THE CURRICULA

FOURTH CLASS (FRESHMAN) YEAR

Because the Institute has a carefully structured program leading to graduation in each of its various curricula, it is advisable to choose at the outset the curriculum in which one plans to graduate. However, there are enough elements common to all curricula in the Fourth Class not only to give cadets a sense of common academic purpose but also to make transfers possible during the first year and even the second. Basically, the curricula divide between science and engineering (Applied Mathematics, Biology, B.S. Psychology, Chemistry, Computer Science, Physics, Physics with Nuclear Energy Concentration, Civil Engineering, Electrical and Computer Engineering, Mechanical Engineering) and the liberal arts (Economics and Business, English, History, International Studies and Political Science, Modern Languages and Cultures, B.A. Psychology, B.A. Physics).

NOTE

The course offerings and requirements of the Virginia Military Institute are under examination and revision continually. This catalogue merely presents the offerings and requirements in effect at the time of publication and in no way guarantees that the offerings and requirements will not change.

APPLIED MATHEMATICS CURRICULUM

The cadet who majors in applied mathematics obtains a sound basic education required for a career in the fields of Operations Research, statistics, or computational mathematics. Our approach emphasizes an interdisciplinary approach, extensive use of technology, and modeling of real world problems. A variety of positions in the military, government, industry, and business are available to a graduate with a B.S. in Applied Mathematics.

Cadets majoring in applied mathematics are also well-prepared to continue their education at the graduate level in Operations Research, statistics, or mathematics.

Opportunities exist for cadets to participate in summer undergraduate research programs at VMI and/or internships with governmental analytical agencies or in the private sector. Recently cadets have taken internships at Los Alamos National Laboratory, TRADOC Research and Analysis Center, and SAIC.

Mathematics staff members serve as curricular advisers to aid majors in planning their degree programs. Normally, the same adviser approves a major's program each semester and advises the cadet throughout the entire cadetship.

MATHEMATICS MINOR

A minor in mathematics is offered to cadets who desire to complement their major area of study with mathematics. The following courses are required for the minor:

- MA 103 or CS 221
- MA 108 or MA 220
- MA 123, MA 124, MA 215
- Nine additional semester hours chosen from MA courses numbered 300 and above. Three of these hours may be satisfied by, CS340,HNS377W or MA330WX.

At least a 2.0 GPA must be maintained for courses within the minor field.

To become a candidate for the minor, the cadet must obtain the approval of both the Head of the Department of Mathematics and Computer Science and the head of the department in the major field.

REQUIREMENTS FOR B.S. DEGREE IN APPLIED MATHEMATICS

The B.S. in Applied Mathematics requires 136 semester hours which includes a minimum of 59 hours of mathematics. The following gives minimum requirements for the degree. Additional courses to complete the requirements must be chosen by the cadet with the approval of his/her departmental adviser.

AREA	REQUIREMENTS
MATHEMATICS	MA 103, MA 110, MA 123, MA 124, MA 133, MA 134, MA 215, MA 301, MA 305, MA 310, MA 311, MA 319, MA 326, MA 405, MA 432, MA 490W, and 15 semester hours chosen from math courses numbered 300 or above and PH 301.
SCIENCE	16 semester hours from two different sciences. (Must complete a two course sequence in each field.) All courses must be laboratory courses.
ENGLISH	10 semester hours to include WR 101, WR 102 and SE 300.
NON-MATHEMATICS	12 semester hours to include HI 103, HI 104, and PS 344 and 3 additional hours from any discipline other than Mathematics.
MILITARY SCIENCE	12 semester hours.
PHYSICAL EDUCATION	4 semester hours.
CIVILIZATION & CULTURES	6 semester hours from the VMI list of approved "X" designated courses.

SYNOPSIS OF THE B.S. CURRICULUM IN APPLIED MATHEMATICS

FOURTH (FRESHMAN) CLASS

First Semester

Subject		Semester Hrs. Credit
	#Science	4
WR 101	English Composition I*	3
MA 103	Matrix Algebra	2
MA 123	Calculus I*	3
HI 103	World History I	3
PE 105/102	Wellness Concepts or Boxing	1/2
	AS, MS, or NS	1
TOTAL		**16 1/2**

Second Semester

Subject		Semester Hrs. Credit
	#Science	4
WR 102	English Composition II*	3
MA 124	Calculus II*	3
MA 133/134**	Math Modeling I and II**	2
HI 104	World History II	3
PE 105/102	Wellness Concepts or Boxing	1/2
	AS, MS, or NS	1
TOTAL		**16 1/2**

THIRD (SOPHOMORE) CLASS

First Semester

Subject		Semester Hrs. Credit
MA 110	Math Software	3
MA 215	Calculus III	4
MA 311	Diff Eqns	3
	Science	4
	SS Elective	3
PE 101/300	Swimming or Physical Cond.	1/2-1
	AS, MS, or NS	1
TOTAL		**18 1/2-19**

Second Semester

Subject		Semester Hrs. Credit
MA 301	Math for Sci & Engr.	3
MA 310	Matlab Programming	3
	Science	4
PS 344	Leadership in Organizations	3
PE 101/300	Swimming or Physical Cond.	1/2-1
	C&C/SS Elective	3
	AS, MS, or NS	1
TOTAL		**17 1/2-18**

SECOND (JUNIOR) CLASS

First Semester

Subject		Semester Hrs. Credit
MA 305	Linear Algebra	3
MA 326	Probability and Statistics	3
	C&C/SS Elective	3
	Free Electives	5
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**16 1/2**

Second Semester

Subject		Semester Hrs. Credit
MA 319	Operations Research I	3
MA 405	Statistics	3
	Mathematics Elective	3
	English (EN) OR Writing (WR) Elective	3
	Free Elective	3
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**17 1/2**

FIRST (SENIOR) CLASS

First Semester

Subject		Semester Hrs. Credit
MA 432	Numerical Analysis	3
MA 490W	Math Capstone	3
	Mathematics Electives	6
	Free Elective	3
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**17 1/2**

Second Semester

Subject		Semester Hrs. Credit
	Mathematics Electives	6
SE 300	Public Speaking	1
	Free Elective	6
	AS, MS, or NS	2
TOTAL		**15**

Total Hours: 136 (includes 55 hours of mathematics)

Cadet must choose a science sequence with Lab in biology, chemistry, or physics.
* Minimum Grade of C required
**Taught on a five-week schedule

BIOLOGY CURRICULA

The mission of the VMI biology department is to broadly train students to understand how living organisms function and to appreciate the intricacies and interactions that govern all living systems. This mission supports the broader VMI mission of creating citizen soldiers, by equipping students to make informed decisions that will better society. We accomplish this by providing students with broad training and a fundamental background in the biological sciences, while providing the opportunity to specialize in the sub-disciplines described under "Academic Concentrations in Biology." In addition, attainment of teacher certification is possible. The degree programs are particularly good at preparing majors to pursue post-graduate education in the biological and health sciences and allow for specialization that matches student interests and career plans. Faculty members believe that interaction with cadets in the classroom, laboratory, and on an individual basis is critical in the development of the successful biology major. In keeping with this philosophy, class sizes are small, laboratories accompany most courses, advising is conducted on an individual basis, and undergraduate research is encouraged. The biology department also provides a summer research experience. The Dr. Fred C. Swope Summer Scholars Program is an intensive, ten-week program that introduces selected students to the scientific method, research design and data analysis, data presentation, use of sophisticated laboratory instruments, and independent research. Each student conducts a research project under the guidance of a faculty mentor. This research is at the "cutting edge" of science, and student/faculty publications have resulted from these projects. Normally, cadets are selected to participate in this program between their second and first class years. Many additional opportunities for undergraduate research exist, allowing students to engage in a one-on-one interaction with a faculty mentor in their area of interest as early as the summer following the fourth class (freshman) year.

B.S. CURRICULUM

Common Core Course Requirements

All B.S. Biology majors are required to complete the following courses:

BI 101 General Biology I
BI 102 General Biology II
BI 103 Biological Diversity and Systematics I
BI 104 Biological Diversity and Systematics II
BI 205 Genetics
Capstone Experience (3 credits)

In addition to these courses, a B.S. major must select one course from each of the following core area pairings:

BI 312 Ecology, BI 410 Evolutionary Biology, BI 311 Aquatic Ecosystems, or BI 317 Herpetology
BI 304 Comparative Vertebrate Morphology, BI 217 Botany, BI 303 Developmental Biology, or BI 405 Histology
BI 335 Neurobiology, BI 204 Physiology, BI Plant Physiology, or BI 323 Exercise Physiology
BI 404 Cell Biology, BI 430 Molecular Biology, or BI 411 Immunology

Additional hours (11-13) must be selected from any area within the biology curriculum except for research hours to total 45 hours in biology. In addition to the biology courses, B.S. majors must complete two semesters of Organic Chemistry with lab (CH 223 and 225, CH 224 and 226), CH 322 Biochemistry, Quantitative Analysis I and II (MA 125 and 126), and General Physics I and II (PY 120 and PY 115, PY 121 and PY 116). To broaden the education, six credits of English (EN) or Writing (WR) above the 100 level are required. Additionally, 12 non-science elective credits must be completed in English, history, economics, business, psychology, philosophy, fine arts, political science, or modern languages. The remainder (9) of the 135 hours required for graduation can be taken from any department on post. Cadets completing the B.S. degree often complete minors in other disciplines. A minor in chemistry can be completed by taking one additional course from selected courses in the chemistry curriculum. The requirements for minors in psychology, English, or history, for example, fit in well to our elective requirements.

B.A. CURRICULUM

Common Core Course Requirements

The B.A. curriculum is designed for those majors who require greater flexibility in their degree requirements, including pursuit of minors in other departments. All B.A. Biology majors are required to complete the following courses:

BI 101 General Biology I
BI 102 General Biology II
BI 103 Biological Diversity and Systematics I
BI 104 Biological Diversity and Systematics II
BI 205 Genetics
Capstone Experience (3 credits)

In addition to these courses, a B.A. major must select one course from each of the following core area pairings:

BI 312 Ecology, BI 410 Evolutionary Biology, BI 311 Aquatic Ecosystems, or BI 317 Herpetology
BI 304 Comparative Vertebrate Morphology, BI 217 Botany, BI 303 Developmental Biology, or BI 405 Histology
BI 335 Neurobiology, BI 204 Physiology, BI Plant Physiology, or BI 323 Exercise Physiology
BI 404 Cell Biology, BI 430 Molecular Biology, or BI 411 Immunology

Additional hours (11-13) must be selected from any area within the biology curriculum except for research hours to total 45 hours in biology. In addition to the biology courses, B.A. majors must complete Quantitative Analysis I and II (MA 125 and 126) and show proficiency in a foreign language through the 200 level. Cadets in the B.A. major must complete either two semesters of organic chemistry with lab (CH 223 and 225, CH 224 and 226) or General Physics I and II (PY 120 and PY 115, PY 121 and PY 116). To broaden the education, six credits of English above the 100 level are required. Additionally, 12 non-science elective credits must be completed in either English (EN) or Writing (WR), history, economics, business, psychology, philosophy, fine arts, political science, or modern languages. The remainder (9) of the 135 hours required for graduation can be taken from any department on post. Cadets completing the B.A. degree often

complete double majors or minors in other disciplines. A minor in chemistry can be completed by taking one additional course from selected courses in the chemistry curriculum. The requirements for minors in psychology, English, or history, for example, fit in well to our elective requirements.

ADDITIONAL CORE CURRICULUM REQUIREMENTS

All B.S. and B.A. Biology majors are also required to satisfy four additional Core Curriculum requirements:

1. Two writing intensive courses must be taken with one in the Biology major.
2. Two Civilizations and Cultures courses (6 credits).
3. PS 344 – Leadership in Organizations.
4. SE 100 – Public Speaking.

ACADEMIC CONCENTRATIONS IN BIOLOGY

These concentrations offer an opportunity for cadets to focus their interests in various fields of biology and to develop intellectual pursuits with their professors as mentors in undergraduate research. If cadets wish to pursue an area of specialty, they are strongly encouraged to select one of the concentrations listed below no later than fall pre-registration during their third class year. A student successfully completing a concentration will earn a BS or BA degree with recognition of the concentration on the final transcript.

Biochemistry and Molecular Biology (BMB) Concentration Curriculum Requirements and Health Sciences Focus

The Concentration in Biochemistry and Molecular Biology is a collaborative effort between the biology and chemistry departments and is designed for the biology, chemistry, or other science or engineering majors who wish to emphasize biochemical or molecular issues in their studies. It is also designed to offer students undergraduate research opportunities in these areas. This option does not change the credit hours needed for the BS/BA in biology or the BS/BA in chemistry degrees. The Concentration requires completion of Introductory Biology I (BI 101), Genetics (BI 205), Cell Biology (BI 404), Structural Biochemistry (CH 321), Molecular Biochemistry (CH 322), Biochemistry Laboratory (CH 323), either Molecular Biology (BI 430) or Physical Chemistry I (CH 301), and two semesters (4 credits minimum) of research experience in an approved area of biology or chemistry. The research experience may be obtained through thesis research, independent research, summer research, a combination of these experiences, or fulfilling the department's Capstone requirement. A 2.0 GPA must be maintained in BMB courses for the concentration. Permission to participate in the program must be obtained from the student's Department Head and the BMB Director. An application form for the BMB concentration can be obtained from the Biology Department secretary, or on line through the BMB website.

Suggested Course Selection for the BMB Concentration

BI 101 General Biology I (non- BI majors only, BI majors take both sequences)*
BI 204 Physiology
BI 205 Genetics)*
BI 215 Nutrition
BI 240 Biological Agents in Warfare and Terrorism
BI 245X Epidemics and Society
BI 303 Developmental Biology
BI 304 Comparative Vertebrate Morphology
BI 313 Microbiology
BI 322 Plant Physiology
BI 321 Invertebrate Zoology
BI 323 Exercise Physiology
BI 331WX Issues in Science and Medicine
BI 335 Neurobiology
BI 404 Cell Biology*
BI 405 Histology
BI 411 Immunology
BI 430 Molecular Biology*
CH 262 Public Health Issues
CH 321 Structural Biochemistry*
CH 322 Molecular Biochemistry*
CH 323 Biochemistry Laboratory*
*Concentration requirement

Ecology, Conservation, and Organismal Sciences (ECOS) Concentration Curriculum Requirements

The Concentration in Ecology, Conservation, and Organismal Sciences (ECOS) is intended for cadets who wish to explore field-based and organismal disciplines of biology, including plant and animal biology, conservation, and ecology. The program also is intended to promote hands-on experiences through undergraduate research, internships in related fields, or immersion in a designated intensive field-oriented class. The ECOS option does not affect the credit hours required for the B.S. or B.A. in Biology, however, 14 credit hours must be obtained from the following list of courses: BI 216 Animal Behavior, BI 217 General Botany, BI 304 Comparative Vertebrate Morphology, BI 311 Aquatic Ecosystems, BI 312 Ecology, BI 316 Mammalogy, BI 317 Herpetology, BI 322 Plant Physiology, BI 324 Ornithology, or BI 410 Evolutionary Biology. Of these 14 required credits, cadets must take at least one taxon specific course (BI 216, BI 217, BI 304, BI 316, BI 317, BI 322, or BI 324), and one concept-based course (BI 311, BI 312, or BI 410). Cadets must complete an additional 4 credit hours by fulfilling an Intensive Experience, which may include an approved ECOS research project or internship, or a course that has been designated as "field intensive". Approved research projects may include 2 semesters of independent research (BI 390/391 or BI 490/491), a Summer Undergraduate Research Initiative (SURI) project, or an equivalent project that has been arranged with approval of a faculty mentor and the ECOS Director. Fulfilling the department's capstone experience requirement may also satisfy this Intensive Experience need. Conducting a summer internship through an approved partner organization is a viable alternative to research, and in fact may be preferable for cadets with particular career goals. Fulfillment of the Intensive Experience also may be accomplished by completing a course that has been designated as "field intensive" by the ECOS

Director (BI 351/352 or equivalent). A 2.0 GPA must be maintained in ECOS courses for the concentration. Permission to participate in the program must be obtained from the student's department head and the ECOS Director. An application form for the ECOS concentration can be obtained from the Biology Department Secretary or on-line through the ECOS website.

Suggested Course Selection for the ECOS Concentration

Must select 14 credit hours from the following two lists of courses.

Taxon Specific Courses – of the 14 credits, at least one course must be from the following:
BI 216 Animal Behavior
BI 217 Botany
BI 304 Comparative Vertebrate Morphology
BI 316 Mammalogy
BI 317 Herpetology
BI 322 Plant Physiology
BI 324 Ornithology

Concept-Based Courses – of the 14 credits, at least one course must be from the following:
BI 311 Aquatic Ecosystems
BI 312 Ecology
BI 410 Evolutionary Biology

Academic Concentration in Teacher Certification

Requirements

This program is appropriate for those students who are interested in teaching careers in secondary education. The program requires completion of the common core and laboratory course requirements, as well as the additional B.S. or B.A. course requirements. In addition, those students wanting teacher certification will have to satisfy the requirements of the teacher certification program by contacting the Director of Teacher Certification. This program is offered through a consortium agreement with Mary Baldwin College and Washington and Lee University. The teacher program provides cadets with the courses they need to: 1) obtain licensure in the state of Virginia, 2) work toward licensure in another state, or 3) gain credentials for teaching in private secondary schools.

Application Procedure:

Cadets wishing to apply for the program must submit an application to the Director of Teacher Certification, Captain Chad Joyce, 312 Cocke Hall. Cadets who are seriously thinking about pursuing licensure are encouraged to apply as early as the second semester of their fourth class year. Cadets interested in licensure in a state other than Virginia or who wish to teach in private secondary schools must also complete an application to be eligible to enroll in VMI's education courses.

Candidacy Requirement:

Cadets who wish to be admitted to the teacher certification program must meet and maintain a cumulative 2.5 GPA. Those cadets who do not meet the cumulative 2.5 standard by the end of their fourth class year, may be admitted conditionally by the Director of Teacher Certification; they must, however, achieve a 2.5 cumulative GPA by the end of the first semester of their second class year in order to continue in the program. Those cadets pursuing licensure in Virginia must also meet the following:

1. Graduation from VMI in an appropriate major discipline.
2. Successful completion of all teacher-certification courses with a 3.0 GPA.
3. Completion of 12 semester hours of student teaching. This requires full-time teaching for one semester under the supervision of a master teacher in the public schools. Because of the demands of most VMI majors, this requirement may need to be completed after graduation from VMI through the adult degree program at Mary Baldwin College.
4. Successful completion of the State Licensure Examination.

Course Requirements

The following courses are required for licensure in Virginia. Those cadets who are pursuing licensure in another state or who wish to teach in private schools should consult with the Director of Teacher Certification to design a program that includes appropriate courses from the listing below.

ED 200 Foundations of Education 3
ED 210 Practicum in Education 3
ED 302 Understanding Exceptional Individuals.....3
ED 303 Teaching and Learning in the Content Areas 3
ED 401 Secondary Methods and Practicum 4
ED 402 Student Teaching and Seminar 15
PS 307 Developmental Psychology.....3

CAPSTONE EXPERIENCES IN UNDERGRADUATE RESEARCH REQUIREMENT (3 CREDITS)

Recognizing that many of our students already engage in a comprehensive research experience that requires them to apply, integrate, and critically analyze information and data, the biology department requires that this experience be recognized as their Capstone Experience. Successful completion of the Capstone Experience is a graduation requirement, therefore any of the following course sequences will satisfy that requirement: BI 353W-354W Summer Scholars Program, BI 390, 391, 392W, 393W, 490W, and 491W Independent Research Courses, BI 401W-402W Senior Honors Thesis, and HN 400-401 Institute Honors. Students must complete two semesters or a full summer of research (SURI) under the guidance of a faculty mentor culminating with a research paper and oral presentation of the data. Those biology students who do not avail themselves of the opportunity to engage in undergraduate research or do so for only one semester will be required to complete BI 420W, Senior Seminar, in order to fulfill the capstone course requirement. Those receiving more than 3 credits for this experience can apply them as research hours credit.

DR. FRED C. SWOPE SUMMER SCHOLARS PROGRAM

The Fred C. Swope Summer Undergraduate Research

Scholar's Program in Biology at the Virginia Military Institute was established in 1991 and in is named after one of VMI's most visionary Biology Department Chairmen, Dr. Fred C. Swope. This two-month program is designed to acquaint selected Biology undergraduate students with the philosophy, practices, and techniques of research. During the months of June through July the program engages the students in a research project with a faculty mentor. At the end of the summer students in the program organize a symposium that is presented to reflect the many facets of their undergraduate research training. Students in the program spend their mornings learning about the many skills and philosophies of the practice of science. Students also carry out research projects in the afternoons with a faculty mentor and acquire the ability to make scientific observations, collect and analyze data, and to synthesize this information in a meaningful context. Students are encouraged to continue their research interests into the following academic year and beyond in anticipation of completion of a Department or Institute Honors Thesis. Upon the completion of these undergraduate research experiences the student has acquired a meaningful and in depth knowledge of the research process and has a realistic idea of what is involved in pursuing post-graduate studies. The program is funded through a private endowment that provides funds for 5-6 student summer stipends plus room, board, six hours of academic credit, and spending money.

HONORS IN BIOLOGY

A cadet can earn departmental honors by completing a research project by their 1st class year and presenting the research to the department. Eligibility to apply for departmental honors requires 1st class standing, a minimum cumulative and biology GPA of 3.000. An application in the form of a research proposal is submitted to the department at the end of the 2nd class year or at the beginning of the 1st class year. If the department approves the proposal, then the cadet will enroll in BI 490 (independent research in the fall) and then BI 491 (independent research in the spring). By the middle of April, a formal research paper will be submitted to the department at least two weeks prior to the oral presentation (defense). The awarding of Honors in Biology will be made following successful completion of the research project and oral defense.

SYNOPSIS OF THE B.S. CURRICULUM IN BIOLOGY

FOURTH (FRESHMAN) CLASS

First Semester

	Subject	Semester Hrs. Credit
BI 101	General Biology I	4
WR 101	English Composition I*	3
HI 103	World History	3
BI 103	Biological Diversity and Systematics I	2
MA 125	Quantitative Analysis I*	3
PE 105/102	Wellness Concepts or Boxing	1/2
	AS, MS, or NS	1
TOTAL		**16 1/2**

Second Semester

	Subject	Semester Hrs. Credit
BI 102	General Biology II	4
WR 102	English Composition II*	3
HI 104	World History	3
BI 104	Biological Diversity and Systematics II	2
MA 126	Quantitative Analysis II	3
PE 105/102	Wellness Concepts or Boxing	1/2
	AS, MS, or NS	1
TOTAL		**16 1/2**

THIRD (SOPHOMORE) CLASS

First Semester

	Subject	Semester Hrs. Credit
BI 205	Genetics or Core Area Elective	4
BI	Core Area Elective	3 or 4
CH 117	Lab for CH 137	1
CH 137	Intro. College Chemistry I	3
	English (EN) or Writing (WR) Elective	3
	LA Elective	3
PE 101/300	Swimming or Prin. of Physical Cond	1/2 -1
	AS, MS, or NS	1
TOTAL		**18 1/2 - 20**

Second Semester

	Subject	Semester Hrs. Credit
BI	Core Area Elective	3 or 4
CH 118	Lab for CH 138.	1
CH 138	Intro. College Chemistry II	3
	Elective	3
	English (EN) or Writing (WR) Elective	3
SE 300	Public Speaking	1
PE 101/300	Swimming or Prin. Of Physical Cond	1/2 -1
	AS, MS, or NS	1/2 NS
TOTAL		**15 1/2-18**

SECOND (JUNIOR) CLASS

First Semester

	Subject	Semester Hrs. Credit
BI	Genetics or Core Area Elective	3 or 4
CH 223	Organic Chemistry I*	3
CH 225	Organic Lab I	1 1/2
PY 120	General Physics I	3
PY 115	General Physics I Lab	1
PS 344	Leadership in Organizations	3
PE	Elective	1/2
	AS, MS, or NS	2/1NS
TOTAL		**16-18**

Second Semester

	Subject	Semester Hrs. Credit
BI	Elective	4
CH 224	Organic Chemistry II	3
CH 230	Organic Lab II	1 1/2
PY 121	General Physics II	3
PY 116	General Physics II Lab	1
	LA Elective	3
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**18**

FIRST (SENIOR) CLASS

First Semester

	Subject	Semester Hrs. Credit
BI	Core Area Elective	3 or 4
	BI Elective	3
	LA Elective	6
	Electives	3
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**17 1/2 -18 1/2**

Second Semester

	Subject	Semester Hrs. Credit
BI 420W	Biology Seminar	3
	BI Elective	3
	Elective	3
CH 322	Biochemistry	3
	AS, MS, or NS	2
TOTAL		**14**

BI (B.S.) (136-138 Hrs. Reg.- 45 BI hours)

*Minimum Grade of C Required.

SYNOPSIS OF THE B.A. CURRICULUM IN BIOLOGY

FOURTH (FRESHMAN) CLASS

First Semester

	Subject	Semester Hrs. Credit
BI 101	General Biology I	4
BI 103	Biological Diversity and Systematics I	2
MA 125	Quantitative Analysis I*	3
WR 101	English Composition I *	3
HI 103	World History	3
PE 105/102	Wellness Concepts or Boxing	1/2
	AS, MS, or NS	1
TOTAL		**16 1/2**

Second Semester

	Subject	Semester Hrs. Credit
BI 102	General Biology II	4
BI 104	Biological Diversity and Systematics II	2
MA 126	Quantitative Analysis II	3
WR 102	English Composition II *	3
HI 104	World History	3
PE 105/102	Wellness Concepts or Boxing	1/2
	AS, MS, or NS	1
TOTAL		**16 1/2**

THIRD (SOPHOMORE) CLASS

First Semester

	Subject	Semester Hrs. Credit
BI 205	Genetics or Core Area Elective	3 or 4
	English (EN) or Writing (WR) Elective	3
	Elective	3
	Language	3
CH 137	Intro. College Chemistry I	3
CH 117	Lab for CH 137	1
PE 101/300	Swimming or Prin. of Physical Cond.	1/2 -1
	AS, MS, or NS	1
TOTAL		**17 1/2-19**

Second Semester

	Subject	Semester Hrs. Credit
BI	Core Area Elective	3 or 4
	English (EN) or Writing (WR) Elective.	3
	Language	3
CH 138	Intro. College Chemistry II	3
CH 118	Lab for CH 138	1
SE 300	Public Speaking	1
PE 101/300	Swimming or Prin. of Physical Cond.	1/2 -1
	AS, MS, or NS	1/2 NS
TOTAL		**15 1/2 - 18**

SECOND (JUNIOR) CLASS

First Semester

	Subject	Semester Hrs. Credit
BI	Genetics or Core Area Elective	3 or 4
CH 223	Organic Chemistry I *AND	3
CH 225	Organic Lab, OR	1 1/2
PY 120	General Physics I	3
PY 115	General Physics I Lab	1
PS 344	Leadership in Organizations	3
	Language	3
PE	Elective	1/2
	AS, MS, or NS	2/1 NS
TOTAL		**14 1/2-17**

Second Semester

	Subject	Semester Hrs. Credit
	BI Elective	4
CH 224	Organic Chemistry II* AND	3
CH 236	Organic Lab II, OR	1 1/2
PY 121	General Physics II	3
PY 116	General Physics II Lab	1
	LA Elective	3
	Language	3
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**16 1/2 -17**

FIRST (SENIOR) CLASS

First Semester

	Subject	Semester Hrs. Credit
	BI Elective	6
BI	Core Area Elective	3 or 4
	LA Elective	6
	PE Elective	1/2
	AS, MS, or NS	2
TOTAL		**17 1/2-18 1/2**

Second Semester

Subject	Semester Hrs. Credit	
BI	Core Area Elective	3 or 4
BI 420	Biology Seminar	3
	Elective	6
	LA Elective	4
	AS, MS, or NS	2
TOTAL		**18-19**

BI (B.A.) (136-138.5 Hours Reg. - 45 BI Hours)

#Cadets who complete Organic Chemistry I & II and labs (9 credits) may reduce the science elective requirement by one hour.
*Minimum Grade of C Required.
Proficiency through 200 level language is required.

CHEMISTRY CURRICULA

The mission of the chemistry department is to provide cadets who major in chemistry with a thorough foundation in chemistry, mastery of modern chemical instrumentation, excellent analytical and mathematical skills and the ability to think things through and solve problems. These skills are highly sought after in every career field. The department offers two degree tracks; the B.S. degree and the B.A. degree in chemistry. The B.S. degree provides the most comprehensive preparation for further work or study in chemistry or a related field such as:

- Chemical Engineering
- Material Science
- Environmental Science
- Pharmacology

The Chemistry Department's B.S. degree is approved by the American Chemical Society and cadets fulfilling the requirements for a B.S. are certified as having met the standards of professional training by the society.

The B.A. degree provides cadets with an opportunity to pursue other interests in preparation for a career of their choosing while providing a solid foundation in the basic areas of chemistry. This degree requires cadets to choose another focus area outside of chemistry and complete either a minor, concentration or certification. Faculty members will work closely with B.A. majors to design a program that best meets the cadets' career goals. Career choices could correspond to the following focus areas:

- Medical, Dental Schools-Concentration in Biochemistry and Molecular Biology
- Military or Intelligence Agencies-International Studies Minor, National Security Minor, Arabic Minor
- Law Enforcement or Forensics-Concentration in Biochemistry and Molecular Biology
- Business/MBA-Business or Economics Minor
- Math/Science Teacher-Teacher Certification Program

Faculty members believe that close interaction with cadets in the classroom and in the chemical laboratory is critical in the development of good chemistry majors. This personal mentoring occurs in many ways but especially in our small classes and during undergraduate research projects. All majors are encouraged to participate in an undergraduate research experience under the guidance of a faculty member either in a 10 week summer program, or during the academic year. The majority of chemistry majors participate in at least one undergraduate research experience. Most of these cadets will present their research at a local or regional professional meeting, and a smaller number will have their results published. Chemistry majors also have the opportunity to work as an industrial intern with a company during the summer. Majors who have demonstrated excellence in the study of chemistry are invited to participate in the departmental honors program during their first class year. Cadets who accept the invitation will be engaged in more extensive research under the close supervision of a faculty sponsor.

The laboratory facilities, instrumentation, library and computer services housed in the Science Building provide majors with the modern techniques needed to learn and practice the science of chemistry both in structured courses and labs and also in independent research. Instrumentation includes liquid and gas chromatographs; several infrared, visible, ultraviolet, and fluorescence spectrometers; nuclear magnetic resonance spectrometers, gas chromatography-mass spectrometer, along with an atomic absorption, d.c. plasma, and flame emission spectrometers. The department also maintains a computer facility for molecular modeling and chemistry tutorials.

All chemistry majors are encouraged to join the active Student Affiliate Chapter of the American Chemical Society. The chapter sponsors visiting speakers, trips to industrial and government laboratories and several social events during the year.

CHEMISTRY PROGRAMS

1. **B.S. Curriculum** — synopsis indicates requirements for this degree.

2. **B.A. Curriculum** — synopsis indicates core requirements for this degree. Demonstrated proficiency of two years of a foreign language is required. Chemistry B.A. majors are also required to complete either (1) a minor in another department, (2) a Concentration in Biochemistry and Molecular Biology or(3) Teacher Certification. Among the more popular focus areas are the Concentration in Biochemistry and Molecular Biology and the Minor in Business.

3. **A Minor in Chemistry** — The Department of Chemistry offers a minor in chemistry to those cadets wishing to expand their scientific knowledge beyond their declared major. Requirements for the minor consist of eight semester hours of core General Chemistry, three hours of Organic Chemistry I (CH 223) with the lab being optional and twelve additional hours of chemistry courses as described in a brochure on the subject which can be obtained from the Chemistry Department. Before formally registering for the program, a cadet should obtain the approval of the department in the major curriculum as well as the head of the Chemistry Department. Successful completion of the requirements of this minor will be noted on the cadet's transcript. For declaration of a CH minor see the Chemistry Department Head.

4. **Concentration in Biochemistry and Molecular Biology** — The Chemistry Department in collaboration with the Biology Department offers its majors the option of obtaining a concentration in the interdisciplinary area of biochemistry and molecular biology. This concentration is particularly well-suited for those chemistry majors wishing to pursue careers in medicine, pharmaceuticals, biomedical research or biochemistry. Pursuit of this concentration does not change the graduation requirements for chemistry majors. Through the choice of appropriate electives and advanced courses, both B.S. and B.A. chemistry majors can obtain this concentration without increasing the number of credit hours required to graduate. To obtain the Concentration in Biochemistry and Molecular Biology, chemistry majors must take the following: BI-101 (Introductory Biology I), BI-205 (Genetics), and BI-302 (Cell Biology). In addition, they must choose CH-322 (Metabolic Biochemistry) and CH-323 (Biochemistry Laboratory) as part of their advanced chemistry electives, and 4 credits of research experience in chemistry or biology. The research experience can be obtained through thesis research, independent research, summer research or a combination thereof.

SYNOPSIS OF THE B.A. CURRICULUM IN CHEMISTRY

FOURTH (FRESHMAN) CLASS

First Semester

	Subject	Semester Hrs. Credit
CH 125	Lab for CH 137	2
CH 137	Intro. College Chemistry I	3
MA 123	Calculus I*	3
HI 103	World History	3
WR 101	English Composition I*	3
PE 105/102	Wellness Concepts or Boxing	1/2
	AS, MS, or NS	1
TOTAL		**15 1/2**

Second Semester

	Subject	Semester Hrs. Credit
CH 126	Lab for CH 138	2
CH 138	Introductory Chemistry II	3
MA 124	Calculus II	3
HI 104	World History	3
WR 102	English Composition II*	3
PE 105/102	Wellness Concepts or Boxing	1/2
	AS, MS, or NS	1
TOTAL		**15 1/2**

SECOND (JUNIOR) CLASS

First Semester

	Subject	Semester Hrs. Credit
CH 301	Physical Chemistry I	3
CH 311W	Lab for CH 301	3
CH 321	Biochemistry	3
	Foreign language [1]	3
	Concentration Elective [3]	3
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**17 1/2**

Second Semester

	Subject	Semester Hrs. Credit
	Adv CH course (300 or above)	3
	Foreign Language [1]	3
	Concentration Elective [3]	3
CH 246	Inorganic Chemistry	3
	Cult. And Civil Elective [1]	3
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**17 1/2**

THIRD (SOPHOMORE) CLASS

First Semester

	Subject	Semester Hrs. Credit
CH 223	Organic Chemistry I*	3
CH 225	Organic Lab I	3
	Foreign Language [1]	3
	Science Elective [2]	4
	Concentration Elective [3]	3
PE 101/300	Swimming or Physical Cond.	1/2-1
	AS, MS, or NS	1
TOTAL		**17 1/2-18**

Second Semester

	Subject	Semester Hrs. Credit
CH 224	Organic Chemistry II	3
CH 226	Organic Lab II	3
PS 344	Leadership in Organizations [1]	3
	Foreign Language [1]	3
	Science Elective [2]	4
PE 101/300	Swimming or Physical Cond.	1/2-1
	AS, MS, or NS	1
TOTAL		**17 1/2-18**

FIRST (SENIOR) CLASS

First Semester

	Subject	Semester Hrs. Credit
CH 335	Analytical Chemistry I	3
CH 337	Lab for Analytical Chem. I	3
	Cult. And Civil Elective [1]	3
	Concentration Elective [3]	3
CH 401	CH Capstone	3
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**17 1/2**

Second Semester

	Subject	Semester Hrs. Credit
	Concentration Elective [3]	3
SE 300	Public Speaking	1
	Electives	10
	AS, MS, or NS	2
TOTAL		**16**

Total Hours: 135 (includes at least 46 chemistry hours)

* Minimum Grade of C Required

[1] Twelve semester hours of electives must be in the Humanistic-Social area. In addition to demonstrating proficiency in a foreign language, cadets must complete 6 credit hours of cultures and civilization courses (study abroad may be substituted for 3 hours) and 3 credit hours of Leadership in Organizations.

[2] A two-semester sequence of core-curriculum approved science and laboratory. The specific course may be determined by the chosen concentration area.

[3] Concentration Electives are determined by the chosen minor/concentration/or certification. The chosen field may require use of free electives to complete.

SYNOPSIS OF THE B.S. CURRICULUM IN CHEMISTRY

FOURTH (FRESHMAN) CLASS

First Semester

	Subject	Semester Hrs. Credit
CH 125	Lab for CH 137	2
CH 137	Intro Chemistry I	3
MA 123	Calculus I*	3
HI 103	World History	3
WR 101	English Composition I*	3
PE 105/102	Wellness Concepts or Boxing	1/2
	AS, MS, or NS	1
TOTAL		**15 1/2**

Second Semester

	Subject	Semester Hrs. Credit
CH 126	Lab for CH 138	2
CH 138	Intro Chemistry II	3
MA 124	Calculus II*	3
HI 104	World History	3
WR 102	English Composition II*	3
PE 105/102	Wellness Concepts or Boxing	1/2
	AS, MS, or NS	1
TOTAL		**15 1/2**

THIRD (SOPHOMORE) CLASS

First Semester

	Subject	Semester Hrs. Credit
CH 223	Organic Chemistry I*	3
CH 225	Organic Lab I	3
MA 215	Calculus III	4
PY 160	General Physics I (with PY 155)	4
SE 300	Public Speaking	1
PE 101/300	Swimming or Physical Cond.	1/2-1
	AS, MS, or NS	1
TOTAL		**16 1/2-17**

Second Semester

	Subject	Semester Hrs. Credit
CH 224	Organic Chemistry II	3
CH 226	Organic Lab II.	3
CH 246	Inorganic Chemistry	3
PY 161	General Physics II (with PY 156)	4
PS 344	Leadership in Organizations	3
PE 101/300	Swimming or Physical Cond.	1/2-1
	AS, MS, or NS	1
TOTAL		**17 1/2-18**

SECOND (JUNIOR) CLASS

First Semester

	Subject	Semester Hrs. Credit
CH 301	Physical Chemistry I	3
CH 311W	Lab for CH 301	3
CH 335	Analytical Chemistry I	3
CH 337	Lab for Analytical Ch I	3
CH 321	Structural Biochemistry	3
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**17 1/2**

Second Semester

	Subject	Semester Hrs. Credit
CH 302	Physical Chemistry II	3
CH 336	Instrumental Analysis	3
CH 338	Lab for Instrumental Analysis	3
	Adv CH Laboratory [2]	1 1/2-3
	Cultures and Civil Elective [1]	3
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**16-17 1/2**

FIRST (SENIOR) CLASS

First Semester

	Subject	Semester Hrs. Credit
CH 451	Senior Thesis	3
	Cultures and Civilizations	3
CH 401	CH Capstone	3
	Electives [1]	6
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**17 1/2**

Second Semester

	Subject	Semester Hrs. Credit
	Adv. CH Course [3]	3
CH 452	Senior Thesis	3
	Electives [1]	9-10 1/2
	AS, MS, or NS	2
TOTAL		**17-18 1/2**

Total Hours: 135.5 (includes at least 64 chemistry hours depending on options selected)

* Minimum Grade of C Required

[1] Twelve semester hours of electives must be in the Humanistic-Social area. Of the twelve, cadets must complete 6 credit hours of cultures and civilization courses (study abroad may be substituted for 3 hours) and 3 credit hours of Leadership in Organizations.

[2] A two-semester sequence of core-curriculum approved science and laboratory. The specific course may be determined by the chosen concentration area.

[3] Students must complete three semester hours of advanced chemistry courses from CH322, CH425, CH 426, CH444, CH467, CH462-4.

[4] Concentration Electives are determined by the chosen minor/concentration/certification. The chosen field may require additional free electives to complete.

CIVIL ENGINEERING CURRICULUM

Civil Engineering (CE) is the oldest of the engineering professions and the broadest in scope. It is the parent of all other branches of engineering. The CE curriculum at VMI includes a traditional array of courses that permit our graduates to pursue any of the specialty areas in Civil Engineering.

CIVIL ENGINEERING SUB-DISCIPLINES

Because of Civil Engineering's broad scope, cadets can choose to concentrate their studies in one of several of the sub-disciplines of Civil Engineering or they may select courses across all topic areas for a more general focus. The following seven Civil Engineering sub-disciplines are available to cadets at VMI:

Construction Management is the application of engineering to time, material, labor, cost, and quality management of construction projects including the complex coordination of construction events, conformance with design specifications, and design and contract modifications to meet project-specific field conditions. Examples are highways and sports stadiums.

Environmental Engineering encompasses a wide spectrum of activities to help protect human health and promote environmental quality. Issues addressed include air quality and air pollution, municipal and industrial solid waste, hazardous waste, risk assessment, soil and groundwater contamination, water and wastewater treatment, water quality monitoring and protection, and others. Examples are clean rivers and clear air.

Fluid Mechanics & Hydraulic Engineering address the properties and analysis of fluids for applications in static and dynamic systems such as pressure on immersed objects, hydraulic machinery such as pumps and turbines and conveyance of water and other fluids. Examples are submarines and hydroelectric power plants.

Geotechnical Engineering involves soil and its properties relevant to groundwater flow, bearing capacity for foundations, settlement and compaction, slope stability, tunneling and mining, and a variety of other issues associated with activities on or below the ground surface. An example is the "Leaning Tower of Pisa."

Hydrology & Water Resources Engineering focuses on surface and groundwater quantity and supply, stormwater runoff and control, canals and river channels, reservoirs, flood control, irrigation supply, water policy, and many other related activities. Examples are Hoover Dam and the Colorado River.

Structural Engineering is the understanding of material properties and static and dynamic forces that affect structures built on a framework of concrete, steel, wood, and other materials. Structural engineering is the basis for anything that is built. Examples are skyscrapers and the Golden Gate Bridge.

Transportation & Planning Engineering applies to the efficient movement of people and goods by planning, designing, building, and maintaining facilities such as highway, rail, airport, and mass transit systems. These systems are the infrastructure backbone of much of the developed world's economy. Examples are the U.S. interstate highway system and your local mass transit system.

Suggested course selections for each of the seven Civil Engineering concentrations available to cadets are outlined on page 46. Regardless of the specific concentration or course mix selected, graduates of the Civil and Environmental Engineering Department (CEE) receive a Bachelor of Science degree in Civil Engineering.

CE CURRICULUM

The CE curriculum, which is approved by the Accreditation Board for Engineering and Technology (ABET), provides a broad background of courses in science, engineering, and the humanities. Graduates are prepared to enter engineering or business directly or to continue their education in graduate school.

Opportunities are available for independent study during both the academic year and the summer. The department conducts a program of undergraduate research based upon the interests and qualifications of individual cadets supported by the advice and guidance of the experienced faculty. All of our full time faculty have Ph.D. degrees and are registered professional engineers.

Laboratory experience is vital to the education of an engineer and the departmental laboratories are equipped with a wide array of both instructional and commercial testing devices. Each cadet participates in laboratory work that demonstrates principles, develops skills, and provides experience with current methods in testing and measurement.

The CE curriculum includes 139 credit hours of which approximately one-half are for CE courses. The non-CE courses include 13 credit hours of mathematics, 12 credit hours of chemistry and physics, and 12 credit hours of required English and history. Other credit hours are required for ROTC and physical education, and 6 credit hours are required for approved civilizations and cultures electives. A current list of these is available from the Civil and Environmental Engineering office.

The CEE program's educational objectives are to produce graduates who are:

1. able to analyze and design CE components and systems;
2. committed to life-long learning;
3. able to communicate effectively both in written and oral forms;
4. able to work well in team situations and contribute to the success of an organization; and
5. committed to moral and ethical practices.

The CEE program's student outcomes are taken directly from the 11 ABET program outcomes (a) through (k). By fulfilling the curriculum requirements for a B.S. degree in Civil Engineering, the department's graduates will attain the following:

1. an ability to apply knowledge of mathematics, science, and engineering;
2. an ability to design and conduct experiments, as well as to analyze and interpret data;
3. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
4. an ability to function on multi-disciplinary teams;
5. an ability to identify, formulate, and solve engineering problems;
6. an understanding of professional and ethical responsibility
7. an ability to communicate effectively;

8. a broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context:
9. a recognition of the need for, and an ability to engage in, life-long learning;
10. a knowledge of contemporary issues;
11. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

MINIMUM COMPETENCY

All VMI academic departments require a minimum 2.0 GPA in the major as a requirement for graduation. To demonstrate minimum competency in CE, the CEE Department applies the following criteria to compute the 2.0 GPA in the major: 1) any CEE course can be repeated a single time and the repeat grade will be used in the GPA calculation; 2) a maximum of two "D" grades in CEE can be applied toward graduation and included in the GPA calculation.

TRANSFER CREDITS

The CEE Department may, on a case by case basis, accept transfer credits for civil engineering courses completed at other institutions.

FE EXAM

All CEE cadets are required to take the Fundamentals of Engineering (FE) exam. Cadets are required to take a FE review course during the eighth semester if they fail the October exam. Passing the FE exam is important to future career advancement in CE, as the exam represents the first step in registration as a professional engineer. The CEE Department uses the FE exam as a significant component of its outcomes assessment process, and to support ABET accreditation. Fundamentals of Engineering exam preparation and professional registration are emphasized in nearly every CEE course beginning in the first semester and continuing to graduation.

PROFESSIONAL ACTIVITIES

The VMI Student Chapter of the American Society of Civil Engineers (ASCE) serves as the focal point of professional activities for our cadets. Eligible CEE cadets are inducted into the national engineering honor society, Tau Beta Pi, which recognizes cadets for academic excellence and leadership characteristics.

HIGH SCHOOL PREPARATION

Applicants considering CE as a choice of major may best prepare in high school by taking the full college preparatory program augmented by as many mathematics and science courses as their schedules permit. Courses in pre-calculus and calculus are particularly important.

SUGGESTED COURSE SELECTION FOR CIVIL ENGINEERING SUBDISCIPLINE CONCENTRATIONS

Construction Management
CE302 Dynamics (ESEI)
CE350 Project Management (required)
CE403 Foundations (DE)
CE436 Transportation Planning & Design (DE)
CE437 Construction Methods & Management (TE)
GE306 Engineering Geology (NSE)
1 open Engineering Science Elective II
3 open Technical Electives or Independent Research

Environmental Engineering
BI101 Biology (NSE)
CE321 Environmental Engineering (required)
CE406 Contaminant Hydrogeology (ESE II)
CE408 Hydraulic Engineering (DE)
CE412 Env. Engrg. Chemistry (ESE I)
CE415 Env. Engrg. Unit Process Design (DE)
4 open Technical Electives or Independent Research

Fluid Mechanics & Hydraulic Engineering
CE302 Dynamics (ESE I)
CE309 Fluid Mechanics (required)
CE401 Hydrology (TE)
CE404 Advanced Fluid Mechanics (ESE II)
CE408 Hydraulic Engineering (DE)
1 open Natural Science Elective
1 open Design Elective
3 open Technical Electives or Independent Research

Geotechnical Engineering
CE302 Dynamics (ESE I)
CE310 Soil Mechanics (required)
CE403 Foundations (DE)
CE406 Contaminant Hydrogeology (ESE II)
CE428 Topics in Structural Design (DE)
GE306 Engineering Geology (NSE)
4 open Technical Electives or Independent Research

Hydrology & Water Resources Engineering
BI101 Biology (NSE)
CE322 Water Resources Engineering (required)
CE401 Hydrology (TE)
CE406 Contaminant Hydrogeology (ESE II)
CE408 Hydraulic Engineering (DE)
CE412 Env. Engrg. Chemistry (ESE I)
CE415 Env. Engrg. Unit Process Design (DE)
3 open Technical Electives or Independent Research

Structural Engineering
CE302 Dynamics (ESE I)
CE327 Concrete Design (required)
CE402 Structural Mechanics (ESE II)
CE423 Structural Steel Design (DE)
CE428 Topics in Structural Design (DE)
CE429 Advanced Structural Theory (TE)
GE306 Engineering Geology (NSE)
3 open Technical Electives or Independent Research

Transportation & Planning Engineering
CE302 Dynamics (ESE I)
CE333 Transportation Engineering (required)
CE401 Hydrology (ESE II)
CE436 Transportation Planning & Design (DE)
CE437 Construction Methods & Management (TE)
GE306 Engineering Geology (NSE)
1 Design Elective
3 open Technical Electives or Independent Research

DE = Design Elective
TE = Technical Elective
ESE = Engineering Science Elective (I, II)
NSE = Natural Science Elective

The technical electives selected from within the Civil and Environmental Engineering Department must meet the following distribution requirements:

- 6 credits of Design Elective from CE403, CE408, CE415, CE423, CE428, CE436
- 4 credits of Natural Science Elective from GE306, BI 101 or CH 138/118
- 3 credits of Engineering Science Elective I from CE302, CE412, ME311, EE351
- 3 credits of Engineering Science Elective II from CE401, CE402, CE404, CE406, CE429, other EE and ME 300 or 400 level courses
- 12 credits of other technical electives from above or CE437, CE443, CE455-460, CE461

SYNOPSIS OF THE B.S. CURRICULUM IN CIVIL ENGINEERING

FOURTH (FRESHMAN) CLASS

First Semester

	Subject	Semester Hrs. Credit
CE 105	Intro. To Civil Engr	1
CE 121	Surveying with Lab	3
CE 104	CE Drawing	1
WR 101	English Composition*	3
HI 103	World History I	3
MA 123	Calculus I*	3
	AS, MS, or NS	1
PE 105/102	Wellness Concepts or Boxing	1/2
TOTAL		**15 1/2**

Second Semester

	Subject	Semester Hrs. Credit
CE 123	Engineering Calculation Tools	2
CH 137	Chemistry	3
CH 117	Chemistry Lab	1
WR 102	English Composition II*	3
HI 104	World History II	3
MA 124	Calculus II*	3
PE 105/102	Wellness Concepts or Boxing	1/2
	AS, MS, or NS	1
TOTAL		**16 1/2**

THIRD (SOPHOMORE) CLASS

First Semester

	Subject	Semester Hrs. Credit
	Natural Science Elec. (GE 306, CH138/117 or BI 101)	4
MA 215	Calculus III	4
ME 201	Statics*	3
PY 160	Physics I	3
PY 155	Physics I Lab	1
SE 300	Public Speaking	1
PE 101/300	Swimming or Physical Conditioning	1/2-1
	AS, MS, or NS	1
TOTAL		**17 1/2-18**

Second Semester

	Subject	Semester Hrs. Credit
CE 214	CE Methods/Probability/Statistics	3
CE 206	Solids*	3
MA 311	Differential Equations	3
PS 344	Leadership in Organizations	3
PY 161	Physics II	3
PY 156	Physics II Lab	1
PE 101/300	Swimming or Physical Conditioning	1/2-1
	AS, MS, or NS	1
TOTAL		**17 1/2-18**

SECOND (JUNIOR) CLASS

First Semester

	Subject	Semester Hrs. Credit
CE 301	Structural Theory	3
CE 309	Fluid Mechanics	3
CE 310	Soil Mechanics	4
CE 321	Environmental Engr. I	3
	Engineering Science Elective I **	3
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**18 1/2**

Second Semester

	Subject	Semester Hrs. Credit
CE 307	Engr. Materials	3
CE 322	Water Resources Engr.	4
CE 327	Concrete Design	3
CE 333	Transportation I	3
CE 350	Civil Engr. Project Management	3
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**18 1/2**

FIRST (SENIOR) CLASS

First Semester

	Subject	Semester Hrs. Credit
CE 451	Seminar	1
	Design Elective	3
	Engineering Science Elective II	3
	Technical Elective	3
	Technical Elective	3
	Civilization & Cultures Elective	3
	PE Elective	1/2
	AS, MS, or NS	2
TOTAL		**18 1/2**

Second Semester

	Subject	Semester Hrs. Credit
CE 448	Civil Engr. Design (Capstone)	3
	Design Elective	3
	Technical Elective	3
	Technical Elective	3
	Civilization & Cultures Elective	3
	AS, MS, or NS	2
TOTAL		**17**

Total Hours: 139 (includes at least 64 hours of civil engineering)

* Minimum Grade of C Required
**CE 412, CE 302, ME 311 or EE 351

COMPUTER SCIENCE CURRICULUM

The Department of Mathematics and Computer Science offers a computer science major leading to a B.S. degree in computer science.

The aims of the department in training computer science majors are:

(1) To prepare the student for graduate study in computer science, or for positions in business, industry, and government service which require computing skills and knowledge.

(2) To give students a firm grounding in the principles and theory underlying computing, oral and written communication skills, and teamwork skills, so that they will understand the capabilities and potentials of hardware and software, the relevance of theory, and the importance of algorithms, information organization, and an awareness of social and ethical issues in computing.

Each new cadet is assigned a departmental adviser who provides the necessary guidance and support throughout the cadetship.

COMPUTER SCIENCE MINOR

A minor in computer science is offered to cadets who desire to complement their major area of study with work in computer science. The following courses are required for the minor: either CS 121-122 or CS 340-422, and nine additional hours of 300- or 400-level CS courses, plus either MA 103, MA 118, or CS 221, and either MA 115, MA 122, MA 123, or MA 126. A minimum 2.0 GPA must be maintained in both the computer science and mathematics courses for the minor. To become a candidate for the minor, the cadet must obtain the approval of the head of the Department of Mathematics and Computer Science and the approval of the head of the department of his/her major field.

REQUIREMENTS FOR B.S. IN COMPUTER SCIENCE

The degree in computer science requires 135 semester hours which includes a minimum of 43 hours of computer science. A minimum 2.0 GPA must be maintained in the computer science courses. The following outline gives minimum requirements. Additional courses to complete the requirements must be chosen by the cadet with approval of his/her departmental adviser. No single course may be used to satisfy requirements in two areas.

Area	Requirements
Computer Science	CS 121, CS 122, CS 316, CS 326, CS 327, CS 345, CS 348, CS 411, CS 412, CS 418, CS 490W, and nine semester hours chosen from CS courses numbered 300 or above.
Humanities/Social Sciences	WR 101, WR 102, HI 103, HI 104, PS 344, SE 300 plus six hours from courses designated as civilizations and cultures.
Mathematics	MA 103, MA 123, MA 124, MA 220, and CS 221.
Science	BI 101& BI 102, or PY 160 - PY 155 & PY 161 - PY 156.
Mathematics and Science Electives	At least 8 semester hours chosen from MA 215, MA 305, MA 306, MA 311 MA 319, MA 422, MA 432, MA 433, BI 101, BI 102, BI 204, BI 205, BI 216, BI 217, BI 303, BI 304, BI 312, BI 313, BI 318, BI 321, BI 324, BI 404, BI 405, BI 410, BI 411, CH 117, CH 118, CH 125, CH 126, CH 137, CH 138, CH 223, CH 224, CH 225, CH 226, CH 246, CH 301, CH 302, CH 311, CH 312, CH 321, CH 322, CH 323, CH 335, CH 336, CH 337, CH 338, CH 425, CH 426, CH 427, CH 434, CH 444, PY 108, PY 203, PY 160, PY 161, PY 155, PY 156, PY 253, PY 254, PY 308, PY 333, PY 334, PY 335, PY 336, PY 341,PY 342, PY 344, PY 441, PY 446, PY 459, AT 201, AT 204, AT 301, AT 306, PS 203, PS 204, PS 301, PS 307, and PS 401. At least one semester hour must be from a mathematics (MA) course.

SYNOPSIS OF THE B.S. CURRICULUM IN COMPUTER SCIENCE

FOURTH (FRESHMAN) CLASS

First Semester

	Subject	Semester Hrs. Credit
CS 121	Programming 1	3
WR 101	English Composition I*	3
MA 123	Calc. with An. Geom. I*	3
	Science#	4
PE 105/102	Wellness Concepts or Boxing	1/2
	AS, MS, or NS	1
TOTAL		**14 1/2**

Second Semester

	Subject	Semester Hrs. Credit
CS 122	Programming II	3
CS 221	Discrete Mathematics	3
WR 102	English Composition II*	3
MA 124	Calc. with An. Geom. II	3
	# Science	4
PE 105/102	Wellness Concepts or Boxing	1/2
	AS, MS, or NS	1
TOTAL		**17 1/2**

THIRD (SOPHOMORE) CLASS

First Semester

	Subject	Semester Hrs. Credit
CS 316	Computer Systems	3
CS 326	Data Structures	3
HI 103	World History	3
	MA/Sci Elective	4
	Elective	3
PE 101/300	Swimming or Physical Cond.	1/2-1
	AS, MS, or NS	1
TOTAL		**17 1/2-18**

Second Semester

	Subject	Semester Hrs. Credit
CS 327	Network Computing	4
HI 104	World History	3
MA 103	Matrix Algebra	2
	Civilization & Cultures	3
	Elective	3
PE 101/300	Swimming or Physical Cond.	1/2-1
	AS, MS, or NS	1
TOTAL		**16 1/2 -17**

SECOND (JUNIOR) CLASS

First Semester

	Subject	Semester Hrs. Credit
CS 348	Database and Information Retrieval	3
	CS elective	3
MA 220	Probability and Statistics	3
SE 300	Public Speaking	1
	Elective	3
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**15 1/2**

Second Semester

	Subject	Semester Hrs. Credit
CS 411	Algorithms	3
	CS Elective	3
PS 344	Leadership in Organizations	3
	Electives	6
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**17 1/2**

FIRST (SENIOR) CLASS

First Semester

	Subject	Semester Hrs. Credit
CS 345	Software Engineering	3
CS 418	Theory Prog. Lang.	3
CS 490W	Research Practicum	3
	Elective	6
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**17 1/2**

Second Semester

	Subject	Semester Hrs. Credit
CS 412	Intro. To Operating Systems	3
	CS Elective	3
	MA/Sci Elective	4
	Civilization & Cultures	3
	Elective	3
	AS, MS, or NS	2
TOTAL		**18**

Total Hours: 135 (includes 42 hours of computer science)

*Minimum Grade of "C" required
#Cadet must choose a science sequence with Lab in biology or physics.

ECONOMICS AND BUSINESS CURRICULUM

The curriculum in economics and business leads to the bachelor of arts degree. The major is designed to provide an understanding of the economic system and the function of business enterprise in the economy. It includes many courses common to other liberal arts curricula, with the aim of developing the cadet's ability to think critically about society's economic issues. In particular, the curriculum features an emphasis on developing analytical tools and methods of both public economic policy and business decision making.

As one of VMI's liberal arts curricula, economics and business is based on a foundation of studies in mathematics, languages, social sciences, and humanities. In addition to the core curriculum requirements listed on page 15, cadets must also take core curriculum courses as listed on the next page (9 hours of humanities or social science electives, plus 12 hours of one foreign language through the 200-level). The curriculum provides a broadly conceived liberal arts education and is an excellent preparation for a wide range of business pursuits, military service, or graduate studies in economics, business, or law.

The department sponsors several extracurricular activities in support of the academic program. These include the visiting scholars' programs under the Northen and Conquest Chair endowments, the VMI chapter of Omicron Delta Epsilon (the international honor society in economics), the VMI chapter of Beta Gamma Sigma (the international honor society in business) and the Cadet Investment Group that affords actual experience in securities investments.

Three awards, the Roberts Medal, the Wheat Medal, and the Philpott Medal, recognize the top graduating seniors in economics and business studies. Academic Excellence Awards are presented annually to the top members of the upper three classes.

The Andrew L. McDowell Scholarship is available to cadets majoring in economics and business. It is based primarily on academic excellence, although other factors such as need, character, extracurricular activities, and leadership may be considered. Applications for this scholarship will be accepted during the spring semester for awards to be made the following academic year.

THE ECONOMICS MINOR

The Department of Economics and Business offers a minor in economics. The economics minor is intended for cadets in other curricula who wish to supplement their major with a further study of economic theory. Cadets are required to complete EC 201, EC 202, EC 303*, and four additional economics electives at the 300 or 400 level (these may include EC 300 and EC 330).

To pursue a minor in economics, cadets must obtain the permission of the Head of the Department of Economics and Business and the head of the department of their major field. The necessary application form can be obtained from the Head of the Department of Economics and Business.

Cadets must maintain an overall 2.0 in the minor and complete all required course work with a grade of "C" or higher. All required courses must be taken at VMI. In addition, no more than two elective courses can be taken at another school.

THE BUSINESS MINOR

The Department of Economics and Business offers a minor in business. The business minor is intended for those cadets in other curricula who wish to supplement their major with a general business orientation.

The discipline of business is concerned with decision making based upon consideration of costs and benefits. Such decision making is central to the conduct of both private enterprises and the public sector of our society. Cadets are required to complete EC 201 or EC 202, EC 303*, BU 210, BU 220, BU 230, BU 310, plus one additional course which may include the second of the EC 201-202 sequence or BU 211, BU 316, BU 330, BU 339.

To pursue a minor in business, cadets must obtain the permission of the Head of the Department of Economics and Business and the head of the department of their major field. The necessary application form can be obtained from the Head of the Department of Economics and Business.

Cadets must maintain an overall 2.0 in the minor and complete all required course work with a grade of "C" or higher. All required courses must be taken at VMI. In addition, no more than one elective courses can be taken at another school.

THE CONCENTRATION IN FINANCIAL MANAGEMENT

The Concentration in Financial Management is designed for the Economics and Business majors who wish to emphasize financial issues in their studies. It is also designed to facilitate the transition to graduate-level work in accounting and finance. This option does not change the 139 credit hours necessary for the degree. Economics and Business majors who wish to declare a Financial Management Concentration must apply in person to the head of the Department of Economics and Business. They must also complete BU 411, BU 415, EC 405, and one of the following courses: BU 305, BU 412, BU 413, EC 421, or EC 430.

*Competency in statistics can be demonstrated by receiving a "C" or higher in MA 105 and MA 106 or MA 220 or MA 307 or BI 201 in lieu of EC 303.

SYNOPSIS OF THE B.A. CURRICULUM IN ECONOMICS AND BUSINESS

FOURTH (FRESHMAN) CLASS

First Semester

		Subject	Semester Hrs. Credit
		*Biology or Chemistry (with Lab)	4
WR	101	English Composition I*	3
HI	103	World History	3
MA	125	Quantitative Methods I*	3
		Foreign Language	3
		AS, MS, or NS	1
PE	105	Wellness Concepts	1/2
TOTAL			**17 1/2**

Second Semester

		Subject	Semester Hrs. Credit
		*Biology or Chemistry (with Lab)	4
WR	102	English Composition II*	3
HI	104	World History	3
MA	126	Quantitative Methods II*	3
		Foreign Language	3
PE	102	Boxing	1/2
		AS, MS, or NS	1
TOTAL			**17 1/2**

*Physics may be taken in the 3rd class year: MA 123-124 must be substituted for MA 125-126. See faculty advisor

THIRD (SOPHOMORE) CLASS

First Semester

		Subject	Semester Hrs. Credit
EC	201	Principles of Microeconomics*	3
BU	210	Financial Accounting*	3
BU	220	Principles of Management*	3
		Humanities or SS Electives	3
		Foreign Language	3
PE	300	Principles of Physical Conditioning	1
		AS, MS, or NS	1
TOTAL			**17**

Second Semester

		Subject	Semester Hrs. Credit
EC	202	Principles of Macroeconomics*	3
BU	211	Managerial Accounting*	3
BU	230	Principles of Marketing*	3
PS	344	Leadership in Organizations	3
		Foreign Language	3
SE	300	Public Speaking	1
PE	101	Swimming	1/2
		AS, MS, or NS	1
TOTAL			**17 1/2**

SECOND (JUNIOR) CLASS

First Semester

		Subject	Semester Hrs. Credit
EC	300	Intermediate Microeconomics*	3
EC	303	Statistics*	3
BU	310	Business Finance*	3
		Free Elective	3
		Humanities or SS Electives	3
		Physical Education Elective	1/2
		AS, MS, or NS	2
TOTAL			**17 1/2**

Second Semester

		Subject	Semester Hrs. Credit
EC	330	Intermediate Macroeconomics*	3
EC	304	Econometrics*	3
BU	339	Operations Management*	3
		BU Elective	3
		Humanities or SS Electives	3
		Physical Education Elective	1/2
		AS, MS, or NS	2
TOTAL			**17 1/2**

FIRST (SENIOR) CLASS

First Semester

		Subject	Semester Hrs. Credit
BU	316	Legal Environment of Business*	3
BU	330	Management Info.Systems*	3
		BU Electives	3
		EC Electives	6
		Physical Education Elective	1/2
		AS, MS, or NS	2
TOTAL			**17 1/2**

Second Semester

		Subject	Semester Hrs. Credit
BU	440	Business Policy*	3
		BU Elective	3
		EC Elective	6
		Free Elective	3
		AS, MS, or NS	2
TOTAL			**17**

Total Hours: 139 (includes 66 hours of economics and business courses)
***Minimum Grade of C required**

All required economics and business courses must be taken at VMI. Any course not taken at VMI must be approved, before taking the course, by the department head.

For all economics and business courses taken in this curriculum, a minimum of 2.0 average must be attained.

The following courses must be completed with a grade of C or higher: BU 210, 211, 220, 230, 310, 316, 330, 339, 440; EC 201, 202, 300, 303, 304, 330; EN 101, 102; MA 125,126.

ELECTRICAL AND COMPUTER ENGINEERING CURRICULUM

Consider these questions:

Are you interested in learning how technology improves our quality of life?
Are you intrigued by high-tech gadgets?
Do you enjoy working with computers?

Now, what are you seeking from your VMI Academic Experience?

Are small class sizes and readily-available professors important to you?
Do you prefer an interactive, "hands-on" education with state-of-the-art laboratory equipment?
Are you interested in opportunities to enhance your education through undergraduate research activities and professional conference participation?

Finally, what are your career aspirations?

Are you interested in working in industry or with the government?
Do you want to serve in the military?
Are you considering graduate school and higher education opportunities?

If so, you should consider majoring in ***Electrical and Computer Engineering***!!

Our philosophy is to provide the highest quality undergraduate education available, balancing a solid theoretical foundation with an equally strong practical training in the electrical and computer engineering discipline. We stress the importance of high-tech design and problem solving skills coupled with integrity and professionalism. Our wide diversity of course and laboratory offerings is complemented by opportunities to personalize your education through the selection of electives and independent studies. Our curriculum is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).

As such, the Educational Objectives of the Electrical and Computer Engineering Department are:

The department seeks to prepare graduates who, in a few years after graduation, have:

1. Established themselves in, and made contributions to, a professional career in industry, government, or the military, and/or are continuing their education in graduate school.
2. Remained current in their profession through continuing education, via the completion of graduate coursework, attainment of certifications, or maintenance of active professional licensure, or through personal self-study and/or on-the-job training as part of their career advancement.

ELECTRICAL AND COMPUTER ENGINEERING PROGRAM OF STUDY

In order to meet these goals, the Electrical and Computer Engineering Department has designed a program of study to prepare you for a rewarding and successful career. To give you the most flexibility after you graduate from our program, our courses provide a broad foundation in many areas of electrical and computer engineering. For those students seeking additional specialization in a particular area, the Electrical and Computer Engineering Department offers a variety of elective courses, as well as customized independent research courses that are tailored to the specific interests of the students and faculty. The program of study culminates with a capstone design experience that includes a competition with design teams from other colleges and universities in the southeastern U.S.

ECE ELECTIVE POLICY

The ECE Department requires six credit hours of ECE electives for graduation. While more than six credit hours of electives may be taken, a maximum of six credit hours may be applied to graduation requirements.

The following three-credit ECE Elective courses are offered regularly, and may be used to satisfy the required six credit hours of ECE Electives:

Fall Semesters: EE 413 (Microelectronics), EE 460 (Portable Power)

Spring Semesters: EE 426 (Semiconductor Devices), EE 455 (Electrical/Mechanical Design)

PROFESSIONAL LICENSURE

Prior to graduation, all engineering cadets are required to take the Fundamentals of Engineering (FE) Examination as an early step toward licensure as a professional engineer.

Effective with the Class of 2013, (Fall 2012 and Spring 2013 FE examinations), all engineering cadets will be responsible for completing and submitting all application paperwork and fees by the published deadlines. Cadets who pass the examination will be fully reimbursed by the department. Cadets who are concerned about the financial obligations associated with this graduation requirement should contact the VMI Financial Aid office immediately.

Any engineering cadet who does not meet these expectations, as determined by the engineering department head, will not meet graduation requirements.

HONORS IN ELECTRICAL AND COMPUTER ENGINEERING

Eligibility:

- Students may apply to the ECE Honors Program no earlier than the beginning of their third class year. The application form must be completed and submitted to the Registrar's Office through the ECE Department Head.
- Applicants must have a minimum cumulative GPA of 3.00 and a minimum ECE GPA of 3.30.

Requirements:

- Students must maintain a minimum cumulative GPA of 3.00 and a minimum ECE GPA of 3.30 in order to remain in the ECE Honors Program and be eligible for ECE Honors upon graduation.
- Students must submit an honors thesis proposal to the ECE Department Head no later than the end of the second class year. The honors thesis proposal must include the following:
  - o A description of the project
  - o Approval of the project advisor(s)
- Students must complete (with no grades below B) a minimum of 3 hours of Undergraduate Research in ECE (EE 491-496) or ECE Internship for Credit (EE 469).
- Students must present the results of their work in an external professional forum, such as IEEE, NCUR, ASEE, etc.
- At the conclusion of their project, but no later than one week before the end of classes that semester, students must submit their final honors thesis to their project advisor(s) and the ECE Department Head for approval.

SCHOLARSHIP AND INTERNSHIP OPPORTUNITIES IN ELECTRICAL AND COMPUTER ENGINEERING

Numerous Scholarship and Internship Opportunities are available to cadets majoring in Electrical and Computer Engineering! Contact the ECE Department Head, or visit the departmental web site: www.vmi.edu/elen , for up-to-date information.

TRANSFER POLICIES

Electrical and computer engineering courses, including online courses, may be transferred to VMI pending an evaluation of equivalency and approval by the ECE Department Head.

MINOR IN COMPUTER ENGINEERING

EE 129 – 3 credits
EE 228 – 3 credits
EE 328 / CS 316 (cross-listed) – 3 credits
EE 339 – 4 credits

And, one of the two options, below:

Option 1: (C/C++ sequence)
CS 340 – 3 credits
CS 422 – 3 credits

OR
Option 2: (Java sequence)
CS 121 – 3 credits
CS 122 – 3 credits

Total hours – 19

Acceptable courses for the MA/SCI elective (8th semester):

MA/SCI W and X courses are not acceptable

AT – all courses are acceptable

BI – all courses are acceptable

CH – all courses are acceptable except CH 111, 112, 131, 132, 362

GE 306 is acceptable

MA – all courses are acceptable except MA 105, 106, 108, 114, 123, 124, 125, 126, 215, 220, 307 and 311

PY – all courses are acceptable except PY 115, 116, 120, 121, 155, 156, 160, 161, 220, 223, 238, and 257.

<u>MA/SCI Elective Policy is effective with the Class of 2013 and later.</u>

SYNOPSIS OF THE B.S. CURRICULUM IN ELECTRICAL AND COMPUTER ENGINEERING

FOURTH (FRESHMAN) CLASS

First Semester

	Subject	Semester Hrs. Credit
EE 111-115	Intro Modules in ECE (1 credit each)	5
WR 101	English Composition I*	3
HI 103	World History	3
MA 123	Calculus I*	3
PE 105/102	Wellness Concepts or Boxing	1/2
	AS, MS, or NS	1
TOTAL		**15 1/2**

Second Semester

	Subject	Semester Hrs. Credit
EE 122	DC Circuits*	3
EE 129	Introduction to Digital Logic Circuits*	3
WR 102	English Composition II*	3
HI 104	World History	3
MA 124	Calc. II*	3
PE 105/102	Wellness Concepts or Boxing	1/2
	AS, MS, or NS	1
TOTAL		**16 1/2**

THIRD (SOPHOMORE) CLASS

First Semester

	Subject	Semester Hrs. Credit
EE 223	Elec. Cir. Analysis	4
EE 228	Digital Systems Design	3
MA 215	Calc. with An. Geom. III	4
MA 311	Elem. Diff. Equations	3
CS 340	Programming	3
PE 101/300	Swimming or Prin. of Physical Cond.	1/2-1
	AS, MS, or NS	1
TOTAL		**18 1/2-19**

Second Semester

	Subject	Semester Hrs. Credit
MA 220	Prob. & Stat. for Engineers	3
EE 230	Signal & Systems Analysis.	3
EE 255	Electronics	4
CS 422	C++ & Object Oriented Programming	3
CS 221	Discrete Mathematics I	3
PE 101/300	Swimming or Prin. of Physical Cond.	1/2 -1
	AS, MS, or NS	1
TOTAL		**17 1/2 -18**

SECOND (JUNIOR) CLASS

First Semester

	Subject	Semester Hrs. Credit
EE 381	Automatic Control Systems	3
EE 328	Computer Architecture	3
EE 356	Electronic Appl & Interface	3
PY 160	General Physics I	3
PY 155	General Physics I Lab	1
PE	Elective.	1/2
PS 344	Leadership in Organizations	3
	AS, MS, or NS	2
TOTAL		**18 1/2**

Second Semester

	Subject	Semester Hrs. Credit
EE 321X	Systems Design I	3
EE 339	Microcontrollers	4
EE 372W	Electronic Communications	4
PY 161	General Physics II	3
PY 156	General Physics II Lab	1
SE 300	Public Speaking	1
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**18 1/2**

FIRST (SENIOR) CLASS

First Semester

	Subject	Semester Hrs. Credit
EE 422	Systems Design II	3
EE 431	Dig. Signal Proc.	4
EE 470	Seminar	1
	Electrical and Computer Eng. Elective	3
EE 420	Green Energy Power Conditioning	3
	AS, MS, or NS	2
TOTAL		**16**

Second Semester

	Subject	Semester Hrs. Credit
EE 445	Computer Networks	3
EE 471W	ECE Hardware Design Prep	1
	ECE Elective	3
	Civilization & Cultures Elective	3
	Math/Sciences Elective	3
	Physical Education Elective	1/2
	AS, MS, or NS	2
TOTAL		**15 1/2**

Total Hours: 137 (includes 66 hours of electrical and computer engineering)

***Minimum Grade of C Required.**

Beginning with the Class of 2010, PS 344 (Leadership in Organizations) is a required course for all VMI cadets. This synopsis reflects a proposed placement of this course and other adjustments of the major curriculum that are tentative pending approval of the Academic Board.

ENGLISH CURRICULUM

The English curriculum is designed to give students a foundation in British and American literature, to enhance their ability to analyze texts and articulate their ideas, and to broaden and deepen their cultural knowledge. English majors therefore take a variety of courses not only in literature but also in philosophy, history, foreign languages, classics, the fine arts, writing, and the sciences. With many free electives, they are also able to pursue minors in other departments as well as concentrations in Writing or Fine Arts.

In addition to enriching the lives of students, the study of language and literature prepares students for a variety of careers. The ability to speak and write clearly and effectively, to use research materials creatively, to analyze and interpret written materials of all sorts, to think about people's motives and understand why they act the way they do—these are skills demanded in just about any occupation. With these skills the English major is also prepared for professional training of many kinds. English graduates of the Institute have been successful in graduate schools of law, business, medicine, theology, psychology, and art, as well as English. English graduates are now at work practicing medicine, commanding troops, writing novels, managing businesses, writing for newspapers, creating marketing strategies, raising money, editing periodicals, painting pictures, practicing law, teaching students, and running colleges.

MINOR IN ENGLISH

A cadet majoring in another curriculum may earn a minor in English by completing EN 201 or 202, EN 209, EN 203 or EN 204 and any three upper-level English (EN) or Writing (WR) courses.

MINOR/CONCENTRATION IN FINE ARTS

An English major may earn a concentration in Fine Arts and a cadet majoring in another curriculum may earn a minor by completing FA 251, 252, 340, and three other three-credit Fine Arts courses.

MINOR/CONCENTRATION IN WRITING

A cadet majoring in a curriculum other than English may earn a minor in writing by completing eighteen credit hours: WR 230 (Rhetorical Traditions) and five of the following courses: WR 330, WR 332, WR 334, WR 340, WR 342, WR 345, WR 347, EN 401, EN 406, WR 468 or WR 470. As many as two of the five electives may be replaced by courses across the curriculum that have been approved as writing intensive (i.e., "W" follows the course number). A cadet majoring in English may earn a concentration in writing by meeting these same requirements. Approved electives for English majors also include EN 473W, EN 474W, and EN 496.

INDEPENDENT STUDY

Qualified English majors may take courses in which they choose their own subject, read books related to it, discuss them individually with an instructor, and write essays on the subject. Also, in the departmental **Honors Program**, the cadet may investigate a subject at greater length and eventually write a long paper on a topic like "The Theme of Hunting in American Literature" or "Anthony Trollope as a Legal Historian." (See EN 473-474, EN 495-496, FA 401, and FA 407.)

EXTRACURRICULAR ACTIVITIES

English majors enjoy, of course, the same range of activities as other cadets; but the one special to them is the English Society, which meets in the Daniels Library in Scott Shipp Hall and brings to VMI important poets, novelists, critics, and artists to read and discuss their work. This group and others, like the Timmins-Gentry Music Society, make trips to see plays and films, visit museums, and hear concerts. The Department also sponsors a biennial trip to England for English majors and minors. Eligible English majors and English or Writing minors may join Sigma Tau Delta, an international honor society.

SPECIAL REQUIREMENTS FOR ENGLISH MAJORS

1) EN 201* or 202* - Survey of English Literature (3 hours).
2) EN 209*- American Literature Survey (3 hours).
3) EN 203* or 204*- World Literature (3 hours).
4) EN250W-Seminar in Literary Research and Analysis (3 hours).
5) Two of the following British pre-1900 courses: EN 308, EN 310, EN 312, EN 316, EN 318, EN 378, EN 413, EN 420, or EN 423. Only one Shakespeare course may count toward this requirement (6 hours).
6) Two of the following American Period courses: EN 350, EN 352, EN 356, EN 360, EN 361, or EN 363 (6 hours).
7) EN 480W Senior Capstone Course.
8) Any four additional English (EN) or Writing (WR) courses, including those listed in (5) and (6) which are not counted in those requirements (12 hours).
9) Two three-credit Fine Arts (FA) courses (6 hours).
10) One foreign language through the second-year level (6 hours).
11) One History (HI) elective, 200-level or above (3 hours).
12) PH 201-202- History of Philosophy (6 hours).
13) One three-credit science elective. The following courses (or others approved by the head of the English and Fine Arts Department) will satisfy this requirement: AT 201, AT 204, BI 101, BI 102, BI 215, BI 216, BI 218, BI 311, CH 246, CH 396, PY 120, PY 121, PY 160 or PY 161, PY 322, or PY 323 (3 hours).
14) Additional electives (of which 6 hours must be in subjects other than English (EN) or Writing (WR)) to make up the total of 136 hours required for graduation. Courses in the following will not count toward this requirement: AS, MS, MU, NS, PE (except PE 430).
15) A passing grade on a Senior Portfolio.

*Minimum grade of C required.

SYNOPSIS OF THE B.A. CURRICULUM IN ENGLISH

FOURTH (FRESHMAN) CLASS

First Semester

	Subject	Semester Hrs. Credit
WR 101	English Composition I*	3
HI 103	World History	3
MA 105	Intro. Prob. & Stat.I	3
	Foreign Language	3
	Core Science (BI, CH, or PY)	4
PE 105/102	Wellness Concepts or Boxing	1/2
	AS, MS, or NS	1
TOTAL		**17 1/2**

Second Semester

	Subject	Semester Hrs. Credit
WR 102	English Composition II*	3
HI 104	World History	3
MA 106	Intro. Prob. & Stat. II	3
	Foreign Language	3
	Core Science (BI, CH, or PY)	4
PE 105/102	Wellness Concepts or Boxing	1/2
	AS, MS, or NS	1
TOTAL		**17 1/2**

THIRD (SOPHOMORE) CLASS

First Semester

	Subject	Semester Hrs. Credit
EN 201	English Literature*	3
	or EN 203 World Literature*	
EN 209	American Literature*	3
	History Elective	3
	Elective (FA)	3
	Foreign Language	3
PE 101/300	Swimming or Physical Conditioning	1/2-1
	AS, MS, or NS	1
TOTAL		**16 1/2-17**

Second Semester

	Subject	Semester Hrs. Credit
EN 202	English Literature*	3
	or EN 204 World Literature*	
EN 250W	Sem. In Literary Res. and Analysis.	3
SE 300	Public Speaking	1
	Elective (FA)	3
PS 344	Leadership in Organizations	3
	Foreign Language	3
PE 101/300	Swimming or Physical Conditioning	1/2- 1
	AS, MS, or NS	1
TOTAL		**17 1/2-18**

SECOND (JUNIOR) CLASS

First Semester

	Subject	Semester Hrs. Credit
	EN or WR Elective	3
	EN Elective (Pre-1900)	3
	EN Elective (American Period)	3
PH 201	Greek & Medieval Philosophy	3
	Science Elective	3
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**17 1/2**

Second Semester

	Subject	Semester Hrs. Credit
	EN or WR Elective	3
	EN Elective (Pre-1900)	3
	EN or WR Elective	3
PH 202	Modern Philosophy	3
	Elective	3
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**17 1/2**

FIRST (SENIOR) CLASS

First Semester

	Subject	Semester Hrs. Credit
	EN Elective (American Period)	3
EN 480W	Senior Capstone Course	3
	Elective (Non EN or WR)	3
	Elective (Non EN or WR)	3
	Elective	3
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**17 1/2**

Second Semester

	Subject	Semester Hrs. Credit
	EN or WR Elective	3
	Elective	3
	Elective	3
	Elective	3
	AS, MS, or NS	2
TOTAL		**14**

Total Hours: 136 (includes 45 hours of required upper-level EN/FA/WR courses)

SPECIAL REQUIREMENTS FOR ENGLISH MAJORS

1) EN 201* or 202* - Survey of English Literature (3 hours).
2) EN 209* - American Literature Survey (3 hours).
3) EN 203* or 204*- World Literature (3 hours).
4) EN 250W – Seminar in Literary Research and Analysis (3 hours).
5) Two of the following British pre-1900 courses: EN 308, EN 310, EN 312, EN 316, EN 318, EN 378, EN 413, EN 420, or EN 423. Only one Shakespeare course may count toward this requirement (6 hours).
6) Two of the following American Period courses: EN 350, EN 352, EN 356, EN 361, or EN 363 (6 hours).
7) EN 480W Senior Capstone Course.
8) Any four additional English (EN) or Writing (WR) courses, including those listed in (5) and (6) which are not counted in those requirements (12 hours).
9) Two three credit Fine Arts (FA) lecture courses (6 hours).
10) One foreign language through the second-year level (6 hours).
11) One History (HI) elective, 200-level or above (3 hours).
12) PH 201-202- History of Philosophy (6 hours).
13) One three-credit science elective. The following courses (or others approved by the head of the English and Fine Arts Department) will satisfy this requirement: AT 201, AT 204, BI 101, BI 102, BI 215, BI 216, BI 218, BI 311, CH 246, CH 396, PY 120, PY 121, PY 160, PY 161, PY 322, or PY 323 (3 hours).
14) Additional electives of which 6 hours must be in subjects other than English (EN) or Writing (WR) to make up the total of 136 hours required for graduation. Courses in the following will not count toward this requirement: AS, MS, MU, NS, PE (except PE 430).
15) A passing grade on a Senior Portfolio.
16) The English and Fine Arts Department adheres to the VMI Transfer Credit Policy; however, it does not grant transfer credit for internet-based or distance-learning courses.

*Minimum grade of C required.

HISTORY CURRICULUM

The history curriculum is designed to produce men and women educated in the responsibilities of citizenship. It prepares cadets for graduate schools of history or government, and for occupations in which the ability to understand backgrounds, grasp issues, and manage affairs is essential, e.g., law, business, politics, government service, and the armed forces.

The curriculum, with proper electives, fully meets the requirements for admission to outstanding schools of law and graduate programs in business administration and management, as well as history. By concentrating electives in a specific subject area, cadets can acquire both the broad outlook offered by history and the specific outlook of other disciplines.

The cadet majoring in history receives, first of all, training in the natural sciences, mathematics, and the English language as an instrument of written and oral communication. Additionally the cadet learns a foreign language. History courses cover the principal fields of modern European, Middle Eastern, East Asian, Latin American, African, and American history. Rather than merely cataloguing events of the past, these courses emphasize an understanding of developments and problems, and they give attention to social, economic, and cultural phenomena, as well as political and constitutional problems.

As history majors advance through the curriculum, they apply the lessons of previous courses to challenging new subjects. Students in 100-level World History comprehend fundamental themes, issues, and trends in global history. Students in 200-level United States history explore and analyze increasingly complex themes, issues, and trends in U.S. history. Students in 300-level courses develop a detailed knowledge of a specific field's major historical events and themes, and where appropriate acquire a functional understanding of relevant historical geography. Each level of the history curriculum is associated with a set of essential skills. Students in 100-level World History sharpen essential college-level skills such as note-taking, critical reading, and studying for both objective and analytical exams. Students in 200-level United States history interpret primary sources and base an argument on them, evaluate secondary sources, and cite sources. Students in 300-level courses evaluate the thesis and evidence in essential historical essays or books, and identify significant historiographical trends. In HI 200 and those 300-level courses designated as methodologically intensive, students learn the basic techniques of historical research, analysis and documentation. They employ common library and electronic research tools, and use book reviews or review essays to assess a field's major literature. In 400-level courses, students frame a research topic, locate and evaluate relevant primary and secondary evidence, and discuss relevant historiography.

The capstone course requirement ensures that all majors gain experience in historical methodology and writing. An Honors Program, open to majors who have demonstrated excellence in the study of history, and a Directed Study course offer opportunities to engage in more extensive research and write a paper under the close supervision of a faculty sponsor.

HISTORY CURRICULUM REQUIREMENTS

See the synopsis of the history curriculum on page 59.

Institute Core Curriculum: Note that WR 101 and 102 must be passed with a grade of C or better. The required core curriculum mathematics sequence may be filled with one of the following course sequences: MA 105/106, MA 123/124 or MA 125/126. All VMI students are required to take two writing-intensive courses, at least one of which must be within their major department. Listings of courses to be offered in each coming semester indicate writing-intensive courses with the suffix W following the course number.

Department of History Core Curriculum: History majors and minors must earn a grade of C or better in the following courses: HI 103, 104, 200, 205 or 205W, 206. History majors must take at least thirty-six hours of history, including the fifteen required hours of HI 103, 104, 200, 205 or 205W, and 206, 460W. Please note that the Department of History will not accept Western Civilization courses as a substitute for World History. They can be transferred in only as history electives. Nor does the History Department allow transfer credit for internet-based or distance-learning courses.

Regional Distribution: History majors must take at least one course from each of three regional categories (Europe, United States, and Africa/Asia/Latin America). These categories are designated in the history course listings. Courses may be counted only for one regional category. The Capstone course (460W) cannot be used to satisfy a regional distribution requirement.

Introduction to Methodology: History majors must take HI 200 “Introduction to Historical Methods,” earning a grade of "c" or better as a prerequisite for one of the 300-level courses designated as methodologically intensive. Completion of at least one 300-level “M” course is a prerequisite to enrollment in HI 460W. Cadets completing this requirement must demonstrate ability to construct an annotated bibliography and to cite sources in accordance with departmental standards. Any methodological course may also fulfill a regional requirement.

Capstone Course: History majors must take HI 460W, during their first class year. The history department may direct individuals to enroll in HI 460W in either fall or spring semester, however. The course requires a major research paper. Topics for the course will vary. (Note: individual sections of HI 460W may have special prerequisites.) Substitutions for HI 460W are rare but with prior approval by the department head, may be allowed for comparable work while in residence at VMI, e.g., an orally defended thesis for Institute Honors or the three-semester departmental honors sequence of HI 372, HI 491W, and HI 492W.

The third class English electives may be filled with any literature course offered by the Department of English and Fine Arts.

The third class science elective may be filled with any course offered in astronomy, biology, chemistry, computer science, Geology, or Physics. CE 208 may also be applied.

The minimum foreign language requirement for history majors is one foreign language through the third-year level, or two foreign languages, each through the second-year level.

The second and first class restricted elective requirements may be filled by: a) courses required for a double-major or minor in another curriculum; b) elective courses offered by the Department of Economics and Business or the Department of English and Fine Arts; c) courses in the International Studies Department.

MINOR IN HISTORY

A minor in history is available to cadets majoring in other curricula. The requirements for a minor are HI 103, 104, 205 or 205W, HI 206, all with a grade of C or better, and twelve additional hours of history electives to total twenty-four hours of history.

MINOR IN MILITARY HISTORY

A minor in Military History is available to cadets majoring in other curricula. The requirement for the military history minor are HI 103, 104, 205 or 205W, HI 206 all with a grade of C or better, and twelve additional hours of military history electives to total twenty four hours of history.

This option is available to history majors as a concentration in military history. They must complete twelve hours of military history electives. Cadets must also meet all other requirements such as regional distributions.

HONORS IN HISTORY

The Honors Program in History is open to majors who have demonstrated excellence in the study of history. History majors seeking honors in history must have completed the departmental core curriculum courses of HI 103, 104, 205 or 205W, and 206. The honors sequence consists of HI 372, HI 491W, and HI 492W.

SYNOPSIS OF THE B.A. CURRICULUM IN HISTORY

FOURTH (FRESHMAN) CLASS

First Semester

Subject		Semester Hrs. Credit
	Chemistry, Biology or Physics	3
	Chemistry, Biology or Physics Lab	1
WR 101	English Composition I *	3
HI 103	World History*	3
MA	Math Sequence I **	3
	Foreign Language	3
PE 105/102	Wellness Concepts or Boxing	1/2
	AS, MS, or NS	1
TOTAL		**17 1/2**

Second Semester

Subject		Semester Hrs. Credit
	Chemistry, Biology or Physics	3
	Chemistry, Biology or Physics Lab	1
WR 102	English Composition II *	3
HI 104	World History*	3
MA	Math Sequence II *	3
	Foreign Language	3
PE 105/102	Wellness Concepts or Boxing	1/2
	AS, MS, or NS	1
TOTAL		**17 1/2**

THIRD (SOPHOMORE) CLASS

First Semester

Subject		Semester Hrs. Credit
EC 201	Principles of Microeconomics	3
	English Elective (literature)	3
HI 205	History of the U.S.*	3
	Science Elective or HI 200*	3
	Foreign Language	3
PE 101/300	Swimming or Physical Conditioning	1/2 -1
	AS, MS, or NS	1
TOTAL		**16 1/2-17**

Second Semester

Subject		Semester Hrs. Credit
EC 202	Principles of Macroeconomics	3
	English Elective (literature)	3
HI 206	History of the U.S*.	3
	Science Elective or HI 200*	3
	Foreign Language	3
PE 101/300	Swimming or Physical Conditioning	1/2- 1
	AS, MS, or NS	1
TOTAL		**16 1/2-17**

SECOND (JUNIOR) CLASS

First Semester

Subject		Semester Hrs. Credit
	Restricted Elective	3
	Electives (HI)	6
PS 344	Leadership in Organizations	3
	Foreign Language	3
PE	Elective	1/2
SE 300	Public Speaking	1
	AS, MS, or NS	2
TOTAL		**18 1/2**

Second Semester

Subject		Semester Hrs. Credit
	Restricted Elective	3
	Electives (HI)	6
	Elective	3
	Foreign Language	3
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**17 1/2**

FIRST (SENIOR) CLASS

First Semester

Subject		Semester Hrs. Credit
	Restricted Elective	3
HI 460W	Capstone Experience	3
	Electives	6
	Elective (Non-HI)	3
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**17 1/2**

Second Semester

Subject		Semester Hrs. Credit
	Restricted Elective	3
	Electives (HI)	6
	Elective (Non-HI)	3
	AS, MS, or NS	2
TOTAL		**14**

Total Hours: 136 (includes 36 hours of history)

*** Minimum grade of C required.**
**** The mathematics sequence may be filled with the following course sequences: MA 105/106, MA 123/124 or MA 125/126 (A grade of C or better required for MA 123 & MA 125).**

INTERNATIONAL STUDIES AND POLITICAL SCIENCE CURRICULUM

The Department of International Studies and Political Science offers a challenging interdisciplinary major in international studies (IS) emphasizing political science, foreign language, history, and economics. The IS curriculum is designed to educate men and women for leadership roles in the global community and provides broad training in the liberal arts with a strong emphasis on the development of communications skills, both written and oral; the ability to think analytically and critically in the field, and on providing a strong understanding of the major ethical questions central to the study of international relations/political science.

Many IS majors go on to earn graduate degrees from top institutions. IS majors are highly qualified for careers in the Armed Forces, other forms of government service, international business and industry, and for numerous other fields requiring a broad liberal arts background.

As part of their degree, IS majors are strongly encouraged to complete either a study abroad or internship experience.

INTERNATIONAL STUDIES CURRICULUM REQUIREMENTS

See the synopsis of the International Studies curriculum on the next page.

Institute Core Curriculum: Note that WR 101 and 102 must be passed with a grade of C or better. The fourth class math requirement may be filled by other math courses with the approval of the head of the International Studies Department.

International Studies Core Curriculum: IS majors must complete the following courses with a grade of C or better: HI 205-206, IS 201, 210, 220, 230, 301, 310, 320, 340, 401W, and EC 306. Political Science electives should be filled with any IS course or SS course offered in the Department of International Studies and Political Science.

Economics electives may be filled from the following courses: EC 300, 307, 330, 401, 404, 408, 410, 414, 452 and BU 306.

English (EN) and Writing (WR) electives should be filled with any literature course at VMI, as well as WR 330, WR 332, WR 340, WR 345.

The science elective may be filled from the following courses: AT 201, 204, BI 215, 311, 312, EL 201, 402, GE 201, 202, 204, PY 201, 202.

The minimum foreign language requirement for majors is one foreign language through the 300 levels, or two foreign languages, each through the 200 level.

Minors in other disciplines and double majors are permitted. Consult with the Head of the International Studies Department.

HONORS IN INTERNATIONAL STUDIES

The Department of International Studies and Political Science offers a two semester Honors program open to all qualified IS majors.

General requirements for the conferral of IS Departmental Honors: to qualify for participation in the first part of the IS Honors Sequence (i.e., for acceptance into IS 491), cadets must: have achieved a 3.5 GPA or higher *in the IS major* through their sixth academic semester at VMI; have achieved a 3.2 GPA or higher *in the overall curriculum* through their sixth academic semester at VMI; and complete and have approved by the head of the IS department, a formal letter of application to the IS Departmental Honors Program.

To qualify for participation in the second part of the IS Honors Sequence (i.e., for acceptance into IS 492) cadets must: have received a grade of "B" or higher in IS 491; have maintained a 3.5 GPA or higher *in the IS major* through their seventh academic semester at VMI; have maintained a 3.2 GPA or higher *in the overall curriculum* through their *seventh* academic semester at VMI.

To be conferred with IS Departmental Honors, cadets must: have received a grade of "B" or higher in IS 491 and IS 492; have maintained a 3.5 GPA or higher *in the IS major* through their eighth academic semester at VMI; have maintained a 3.2 GPA or higher *in the overall curriculum* through their eighth academic semester at VMI; be formally endorsed for conferral by their faculty sponsor and be on schedule to graduate at the time for the completion of the IS Honors Sequence.

MINOR IN INTERNATIONAL STUDIES AND POLITICAL SCIENCE

Cadets majoring in other curricula may fulfill the requirements for the IS minor by taking 18 semester credit hours of international studies and political science courses outside their major curriculum. Required courses for the minor include IS 310 or HI 324, or HI 325, and IS 220 and IS 320.

History majors who choose to fulfill the requirements for the minor by taking HI 324 or HI 325 are still required to take 18 credit hours outside their major (21 hrs. total). History majors who take IS 310 can complete the minor with 18 credit hours.

MINOR IN NATIONAL SECURITY

The National Security Minor [NSM] is targeted for cadets who intend to pursue:

- Graduate study either immediately upon graduation or following commissioning and then during or after service in the military, or
- Careers in the military or civilian sectors related to matters of national security, intelligence, diplomacy and international relations

The Minor allows cadets to concentrate on a particular aspect of security, broadly defined. It can include energy, economic health of the US, education, state of environment as well as more traditional aspects of security such as defense policy, international relations, and area studies.

The NSM requires 24 hours of academic credit consisting of:

- 9 hours: National Security Policy [IS 320]; Research Design for Political Science [IS 460W]; and National Security Minor Senior Project Experience with a major Senior Paper
- 6 hours: Two electives from International Studies
- 9 hours: Three electives from departments other than International Studies to include History, Economics, Engineering, Math and Sciences

INFORMATION

You can contact the Department of International Studies and Political Science at (540) 464-7676; E-mail: Interstudies@vmi.edu. Information, including course descriptions, cadet activities, and faculty biographies is also available at: http://www.vmi.edu/interstudies/

SYNOPSIS OF THE B.A. CURRICULUM IN INTERNATIONAL STUDIES AND POLITICAL SCIENCE

FOURTH (FRESHMAN) CLASS

First Semester

	Subject	Semester Hrs. Credit
	Chemistry, Biology or Physics	3
	Chemistry, Biology or Physics Lab	1
WR 101	English Composition I*	3
HI 103	World History	3
MA 105	Intro. Prob. & Stat.I	3
	Foreign Language	3
PE 105/102	Wellness Concepts or Boxing	1/2
	AS, MS, or NS	1
TOTAL		**17 1/2**

Second Semester

	Subject	Semester Hrs. Credit
	Chemistry, Biology or Physics	3
	Chemistry, Biology or Physics Lab	1
WR 102	English Composition II*	3
HI 104	World History	3
MA 106	Intro. Prob. And Stat.II	3
	Foreign Language	3
PE 105/102	Wellness Concepts or Boxing	1/2
	AS, MS, or NS	1
TOTAL		**17 1/2**

THIRD (SOPHOMORE) CLASS

First Semester

	Subject	Semester Hrs. Credit
EC 201	Principles of Microeconomics	3
	English (EN) or Writing (WR) Elective	3
HI 205	History of the U.S.*	3
IS 201	Intro. to International Studies*	3
	Foreign Language	3
PE 101/300	Swimming or Physical Cond.	1/2-1
	AS, MS, or NS	1
TOTAL		**16 1/2-17**

Second Semester

	Subject	Semester Hrs. Credit
EC 202	Principles of Macroeconomics	3
HI 206	History of the U.S.*	3
IS 220/230	Inter. Politics or Comparative Politics*	3
	Foreign Language	3
	Elective	3
PE 101/300	Swimming or Physical Cond.	1/2-1
	AS, MS, or NS	1
TOTAL		**16 1/2-17**

SECOND (JUNIOR) CLASS

First Semester

	Subject	Semester Hrs. Credit
EC 306	International Econ*	3
IS 301	Tech. of Comp. Analysis **	3
SE 300	Public Speaking	1
	Foreign Language	3
PS 344	Leadership in Organizations	3
	AS, MS, or NS	2
TOTAL		**15**

Second Semester

	Subject	Semester Hrs. Credit
IS 210	American Gov't*	3
	Science Elective	3
	English (EN) or Writing (WR) Elective	3
IS 320	Natl. Security Policy*	3
	Foreign Language	3
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**17 1/2**

FIRST (SENIOR) CLASS

First Semester

	Subject	Semester Hrs. Credit
IS 310	American Foreign Policy*	3
	Electives (IS)	6
	Elective +	6
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**17 1/2**

Second Semester

	Subject	Semester Hrs. Credit
IS 340	Political Theory*	3
IS 401W	International Studies Semin*	3
	Elective (EC)	3
	Electives +	6
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**17 1/2**

Total Hours: 136 (includes 30 hours of political science)

*Minimum Grade of "C" Required
*Must be attempted in the 3rd class year or in 2nd class year if transferring from another department. Open only to IS majors.
**Open only to IS majors who have completed IS 201 with a grade of 75 or higher.
+Within the electives courses, cadets must take 6 credits within the civilization and cultures designation.

MECHANICAL ENGINEERING CURRICULUM

Mechanical engineering is the second oldest of the engineering professions and has the largest enrollment of students in the United States. Mechanical engineering is a very broad field which includes many areas of study such as refrigeration, air conditioning, energy conversion, nuclear engineering, biomedical engineering, transportation equipment engineering and industrial engineering. Mechanical engineers are employed in design, operations, sales, energy conservation, research, and management. A mechanical engineering education is an excellent background for a career in the military, government, business, or other professions such as law and medicine.

The mechanical engineering curriculum at VMI has two main branches: one branch consists of courses related to energy; the other branch has courses which are related to structures and motion in mechanical systems. The curriculum provides a broad background with courses in science, mathematics, liberal arts, and all of the engineering sciences. Extensive use is made of the computer facilities at VMI.

The mission of the Mechanical Engineering Department is to prepare graduates for graduate studies, for a professional engineering career, or for a career in the military through a continually improving curriculum of courses in engineering, related sciences, mathematics, and humanities which will allow the student to possess:

Educational Objective 1

Enable the student to develop the ability to identify, formulate, and solve engineering problems in both the thermal/fluids, mechanical design and related areas.

Supporting Program Outcomes:

1.1 Graduates will have the ability to apply the knowledge of mathematics (through multivariate calculus and differential equations), science (through chemistry and calculus-based physics), and engineering to engineering problems in the thermal and mechanical design areas.

1.2 Graduates will have the ability to analyze, and design mechanical and thermal systems, components and processes incorporating applicable engineering standards and realistic constraints.

1.3 Graduates will have the ability to design and conduct experiments, and to analyze and interpret experimental results.

1.4 Graduates will have the ability to use modern computational and analytical techniques, skills and tools.

Educational Objective 2

Enable the student to develop the professional skills and awareness necessary to responsibly practice engineering in a global and societal context.

Supporting Program Outcomes:

2.1 Graduates will have effective oral and written communication skills.

2.2 Graduates will have the ability to effectively function on teams.

2.3 Graduates will have an understanding of their professional and ethical responsibilities.

2.4 Graduates will recognize their need of life-long learning and will possess the ability to engage in life-long learning.

Laboratory facilities consist of: Computer-aided Design and Engineering Lab; Energy Lab; Computation Lab; Instrumentation Lab; Manufacturing and Robotics Lab; Materials Lab. Laboratories are designed as an extension of classroom work and provide technological experiments considered important to the engineering student. Cadets are provided practical hands-on experience on modern equipment. The department strongly emphasizes the use of computers for problem solving. A programming language is taught using microcomputers, and computer-aided drafting (CAD) is taught as a companion element in the drawing course. Both programming and CAD, as well as other computer applications, become an integral part of most courses taught in the department.

The Mechanical Engineering Department has been in existence since 1941 as a service department to the other engineering departments. The new curriculum, started in 1982, produced its first graduates in May 1985 and is accredited by ABET, Inc.

The department sponsors a student section of the ASME (American Society of Mechanical Engineers). Participation in professional activities is emphasized. Cadets are required to take the Fundamentals of Engineering (FE) examination as a graduation requirement during their first class year so that in the future they can become registered Professional Engineers.

HONORS IN MECHANICAL ENGINEERING

1. Eligibility

Each candidate must:

A. Have an overall 3.00 quality point average in all classes (through the end of his/her 2nd class year).

B. Have an overall 3.25 quality point average in all Mechanical Engineering classes (through the end of his/her 2nd class year).

C. Have a 3.00 quality point average in all classes at graduation.

D. Have a 3.25 quality point average in all Mechanical Engineering classes at graduation.

2. Application and Administrative Procedures

Each candidate must:

A. Inform, in writing, the Department Head of their intention to participate in the Honors Program before the end of the cadet's second class year.

B. Register for 2 semesters of the Independent Study sequence (ME 461-ME 462).

C. Find a faculty adviser who is willing to supervise their Independent Study.

D. Have the subject of their independent study approved by the Departmental Honors Committee prior to the beginning

of the Independent Study sequence. The Departmental Honors Committee will appoint a faculty Thesis Committee consisting of three faculty members including the adviser.

3. Program Requirements:

Each candidate must:

A. Write an honors thesis. A typed draft of this thesis will be submitted to their Thesis Committee no later than five days before the beginning of the final examination period.
B. Present the results of their independent study to the Thesis Committee and any interested faculty no later than the second day of the final examination period, and receive the endorsement of a majority of the faculty present for the presentation.
C. Present the results of their independent study at an undergraduate (VMI Undergraduate Research Symposium, National Undergraduate Research Conference, MARCUS, etc.), regional, national, or international conference.
D. Submit the final version of their thesis to the Thesis Committee before the end of the final examination period.

AEROSPACE ENGINEERING CONCENTRATION

A cadet may elect to obtain a concentration in Aerospace Engineering. To obtain a concentration in Aerospace Engineering a cadet must complete ME 311, ME 314, and 3 of the following 6 courses, ME 413, ME 415, ME 416, ME 417, ME 481, ME 484 for a total of 15 hours. A 2.0 GPA must be maintained in courses for the concentration. A cadet must obtain permission from both the ME department head and the head of the cadet's major field of study.

Must complete
ME 311 Thermodynamics (3-0-3)
ME 314 Fluid Mechanics (3-1-3.5)

Also must complete 3 of the following 6 courses
ME 413 Aircraft Propulsion Systems (3-0-3)
ME 415 Flight Mechanics (3-0-3)
ME 416 Fundamentals of Aerodynamics (3-0-3)
ME 417 Aircraft Structural Analysis (3-0-3)
ME 481 Computational Modeling and Virtual Design (Aerospace Project) (3-0-3)
ME 484 Fiber Reinforced Composite Materials (3-0-3) (Aerospace Project)

NUCLEAR ENGINEERING CONCENTRATION

A cadet may elect to obtain a concentration/minor in Nuclear Engineering. To obtain a concentration/minor in Nuclear Engineering a cadet must complete the mandatory courses and two of the three available electives for a total of 15 hours. A 2.5 GPA must be maintained in the courses for the concentration/minor. A cadet must obtain permission from both the ME Department head and the head of the cadet's major field of study.

Mandatory courses:
ME 311 Thermodynamics I
ME 313 Thermodynamics II
ME 314 Fluid Dynamics or CE 309 Fluid Mechanics

Elective Courses (choose two out of three).
ME 431 Power Plant Design
PY 344 Nuclear Physics
PY 453 Nuclear Reactor Engineering

ADDITIONAL INFORMATION

Applicants considering mechanical engineering as a choice of major may best prepare in high school by taking the full college preparatory program augmented by as many mathematics and science courses as their schedules permit. Courses in engineering drawing (drafting) and computer programming are also recommended, but they should not be taken in lieu of elements of the college preparatory sequence.

SYNOPSIS OF THE B.S. CURRICULUM IN MECHANICAL ENGINEERING

FOURTH (FRESHMAN) CLASS

First Semester

	Subject	Semester Hrs. Credit
CH 117	Lab for CH 137	1
CH 137	Intro. College Chemistry I	3
WR 101	English Composition I*	3
HI 103	History	3
MA 123	Calc. with An. Geom. I*	3
ME 105	Intro. to Mech. Eng.	1
ME 109	CAD/Solid Model	1
PE 105/102	Wellness Concepts or Boxing	1/2
	AS, MS, or NS	1
TOTAL		**16 1/2**

Second Semester

	Subject	Semester Hrs. Credit
WR 102	English Composition II*	3
HI 104	History	3
MA 103	Matrix Algebra	2
MA 124	Calculus with An. Geom. II*	3
ME 110	Materials	3
ME 203	Programming	2
PE 105/102	Wellness Concepts or Boxing	1/2
	AS, MS, or NS	1
TOTAL		**17 1/2**

THIRD (SOPHOMORE) CLASS

First Semester

	Subject	Semester Hrs. Credit
MA 215	Calc. with An. Geom. III	4
MA 220	Probability and Statistics	3
ME 201	Statics	3
PY 160	Gen Physics I	3
PY 155	Physics Lab	1
PE 101/300	Swimming or Physical Cond.	1/2-1
SE 300	Public Speaking	1
	AS, MS, or NS	1
TOTAL		**16 1/2-17**

Second Semester

	Subject	Semester Hrs. Credit
MA 311	Differential Equations	3
ME 206	Solid Mechanics.	3
ME 311	Thermodynamics	3
PS 344	Leadership in Organizations**	3
PY 161	Gen. Physics II	3
PY 156	Physics Lab II	1
PE 101/300	Swimming or Physical Cond.	1/2-1
	AS, MS, or NS	1
TOTAL		**17 1/2 -18**

SECOND (JUNIOR) CLASS

First Semester

	Subject	Semester Hrs. Credit
EC 322	Engr. Economy	2
EE 351	Elec. Cir. & Machines**	3
ME 302	Dynamics	3
ME 313	Thermodynamics II	3 1/2
ME 325	Instrumentation Lab	2
	Civil & Cultures	3
	AS, MS, or NS	2
TOTAL		**18 1/2**

Second Semester

	Subject	Semester Hrs. Credit
ME 314	Fluid Mechanics	3 1/2
ME 321	Dynamics of Machinery	3
ME 322	Mech. Analysis	3
ME 336	Heat and Mass Transfer	3 1/2
ME 342	Controls	3
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**18 1/2**

FIRST (SENIOR) CLASS

First Semester

	Subject	Semester Hrs. Credit
ME 419	Thermal-Fluid Systems Design	4
ME 425	Mech. Design	4
ME 457	Seminar	1/2
	Technical Elective	3
	Technical Elective	3
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**17**

Second Semester

	Subject	Semester Hrs. Credit
ME 444	Mechanical Engr. Design	3
	Technical Elective	3
	Elective	3
	Math/Science Elective	3
	Civil & Cultures	3
ME 458	Seminar	0
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**17 1/2**

Total Hours: 140 (includes 54 hours of specified mechanical engineering courses)

Electives are chosen from the distribution requirements shown on the next page.
For all Mechanical Engineering and Technical Elective courses taken or attempted in this curriculum, a minimum 2.0 average must be maintained.
* Minimum grade of C required
** To facilitate scheduling in the department half of the cadets majoring in ME will take PS 344 and half will take EE 351.

MECHANICAL ENGINEERING CURRICULUM DISTRIBUTION REQUIREMENTS FOR ELECTIVES

Electives are chosen by the cadet in consultation with the faculty adviser and subject to the distribution shown below.

TECHNICAL ELECTIVES

Nine (9) hours minimum course work selected from ME, CE, EE, CS, MA, PY, CH, or BI which contribute to the quality of the cadet's program. Selection of appropriate courses must be approved by the adviser in consultation with the mechanical engineering department head.

CIVILIZATION AND CULTURES ELECTIVES

Six (6) hours must be selected from the approved list of Civilization and Cultures courses.

ELECTIVE

A three (3) credit-hour course selected from 200-level or higher. Courses in the 100-level may be selected in Modern Languages.

MATH/SCIENCE ELECTIVE

A three (3) credit-hour course selected from 200 level or higher mathematics (except MA 330WX) or an approved science course from BI, CH, or PY

MODERN LANGUAGES AND CULTURES CURRICULUM

The Department of Modern Languages and Cultures offers an interdisciplinary major that requires in-depth study of Arabic, French, German, Japanese and Spanish and emphasizes work in literatures, history, and political science. Students of Modern Languages and Cultures thus take a variety of courses aimed toward acquiring knowledge not only of a foreign language, but also of the literature, culture, history, economics, and politics of the country or area where the foreign language they are studying is the major tongue. Since the curriculum allows for 18 hours of unrestricted electives, the department encourages cadets to double major or to minor in another curriculum or to study other foreign languages (a minimum of two years study of each language). The Modern Language and Cultures Department does not accept transfer credit of internet-based or distance learning courses at any level.

The curriculum is designed to provide a student with skills to function effectively on a shrinking planet. The countries and geographical areas that combine to shape the modern world, while becoming increasingly interconnected and geographically accessible, nevertheless remain far apart in their linguistic, cultural, economic, and political systems. The Modern Languages and Cultures curriculum enhances an understanding of global issues and fosters in-depth knowledge of a country or area. Graduates of the curriculum should thus be well-prepared to pursue advanced study in a variety of fields or to find positions in teaching, the armed forces, government, the foreign service, or in multinational firms. The curriculum of Modern Languages and Cultures lays the groundwork for an individual to assume a leadership role in an increasingly internationalized world.

A cadet may earn a bachelor's degree in two ways (please consult the "Synopsis of the Modern Languages and Cultures Curriculum") :

(1). He or she must take all prescribed courses and acquire a minimum of 24 credit hours above the 200-level in one foreign language. A minimum of 9 credit hours must be earned in 400-level language courses.

(2). He or she must take all prescribed courses and acquire a minimum of 12 credit hours above the 200-level in one foreign language (a minimum of 3 credit hours must be earned in a 400-level language course). In addition, cadets must earn 3 credit hours above the 200-level in another language. Students who choose this option are required to take all history and political science courses that correspond to their principal language and must also complete 9 additional hours of free electives.

Majors must either study abroad or participate in a foreign intern program in a country where their primary foreign language is a principal tongue. Upon completion of all requirements, majors will be awarded a B.A. degree in Modern Languages and Cultures, with their language (s) specified (i.e., B.A. in Modern Languages and Cultures - French; B.A. in Modern Languages and Cultures - French and Arabic).

HONORS IN MODERN LANGUAGES AND CULTURES

A cadet wishing to graduate with Honors in the Department of Modern Languages must be a Modern Language major, have a cumulative GPA of at least 3.0 in courses taken in the major (exclusive of subjects taken in the Fourth Class), and have permission of the Department Head. Cadets must complete ML 498 and ML 499 and produce a thesis which is written in the student's major foreign language, as appropriate. The thesis must achieve a language ranking of "Advanced-High" and adhere to MLA specifications.

MINOR IN MODERN LANGUAGES AND CULTURES

A cadet who wishes to earn a minor in Modern Languages and Cultures must complete a "Minor Declaration Form" and earn 12 credit hours above the 200-level in a foreign language (a minimum of 3 credit hours must be earned in a 400-level language course). In addition, cadets must take all courses prescribed in the curriculum.

MINOR IN MODERN LANGUAGES

A cadet who wishes to earn a minor in Modern Languages must complete a "minor Declaration Form" for each language in which he or she wishes to earn a minor. Minors may concentrate their work in the following configurations:

(1). A cadet may earn a minor by successfully completing 12 credit hours above the 200-level of the chosen language. A maximum of nine hours may be taken from among the 300-level courses and a minimum of 3 hours must be taken at the 400-level. If a cadet qualifies for a minor in more than one language, he or she will be awarded a minor in each language.

(2). A cadet may earn a minor in Modern Languages by earning 6 hours on the 300 level of one language and 6 hours at the 200-or higher level of another language. Cadets pursuing this track may choose among the languages offered by the department and will be awarded a minor in Modern Languages.

Every cadet who minors in Modern Languages is strongly urged to study in a country where his or her foreign language is the principal tongue. Courses taken elsewhere and requests for alternate configurations of a minor must be approved in advance by the head of the Department of Modern Languages. Institute regulations require a cadet to maintain a C average (2.00 GPA) in all minor courses.

SYNOPSIS OF THE B.A. CURRICULUM IN MODERN LANGUAGES AND CULTURES

FOURTH (FRESHMAN) CLASS

First Semester

		Subject	Semester Hrs. Credit
		BI/CH/PY	4
WR	101	English Composition I*	3
HI	103	World History	3
MA	105	Intro. Prob. & Statistics I	3
ML	#		3
PE	105	Wellness Concepts	1/2
		AS, MS, or NS	1
TOTAL			**17 1/2**

Second Semester

		Subject	Semester Hrs. Credit
		BI/CH/PY	4
WR	102	English Composition II*	3
HI	104	World History	3
MA	106	Intro. Prob. & Statistics	3
ML	#		3
PE	102	Boxing	1/2
		AS, MS, or NS	1
TOTAL			**17 1/2**

THIRD (SOPHOMORE) CLASS

First Semester

		Subject	Semester Hrs. Credit
EC	201	Principles of Microeconomics	3
		EN/FA/WR Elective	3
		Science Elective	3
ML	#		3
		Elective	3
PE	101	Swimming	1/2
		AS, MS, or NS	1
TOTAL			**16 1/2**

Second Semester

		Subject	Semester Hrs. Credit
EC	202	Principles of Macroeconomics	3
		EN/FA/WR Elective	3
HI	325	AM. For Relations	3
ML	#		3
		Elective	3
SE	300	Public Speaking	1
PE		Elective	1/2
		AS, MS, or NS	1
TOTAL			**17 1/2**

SECOND (JUNIOR) CLASS

First Semester

		Subject	Semester Hrs. Credit
EC	306	International Economics	3
HI**	#		3
ML	#		3
ML	#		3
PS	344	Leadership in Organizations	3
PE	300	Principles of Physical Conditioning	1
		AS, MS, or NS	2
TOTAL			**18**

Second Semester

		Subject	Semester Hrs. Credit
HI**	#		3
ML	#		3
ML	#		3
		Elective	3
IS	220	International Politics	3
PE		Elective	1/2
		AS, MS, or NS	2
TOTAL			**17 1/2**

FIRST (SENIOR) CLASS

First Semester

		Subject	Semester Hrs. Credit
ML	450	Capstone	3
ML			6
IS		Elective***	3
		Elective	3
		Elective	3
		AS, MS, or NS	2
TOTAL			**17**

Second Semester

		Subject	Semester Hrs. Credit
ML			3
ML			3
		Elective	3
		IS Elective	3
		Physical Education	1/2
		AS, MS, or NS	2
TOTAL			**14 1/2**

Total Hours: 136 (includes 39 hours of language-based courses)

* Minimum Grade of C Required
**Cadets are required to take the following history courses as appropriate to their foreign language(s):
AR = HI 333 History of the Middle East I; HI 334 History of the Middle East II
FR= HI 350 France and the French Empire; HI 365 The French Revolution and Napoleon
GR=HI 361 The Age of Blood and Iron; HI 375 Germany and Eastern Europe
JP=Any 300-level or 400-level History course; HI 346 Modern Japan
SP= HI 373 Colonial Latin America; HI 374 Modern Latin America; HI 388 Modern Spain; Civil War-Colonial Conflict.
***Cadets are required to take a IS course appropriate to their foreign language area(s):
AR = Any 300 level IS course
FR and GR = IS 330 Politics and Western Europe
JP=IS 345 Politics in East Asia
SP = IS 335 Politics in Latin America or IS 330W Politics in Western Europe
#Cadets must take two civilization & cultures designated courses

PHYSICS CURRICULUM

Physics is the study of the basic laws that describe all natural phenomena, and it is often instrumental to the development of new technologies. At VMI dedicated faculty mentors help cadets develop strong analytical reasoning, laboratory, computational, and technical communication skills. They also provide our majors with the opportunity to combine skills developed in their coursework with the creativity needed to solve real-world problems in independent research projects in pure and applied physics.

Mathematics is an integral part of the study of physics, and it is essential for students to come with strong mathematics skills to successfully pursue the physics major. While the physics curriculum is rich in applied mathematics, it is also a well-balanced program with many opportunities to develop hands-on laboratory and computer programming skills and to probe the relationship between experiment and mathematical theory that is the hallmark of physics.

The physics curriculum is a flexible curriculum that provides an excellent opportunity for the development of intellectual breadth while also building strong scientific and technical skills. Our degree programs offer a generous complement of electives, allowing cadets to obtain one or more minors or even to double major in select cases. This flexibility allows each cadet to point the degree along the career path that they wish to pursue. Historically, physics has been a very marketable degree that graduates use to follow a wide range of career paths in the military, industry, and in education.

Our B.S. physics degree program offers solid training for many technical career paths or for graduate study in physics and other closely allied technical fields. In addition to the core curriculum requirements, it includes 15 credit hours of free electives, 6 credit hours of humanities and social science electives, and 12 hours of technical electives.

Our B.S. in physics with a concentration in nuclear energy is specifically designed to prepare students for work in the nuclear power industry, the Navy's NUPOC program, or for graduate study in Nuclear Engineering. It includes 12 credit hours of free electives, 6 credit hours of humanities and social science electives, 6 credit hours of technical electives, and 6 credit hours of physics electives (at the 300 or 400 level).

Our B.A. physics degree program is well suited to the student who wants to major in physics but who also has strong interests in the humanities or social sciences. The B.A. degree program is also designed to allow those cadets interested in teaching physics at the high school level to work toward teacher certification while they complete their physics degree. With 21 credit hours of free electives, the B.A. option allows a cadet to pursue a second area of study in depth, and it is expected that some of the free elective hours will be used to obtain a minor or to pursue a double major. There are also 9 hours of technical electives and 9 hours of physics electives (at the 200, 300, or 400 level). Finally, cadets pursuing the B.A. are required to meet a four semester foreign language requirement or demonstrate equivalent proficiency.

The department houses a generous complement of well-equipped classrooms, teaching laboratories and faculty research laboratories. The teaching laboratories include two general physics laboratories, an electronics and interfacing laboratory, an optics laboratory, and a modern physics laboratory. The department has a small accelerator and nuclear physics laboratory in the basement of Mallory Hall, and the VMI Observatory, a short drive from Post, has a 20-inch reflecting telescope and an array of smaller telescopes that are used in our astronomy courses and for faculty and cadet research projects.

Faculty conduct research with cadets in laboratories devoted to organic thin film device fabrication and characterization, laser physics and fiber optics, solid state and gas phase laser spectroscopy, and astronomy. Every cadet who completes the degree program will work one-on-one or in a small group with a faculty mentor on a research project.

Cadets majoring in physics and the fulltime physics faculty form a close-knit academic community in which cadets can pursue a deeper understanding of the physical world while also preparing for a broad array of career paths.

MINOR IN PHYSICS

A minor in physics is offered to cadets who desire to complement their major area of study with additional work in the field of physics. The requirements that must be satisfied are as follows:

1. General Physics Sequence
   PY 160, PY 161, PY 155, and PY 156

2. Modern Physics
   PY 335 Modern Physics I

3. At least 9 additional hours of courses are required. Those courses must be selected from the following: AT 306, PY 253W, PY 254, PY 308, PY 333W, PY 334, PY 341, PY 342, PY 344, PY 336, PY 441, PY 446, PY 453, PY 257, PY 459, PY 460.

4. A minimum GPA of 2.0 is required in all courses required for the minor.

A cadet who wishes to apply for the physics minor must do so prior to the spring semester of the Second Class (junior) year. Contact the head of the Department of Physics and Astronomy for details.

MINOR IN ASTRONOMY

A minor in astronomy is offered to cadets who desire to complement their major area of study with additional work in the field of astronomy. The student must complete the following courses:

PY 160-161 and PY 155-156
AT 201 - The Solar System
AT 204 - Stars, Galaxies, and the Universe
AT 301 - Observational Techniques
AT 306 - Introductory Astrophysics

A minimum GPA of 2.0 is required in all courses required for the minor.

SYNOPSIS OF THE B.S. CURRICULUM IN PHYSICS

FOURTH (FRESHMAN) CLASS

First Semester

		Subject	Semester Hrs. Credit
CH	111	Lab for CH 131	1
CH	131	Chemical Science I	3
WR	101	English Composition I*	3
HI	103	World History	3
MA	123	Calc. with An. Geom. I*	3
PY	160	General Physics I	3
PY	155	Lab for General Physics I	1
PE	105/102	Wellness Concepts or Boxing	1/2
		AS, MS, or NS	1
TOTAL			**18 1/2**

Second Semester

		Subject	Semester Hrs. Credit
CH	112	Lab for CH 132	1
CH	132	Chemical Science II	3
WR	102	English Composition II*	3
HI	104	World History	3
MA	124	Calc. with An. Geom. II*	3
PY	161	General Physics II	3
PY	156	Lab for General Physics II	1
PE	105/102	Wellness Concepts or Boxing	1/2
		AS, MS, or NS	1
TOTAL			**18 1/2**

THIRD (SOPHOMORE) CLASS

First Semester

		Subject	Semester Hrs. Credit
MA	103	Matrix Algebra	2
MA	215	Calc with An. Geom. III	4
PY	238	Laboratory Techniques	2
PY	254	Optics	3
PY	253W	Optics Lab	1
PE	101/300	Swimming or Physical Cond.	1/2 -1
		Free Elective	3
		AS, MS, or NS	1
TOTAL			**16 1/2-17**

Second Semester

		Subject	Semester Hrs. Credit
MA	311	Elem. Dif. Eq.	3
PY	223	Programming & Data Analysis.	2
PY	257	Electronics and Interfacing	4
PS	344	Leadership in Organizations	3
		Tech Elective	3
PE	101/300	Swimming or Physical Cond.	1/2 -1
		AS, MS, or NS	1
TOTAL			**16 1/2-17**

SECOND (JUNIOR) CLASS

First Semester

		Subject	Semester Hrs. Credit
MA	301	Higher Math Engr. Sc.	3
PY	341	Elec. & Mag. I	3
PY	333W	Modern Physics Lab	1
PY	335	Modern Physics I	3
		Hum. or Soc. Science Elective.	3
		AS, MS, or NS	2
TOTAL			**15**

Second Semester

		Subject	Semester Hrs. Credit
PY	336	Modern Physics II	3
PY	342	Elec. & Mag. II	3
PY	441	Classical Mechanics I	3
		Tech Elective	3
		Free Elective	3
PE		Elective	1/2
		AS, MS, or NS	2
TOTAL			**17 1/2**

FIRST (SENIOR) CLASS

First Semester

		Subject	Semester Hrs. Credit
PY	420	Capstone I	2
PY	459	Intro. Quantum Mech	3
		Hum. or Soc. Science Elective	3
		Tech Elective	3
		Free Elective	3
		PE Elective	1/2
		AS, MS, or NS	2
TOTAL			**16 1/2**

Second Semester

		Subject	Semester Hrs. Credit
PY	421	Capstone II	1
PY	446	Thermal Physics	3
SE	300	Public Speaking	1
		Tech Elective	3
		Free Elective	3
		Free Elective	3
		PE Elective	1/2
		AS, MS, or NS	2
TOTAL			**16 1/2**

Total Hours: 136 (includes 45 hours of physics courses)

See text for a discussion of elective requirements

***Minimum grade of C required**

SYNOPSIS OF THE B.S. CURRICULUM IN PHYSICS (NUCLEAR)

FOURTH (FRESHMAN) CLASS

First Semester

		Subject	Semester Hrs. Credit
CH	111	Lab for CH 131	1
CH	131	Chemical Science I	3
WR	101	English Composition I*	3
HI	103	World History	3
MA	123	Calc. with An. Geom. I*	3
PY	160	General Physics I	3
PY	155	Lab for General Physics I	1
PE	105/102	Wellness Concepts or Boxing	1/2
		AS, MS, or NS	1
TOTAL			**18 1/2**

Second Semester

		Subject	Semester Hrs. Credit
CH	112	Lab for CH 132	1
CH	132	Chemical Science II	3
WR	102	English Composition II*	3
HI	104	World History	3
MA	124	Calc. with An. Geom. II*	3
PY	161	General Physics II	3
PY	156	Lab for General Physics II	1
PE	105/102	Wellness Concepts or Boxing	1/2
		AS, MS, or NS	1
TOTAL			**18 1/2**

THIRD (SOPHOMORE) CLASS

First Semester

		Subject	Semester Hrs. Credit
MA	103	Matrix Algebra	2
MA	215	Calc with An. Geom. III	4
PY	238	Laboratory Techniques	2
PY	254	Optics	3
PY	253W	Optics Lab	1
PE	101/300	Swimming or Physical Cond.	1/2 -1
		Free Elective	3
		AS, MS, or NS	1
TOTAL			**16 1/2-17**

Second Semester

		Subject	Semester Hrs. Credit
MA	311	Elem. Dif. Eq.	3
ME	311	Thermodynamics I	3
PY	223	Programming & Data Analysis.	2
PY	257	Electronics and Interfacing	4
PS	344	Leadership in Organizations	3
PE	101/300	Swimming or Physical Cond.	1/2 -1
		AS, MS, or NS	1
TOTAL			**16 1/2-17**

SECOND (JUNIOR) CLASS

First Semester

		Subject	Semester Hrs. Credit
MA	301	Higher Math Engr. Sc.	3
ME	314	Fluid Mechanics	3 1/2
PY	333W	Modern Physics Lab	1
PY	335	Modern Physics I	3
		Hum. or Soc. Science Elective.	3
		AS, MS, or NS	2
TOTAL			**15 1/2**

Second Semester

		Subject	Semester Hrs. Credit
ME	336	Heat and Mass Transfer	3 1/2
PY	336	Modern Physics II	3
PY	441	Classical Mechanics I	3
PY	344	Nuclear Physics	3
		Free Elective	3
PE		Elective	1/2
		AS, MS, or NS	2
TOTAL			**18**

FIRST (SENIOR) CLASS

First Semester

		Subject	Semester Hrs. Credit
PY	420	Capstone I	2
		Physics Elective	3
		Nuclear Energy Elective**	3
		Tech Elective	3
		Free Elective	3
		PE Elective	1/2
		AS, MS, or NS	2
TOTAL			**16 1/2**

Second Semester

		Subject	Semester Hrs. Credit
PY	421	Capstone II	1
SE	300	Public Speaking	1
		Physics Elective	3
		Tech Elective	3
		Free Elective	3
		Hum. or Soc. Science Elective	3
		PE Elective	1/2
		AS, MS, or NS	2
TOTAL			**16 1/2**

Total Hours: 137 (includes 42-45 hours of physics courses)

***Minimum grade of C required**

****Chosen from PY 453 Nuclear Reactor Engineering or ME 431 Power Plant Design (note additional ME prerequisites for this course).**

SYNOPSIS OF THE B.A. CURRICULUM IN PHYSICS

FOURTH (FRESHMAN) CLASS

First Semester

		Subject	Semester Hrs. Credit
CH	111	Lab for CH 131	1
CH	131	Chemical Science I	3
WR	101	English Composition I*	3
MA	123	Calc. with An. Geom. I*	3
PY	160	General Physics I	3
PY	155	Lab for General Physics I	1
PE	105/102	Wellness Concepts or Boxing	1/2
		AS, MS, or NS	1
TOTAL			**15 1/2**

Second Semester

		Subject	Semester Hrs. Credit
CH	112	Lab for CH 132	1
CH	132	Chemical Science II	3
WR	102	English Composition II*	3
MA	124	Calc. with An. Geom. II*	3
PY	161	General Physics II	3
PY	156	Lab for General Physics II	1
		Free Elective	3
PE	105/102	Wellness Concepts or Boxing	1/2
		AS, MS, or NS	1
TOTAL			**18 1/2**

THIRD (SOPHOMORE) CLASS

First Semester

		Subject	Semester Hrs. Credit
HI	103	World History	3
MA	103	Matrix Algebra	2
MA	215	Calc with An. Geom. III	4
PY	254	Optics	3
PY	238	Laboratory Techniques	2
PE	101/300	Swimming or Physical Cond.	1/2 -1
		Foreign Language	3
		AS, MS, or NS	1
TOTAL			**18 1/2-19**

Second Semester

		Subject	Semester Hrs. Credit
HI	104	World History	3
MA	311	Elem. Dif. Eq.	3
PY	223	Programming & Data Analysis.	2
PY	220	Physics Topics Seminar	1
PS	344	Leadership in Organizations	3
PE	101/300	Swimming or Physical Cond.	1/2 -1
		Foreign Language	3
		AS, MS, or NS	1
TOTAL			**16 1/2-17**

SECOND (JUNIOR) CLASS

First Semester

		Subject	Semester Hrs. Credit
PY	335	Modern Physics I	3
PY	333W	Modern Physics Lab	1
		PY Elective	3
		Free Elective.	3
		Foreign Language	3
		AS, MS, or NS	2
TOTAL			**15**

Second Semester

		Subject	Semester Hrs. Credit
PY	336	Modern Physics II	3
PY	441	Classical Mechanics I	3
		PE Elective	1/2
		Tech Elective	3
		PY Elective	3
		Foreign Language	3
		AS, MS, or NS	2
TOTAL			**17 1/2**

FIRST (SENIOR) CLASS

First Semester

		Subject	Semester Hrs. Credit
PY	420	Capstone I	2
		Physics Elective	3
		Tech Elective	3
		Free Elective	3
		Free Elective	3
		PE Elective	1/2
		AS, MS, or NS	2
TOTAL			**16 1/2**

Second Semester

		Subject	Semester Hrs. Credit
PY	421	Capstone II	1
SE	300	Public Speaking	1
		Tech Elective	3
		Free Elective	3
		Free Elective	3
		Free Elective	3
		PE Elective	1/2
		AS, MS, or NS	2
TOTAL			**16 1/2**

Total Hours: 135 (includes 38 hours of physics courses)

See text for a discussion of elective requirements

***Minimum grade of C required**

PSYCHOLOGY CURRICULA

The Department of Psychology and Philosophy offers Bachelor of Arts and Bachelor of Science degrees in psychology, and minors in leadership studies, philosophy, and psychology.

Psychology is the scientific study of human behavior and the mental, emotional, and physical processes associated with behavior. It is a science, an academic discipline, and a profession. As scientists, psychologists are concerned with the careful and systematic observation of behavior, as well as the collection, analysis, and interpretation of empirical data. As academicians, psychologists deal with theoretical concepts and interpretations, and ethical controversies. As professionals, psychologists are dedicated to improving the quality of life, enhancing personal and organizational effectiveness, and preserving the dignity of their fellow humans.

Students drawn to psychology must be willing to extend the boundaries of their knowledge about human behavior, develop mature and ethical values, learn to distinguish between valuable and trivial information, and acquire the broad perspective necessary to influence and shape the world around them. They gain from their studies a solid knowledge of psychological terms, concepts, theories, methods, and issues. They develop the ability to gather and synthesize information from a variety of sources, inside and outside the classroom, and they learn more about the human condition in the process.

PSYCHOLOGY CURRICULA REQUIREMENTS

The psychology curriculum for the Bachelor of Science degree requires 136 hours to graduate, of which 39 must be in psychology. The curriculum for the Bachelor of Arts degree requires 136 hours, of which 39 must be in psychology. (Note: PS 201, WR 101, WR 102, and MA 123 must be passed with a grade of C or better.)

MINOR IN LEADERSHIP STUDIES

See Special Programs, page 75.

MINOR IN PHILOSOPHY

To qualify for a minor in philosophy, a cadet must complete a minimum of 15 hours in philosophy with a grade of C or better in each course. Required courses include PH 201/202/301. The remaining six hours must be selected from PH 204, 304, 307, 308, 309, IS 340 or IS 442. Additionally, any other course with a PH prefix may be counted as an elective.

Upon electing to minor in philosophy, the cadet must obtain the approval of the department head in his or her own major curriculum, and the head of the Department of Psychology and Philosophy.

MINOR IN PSYCHOLOGY

To qualify for a minor in psychology, a minimum of 18 hours in psychology with a grade of C or better in each course must be completed. All candidates must complete PS 201. Six hours must be selected from PS 203, PS 204, PS 301 or PS 401. Six hours must be selected from PS 302, PS 305, PS 307 or PS 315. The remaining three hours may be chosen from any PS coursework or PH 308.

Upon electing to minor in psychology, approval must be obtained from the major curriculum head and the head of the Department of Psychology and Philosophy.

HONORS IN PSYCHOLOGY

A cadet may earn honors in psychology by maintaining an overall GPA of 3.0 in all classes and a GPA of 3.25 in all psychology courses, both upon admittance to the program and at graduation. Consult with the head of the Department of Psychology and Philosophy for specific requirements regarding eligibility and application and administrative procedures.

SYNOPSIS OF THE B.S. CURRICULUM IN PSYCHOLOGY

FOURTH (FRESHMAN) CLASS

First Semester

	Subject	Semester Hrs. Credit
BI 101	General Biology I	4
MA 105	Intro. to Prob and Stat I	3
HI 103	World History	3
WR 101	English Composition I *	3
PE 105	Wellness Concepts	1/2
	AS, MS, or NS	1
TOTAL		**14 1/2**

Second Semester

	Subject	Semester Hrs. Credit
BI 102	General Biology II	4
MA 106	Intro to Prob and Stat II	3
HI 104	World History	3
WR 102	English Composition II *	3
	Free Elective	3
PE 101	Swimming	1/2
	AS, MS, or NS	1
TOTAL		**17 1/2**

THIRD (SOPHOMORE) CLASS

First Semester

	Subject	Semester Hrs. Credit
MA 123	Calculus and Analytical Geometry I *	3
PS 201	Intro. to Psychology*	3
	Philosophy Elective ***	3
	Free Elective	3
	Science Elective **	4
PE 102	Boxing	1/2
	AS, MS, or NS	1
TOTAL		**17 1/2**

Second Semester

	Subject	Semester Hrs. Credit
MA 124	Calculus & Analytical Geometry II*	3
PS	Core C	3
	Free Elective	3
	Philosophy Elective ***	3
	Science Elective**	4
PE	Elective	1/2
	AS, MS, or NS	1
TOTAL		**17 1/2**

SECOND (JUNIOR) CLASS

First Semester

	Subject	Semester Hrs. Credit
MA 307	Stat for Social Sciences	3
PS CORE	PS Core A	3
PS CORE	PS Core B	3
SE 300	Public Speaking	1
	Science Elective **	4
PE 300	Principles of Physical Cond.	1
	AS, MS, or NS	2
TOTAL		**17**

Second Semester

	Subject	Semester Hrs. Credit
PS 344	Leadership in Organizations	3
PS CORE	PS Core A	3
PS CORE	PS Core B	3
	Science Elective **	4
	Free Elective	3
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**18 1/2**

FIRST (SENIOR) CLASS

First Semester

	Subject	Semester Hrs. Credit
PS 402W	Research Methods	3
PS CORE	PS Core D	3
PS CORE	PS Core D	3
	Free Elective	3
	Science Elective **	3
	AS, MS, or NS	2
TOTAL		**17**

Second Semester

	Subject	Semester Hrs. Credit
PS 403W	Independent Project	3
PS CORE	PS Core D	3
	Science Elective **	3
	Free Elective	3
	Free Elective	2
	PE Elective	1/2
	AS, MS, or NS	2
TOTAL		**16 1/2**

Total Hours: 136 (includes 39 hours of psychology courses)

*Minimum Grade of C required.
**Must be taken from: AT, BI, CH, or PY.
***PH elective must include either PH 202 Modern or PH 308 Minds & Machines

Psychology Core Groups:
A: PS 301 Learning, PS 401 Cognition, PS 404 History and Systems
B: PS 302 Social, PS 305 Abnormal, PS 315 Personality
C: PS 203 Biopsychology I, PS 204 Biopsychology II, PS 307 Developmental
D: Any other three PS courses, including those listed in Cores A, B, or C.

SYNOPSIS OF THE B.A. CURRICULUM IN PSYCHOLOGY

FOURTH (FRESHMAN) CLASS

First Semester

	Subject	Semester Hrs. Credit
BI 101	General Biology I	4
WR 101	English Composition I *	3
HI 103	World History	3
	Foreign Language 101	3
PE 105	Wellness Concepts	1/2
	AS, MS, or NS	1
TOTAL		**14 1/2**

Second Semester

	Subject	Semester Hrs. Credit
BI 102	General Biology II	4
WR 102	English Composition II *	3
HI 104	World History	3
	Foreign Language 102	3
	Free Elective	3
PE 101	Swimming	1/2
	AS, MS, or NS	1
TOTAL		**17 1/2**

THIRD (SOPHOMORE) CLASS

First Semester

	Subject	Semester Hrs. Credit
MA 105	Intro. to Prob. and Stat. I	3
PS 201	Intro. to Psychology*	3
	Foreign Language 201	3
	Free Elective	3
	English Elective	3
PE 102	Boxing	1/2
	AS, MS, or NS	1
TOTAL		**16 1/2**

Second Semester

	Subject	Semester Hrs. Credit
MA 106	Intro. to Prob. and Stat. II	3
PS CORE	PS Core C.	3
	Free Elective	3
	Foreign Language 202	3
	Philosophy Elective ***	3
PE	Elective	1/2
SE 300	Public Speaking	1
	AS, MS, or NS	1
TOTAL		**17 1/2**

SECOND (JUNIOR) CLASS

First Semester

	Subject	Semester Hrs. Credit
MA 307	Stat. for Social Sciences	3
	Philosophy Elective ***	3
PS CORE	PS Core A.	3
PS CORE	PS Core B	3
PS 344	Leadership in Organizations	3
PE	Elective	1/2
	AS, MS, or NS	2
TOTAL		**17 1/2**

Second Semester

	Subject	Semester Hrs. Credit
	Philosophy Elective ***	3
PS CORE	PS Core A.	3
PS CORE	PS Core B	3
	Free Elective	3
	Free Elective	3
PE 300	Principles of Physical Conditioning	1
	AS, MS, or NS	2
TOTAL		**18**

FIRST (SENIOR) CLASS

First Semester

	Subject	Semester Hrs. Credit
PS 402W	Research Methods	3
PS CORE	PS Core D	3
PS CORE	PS Core D	3
	Free Elective	3
	Science Elective ***	3
	AS, MS, or NS	2
TOTAL		**17**

Second Semester

	Subject	Semester Hrs. Credit
PS 403W	Independent Project	3
PS CORE	PS Core D	3
	Science Elective ***	3
	Free Elective	3
	Free Elective	3
	PE Elective	1/2
	AS, MS, or NS	2
TOTAL		**17 1/2**

Total Hours: 136 (includes 39 hours of psychology)

*Minimum Grade of C required.
**Must be taken from: AT, BI, CH, or PY.
***PH elective must include either PH 202 Modern or PH 308 Minds & Machines

Psychology Core Groups:
A: PS 301 Learning, PS 401 Cognition, PS 404 History and Systems
B: PS 302 Social, PS 305 Abnormal, PS 315 Personality
C: PS 203 Biopsychology I, PS 204 Biopsychology II, PS 307 Developmental
D: Any other three PS courses, including those listed in Cores A, B, or C.

SPECIAL PROGRAMS

INFORMATION TECHNOLOGY AND DESIGN MINOR

Information Technology and Design (ITD) Minor
The Department of Applied Mathematics and Computer Science offers a minor in Information Technology and Design (ITD).

Description
Each cadet seeking the minor must complete a minimum of five courses (16 credit hours) including the 4 required courses and 1 elective. Each listed course is 3 credits except for the 4 credit ITD 327.

Required courses
Introduction to Information Technology (ITD 111)
Programming (CS 121)
Database Management and Information Retrieval (ITD 348)
Telecommunication and Networking (ITD 327)

Electives
Software Development and Management (ITD 345)
Web Applications (ITD 347)
MIS (BU 330)
Computer Forensics (ITD 343)
Human Computer Interaction (ITD 346)

The Information Technology and Design minor will produce graduates prepared for careers influenced strongly by a firm understanding of the role of technology and its place in military, for-profit and not-for-profit environments. Whatever career field the cadet chooses, this minor will augment their ability to consult, support and implement technological changes in the workplace. VMI graduates with an ITD Minor will possess a strong understanding of the role of technology at many levels and further acquire an understanding of the need for integrating information technology in human endeavors, safely and securely. This program will address the need for liberal arts graduates and others to better understand the scientific as well as human aspects of information technology, both of hardware and software, but especially in the interaction of human and machine. For science and engineering graduates, the development of information technology design and security will better prepare them for implementing information management schemes in their chosen field. For more information on the ITD Minor, please see COL Siemers, Department Chair or COL Gluck of the Mathematics and Computer Science Department, 426 Mallory Hall.

LEADERSHIP STUDIES MINOR

The Department of Psychology and Philosophy offers an interdisciplinary minor in Leadership Studies.

Requirements: Each cadet seeking the minor must complete successfully 23 hours as follows: all must complete PS 344 (Leadership in Organizations) followed by PS 495 (Independent Project in Leadership) with a grade of C or better. The cadet must have a GPA of 2.0 or better in all coursework for the minor. Four hours of ROTC at the 300 level and four hours of ROTC at the 400 level are required.

Electives: The remaining 9 hours must be selected from the courses listed below from at least three departments.

Economics/Business

BU	220	Principles of Management
BU	322	Human Resource Management
BU	306	International Business
BU	440	Business Policy Seminar

English

WR	340	Writing for the Professions
WR	342	Technical Writing
WR	347	Advanced Composition
EN	376	Literature of War

History

HI	385	U.S. Military History to 1919
HI	386	U.S. Military History since 1919

Physical Education

PE	430	Health Education

Politics International Studies

IS	340	Political Theory
IS	320	National Security Policy
IS	401W	International Studies Seminar

Psychology and Philosophy

PS	302	Social Psychology
PS	306	Human Resource Management
PS	308	Motivation
PH	301	Logic
PH	304	Ethics

Rationale: Through an interdisciplinary curriculum, we seek to develop in each qualified cadet a base of knowledge about leadership and its effective application. The intent of this minor is to allow cadets to enhance their knowledge of the leadership process, while simultaneously increasing effectiveness in leadership and management performance.

TEACHER EDUCATION

VMI currently offers a teacher education program in elementary, middle, or secondary education as a member of the Rockbridge Teacher Education Consortium with Washington and Lee University and Southwest Virginia University. The program is nationally certified by the Teacher Education Accreditation Council. Through the consortium, cadets may complete the courses they need to obtain licensure in the state of Virginia. In most cases, cadets who meet requirements for the Virginia license will receive initial licensure to teach in all other states through reciprocal agreements among state departments of education. In addition, many private schools favor applicants who have been licensed through a state-approved program.

Students with an interest in education but do not plan to pursue teacher licensure may take professional education courses after consulting with their advisor.

Application Procedure:
Cadets wishing to apply for the program must submit an application to the Director of Teacher Education, LTC Elaine Humphrey, Miller Academic Center, 202 Carroll Hall. Cadets who are seriously thinking about pursuing licensure are encouraged to apply as early as the second semester of their fourth class year. Cadets interested in licensure in a state other than Virginia or who wish to teach in private secondary schools must also complete an application to be eligible to enroll in VMI's education courses.

Candidacy Requirements:
Cadets who wish to be admitted to the teacher education program must meet and maintain a cumulative 2.5 GPA. Those cadets who do not meet the cumulative 2.5 standard by the end of their fourth class year, may be admitted conditionally by the Director of Teacher Education; they must, however, achieve a 2.5 cumulative GPA by the end of the first semester of their second class year to continue in the program.
Those cadets pursuing licensure in Virginia must also meet the following:

1. Graduation from VMI in an appropriate major discipline.
2. Successful completion of all teacher-certification courses with a 3.0 GPA.
3. Completion of 12 semester hours of student teaching. This requires full-time teaching for one semester under the supervision of a master teacher in the public schools. Because of the demands of most VMI majors, this requirement may need to be completed after graduation from VMI through the adult degree program at Mary Baldwin College.
4. Successful completion of the State Licensure Examination.

Course Requirements
The following courses are required for licensure in Virginia. Those cadets who are pursuing licensure in another state or who wish to teach in private schools should consult with the Director of Teacher Education to design a program that includes appropriate courses from the listing below.

ED 200	Foundations of Education	3
ED 210	Practicum in Education	3
ED 302	Understanding Exceptional Individuals	3
ED 303	Teaching and Learning in the Content Areas	3
ED 401	Secondary Methods and Practicum	4
ED 402	Student Teaching and Seminar	15
PS 307	Developmental Psychology	3