal degree requirements.

### Advanced Phase (Mil S III and Mil S IV)

The Advanced Phase of the Four-Year Program is open to students who have successfully completed the Basic Phase and are accepted by the Professor of Military Science for further enrollment. It is also open to students who have gained appropriate advanced standing through either successful completion of basic summer programs (see the description of the Two-Year Program) or prior military training. Any student entering the Advanced Phase must have two years of academic work remaining at Cornell or another area degree-granting institution. The student must pass such physical and aptitude tests as may be prescribed. In addition, the past performance and desire of each student is evaluated to determine if he or she has the potential for eventual commissioning.

When students are accepted for the Advanced Phase, they execute a written contract with the United States government. Under terms of the contract, they agree to complete the Advanced Phase and to accept a commission if tendered. Concurrent with the signing of the contract, students enlist in the United States Army Reserve for control purposes.

Classroom study in the Advanced Phase includes one military science course each semester on such subjects as leadership and management, small-unit tactics, and command and staff organization and functions. A student must also complete six credits of University advanced-level enrichment courses. As with the Basic Phase requirement, these hours may generally be applied toward the student's degree requirement hours. The 1½ hours a week of practical leadership training continues, and, between the junior and senior years, all cadets attend a six-week advanced summer camp currently conducted at Fort Bragg, North Carolina.

### Two-Year Program

The Two-Year Program consists of the last two years (the Advanced Phase) of the regular Four-Year Program. In order to qualify for the Two-Year Program, a student must successfully complete a basic six-week summer camp or an intensive three-week, on-campus summer officer education program. (See Mil S 299 in the *Summer Session Announcement*.)

The Two-Year Program is open to selected students who have two years of academic study remaining at Cornell or any other degree-granting institution. Applications are accepted from December to April. Selectees complete the basic six-week camp or the three-week summer officer education program before registering in the Advanced Phase the following fall. They must also pass specified physical requirements and execute the same written contract as those students who enter the Advanced Phase after completing the regular Basic Phase.

### Scholarships

Scholarships are awarded on the basis of merit and are available for one, two, three, or four years. AROTC scholarships are awarded each year to outstanding Basic Camp participants and students in the freshman, sophomore, and junior classes. Cadets who are awarded scholarships continue to receive support until graduation as long as they fulfill the requirements. The active duty requirement for all scholarship students is four years.

Scholarship cadets receive funding for University tuition, required fees, required textbooks, and classroom materials for the duration of their scholarship. Basic course scholarship cadets also receive \$100 a month for up to ten months a year.

### Commissioning

All students who successfully complete the Advanced Phase, including the advanced summer camp, are commissioned as second lieutenants in the United States Army Reserve or the Regular Army upon graduation.

### Distinguished Military Graduates

Selected senior cadets with high academic achievement and outstanding military qualities are designated Distinguished Military Graduates (DMG). All cadets, scholarship and nonscholarship, are eligible to compete. DMGs may be commissioned in the Regular Army rather than the Army Reserve; those who are so commissioned enter the Army on the same basis as graduates of the United States Military Academy at West Point.

### Service Obligations

A variety of active duty and reserve combinations are available. Nonscholarship cadets must spend either three years on active duty and three more years on Reserve status, or three to six months on active duty followed by membership in Reserve units for six years. The manpower requirements of the Army determine the proportion of officers who serve in each category. Current trends indicate that requests for active duty for three years by nonscholarship, non-regular Army officers will be approved. However, it is a competitive process. Similarly, requests for limited active duty (three to six months for training only) are selectively approved. An officer beginning three years active duty first attends the Basic Officer Course (normally eight to twelve weeks) of the assigned branch. Upon completion of this course, the officer is assigned to a unit and location that is determined by the desires of the individual and requirements of the Army. Those officers selected for three to six months attend the Basic Officer Course, after which they are released to Reserve status.

Nonscholarship cadets accepting a Regular Army commission serve a minimum of three years on active duty followed by three years in Reserve status.

Every scholarship cadet (whether commissioned in the Regular Army or the Reserve) serves four years on active duty and two years on Reserve status.

### Choice of Branch

Cadets in the second year of the Advanced Phase (normally the senior year) may specify the branch of the Army—such as Infantry, Corps of Engineers, Armor, Signal Corps, Artillery, Air Defense, Ordnance, Chemical, Adjutant General, Judge Advocate General, Finance, Medical Service, Military Intelligence, Military Police—in which they prefer to serve. They are notified in the spring, before commissioning, of the branch to which they are assigned. The likelihood of appointment in a chosen branch depends upon the student's academic and officer education performance, degree area, and the needs of the Army at that time.

### Graduate Study

Active duty deferments may be granted to individuals who want to attend graduate school at their own expense after commissioning. Current policy is to approve all requests for active duty deferment for graduate school for two years (three years for law school). Requests for longer deferments will be considered on an individual basis.

### Benefits

Each cadet in the Advanced Phase (Mil S III and Mil S IV) receives \$100 a month for ten months a year. While attending the advanced summer camp (between the junior and senior years), each cadet receives approximately \$550 and an allowance for travel to and from camp. Uniforms, textbooks, and supplies required for AROTC instruction are provided by the Army.

A cadet in the Two-Year Program receives the same payments as cadets in the Advanced Phase and in addition, receives approximately \$450 and a travel allowance for basic summer camp attendance before entering the Advanced Phase.

### Military Science Courses

All cadets take one course or a module or both each semester in military science. The number of hours a week spent in the classroom varies from semester to semester, as does the credit received for each course. Students in the Four-Year Program are required to take courses as noted below. Students in the Two-Year Program are required to take all of the courses listed for the junior and senior years.

#### Freshman Year (Mil S I)

**Mil S 101 United States Organization for Defense** Fall. 1 credit. Required.  
Staff.

Students examine the United States defense apparatus in terms of organization, mission, personnel, and relationships among military forces and between the military forces and various branches and departments of the government. The United States Army force structure is examined at all levels. The complexities and magnitude of operating the defense organization are studied to provide a framework for subsequent instruction.

**Mil S 102 Social and Organizational Psychology in the Military Environment** Spring. 1 credit. Required.  
Staff.

This course allows the student to develop a basic understanding and appreciation of the theories of social and organizational psychology and behavior as they apply to the military setting. Attention is given to leader types, the source and exercise of authority, and the impact of varying styles of leadership on motivation and organization effectiveness. The student is introduced to the concepts of integrity, ethics, and professionalism.

#### Sophomore Year (Mil S II)

**Mil S 211 Armed Conflict and Society** Fall. 3 credits. Required.

3 classes each week. Presentation by Army, Marine Corps, and Navy instructors with guest lecturers, primarily from government and history departments.

A study of modern warfare that examines the relationship of military strategy to geography, economics, sociology, technology, and national political realities and values; the evolution of warfare, including principles of war, weapons, and associated equipment; and the effects of nuclear weapons and guerrilla warfare on traditional concepts of national strategy.

**Mil S 221 Mapping: Land Navigation** Spring. 1 credit. Required.  
Staff.

This course provides practical knowledge of the various forms of topographic representation. Students develop, interpret, and use maps in terrain association and land navigation. Knowledge of topography is complemented by an orientation on significant environmental influences from political, social, and climatic factors. Portions of the course offer practical experience in land navigation and orienteering.

#### Junior Year (Mil S III)

**Mil S 332 Theory and Dynamics of the Military Team** Fall. 2 credits. Required.  
Staff.

After an initial introduction to techniques of presenting briefings, the student is provided with a broad understanding of the principles and application of teamwork in military organizations. Particular emphasis is given to leadership responsibilities of the commander as the team coordinator. Additionally, the student has an opportunity to develop an understanding of the roles and contributions of the various branches of the Army in support of the military team.

**Mil S 322 Leadership in Small Unit Operations** Spring. 2 credits. Required.  
Staff.

This course provides an understanding of the nature of decision making and the tactical application of the military team. Through the use of conferences and extensive practical exercises, students develop familiarity with the factors influencing the leader's decisions; the processes of planning, coordinating, and directing the operations of military units to include troop-leading procedures; and development of operation plans and orders.

#### Senior Year (Mil S IV)

**Mil S 424 Contemporary Military Environment I** Fall. 2 credits. Required.  
Staff.

A detailed examination of the functions and activities of military organizations, their commanders, and their staff. Discussion focuses on students' past experiences and future expectations in examining such aspects of the military environment as the chain of command, decision making, command and staff relations actions, and the various elements of small-unit administration.

**Mil S 481 Contemporary Military Environment II** Spring. 2 credits. Required.  
Staff.

As a continuation of the material presented in Mil S 424, students examine carefully the leadership environment of an Army officer. Conferences and seminars are used to examine the techniques of effective military leadership, the sociological and psychological environment, the nature of military law and above all, the professional ethics, responsibilities, and obligations of an Army officer.

### Practical Leadership Training

#### All Army Officer Education Students

All Advanced Phase AROTC students and Basic Phase students belong to a cadet organization for the purpose of participation in practical leadership experiences. The cadet organization meets formally for 1½ hours each week as part of the leadership laboratory program.

The rationale for the form and content of the program is the fact that continued exposure to leadership situations that are both mentally and physically challenging will develop poise and self-confidence. The practical result for the individual participant is the ability to apply intelligently and creatively the decision-making process to a variety of complex situations, while simultaneously supervising the performance of others.

Training of this nature allows students to learn how to communicate effectively with peers, subordinates, and superiors. Most importantly, the program helps instill in each participant a heightened awareness of the roles character traits such as integrity, cooperation, devotion to duty, and professionalism play in the smooth operation of any organization.

In the Leadership Laboratory, all of these objectives are accomplished by emphasizing practical exercises and first-hand experience. Types of practical laboratory activities include an introduction to rifle marksmanship, mountaineering, physical training, land navigation and orienteering, signal communications, tactics, and orientation and training exercises at military installations.

As with many laboratory periods, no credit is given and participation is required for successful completion of the AROTC program. Students register as follows:

<b>Mil S I Leadership Laboratory I</b>	
Fall	Spring
Mil S 141	Mil S 142

Mil S 1 cadets select either rifle marksmanship, orienteering, or rappelling. These interesting and

challenging activities do not provide academic credit, but may be used for physical education credit if adequate hours have been accrued.

#### Mil S II Leadership Laboratory II

Fall Spring  
Not offered Mil S 242

Cadets meet for two hours each week as members of the cadet organization to participate in practical leadership exercises. Types of practical activities include familiarization in rifle marksmanship, orienteering, drill and ceremonies, signal communications, physical fitness training, tactics and field exercises.

#### Mil S III Leadership Laboratory III

Fall Spring  
Mil S 341 Mil S 342

Cadets meet for 1½ hours a week to prepare for a six-week summer camp that follows the junior year. Emphasis is on the development of individual skills in leadership techniques and practical skills. Cadets rotate among leadership positions to develop an ability to apply decision-making processes to a myriad of situations. Cadets also acquire technical expertise and proficiency in signal communications, physical fitness, drill and ceremonies, rappelling, orienteering, tactics, water survival, and other military skills.

#### Mil S IV Leadership Laboratory IV

Fall Spring  
Mil S 441 Mil S 442

Senior cadets plan and operate the Leadership Laboratory programs for Mil S I-III cadets. The development of planning and supervisory skills is emphasized. Cadets have an opportunity to practice leadership skills developed during previous ROTC training and summer camp experiences.

## Naval Science

Donald J. Meyer, United States Navy, Professor of Naval Science and Commanding Officer, Naval ROTC Unit

Commander Joseph M. Quigley, United States Navy  
Major Robert A. Packard, United States Marine Corps  
Lieutenant Curtis J. Hawks, United States Navy  
Lieutenant Charles P. Schuster, United States Navy  
Lieutenant David M. Armitage, United States Navy  
Lieutenant Barton S. Finegan, United States Navy

The objective of the Naval Officer Education Program is to prepare selected students for service as commissioned officers in the United States Navy or United States Marine Corps by supplementing their undergraduate education with instruction in essential concepts of naval science and fostering development in the qualities of leadership, integrity, and dedication to their country and the naval service. The program is compatible with most undergraduate major fields of study, including five-year baccalaureate degree programs.

The objective is achieved through a broad program, normally covering four years, which combines specific courses in naval science and specified academic subjects to supplement weekly laboratory sessions in which the practical aspects of naval science and leadership procedures are stressed. It also includes at least one summer-at-sea period.

**Non-naval Officer Education Students.** Though the Navy program has been designed to prepare future officers, Navy courses are open to all students at Cornell University as space limitations allow.

### Requirements for Enrollment

An applicant for Naval ROTC at Cornell must be a citizen of the United States. Applicants must have reached their seventeenth birthday by June 30 of the entering year and be less than twenty-five years of age on June 30 of the calendar year in which

commissioned. Waivers of the upper age limit may be granted on an individual basis by the Chief of Naval Personnel up to age twenty-nine on June 30 of the year in which commissioned. Applicants must also meet physical and medical requirements. Interested students should visit the Naval Officer Education unit in Barton Hall.

### Programs

There are two types of Navy programs. They are the Scholarship Program and the College Program. They differ primarily in benefits to the student and type of commission earned.

#### Scholarship Program

The Naval Officer Education Program provides 6,000 scholarships in over fifty-five universities nationwide to selected students who want to serve in the Navy or Marine Corps. Financial support is provided students during college preceding the award of the baccalaureate degree.

#### Benefits

The program provides uniforms, full tuition, most instructional fees, textbooks, nonconsumable supplies, and \$100 a month for a maximum of forty months. Successful completion of the Scholarship Program leads to a commission in the Regular Navy or Marine Corps. At Cornell University over 90 percent of Naval students have a scholarship. In the past, of those students who have entered the Cornell program without a scholarship, more than 80 percent have been successful in obtaining one.

#### Entering the Scholarship Program

There are three ways to enter the Scholarship Program:

*First*, by applying for the national competition each year. This entails filling out and sending an appropriate application, being interviewed, having a physical examination, and applying to and being accepted by one of the NROTC colleges or universities throughout the country.

*Second*, by enrolling in the College Program at Cornell and being recommended by the Professor of Naval Science for a scholarship after at least one year in the program.

*Third*, by entering through one of the Two-Year College Programs.

#### College Programs

There are two College Programs available. Both lead to a commission in the Naval or Marine Corps Reserve and three years of active duty.

Each of these programs provide textbooks for naval professional courses, uniforms, and a subsistence allowance of \$100 a month from the beginning of the junior year.

The regular College Program is three to four years long. Academic requirements for students in this program are somewhat less than those for scholarship students as noted in the curriculum section of this booklet.

The Two-Year College Program begins the summer before the junior year, when students attend a required program at the Naval Science Institute in Newport, Rhode Island, with pay.

### Summer Training

Each summer, students in the Scholarship Program spend approximately six weeks on a Navy ship or with a naval activity anywhere in the world for on-the-job training. College Program students attend at least one summer training session of the same duration between the junior and senior years. While attending summer training sessions, midshipmen are paid approximately \$400 a month.

### Active Duty Requirements

As required by Section 2107, Title 10, United States Code, selected applicants must enlist in the United States Naval Reserve for six years in pay grade E-1 (seamen recruit) prior to being appointed midshipman, USNR, and receiving compensation. Students that are disenrolled from the NROTC Navy-Marine Corps Scholarship Program for reasons beyond their control shall, upon disenrollment, be discharged from their enlisted status. It should be understood that two years active enlisted service will be required of those students who default from the terms of their NROTC contract after the beginning of their junior year. Additionally, two years active enlisted service is incurred at any time for those individuals who are released from active duty specifically to participate in the NROTC scholarship program and do not complete such training.

Officers commissioned in the Regular Navy or Marine Corps serve on active duty for a minimum of four years. Those commissioned in the Naval or Marine Corps Reserve serve three years on active duty. Specialized training following commissioning adds additional active duty requirements in some cases.

#### Choice of Assignment

Graduates have an opportunity to request the duty they prefer upon graduation. These requests are given careful consideration and every effort is made to assign the newly commissioned officer the duty of his or her choice.

Among the types of assignments are duty in nuclear power engineering for surface ships and submarines, naval aviation, large and small surface ships, engineering duty officer billets, civil engineering corps, and supply corps.

#### Marine Corps Options

The United States Marine Corps is an integral part of the Naval Service and is commanded by the Commandant of the Marine Corps. One-sixth of the NROTC scholarship students may be Marine selectees who will be designated as Marine-option midshipmen. Upon successful completion of the program, they will be appointed second lieutenants in the United States Marine Corps.

Marine-option midshipmen will follow the same program as other NROTC midshipmen for the first two years. Beginning with the junior year, Marine-option midshipmen will be taught Marine courses by a Marine officer instructor. For the first class summer cruise (after the junior year), known as the Bulldog Cruise, Marine option students will travel to Quantico, Virginia, where they will undergo six weeks of intensive training. Upon commissioning the following year as second lieutenants, they will be assigned to the Basic School at Quantico, Virginia. After the Basic School, the Marine officer is assigned duty in a variety of occupational fields. Among the duties available are Infantry, Aviation, Artillery, Tracked Vehicles, Engineers, Communications, Electronics, Supply, Administration, and Computer Science. The officer may serve on board naval vessels or at shore installations of the Marine Corps or Navy, in this country or overseas.

The Marine Corps has a postgraduate educational system similar in objectives and organization to that of the Navy. Marine officers selected for aviation receive flight training at the Naval Air Station, Pensacola, Florida, along with their Navy counterparts.

### Curriculum

A student has three categories of requirements to fulfill as a midshipman in the Naval Officer Education Program. The first of these requirements is a weekly naval professional laboratory each semester. The second requirement is a naval science course each semester. The last set of requirements consists of other required courses prescribed by the Navy to meet the growing need for more and better technically educated junior officers.

## Naval Professional Laboratories

**Nav S 141-142, 241-242, 341-342, or 441-442**

All students in the Naval program participate in one ninety-minute laboratory session each week. The sessions are held from 2:30 until 4:00 on either Wednesday or Thursday afternoon. These periods are planned and implemented for the most part by the midshipmen officers in the battalion organization and consist of both drill and professional information briefings and underway training aboard the unit's fifty-foot seagoing sail training ketch. Students gain experience in actual leadership situations and at the same time learn the fundamentals of seamanship, military formations, movements, commands, discipline, courtesies, and honors. During information briefings, special emphasis is given to applied leadership as it relates to the administrative and managerial aspects of a Navy or Marine Corps officer's duties.

## Naval Science Courses

All Navy and Marine midshipmen take one naval science course together each semester during their freshman and sophomore years. Navy-option students continue to take a naval science course each semester during their junior and senior years. Marine-option students are required to take only the amphibious warfare course in either their junior or senior year, depending on when the course is offered. The number of hours a week spent in the classroom varies semester to semester, as does the credit received for each course.

## Freshman Year

**Nav S 101 Fundamentals of Naval Science** Fall. Noncredit.

One-hour class each week (lecture-recitation). Navy staff.

A study of fundamental aspects of naval science, including its conceptual contributions to sea power, factors involved in the physical development of naval forces, resources which must be managed, and prospects for the future.

**Nav S 102 (also M&AE 101) Naval Ship Systems** Spring. 3 credits.

3 lecture-recitation classes each week. R. L. Wehe. An introduction to primary ship systems and their interrelationship. Basic principles of thermodynamics, propulsion, mechanical operation, internal communications, electronics, ship structure, and other marine systems are considered.

## Sophomore Year

**Nav S 201 Naval Weapons Systems** Fall. 3 credits. Prerequisites: Mathematics 192 or 112 and Physics 208 or 214.

Lecture-recitations, M W F 8. Navy staff. The principles and theories used in the development of naval weapons systems are examined. Initially, extensive study is made of sensing and detection systems, especially radar and sonar, followed by discussions of ancillary systems for computing, tracking, stability, and weapons control and delivery. The latter part of the course covers the formal derivation of the fire control problem and development of an algorithmic solution method applicable to the digital computer.

**Nav S 202 Seapower—Maritime Affairs** Spring. 2 credits.

One seminar weekly. Navy staff. Discussions explore the meaning and modern applicability of seapower concepts, including such components as naval power, ocean science, ocean industry, ocean commerce, and international law.

## Junior Year (Navy)

**Nav S 305 (also Ag En 305) Principles of Navigation** Fall. 4 credits.

4 classes each week (lecture-recitation-project work)

The course covers coordinate systems, chart projections, navigational aids, instruments, compass observations, tides and currents, and soundings. It also includes celestial navigation, time, spherical trigonometry, motion of the stars and sun, star identification, position fixing, use of the nautical almanac, electronic navigation systems, and air navigation.

**Nav S 321 Naval Operations** Spring. Noncredit.

One one-hour class each week. Navy staff. The course covers the application of command and control principles and the integration of sensors and weapons systems in the conduct of naval operations. Visual and electronic communications methods, data systems employment, tactical disposition of forces, and fleet logistics support are studied. Topics in shiphandling also are discussed.

## Senior Year (Navy)

**Nav S 431 (also H Adm 414) Organizational Behavior and Small Group Problems** Fall and Spring. 3 credits.

Current research is examined to provide a conceptual framework for understanding group processes within organizations. In addition, students participate in experiential labs aimed at enhancing their effectiveness as members or leaders of groups. Topics include: stages of group development, leadership, decision making, motivation, individual versus group needs, organizational communication, power, and organizational change.

**Nav S 432 Naval Administration Topics** Spring. Noncredit.

A variety of topics important to the naval officer for both professional and managerial development are reviewed. The material is directed at the midshipman for his own understanding of naval administration and for use in counseling his subordinates in the role of the division officer. Through the use of lectures, situation problems, and role playing, the student will learn about the various aspects of naval management and administration.

## Additional Required Course

This course may be taken at any time during a student's undergraduate academic career.

**Nav S 302 Armed Conflict and Society** Fall. 3 credits.

3 classes each week. Presentation by Marine Corps and Navy instructors with guest lecturers, primarily from government and history departments. A study of modern warfare that examines the relationship of military strategy to geography, economics, sociology, technology, and national political realities and values, the evolution of warfare, including principles of war, weapons, and associated equipment and the effects of nuclear weapons and guerrilla warfare on traditional concepts of national strategy.

## Junior or Senior Year (Marines)

**Nav S 311 Amphibious Warfare** Spring. 3 credits.

3 lecture-recitations each week. Marine Corps staff. The history of the development, theory, techniques, and conduct of amphibious operations during the twentieth century. Special emphasis will be on amphibious operations conducted in the Central Pacific during World War II.

## Other Required Courses

## Navy Option

In order to receive commissions in the United States Navy, midshipmen must complete all the requirements for a baccalaureate degree as well as certain academic requirements specified by the Navy. Study in engineering and scientific fields is required for a majority of Navy-option scholarship students. Specifically, 80 percent of the Navy-option scholarship students are encouraged to pursue majors in engineering and approved sciences (chemistry, mathematics, physics, computer science, oceanography, operations analysis, or the physical sciences) to meet the technological requirements of the modern Navy. Other fields of study for majors leading to a baccalaureate degree and having a direct applicability for the unrestricted line are permitted with the approval of the Professor of Naval Science. Academic majors in fields that show a career interest apparently antithetical to a career in the unrestricted line (for example, agronomy, art, floriculture, music, physical education, predoctoral studies, theology, or wildlife management) are precluded for Navy-option scholarship students. Because of changing terminology for academic fields of study, it is not practical to provide a complete list of authorized and unauthorized majors. Examples of fields of academic study of interest to the Navy for educating officers of the unrestricted line are:

Asian studies	management
chemistry	mathematics
computer science	oceanography
economics	operations analysis
engineering	physical sciences
European studies	physics
foreign affairs	public administration
history	Soviet studies
Latin American studies	

Although there are few restrictions placed upon Navy-option College Program students (or any Marine-option students) with respect to academic majors, it is important to understand the vital need for mathematics and science in the modern Navy. College Program students who want to compete for a scholarship are encouraged to select majors in those fields listed above.

Other required courses depend on the commissioning program in which the Navy-option midshipmen are enrolled and are given in the following sections.

## Scholarship Program Navy-Option Students

All Navy-option scholarship students must complete two semesters of science-level calculus (six credits minimum) by the end of the sophomore year and two semesters of calculus-based physics (six credits minimum) by the end of the junior year.

Scholarship Program Navy-option students who do not major in chemistry, engineering, mathematics, physics, computer science, oceanography, operations analysis, or the physical sciences must also complete two science or engineering courses as electives.

## College Program Navy-Option Students

College Program students who desire entry into the Navy-Option Scholarship Program should fulfill all of the requirements applicable to Navy-option scholarship students to be eligible and competitive for a Professor of Naval Science (PNS) Scholarship.

## Marine Option

Any Naval midshipman, in either the Scholarship Program or the College Program, who completes all of Cornell University's degree requirements in any academic major is eligible for a commission in the United States Marine Corps or United States Marine Corps Reserve. Marine-option students take the same naval science courses and naval professional



laboratories as Navy-option students for the freshman and sophomore years. During the junior and senior years, Marine-option students meet with the Marine officer instructors one hour each week and take two naval science courses. In addition, two semesters of any courses (a minimum of three hours each) in the following subject areas are required, the intent being to broaden the base of knowledge of the individual. The specific course chosen must be approved by a Marine Officer Instructor (MOI).

anthropology  
behavioral sciences  
communication methods  
computer science (upper level)  
economics  
geography  
languages  
management engineering  
philosophy  
political science  
sociology  
world history

### University Courses

A wide range of courses satisfy Naval ROTC science and engineering elective or social sciences and humanities requirements. Consult your naval science instructor or adviser concerning appropriate course selections. A partial list of those Cornell University courses that meet academic requirements of the program follows:

**Calculus**  
Math 111 and 112 or 122 Calculus  
Math 191, 192, or 194 Calculus for Engineers

**Physics**  
Phys 112 and 213 or 217  
Phys 207-208 Fundamentals of Physics

**Chemistry**  
Chem 103-104 Introduction to Chemistry  
Chem 207-208 General Chemistry  
H Adm 171-172 Food Chemistry

**Computer Science**  
DBS 105 Introduction to Computer Programming  
Com S 101 The Computer Age  
Com S 102 Introduction to FORTRAN Programming  
Com S 211 Computers and Programming  
Com S 314 Introduction to Computer Systems and Organization  
M&AE 389 Computer-Aided Design  
Com S 436 Introduction to Computers in Planning  
H Adm 114 Information Systems I  
Ag En 151 Introduction to Agricultural Engineering and Computing  
Ag En 152 Engineering Drawing  
I&LR 211 Economic and Social Statistics

### Extracurricular Activities

The Navy ROTC student at Cornell is offered a broad range of activities in which to participate. Each summer, as an optional part of their summer training, midshipmen sail aboard the Unit Sail Training Vessel *China Doll* to distant ports of call. Back at Lake Cayuga a highly respected sail training program offers instruction, both in small sailboats and in large boat sailing, onboard *China Doll*, to all who want to participate. The unit offers a comprehensive sports program in which most midshipmen participate. The Navy unit has won the independent Division All Sports Trophy for four of the last five years. Midshipmen participate in a myriad of social events, including the annual Navy ball, the Tri-Service military ball, and traditional Naval mess nights.

Major Gary R. Fisher, United States Air Force  
Captain Joseph Pallay, United States Air Force  
Lieutenant Paul A. Gifford, United States Air Force

The objective of the Air Force Office Education program at Cornell is to prepare men and women for positions as officers in the United States Air Force. The program is designed to provide the student with a background of aerospace knowledge and to further develop qualities of leadership, integrity, and self-discipline. The objectives are achieved through four-year and two-year programs. These programs include specific courses in aerospace studies and practical laboratories.

Entering students are assigned to one of four categories: flying (pilot-navigator), missile, engineering-science; and general service. These assignments are based on the student's preferences, qualifications, academic field of study, and the needs of the Air Force.

### Requirements for Enrollment

The Air Force Officer Education program is open to any undergraduate or graduate student enrolled in any major field of study. The student's academic course of study is often a prime factor in determining the kind of career pursued in the Air Force. (See Air Force Careers below.)

Applicants must be United States citizens. Noncitizens may enroll and will receive certificates acknowledging completion of the course, but cannot receive a commission.

Applicants who are interested in flying (as pilot or navigator) or missile duty should make that request known at the time they enter the program.

All applicants receive physical examinations at no cost and, to be accepted, must meet the physical requirements listed below.

Though the program is designed to prepare future Air Force officers, Department of Aerospace Studies courses are open to all students at Cornell.

### Physical Requirements

Every applicant must be free from any limiting physical infirmity and must have normal hearing, blood pressure, and heartbeat. Weight must be normal for height and age.

Following are the additional specific requirements for nonflying categories.

**Vision:** bilateral distant vision without corrective lenses, at least 20/400.

**Height** (for men): at least sixty but not more than eighty inches; (for women): at least fifty-eight but not more than seventy-two inches.

**Allergy:** no history of asthma since twelfth birthday.

**Dental health:** good.

Those students who are interested in qualifying for flying categories (pilot or navigator) must meet the following specific requirements:

**Vision** (for pilot candidates): 20/20 bilateral near and far vision without corrective lenses; (for navigator candidates): bilateral near vision at least 20/20 without corrective lenses and bilateral far vision at least 20/70 without correction, providing it is correctable to 20/20 with lenses.

**Color vision:** normal.

**Height:** at least sixty-four but not more than seventy-six inches; sitting height not more than thirty-nine inches.

**Allergy:** no history of allergy or hay fever since twelfth birthday.

**Dental health:** good.

### Four-Year Program

The four-year program is open to all freshman students. Sophomores may enter the program, but require departmental approval. Students in a five-year degree program may enroll in their freshman or sophomore year.

Veterans of the United States armed forces and students entering Cornell from military schools may receive advanced standing, subject to approval by the Professor of Aerospace Studies.

The four-year program consists of the basic program (first two years) and the Professional Officer Course (advanced program) during the junior and senior years. The basic program carries no military commitment and students may withdraw at any time during that period.

### Basic Program

Students in the basic program take one credit of classroom work offered by the Department of Aerospace Studies each semester. During the freshman year, the role of the United States military forces in the contemporary world is examined with emphasis on human rights and the organization and mission of the United States Air Force. The functions of strategic offensive and defensive forces, general purpose forces, and aerospace support forces are covered. In the sophomore year, the history and development of military aviation and American air power are studied.

Students also spend one hour a week in a leadership laboratory, which includes classroom instruction in responsibilities and the environment of the junior officer and instruction and practice in basic drill and ceremonies. In addition, all students participate in summer field training for four weeks between their sophomore and junior years.

### Professional Officer Course

The Professional Officer Course (POC) is a two-year advanced course of instruction. Students who are accepted for the POC must have successfully completed or validated the basic course and must meet the academic and physical standards. Each cadet accepted into the POC must sign an agreement to complete the program and accept, if tendered, a commission in the Air Force Reserve upon graduation.

Classroom study in the POC requires three hours a week each semester. In the junior year, cadets study Air Force leadership and management at the junior officer level. During the senior year, cadets study the elements of national security and the place of the military in American society. Leadership laboratory requires a minimum of one hour a week in the junior and senior years. In the leadership laboratory the cadet is exposed to advanced leadership experiences and applies principles of management learned in the classroom.

### Flight Instruction Program

All cadets accepted for pilot training participate, in their senior year, in the Air Force ROTC flight instruction program at no cost.

This program consists of ground school and twenty-five hours of flying training in a light aircraft. Instruction is provided by a local civilian flying school. Upon completion of the program, a cadet may continue training for a private pilot's license through the Federal Aviation Agency.

### Two-Year Program

The two-year program consists of the last two years (the Professional Officer Course) of the regular four-year program plus a six-week summer training course preceding enrollment. (Details of the Professional Officer Course are given above.)

The two-year program is open to male and female students with two years of academic study remaining at Cornell (graduate or undergraduate), or at schools under crosstown or consortium agreement. Applications are accepted from November through May of the year preceding the applicant's planned entry into the program. Selectees are then required to successfully complete a six-week summer training program at government expense.

## Department of Aerospace Studies

Lieutenant Colonel Ronald F. Kozma, United States Air Force, Professor of Aerospace Studies and Commander, Air Force ROTC Detachment 520

## Scholarships

The Air Force awards more than six thousand scholarships annually. Four-year AFROTC scholarships are awarded to selected high school seniors. Three- and two-year scholarships are awarded annually on a competitive basis to students enrolled in the Air Force Officer Education Program. Applicants for the two-year program are also eligible to be considered for scholarships. Financial status or the award of other scholarships does not disqualify applicants for AFROTC scholarship awards. Acceptance of an AFROTC scholarship does not commit an individual to serve any additional time on active duty with the Air Force.

The vast majority of two-, three-, and four-year scholarships are limited to students majoring in engineering, physics, mathematics, computer science, and atmospheric science. A limited number of four-year scholarships are available to those enrolled in nontechnical academic majors such as business administration, accounting, and foreign languages. Some two- and three-year scholarships are awarded to students in nontechnical academic majors who desire to become navigators or missile launch officers.

A scholarship cadet receives a \$100 a month tax-free subsistence allowance, all tuition, fees, and reimbursement for the cost of textbooks for the duration of the scholarship.

## Fees

A uniform deposit of \$30 is required. Students are also encouraged to contribute to a Cadet Activities Fund to cover the cost of most of their social activities.

## Benefits

All cadets in the advanced program (POC) receive \$100 a month nontaxable subsistence allowance for the academic year. During the four- or six-week summer field training (see below), each cadet receives pay equal to one-half of a second lieutenant's salary, plus an allowance for travel to and from the field site. Most textbooks and supplies required for Department of Aerospace Studies courses are provided.

All cadets are eligible to participate in field trips made to Air Force bases throughout the country. Scholarship and advanced cadets (POC) are entitled to space-available rides on all aircraft flying within the continental United States.

## Field Training

There are two types of field training: a four-week course for cadets in the Four-Year Program and a six-week course for Two-Year Program applicants. Students of either program normally attend field training between their sophomore and junior years. Field training is hosted each summer by several active Air Force installations.

Field training is designed to stimulate the development of military leadership among students through meaningful experiences. This is accomplished through the field training curriculum and associated activities. The curriculum consists of aircraft, aircrew, and survival orientation, junior officer training, physical training, small arms training, a social-action program, and supplemental training. Special emphasis is placed on career orientation and interaction with young officers in fields of interest to the student. The six-week field training program differs in that it has an additional sixty hours of academic course work similar to the sixty hours of course work taken by the Four-Year Program cadets during their freshman and sophomore years.

In addition to field training, Airborne Training (parachute jumping instruction) is available as an extracurricular activity to selected volunteer cadets.

## Advanced Training Program (ATP)

This program allows selected cadets to go to active duty Air Force bases for a two- or three-week period during the summer following their junior year. As "third lieutenants," cadets receive specialized career orientation and an opportunity to experience leadership, human relations, and management challenges encountered by Air Force junior officers. Cadets also have an opportunity to become familiar with the Air Force way of life. Cadets receive pay and allowances authorized by current directives at the time of Advanced Training attendance.

## Commissioning

All students who successfully complete the AFROTC advanced program (POC) and who are awarded a baccalaureate degree are commissioned as second lieutenants in the Air Force Reserve.

## Air Force Careers

Air Force policy has been to assign new officers to a career field appropriate to their educational background. Students in the engineering-scientific category may be assigned to practice in their specialty in research and development, communications, aeronautics, astronautics, design and development, the biological sciences, computer design and maintenance, meteorology, or various other engineering and scientific fields. They will work under the supervision of some of the most highly qualified people in their field and have access to the latest scientific facilities and equipment.

Any undergraduate major is suitable for those who are interested and qualified to be pilots or navigators. After completion of flying training, they are assigned primary duties flying various kinds of aircraft.

Officers who elect missile duty will be sent to school for training in that field. Upon completion of school they will be assigned to one of the operational missile bases as a crew member. This type of assignment provides an opportunity for a young officer to obtain command experience and also enjoy the extra option of enrolling in a graduate program.

Those officers graduating in the general service category can anticipate assignments in manpower management, administration, logistics, police and investigation, intelligence, personnel, transportation, information, and numerous other career fields. They will use their educational backgrounds in positions of responsibility and be given the opportunity to develop further their managerial and administrative skills.

## Service Obligations

Second lieutenants commissioned in nonflying categories are required to serve on active duty for four years. Pilot trainees are required to serve on active duty for six years after completing flying training and receiving their aeronautical rating. Navigator trainees will serve five years after receiving their aeronautical rating. Some newly commissioned officers are allowed to postpone their active service in order to remain in college and earn advanced degrees.

## Curriculum

Students in the four-year program are required to take all the courses listed below. Students in the two-year program are required to take all of the courses listed for the junior and senior years.

### Freshman Year

#### Aero S 161 United States Military Forces Fall.

1 credit.

1 class each week. J. Pallay.

A study of current United States military forces with emphasis on the analysis of the doctrine, mission, and organization of the United States Air Force. Current factors affecting today's professional military

officers are considered. Special emphasis is placed on the role of human rights in the Department of Defense. The elements of strategic offensive and defensive forces is explored.

#### Aero S 162 Aerospace Operations Spring. 1 credit.

1 class each week, plus a field trip to a local military installation. J. Pallay.

The aerospace forces of the United States are studied, with emphasis on the mission, resources, and operations of tactical air forces throughout the world. Army and Navy operations and functions as contributions to the total national defense are reviewed. Through the case-study method, aerospace budgetary decision making is introduced.

### Sophomore Year

#### Aero S 211 Development of Military Aviation Fall. 1 credit.

1 class each week. R. F. Kozma.

Factors leading to the development of aviation and the concepts and doctrine for the employment of air power are studied. Topics to be reviewed and analyzed include the history of manned flight, the effects of World War I on the uses of aviation, and the development of pre-World War II aircraft and the political struggles for an independent United States air arm. The role of air power in World War II, including strategic bombing, tactical air power, and the role of air superiority in warfare is examined.

#### Aero S 212 American Air Power Since 1947 Spring. 1 credit.

1 class each week. R. F. Kozma.

The employment of the Air Force since World War II in military and nonmilitary operations to support national objectives. Effects of technology on defense policy and strategy are reviewed. The part played by the air arm in activities such as the Berlin Airlift and national and international relief missions is discussed. The role of air power in the Korean conflict, the Cuban crisis, and the Vietnam War are examined from the viewpoint of technology and tactical doctrine.

### Junior Year

#### Aero S 331 Leadership and Communicative Skills Fall. 3 credits.

2 or 3 classes each week. G. R. Fisher. Leadership responsibilities at the junior officer level including the responsibility, authority, and functions of a military commander and his staff emphasize management research and theory. Recent approaches to leadership models and the importance of communication skills in any leadership role are considered. Case study exercises and oral and written assignments are required.

#### Aero S 332 Management in the Armed Forces Spring. 3 credits.

2 or 3 classes each week. G. R. Fisher. Management at the junior officer level. Basic concepts of management and decision-making process, including planning, organizing, coordinating, directing, and controlling. Evaluation process and techniques used by management are studied. Position of management in world of power and politics, including managerial strategy and tactics is considered. Case studies and oral and written assignments are required.

### Senior Year

#### Aero S 461 Military and American Society Fall. 3 credits.

2 or 3 classes each week. P. A. Gifford. The functions and roles of the professional officer in a democratic society and how they relate to the socialization processes, prevailing public attitudes, and value orientations associated with professional military service are examined. Changes within the military are analyzed, including such topics as the

all-volunteer service, race relations, and the impact of women in the armed forces. The essential features of the military justice system as it functions to protect basic human rights and organizational order are reviewed. The formation and implementation of defense policy including political, economic, and social constraints is studied.

**Aero S 462 American Defense Policy** Spring.  
3 credits.

2 or 3 classes each week. P. A. Gifford.  
The prerequisites for maintaining adequate national security forces are explored, and the impact of technological and international development upon strategic preparedness and the overall defense policy-making process is assessed. An investigation of basic contemporary nuclear strategy, its evolution, control, and future. Alternatives to nuclear war including arms control, limited wars, wars of revolution, and insurgency are examined. Governmental processes and relationships that determine the contemporary military environment and provide a perspective for the future of defense policymaking in the United States.

Elective Course

**Aero S 405 Principles of Air Navigation and Aircraft Systems** Fall. 3 credits. Not offered 1981-82.

2 classes each week.  
Basic principles of weather elements, aerodynamics, aircraft systems, engine systems, and navigation systems. The study of these systems is integrated with chart projections, navigational aids, flight instruments, and avionics. Use of flight computer will be covered. This will prepare students for F.A.A. Private Pilot Ground School Test.

Leadership Laboratory Courses

All Air Force cadets spend at least one hour a week throughout the academic year in a leadership laboratory, for which no academic credit is given. Occasionally laboratories are held at times other than the normally scheduled period (such as the fall Veteran's Day Parade and the spring Military Awards Ceremony). All cadets also are expected to either observe or participate in an evening dining-in. Cadets are required to pass minimum physical fitness and weight standards once a semester.

**Aero S 141-142 Initial Military Experiences**

Introduction to the responsibilities, life, and work of an Air Force officer. Basic knowledge of drill and ceremonies, military courtesies, and the wearing of the uniform. Field trip to local military installation.

**Aero S 241-242 Intermediate Military Experiences**

Develops skills in giving commands for drill and ceremonies. Introduction to Air Force base environment in which the USAF officer functions. Includes a look at career areas available based on academic majors. Students experience and participate in leadership situations through military drills and ceremonies.

**Aero S 341-342 Junior Officer Leadership**

Cadets assume leadership responsibilities similar to those of a junior officer. Emphasis is on comprehending the importance of applying effective human relations in dealing with superiors, peers, and subordinates. Relationship between Air Force Specialty Codes, and academic majors. The importance of basic health habits to leadership.

**Aero S 441 Advanced Leadership Experiences**

Command leadership in operating a military organization. Cadets apply effective leadership and managerial techniques with individuals and groups and participate in self-analysis of leadership and managerial abilities.

**Aero S 442 Precommissioning Laboratory**

Factors that facilitate transition from civilian to military life are reviewed. The need for military security, base services and activities, personal finances, travel regulations, and social obligations are introduced.

Faculty Roster

Hone, Gerald J., Lieutenant Colonel, M.A., U. of Alabama. Prof., Military Science  
Kozma, Ronald F., Lieutenant Colonel, M.A., U. of Northern Colorado. Prof., Aerospace Studies  
Meyer, Donald J., Captain, M.S., George Washington U. Prof., Naval Science