~~Majoring in Math possible~~

http://digital.usma.edu/libmedia/archives/catalog/1975-76.pdf

This seems to be first catalog in which courses with credit hours are used 1965-66 is 1st year where credits are used

West Point

UNITED STATES MILITARY ACADEMY

1975-1976 CATALOG

18 wk SOM

One Hundred Seventy-Fourth Year

W. Point 1975-76

Contents

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IV. Academic Program

A young man entering the United States Military Academy can expect to expand his store of knowledge, to develop more fully the intellectual skills he needs to assume responsibility as a junior officer, and to build a strong foundation for assuming senior officer responsibilities. He can also expect to acquire a sound basis for postgraduate specialization in one of a variety of academic disciplines.

THE EDUCATIONAL PHILOSOPHY

The Military Academy, as the only college specifically charged with preparing young men for service as officers in the United States Army, has a unique educational philosophy. Graduates must be enlightened military leaders of strong moral courage whose minds are creative, critical, and resourceful.

The total curriculum helps develop those qualities an officer needs whether he leads a platoon or works at the highest level of government. Together, the academic curriculum and military training emphasize logical analysis, clear and concise expression, independent thought and action, and readiness to carry out legal orders.

Standard academic courses provide an essential core of knowledge in the arts and sciences. Emphasis is placed on using this knowledge to solve problems. Advanced and elective courses allow the individual cadet to realize his full potential, to concentrate in an area of interest, and to make forays into subjects about which he is simply curious.

Academic exploration blends with physical development, gained through physical education, intramural sports, and intercollegiate athletics. In addition, military education, training, and experience provide basic military principles and techniques and opportunities to test them in real leadership situations. Finally, while the Academy continually adapts itself to the pace of professional, national, and international change, it remains true to the sense of duty, honor, and service to country which has traditionally distinguished its graduates.

The Dean of the Academic Board
Frederick A. Smith, Jr., BG; B.S., USMA; M.S.M.E., Johns Hopkins; M.B.A., George Washington; Ph.D., Illinois.

The observations of Charles Dickens are as accurate now as they were when he visited West Point in 1842. "The course of education is severe, but well devised, and manly."

THE ACADEMIC CURRICULUM

The curriculum reflects 173 years of evolutionary change both in the military profession and in higher education. Today's balanced offering of courses in the arts and sciences leads to a Bachelor of Science degree and builds a foundation for continuing education and professional development.

The two complementary parts of the curriculum are a broad, general core program which is prescribed, and an elective program which is individually tailored. The general curriculum provides a sound educational foundation across the academic spectrum—math, science, engineering, English, history, social sciences, national security, and psychology. The elective program is an extension of the core program, which allows a cadet to achieve a reasonable degree of subject concentration by choosing electives from one of four broad areas: Basic Science, Applied

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Science and Engineering, Humanities, and National Security and Public Affairs.

Many graduates who remain in the Army go on to civilian graduate schools. One of the aims of the curriculum at West Point, then, is to give cadets a basis for postgraduate work within one of the above four areas.

Methods of Instruction

Here you will be far more than a mere face in the crowd. Small classes—usually of 12 to 16 cadets—assure discussion and individual attention. Grouping by ability, with periodic adjustments, allows concentration on the fundamentals if that is what you need, or an accelerated pace if you already have a firm grasp of the basics. You will be encouraged to participate daily and you will be evaluated frequently. If you are unsure of the material taught on any given day, or wish to move beyond it, extra one-on-one instruction is available. You always know where you stand in each course: grades go to a computer each week, and you can find out how you are doing by consulting remote terminals in your company area or in an academic building.

Lecture Series

Academic departments and other groups sponsor a comprehensive lecture series which complements the Academy's course of instruction. Guest lecturers include recognized authorities in various academic disciplines, noted authors, playwrights, religious and civic leaders, businessmen, and military leaders. Among recent lecturers have been Ayn Rand, author; Walter Kerr, *New York Times* drama critic; James Farmer, founder of the Congress of Racial Equality; General Andrew J. Goodpaster, former Supreme Allied Commander in Europe; Dr. B.M.W. Knox, eminent classical scholar; Dr. Kay Lathrop of Los Alamos Laboratories in New Mexico; Russell F. Weigley, distinguished military historian; General Maxwell D. Taylor, USA Retired, former Chairman of the Joint Chiefs of Staff and U.S. Ambassador; and United States Senators and Representatives.

THE CORE ACADEMIC PROGRAM

The 42 courses of the Core Academic Program provide a nucleus of knowledge in mathematics, science, engineering, the social sciences, and the humanities—slightly weighted toward the sciences. Each course must be successfully completed. The accompanying table shows the core courses and the sequence in which they are normally taken. Variations may result from the selection of certain areas of concentration, performance in previous college-level courses, and enrollment in advanced or accelerated programs. Electives are listed to show where they are normally scheduled during the four-year program.

Course Designation

First-year courses are numbered in the 100's, second-year in the 200's, third in the 300's, and fourth in the 400's. The second digit indicates the level of the course: 0 = standard, 4 or 5 = advanced, 7 or 8 = elective.

For core courses the third digit indicates the term in which the course is offered: odd digit = first term, even = second term. Electives may be offered in either or both terms as indicated in the course description. A credit hour represents one hour of classroom instruction and associated preparation each week for eighteen weeks (one term).

Validation and Advanced Placement

You may be excused from (validate) certain core courses if you have sufficient knowledge of a subject to meet the appropriate department's standards. Credit earned in other colleges, scores on Advanced Placement Examinations, and tests administered at the Academy are considered in validation decisions. Validation of a core course does not lighten your academic load; rather, it allows you an additional elective in place of the validated course. If you show unusual ability, or have prior knowledge of a

In 1965-66 phys ed was an exception: more hours than credits. Probably in this year (1975-76) too.

from P96 of catalog

Add 6 electives 6x2.5 = 15 cr

Phys Ed 7 cr*

Military Science

Mil. Instr 7

~~Mil Leaders 2.5~~

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Total cr for year

Phys Ed.

Assuming same hrs/cr ratio as in 1965 we estimate 334 hrs.

CORE CURRICULUM[x]

Fourth Class (Freshman) Year	First Term	Second Term		
y*Mathematics	MA 101	MA 102	12.	
*English	EN 101	EN 102	5.	
†*Foreign Language	L—101	L—102	5.	31.
*Environment	EV 101	EV 102	5.	
*Engineering Fundamentals	EF 101	EF 102	4.	
Third Class (Sophomore) Year				
*Mathematics	MA 201	MA 207	7.	
Physics (one sequence to be selected)	PH 201	PH 202	7.	
	or			
	PH 201	PH 204		
*Chemistry	CH 201	CH 204	7.	
†*Foreign Language	L—201	L—202	6.	37.
English	EN 201	—	2.5	
*Psychology		PL 202	2.5	
History (One sequence to be selected)	HI 201	HI 202	5.	
	or			
	HI 203	HI 204		
Second Class (Junior) Year				
Electrical Engineering	EE 301	EE 304	7.	
*Mechanics	ME 301	**ME 302	7.	
*Mechanics	ME 303	—	3.5	31.
Physics	—	PH 303	3.5	+ 5
	or			elect
	—	PH 305		
Law	LW 301	LW 302	5.	
*Social Sciences	SS 301	SS 302	5.	
	Elective	Elective		
First Class (Senior) Year				
Engineering (One sequence to be selected)	*CE 401	*CE 402	7.	
	or			
	CE 453	CE 454		
	or			
	*OE 401	*OE 402		
	or			
	EE 401 3.5	3.5 EE 402	7	26 + 10
	or			elect.
	GE 401	GE 402	?	
Leadership	PL 401 2.5	—	2.5	
English	—	EN 402	2.5	
*Social Sciences	SS 401	SS 407	7.	
*History	HI 401	HI 402	7.	
	Elective	Elective		
	Elective	Elective		

Phys Ed + Mil Sci

[x]See Chapter VI, "Courses of Instruction," for course descriptions, including required courses in military science and physical education.

[y]Each term of Fourth Class mathematics is equivalent to two courses.

*Advanced versions of these courses are offered to qualified individuals by the department concerned.

**Cadets concentrating their electives in the Humanities and National Security and Public Affairs areas may substitute an elective for this course.

†The Department of Foreign Languages offers programs in Chinese, French, German, Portuguese, Russian, and Spanish.

Total core credits (no electives) no phys ed

31
37
31
26
125

Acad. Prog

Core Curric minus electives 125 ~~121.5~~

Electives 15

Phys Ed 7

Military Sci 7.5

147.5 cr

18 hrs/cr

so 147.5 →

2646 Acad

334 Phys Ed

2980

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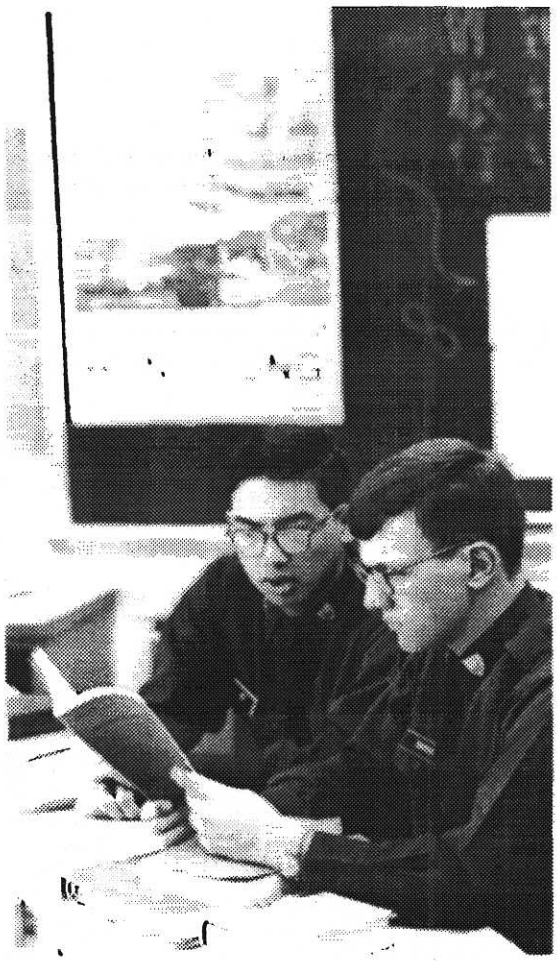
subject but cannot validate it, you may be enrolled in an advanced or accelerated program.

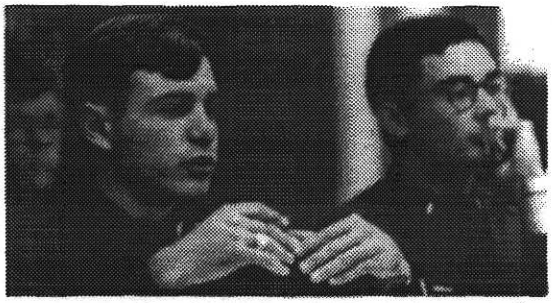
Honors Courses and Advanced Individual Study

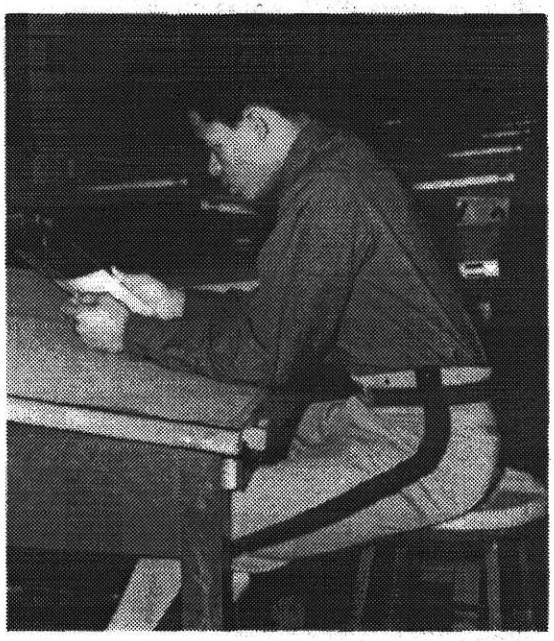
If you are an exceptional student, you may enroll in an honors course or advanced individual study in any of the disciplines taught at the Academy. These programs emphasize independent or tutorial work and are excellent preparation for graduate study.



THE ELECTIVE PROGRAM

Each cadet takes a minimum of six electives. This number may be increased depending on area of elective concentration, number of core courses validated, and enrollment in advanced or accelerated programs. With approval of the Dean, upperclassmen may take overload electives. Careful choice of electives can weight an individual's program toward the humanities or social sciences, or reinforce his scientific orientation. The following table lists all elective courses offered. For a course description of a particular elective, refer to Chapter VI, "Courses of Instruction."





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ELECTIVE COURSE OFFERINGS

Course No.	Course Title	Department
CE 381	Soil Mechanics	Engineering
CE 382	Engineering of Environmental Systems	Engineering
CE 481	Design of Concrete Structures	Engineering
CE 482	Advanced Structural Analysis	Engineering
CE 489	Advanced Individual Study in Engineering	Engineering
CH 383	Organic Chemistry I	Chemistry
CH 384	Organic Chemistry II	Chemistry
CH 481	Physical Chemistry I	Chemistry
CH 482	Physical Chemistry II	Chemistry
CH 485	Human Biology I	Chemistry
CH 486	Human Biology II	Chemistry
CH 489	Advanced Individual Study in Chemistry	Chemistry
EE 382	Electromechanical Energy Conversion	Electrical Engineering
EE 383	Electromagnetic Fields	Electrical Engineering
EE 482	Power System Analysis	Electrical Engineering
EE 483	Digital Computer Systems	Electrical Engineering
EE 484	Communication Systems	Electrical Engineering
EE 485	Computer Engineering	Electrical Engineering
EE 486	Solid State Electronics	Electrical Engineering
EE 489	Advanced Individual Study in Electrical Engineering	Electrical Engineering
EF 382	Computer Applications with FORTRAN	Earth, Space and Graphic Sciences
EF 383	Data Processing with COBOL	Earth, Space and Graphic Sciences
EF 384	Principles of Surveying	Earth, Space and Graphic Sciences
EF 488	Advanced Computer Programming	Earth, Space and Graphic Sciences
EF 489	Advanced Individual Study in Computer Science or Geodetic Science	Earth, Space and Graphic Sciences
EN 381	British Literature Survey	English
EN 383	Period Studies in Literature	English
EN 385	Background to American Studies	English
EN 391	Introduction to Fine Arts	English
EN 392	Introduction to Music	English
EN 481	Aspects of Literature	English
EN 482	Aspects of American Studies	English
EN 483	Seminar in American Studies	English
EN 485	Seminar in Major British Authors	English
EN 486	Seminar in Major American Authors	English
EN 489	Advanced Individual Study in English	English
EV 381	Geography of the USSR	Earth, Space and Graphic Sciences
EV 382	Geography of People's Republic of China	Earth, Space and Graphic Sciences
EV 383	Astronomy	Earth, Space and Graphic Sciences
EV 384	Regional Geography of the US	Earth, Space and Graphic Sciences
EV 385	Issues Confronting Man and His Environment	Earth, Space & Graphic Sciences
EV 387	Cartography	Earth, Space & Graphic Sciences
EV 388	Physical Geology	Earth, Space & Graphic Sciences
EV 489	Advanced Individual Study in Environment, Geology or Geography	Earth, Space & Graphic Sciences
GE 381	Scientific Management	Engineering
GE 383	Systems Engineering and Decision Making	Engineering
HI 371	History of Russia	History
HI 372	History of US Foreign Relations	History
HI 373	Topics in American History	History
HI 374	Topics in European History	History
HI 375	History of the Far East	History
HI 376	The Black in American History	History
HI 381	History of Revolutionary Warfare	History
HI 383	Twentieth Century Warfare	History
HI 384	Topics in Military History	History
HI 481	Seminar in History	History
HI 489	Advanced Individual Study in History	History
LC 383	Chinese Literature and Culture I	Foreign Languages
LC 384	Chinese Literature and Culture II	Foreign Languages

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Course No.	Course Title	Department
LC 485	Readings in Modern Chinese	Foreign Languages
LC 486	Chinese Military Readings	Foreign Languages
LF 381	French Language through Literature	Foreign Languages
LF 382	Military and Scientific Readings in French	Foreign Languages
LF 483	History of French Civilization I	Foreign Languages
LF 484	History of French Civilization II	Foreign Languages
LF 485	Survey of French Literature I	Foreign Languages
LF 486	Survey of French Literature II	Foreign Languages
LF 487	Directed Studies in French	Foreign Languages
LF 488	Directed Studies in French	Foreign Languages
LG 382	Military and Scientific Readings in German	Foreign Languages
LG 371	German Language through Literature I	Foreign Languages
LG 372	German Language through Literature II	Foreign Languages
LG 483	History of German Civilization	Foreign Languages
LG 484	Contemporary Germany	Foreign Languages
LG 485	Survey of German Literature	Foreign Languages
LG 486	Modern German Literature	Foreign Languages
LG 487	Directed Studies in German	Foreign Languages
LG 488	Directed Studies in German	Foreign Languages
LP 371	Portuguese Language through Literature I	Foreign Languages
LP 372	Portuguese Language through Literature II	Foreign Languages
LP 383	Military Readings in Portuguese	Foreign Languages
LP 475	Survey of Brazilian Literature	Foreign Languages
LP 476	Modern Brazilian Literature	Foreign Languages
LP 487	Directed Studies in Portuguese	Foreign Languages
LP 488	Directed Studies in Portuguese	Foreign Languages
LR 381	Advanced Russian Language	Foreign Languages
LR 382	Russian Language through Literature	Foreign Languages
LR 473	Russian and Soviet Civilization	Foreign Languages
LR 474	Soviet Russian Literature	Foreign Languages
LR 475	Military and Scientific Readings in Russian	Foreign Languages
LR 476	Soviet Expository Writings	Foreign Languages
LR 487	Directed Studies in Russian	Foreign Languages
LR 488	Directed Studies in Russian	Foreign Languages
LS 371	Spanish Language through Literature I	Foreign Languages
LS 372	Spanish Language through Literature II	Foreign Languages
LS 382	Military Readings in Spanish	Foreign Languages
LS 483	Survey of Spanish-American Literature	Foreign Languages
LS 484	Modern Spanish-American Literature	Foreign Languages
LS 485	Survey of Spanish Literature	Foreign Languages
LS 486	Modern Spanish Literature	Foreign Languages
LS 487	Directed Studies in Spanish	Foreign Languages
LS 488	Directed Studies in Spanish	Foreign Languages
LW 481	International Law	Law
LW 482	Seminar in Military Aspects of International Law	Law
LW 488	Business and Procurement Law	Law
MA 471	Linear Algebra	Mathematics
MA 473	Intermediate Probability and Statistics	Mathematics
MA 481	Linear Programming	Mathematics
MA 482	Abstract Algebra	Mathematics
MA 484	Differential Equations	Mathematics
MA 485	Complex Analysis	Mathematics
MA 486	Numerical Analysis	Mathematics
MA 487	Real Variable Theory	Mathematics

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Course No.	Course Title	Department
MA 489	Advanced Individual Study in Mathematics	Mathematics
ME 384	Mechanics of Materials	Mechanics
ME 387	Introduction to Applied Aerodynamics	Mechanics
ME 388	Aerodynamics of V/STOL Flight	Mechanics
ME 472	Direct Energy Conversion	Mechanics
ME 474	Propulsion	Mechanics
ME 475	Gas Dynamics	Mechanics
ME 476	Experimental Stress Analysis	Mechanics
ME 477	Experimental Fluid Mechanics & Thermodynamics	Mechanics
ME 478	Analysis of Modern Lightweight Structure	Mechanics
ME 482	Heat Transfer	Mechanics
ME 483	Space Mechanics	Mechanics
ME 485	Continuum Mechanics	Mechanics
ME 486	Mechanical Vibrations	Mechanics
ME 488	Flight Mechanics	Mechanics
ME 489	Advanced Individual Study in Mechanics	Mechanics
OE 383	Engineering Materials	Engineering
OE 385	Management Engineering	Engineering
OE 481	Automotive Engineering	Engineering
OE 483	Helicopter Engineering	Engineering
OE 487	Operations Research	Engineering
PH 383	Introduction to Theoretical Physics I	Physics
PH 384	Introduction to Theoretical Physics II	Physics
PH 483	Solid State Physics	Physics
PH 385	Topics in Physics	Physics
PH 484	Quantum Mechanics	Physics
PH 486	Experimental Physics	Physics
PH 487	Nuclear Reactor Theory	Physics
PH 488	Nuclear Physics	Physics
PH 489	Advanced Individual Study in Physics	Physics
PL 472	Topics in Sociology	Office of Military Leadership
PL 481	Managerial Psychology	Office of Military Leadership
PL 483	Social Psychology	Office of Military Leadership
PL 487	Psychology II	Office of Military Leadership

Course No.	Course Title	Department
PL 489	Advanced Individual Study in the Behavioral Sciences	Office of Military Leadership
SS 372	Policy and Administration	Social Sciences
SS 373	Quantitative Analysis in the Social Sciences	Social Sciences
SS 383	Middle Eastern Studies	Social Sciences
SS 384	Government and Politics of Latin America	Social Sciences
SS 385	Comparative Economic Systems	Social Sciences
SS 386	Political Philosophy	Social Sciences
SS 387	Seminar in Public Policy	Social Sciences
SS 388	Macroeconomics	Social Sciences
SS 389	Managerial Economics	Social Sciences
SS 471	Major Political Systems of East Asia	Social Sciences
SS 473	Issues in American Foreign Policy	Social Sciences
SS 475	Government and Politics of the Soviet Union	Social Sciences
SS 476	International Affairs: Theory and Applications	Social Sciences
SS 482	Microeconomics	Social Sciences
SS 483	National Security Seminar	Social Sciences
SS 484	International Economics and Economic Development	Social Sciences
SS 485	Problems of Developing Nations	Social Sciences
SS 486	Political and Cultural Anthropology	Social Sciences
SS 487	Public Policy Decision Making and Debate	Social Sciences
SS 489	Advanced Individual Study in Social Sciences	Social Sciences

2-5
2-5
2.5

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The General Elective Program

A cadet following this program can choose electives from the entire list of electives, satisfying his intellectual curiosity in several disciplines while developing a sound basis for future graduate study.

Areas of Elective Concentration and Associated Elective Fields

Some cadets wish to go into greater depth in an area of special interest or aptitude. To help these cadets design their individual academic programs, electives have been grouped into 24 fields under four areas of concentration and an interdisciplinary field, Management.

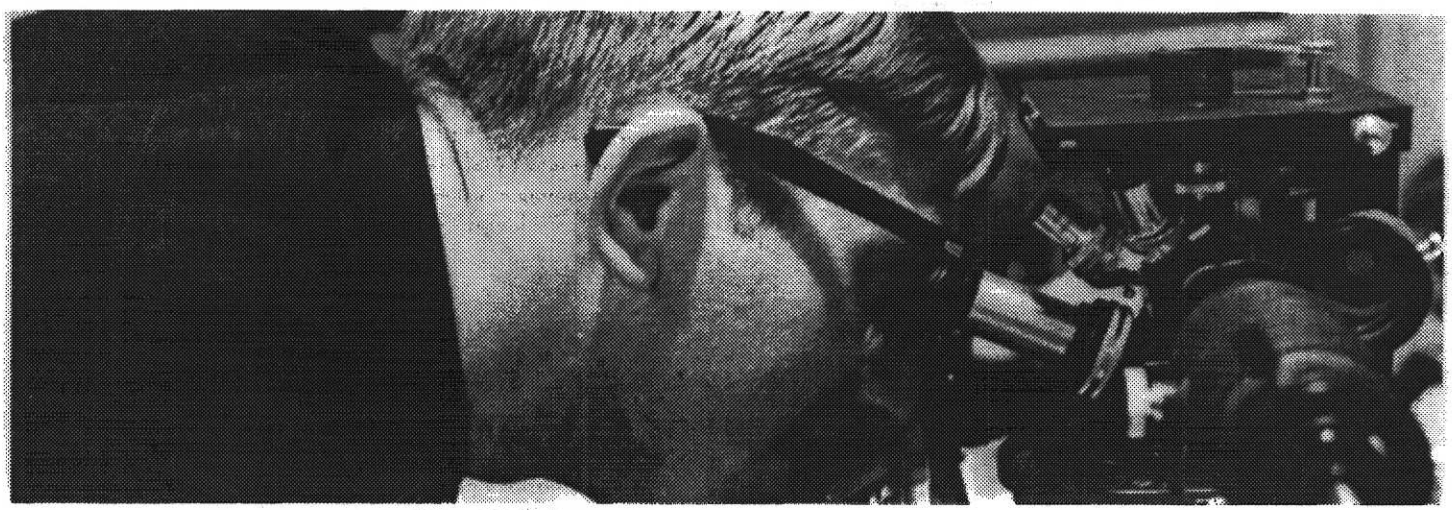
Applied Science and Engineering:
- **Civil Engineering**
- **Electrical Engineering**
- **Engineering Mechanics**
- **Nuclear Engineering**
- **Weapon Systems Engineering**

Basic Science:
- **Chemistry**
- **Computer Science**
- **Mathematics**
- **Physics**

Humanities:
- **American Studies**
- **Foreign Languages:**
  - **Chinese**
  - **French**
  - **German**
  - **Portuguese**
  - **Russian**
  - **Spanish**
- **Literature**

National Security and Public Affairs:
- **Economics**
- **Geography**
- **History**
- **International Affairs**
- **Military Studies**
- **Political Science**

Interdisciplinary Field:
- **Management**



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ELECTIVES WITHIN AREAS OF CONCENTRATION

The requirements for each area of elective concentration and its associated fields will be found on this and succeeding pages. Although the Military Academy does not offer a majors program, a cadet, by carefully designing his elective program, can achieve the equivalent of a minor and in some cases approach the course requirements for a major as defined by other academic institutions.

APPLIED SCIENCE AND ENGINEERING AREA

Cadets concentrating in the Applied Science and Engineering Area must satisfy the following requirements:

a. Complete a core program engineering sequence other than General Engineering.

b. Complete six elective courses as follows:

1. Five selected from the Applied Science and Engineering Area list or completion of the requirements of the Civil Engineering, Electrical Engineering, Engineering Mechanics, Nuclear Engineering or Weapon Systems Engineering fields, and

2. One selected from among the entire elective course offerings.

Applied Science and Engineering Area Elective Course List: CE 381, CE 382, CE 481, CE 482, CE 489, EE 382, EE 383, EE 482, EE 483, EE 484, EE 485, EE 486, EE 489, EF 384, GE 381, GE 383, ME 384, ME 387, ME 388, ME 472, ME 474, ME 475, ME 476, ME 477, ME 478, ME 482, ME 483, ME 485, ME 486, ME 488, ME 489, OE 383, OE 385, OE 481, OE 483, OE 487, PH 487.

CIVIL ENGINEERING FIELD

Requirement: Complete four principal electives to include ME 384 and at least one additional course chosen from the combined lists of principal and associated electives. The engineering sequence CE 401-402 or CE 451-452 must be chosen.

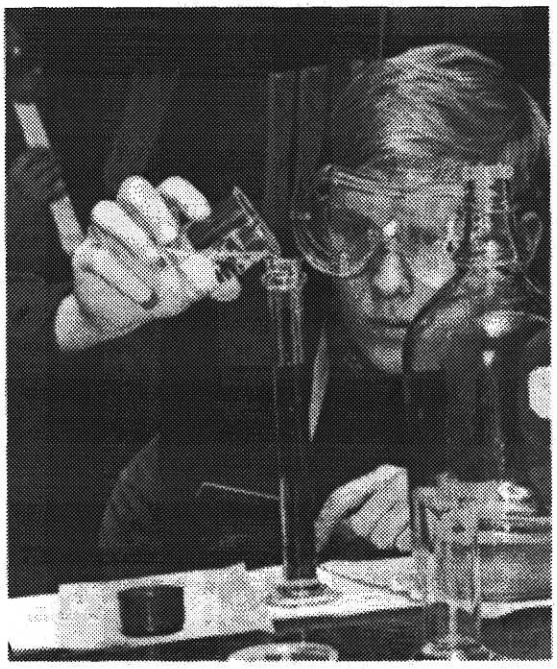
Principal Electives: CE 381, CE 382, CE 481, CE 482, CE 489, EF 384, GE 383, ME 384, OE 385.

Associated Electives: EF 382, EF 489A, EV 385, EV 388, GE 381, MA 471, MA 473, MA 481, MA 484, MA 486, ME 476, ME 477, ME 478, ME 485, ME 486, OE 383.

ELECTRICAL ENGINEERING FIELD

Requirement: Complete all principal electives and at least two associated electives. Electrical Engineering, EE 401-402, must be taken as the required engineering sequence.

Principal Electives: EE 382, EE 383, EE 484.



Associated Electives: EE 482, EE 483, EE 485, EE 486, EE 489, EF 382, EF 489, MA 471, MA 484, MA 485, ME 472, ME 486, OE 383, PH 483, PH 484.

ENGINEERING MECHANICS FIELD

Requirement: Complete four principal electives and at least one course chosen from the combined lists of principal and associated electives.

Principal Electives: ME 384, ME 387, ME 388, ME 472, ME 474, ME 475, ME 476, ME 477, ME 478, ME 482, ME 483, ME 485, ME 486, ME 488, ME 489.

Associated Electives: EE 402, EF 382, CE 381, CE 481, CE 482, MA 485, MA 486, OE 383, OE 481, OE 483, PH 383.

NUCLEAR ENGINEERING FIELD

Requirement: Complete four principal electives to include PH 487 and at least one course selected from the combined lists of principal and associated electives. CE 453-454 must be taken as the required engineering sequence.

Principal Electives: EF 382, GE 383, MA 484, ME 384, ME 482, OE 383, PH 484, PH 487, PH 488.

Associated Electives: CE 382, CE 489, EE 401, EE 402, EF 488, MA 473, MA 485, MA 486, PH 383, PH 384, PH 483, PH 486, PH 489.

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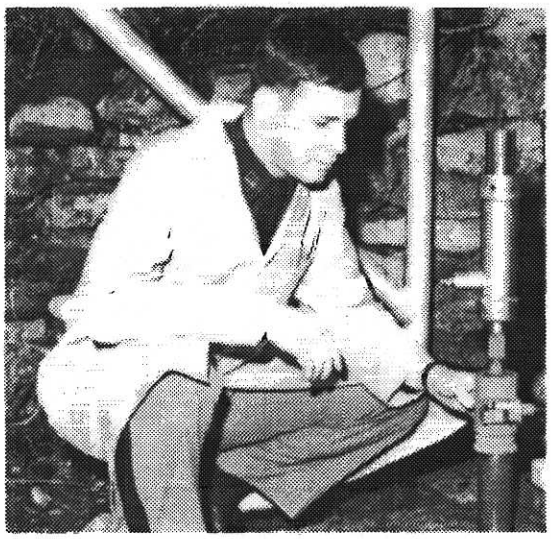


WEAPON SYSTEMS ENGINEERING FIELD

Requirement: Complete three principal electives and at least two courses from the combined lists of principal and associated electives. OE 401-402 or OE 451-452 must be taken as the required engineering course sequence.

Principal Electives: CE 489, GE 383, MA 484, ME 384, ME 388, ME 478, ME 483, ME 486, OE 383, OE 385, OE 481, OE 483.

Associated Electives: EE 402, EF 382, GE 381, MA 473, MA 481, MA 485, MA 486, ME 387, ME 474, ME 475, ME 482, ME 488, OE 487.

BASIC SCIENCE AREA

Cadets concentrating in the Basic Science Area must satisfy following requirements:

a. Complete a core program engineering sequence other than General Engineering.

b. Complete six elective courses as follows:

1. Five selected from the Basic Science Area List or fulfillment of the requirements of the Chemistry, Computer Science, Physics, or Mathematics fields, and

2. One selected from among the entire elective course offerings. Basic Science Area Elective Course List: CH 383, CH 384, CH 481, CH 482, CH 485, CH 486, CH 489, EF 382, EF 383, EF 488, EF 489A, EF 489B, EV 383, EV 388, EV 489, MA 471, MA 473, MA 481, MA 482, MA 484, MA 485, MA 486, MA 487, MA 489, PH 383, PH 384, PH 385, PH 483, PH 484, PH 486, PH 488, PH 489.

CHEMISTRY FIELD

Requirement: Complete four principal electives and one course chosen from the combined lists of principal and associated electives.

Principal Electives: CH 383, CH 384, CH 481, CH 482, CH 485, CH 486, CH 489.

Associated Electives: EF 382, EV 385, MA 473, MA 484, MA 486, PH 483, PH 484, PH 488.

COMPUTER SCIENCE FIELD

Requirement: Complete three principal electives, to include EF 382, and EE 483 or EE 485 and two additional courses chosen from the combined lists of principal and associated electives.

Principal Electives: EE 483, EE 485, EF 382, EF 383, EF 488, EF 489A, MA 486.

Associated Electives: GE 381, GE 383, MA 481, OE 385, OE 487, SS 389.

MATHEMATICS FIELD

Requirement: Complete four principal electives and one course chosen from the combined lists of principal and associated electives.

Principal Electives: MA 471, MA 473, MA 481, MA 482, MA 484, MA 485, MA 486, MA 487, MA 489.

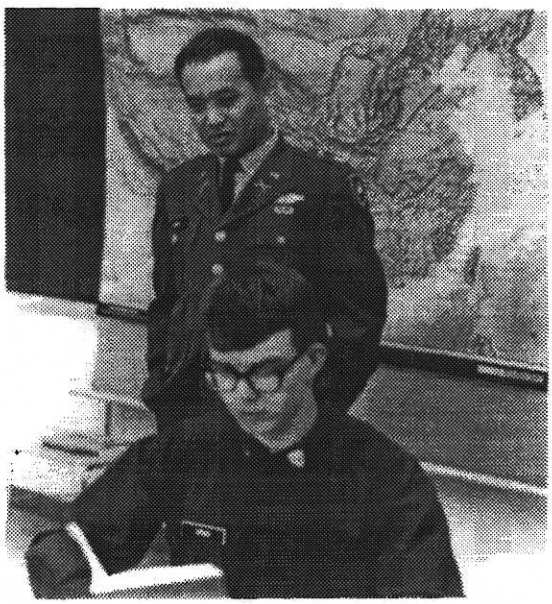
Associated Electives: EE 483, EE 484, EF 382, EF 383, EF 489A, EV 383, ME 478, ME 483, ME 485, ME 486, OE 385, OE 487, PH 383, PH 384, PH 484.

PHYSICS FIELD

Requirement: Complete four principal electives and one course from the combined lists of principal and associated electives.

Principal Electives: MA 484, PH 383, PH 384, PH 385, PH 483, PH 484, PH 486, PH 487, PH 488, PH 489.

Associated Electives: CE 453-454, EE 486, EV 383, MA 473, MA 485, MA 486, ME 483, OE 383.



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DEPARTMENT OF MATHEMATICS

Professor and Head of Department

Jack M. Pollin, COL; B.S., USMA; M.S., Penn.; M.S., R.P.I.; M.A., George Washington; Ph.D., Arizona.

The general requirement in mathematics for graduation from the Military Academy is satisfied by successful completion of the Standard Program at the end of the second year of study or completion of one of the Advanced Programs. Advanced Programs are designed for cadets who, by virtue of outstanding performance demonstrated during the early months of first year mathematics, exceptional aptitude, or above standard preparation before entering West Point, are able to satisfy the Standard Program requirements in less than two years. Cadets meeting the foregoing selection criteria are permitted to volunteer for assignment to an Advanced Program. Correspondingly, if the pace proves too rapid, opportunity for transfer to a slower program without prejudice is provided. Successful completion of either Advanced Program II or III, in addition to providing coverage of enrichment topics, offers opportunity for additional elective courses. The courses constituting the Standard and Advanced Programs are summarized below. Electives chosen by cadets in Advanced Programs during their second year need not be in mathematics, but if mathematics courses are chosen the recommended courses are those listed.

STANDARD PROGRAM: **MA 101-102; MA 201-207**
ADVANCED PROGRAM I: **MA 101-152; MA 201-207**
ADVANCED PROGRAM II: **MA 153-154; MA 207, one elective [MA 484 recommended]**
ADVANCED PROGRAM III: **MA 155-156; two electives [MA 484 and MA 485 recommended]**

STANDARD PROGRAM COURSES

MA 101-102 Calculus
Prerequisite: None
An introduction to set theory and inequalities is followed by a rigorous treatment of differential and integral calculus of single variable algebraic functions coordinated with plane analytic geometry and applications. Included is the study of calculus of transcendental functions, polar coordinates, plane vectors, infinite series and an introduction to matrix algebra covering algebraic operations and systems of equations.

12 Credit Hours

MA 201 Multivariable Calculus
Prerequisite: MA 102 or MA 152
This course covers solid analytic geometry, vector calculus and the calculus of functions of several variables. Topics included are partial differentiation, multiple integration, vector differentiation, line integrals and Green's Theorem.

3.5 Credit Hours

MA 207 Differential Equations and Probability Theory & Statistical Inference
Prerequisite: MA 154 or MA 201
Methods of solution of ordinary differential equations are studied including series solutions, differential operators, and Laplace transforms. Probability fundamentals are followed by the study and applications of distributions, estimation theory, confidence intervals, and hypothesis testing.

3.5 Credit Hours

ADVANCED PROGRAM I COURSE

MA 152 Calculus and Introduction to Linear Algebra
Prerequisites: MA 101 and selection by Head of Department
For cadets doing superior work in MA 101, this course covers the same material as MA 102 and includes an enriched introduction to matrix algebra including vector spaces and eigenvalues.

6 Credit Hours

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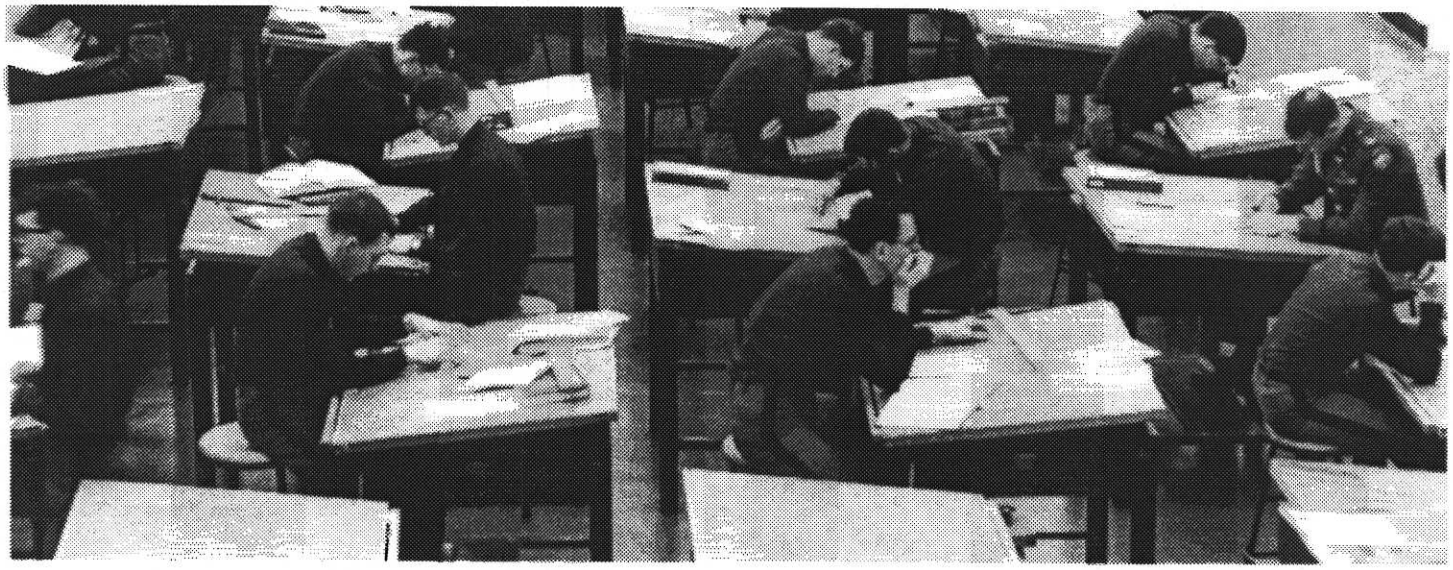

ADVANCED PROGRAM II COURSES

MA 153-154 Advanced Placement Calculus, Multivariable Calculus, and Introduction to Linear Algebra
Prerequisite: Selection by Head of Department
An accelerated course covering the material in MA 101-152 and MA 201. Successful completion provides for one additional elective.

12 Credit Hours

216 hrs

ADVANCED PROGRAM III COURSES

MA 155-156 Advanced Placement Calculus, Multivariable Calculus, Introduction to Linear Algebra, Differential Equations, and Probability Theory and Statistical Inference
Prerequisite: Selection by Head of Department
An accelerated course covering the material in MA 101-152 and MA 201-207. Successful completion provides for two additional electives.

12 Credit Hours

216

ELECTIVE COURSES

MA 471 Linear Algebra
Second Term—Prerequisite: Completion of the Mathematics Core Curriculum
An extension of the linear algebra studied in the core curriculum, to include matrix operations, vector spaces, and characteristic values and vectors. Emphasis is on applications in science, engineering, management and economics.

2.5 Credit Hours

45 hrs

MA 473 Intermediate Probability and Statistical Applications
Second Term—Prerequisite: Completion of the Mathematics Core Curriculum
An introduction to modeling and stochastic processes wherein Markov chains, reliability and life testing are discussed. The theory of statistical inference is developed in detail and applied to statistical experiments.

2.5 Credit Hours

MA 481 Linear Programming
Either Term—Prerequisite: Completion of the Mathematics Core Curriculum
A study of optimal solutions of linear systems using the original and revised simplex methods. Special topics such as the transportation problem, game theory and integer programming are also introduced.

2.5 Credit Hours

MA 482 Abstract Algebra
First Term—Prerequisite: Completion of the Mathematics Core Curriculum and permission of Head of Department
An introductory modern algebra course for cadets planning graduate work in mathematics or theoretical work in science or engineering. Groups, rings, integral domains and fields are studied.

2.5 Credit Hours

MA 484 Differential Equations [Intermediate]
Either Term—Prerequisite: Completion of the Mathematics Core Curriculum
A broad spectrum of subjects is studied, to include

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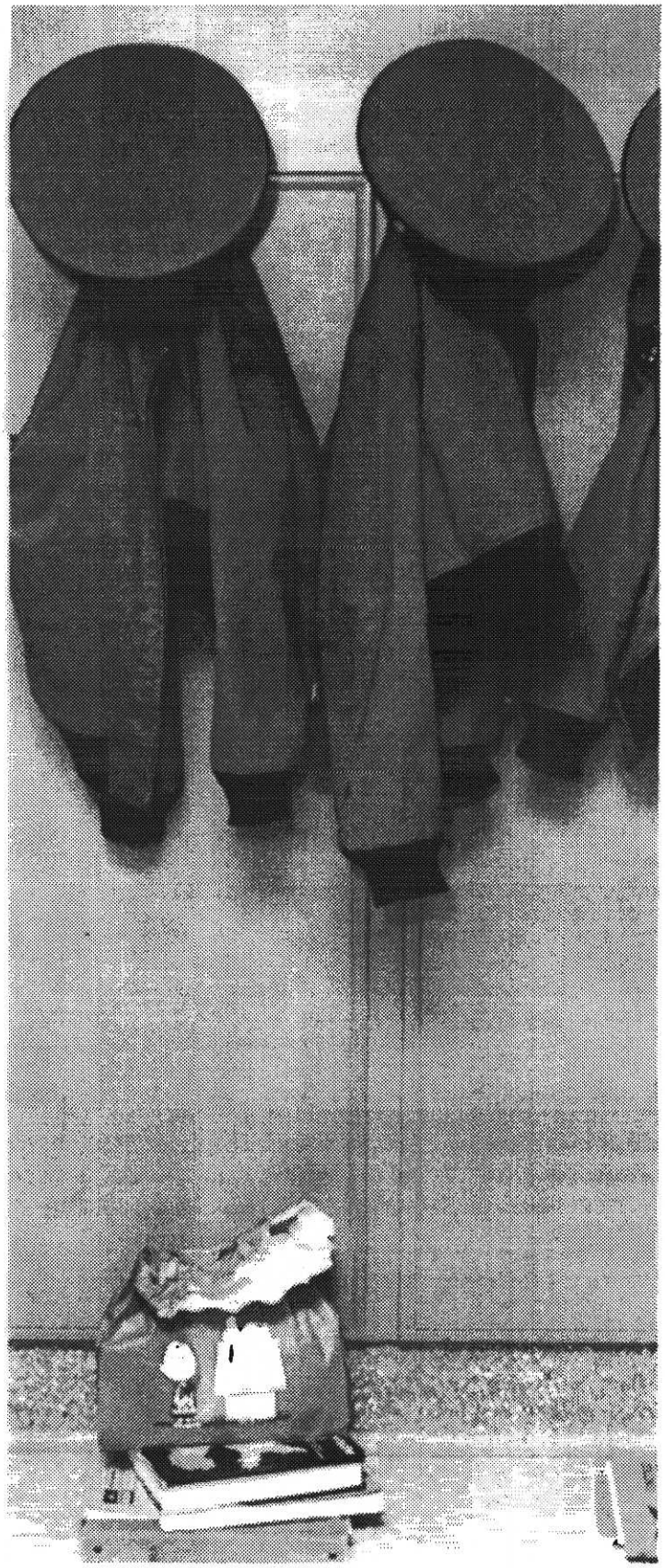

existence and uniqueness of solutions, linear theory, systems of differential equations, non-linear equations, numerical methods, Fourier and partial differential equations.

2.5 Credit Hours

2.5
K 18
45 hrs

MA 485 Complex Analysis

Either Term—Prerequisite: Completion of the Mathematics Core Curriculum

Development of the classical theory provides a basis for a study of applications including residue theory, contour integrals, conformal mapping and the solution of the Dirichlet and Neumann problems.

2.5 Credit Hours

45 hrs

MA 486 Numerical Analysis with Digital Computation

Second Term—Prerequisite: Completion of the Mathematics Core Curriculum

Investigation of the methods of approximating the solutions of mathematical problems using the digital computer. Analysis of the significance and control of error is studied. Applicatory problems are emphasized.

2.5 Credit Hours

45 hrs

MA 487 Real Variable Theory

Second Term—Prerequisite: Completion of the Mathematics Core Curriculum and Complex Analysis. Permission of Head of Department.

A rigorous approach to the foundations of analysis. Concepts of topology provide a basis for a formal discussion of differentiability, integrability, uniform convergence, bounded variation, monotone functions and Stieltjes integration.

2.5 Credit Hours

45 hrs

MA 489 Advanced Individual Study in Mathematics

Either Term—Prerequisite: Permission of Head of Department

An intensive tutorial course offered to a limited number of highly qualified cadets who have completed available mathematics elective courses. Course work is tailored to meet individual desires.

2.5 Credit Hours

45 hrs.

1975 W. Point

Core

42 courses

Hours = 18 x credits
(18 week sem)

125 cr = 2250 hrs

Elect

6 courses minimum
x2.5 credits (meth courses)
= 15 cr.
= 15 x 18 = 270 hrs.

Total Hrs

2250
270
334 Phy Ed
126 Mil
2980 hrs.

Phys Ed.

Every cadet does intercollog or intramural

Phys Ed is additional 7 credits. Using 1965 ratio, we estimate 334 hrs, Intercollor Intramural is ignored.

Mil Sci

Mil Sci	Tot	1 cr hr
	102	1
	202	1.5
	301	1
	401	1.5

7 cr = ~~1 hrs~~
= 126 hrs

1975 Math W. Point

Core curriculum

12 cr 1st yr
7 cr 2nd
19 cr

19 x 18 = 342 hrs.

Electives
(6 courses
@ 2.5 cr
= 15 cr
= 270

270 hrs

Total (max) math = 342 + 270
= 612