ILLINOIS MATHEMATICS AND SCIENCE ACADEMY

"A Pioneering Educational Community"

COURSE OFFERINGS 1990/91

ENGLISH

010 Sophomore English

Grade Level: Sophomore
Length: One Year
Credit: 1.00
Prerequisite: None

This course will introduce students to a variety of genres in literature, to the processes of effective aesthetic reading, to the work of discussion and performance as a response to literature, and to the processes of writing in a variety of forms and for a variety of purposes. In the first semester, all students will read THE ODYSSEY and OEDIPUS REX. In the second semester, all students will read THE TEMPEST and a second major work. The other readings for the course, including the major works from which individual instructors may choose, include THE WASTELAND, ANTIGONE, I KNOW WHY THE CAGED BIRD SINGS, HUCKLEBERRY FINN, A DEATH IN THE FAMILY, DEATH OF A SALESMAN, as well as a selection of poetry, short stories, and essays.

020 Junior English

Grade Level: Junior
Length: One Year
Credit: 1.00
Prerequisite: Sophomore English

The work of developing skill in aesthetic reading and in discussion, performance, and writing will continue at higher levels. Students will be expected to develop greater independence as readers and writers, to be more conscious of their own processes as readers and writers. All students will read a core of poems selected by all of the instructors and HAMLET in the first semester. In the second semester, all students will read a major novel. Other literature will be selected from such works as CRIME AND PUNISHMENT, A PORTRAIT OF THE ARTIST AS A YOUNG MAN, THE NORTON ANTHOLOGY OF POETRY, THE NORTON ANTHOLOGY OF SHORT FICTION, the ALCESTIS, and Biblical selections.

FIRST SEMESTER OFFERINGS

Senior English (Required)

Students must be enrolled in an English class each semester of their senior year.

030 Modern American Poetry

Grade Level: Senior
Length: One Semester
Credit: .50 **(Offered also in Second Semester)**
Prerequisite: Junior English

This course is concerned with the evolution of American poetry from Walt Whitman to the present, and particularly with the development of a distinctive American voice. Students will begin with a review of prosody (i.e., denotation, connotation, figurative language, tone, symbol, etc.), providing the tools to examine confidently recent, experimental poetic expression. The course weaves two poetic threads: the masters (Walt Whitman, T.S. Eliot, Ezra Pound, Wallace Stevens, Robert Frost) and the contemporaries (Robert Bly, Sylvia Plath, Galway Kinnell, William Stafford, Denise Levertov, Robert Lowell, Elizabeth Bishop).

032 Individual Struggles

Grade Level: Senior
Length: One Semester
Credit: .50
Prerequisite: Junior English

Each of the literary works in this course will present an individual embroiled in a struggle for self-definition and for a definition of what it means to be an individual. Because the concept of individuality alters with changing times and places, we will read works from a variety of periods and cultures. Our reading will include selections from the Old and New Testaments, Joseph Campbell's "The Separation of East and West," a biography of Buddha, E.M. Forster's A PASSAGE TO INDIA, Bernard Malamud's THE FIXER, Emerson's "Self-reliance," Thoreau's "On Civil Disobedience," Hardy's TESS OF THE D'URBERVILLES, and poetry by Thomas Hardy, T.S. Eliot, W.H. Auden, Samuel Taylor Coleridge, Wordsworth, and others.

033 Portraits of Creativity

Grade Level: Senior
Length: One Semester
Credit: .50 **(Offered also in Second Semester)**
Prerequisite: Junior English

Students will examine the work and lives of a number of creative people from a variety of fields, including both the arts and the sciences. Readings will include accounts of the work and lives of James Joyce, Sylvia Plath, Einstein, Picasso, the mathematician Poincare, Mozart, and Van Gogh. Students will also read about creativity from a variety of perspectives, including that of the psychiatrist Rollo May.

034 The Russian Consciousness in Literature

Grade Level: Senior
Length: One Semester
Credit: .50
Prerequisite: Junior English

What qualities, what perceptions in the Russian consciousness might account for Russia's rapid and significant change from an apparent backwater of Europe to a major world power in the twentieth century? To explore these and other questions, students will study a variety of pre- and post-Revolutionary Russian writers, as well as study the country's art, music, and film, as such works may express and give insight into the Russian consciousness.

SECOND SEMESTER OFFERINGS

041 Dramatic Literature: The Theater as Microcosm

Grade Level: Senior
Length: One Semester
Credit: .50
Prerequisite: Junior English

This course will study a variety of dramatic literature, ranging over many countries and historical periods, in an attempt to discover why the theater experience seems so often to present a microcosm of our world, a microcosm often seeming to be more real, more alive than our own world. In addition to printed literature, the course will examine film, and if possible, students will attend live theater performances to increase their understanding of the compelling qualities of dramatic expression.

042 Images of Horror

Grade Level: Senior
Length: One Semester
Credit: .50
Prerequisite: Junior English

To determine what understanding art seeks in images of horror, students will read typical pieces of horror literature as well as traditional literature not ordinarily classified as horror stories, but nonetheless involving monstrous beings and actions. A partial list of readings includes Frankenstein by Mary Shelley, Prometheus Bound by Aeschylus, Dracula by Bram Stoker, The Turn of the Screw by Henry James, Conrad's Heart of Darkness, and Shakespeare's Macbeth.

043 Modern American Poetry

Grade Level: Senior
Length: One Semester **(Offered also in First Semester)**
Credit: .50
Prerequisite: Junior English

This course is concerned with the evolution of American poetry from Walt Whitman to the present, and particularly with the development of a distinctive American voice. Students will begin with a review of prosody (i.e., denotation, connotation, figurative language, tone, symbol, etc.), providing the tools to examine confidently recent, experimental poetic expression. The course weaves two poetic threads: the masters (Walt Whitman, T.S. Eliot, Ezra Pound, Wallace Stevens, Robert Frost) and the contemporaries (Robert Bly, Sylvia Plath, Galway Kinnell, William Stafford, Denise Levertov, Robert Lowell, Elizabeth Bishop).

044 Portraits of Creativity

Grade Level: Senior
Length: One Semester
Credit: .50 **(Offered also in First Semester)**
Prerequisite: Junior English

Students will examine the work and lives of a number of creative people from a variety of fields, including both the arts and the sciences. Readings will include accounts of the work and lives of James Joyce, Sylvia Plath, Einstein, Picasso, the mathematician Poincare, Mozart, and Van Gogh. Students will also read about creativity from a variety of perspectives, including that of the psychiatrist Rollo May.

FINE ARTS

100(F) Concert Band
101(S)

Grade Level: Sophomore/Junior/Senior
Length: One - Two Semester(s)
Credit: .50 - 1.00 Pass/Fail option
Prerequisite: Play traditional wind/percussion instrument at basic level

Students enrolled in Concert Band will be provided the opportunity to examine, rehearse, and perform varied styles of band music of both Western and non-Western composers in a laboratory setting. Experiences in chamber music, symphonic band, and pep band will be included in the class. In addition, materials pertaining to music history, theory, aural skills, and musicianship will be presented, both from a scientific as well as an artistic approach. (Students enrolled in the Music Program are eligible to participate in Jazz Ensemble and either the Blue or Silver Pep Band.)

108(F) Concert Orchestra
109(S)

Grade Level: Sophomore/Junior/Senior
Length: One - Two Semester(s)
Credit: .50 - 1.00 Pass/Fail option
Prerequisite: Play stringed instrument (violin, viola, 'cello, or string bass) at basic level

Students enrolled in Concert Orchestra will be provided the opportunity to examine, rehearse, and perform varied styles of string music of both Western and non-Western composers in a laboratory setting. Experiences in chamber ensemble, string orchestra, and full symphony orchestra will be included in the class. In addition, materials pertaining to music history, theory, aural skills, and musicianship will be presented, both from a scientific as well as an artistic approach. (Students enrolled in the Music Program are eligible to participate in any music sponsored co-curricular activity.)

110(F) Concert Choir
111(S)

Grade Level: Sophomore/Junior/Senior
Length: One - Two Semester(s)
Credit: .50 - 1.00 Pass/Fail option
Prerequisite: No prerequisite/Music reading skills helpful

This course provides students with the opportunity to explore Music and the Fine Arts in a laboratory setting. Included will be the development of the fundamentals of ensemble performance:

tone, intonation, balance and precision of execution; interpretation of the score; tempo, style of enunciation/diction, phrasing, and dynamics. In addition, materials pertaining to music history, theory, aural skills, and musicianship will be presented from a scientific as well as an artistic approach. (Students enrolled in the Music Program are eligible to participate in any music sponsored co-curricular activity.)

120 Art Design I

Grade Level: Sophomore/Junior/Senior
Length: One Semester
Credit: .50 Pass/Fail option
Prerequisite: None

This course will provide students with the opportunity to create both two and three dimensional design solutions and the option of studying drawing. Through the examination of various styles of art and the investigation of the elements and principles of design, the course will prepare students to make aesthetic choices throughout life.

121 Ceramics

Grade Level: Sophomore/Junior/Senior
Length: One Semester
Credit: .50 Pass/Fail option
Prerequisite: None

This course will provide students with the opportunity to explore each of the methods of handbuilding as well as to be introduced to throwing on the potter's wheel. Students will experience the characteristics of clay, learn terminology, practice proper technique, and use the elements and principles of design as a basis for creating and evaluating ceramicware.

122 Jewelry Making and Metals

Grade Level: Sophomore/Junior/Senior
Length: One Semester
Credit: .50 Pass/Fail option
Prerequisite: None

This is an introduction course in Jewelry and Metals designed to familiarize the student with the basic metal techniques and processes of casting and fabrication. The student will also be taught the basic techniques of sawing, filing, soldering and polishing the metal. The course will provide a basic understanding of the elements and principle of design and how they act as building blocks for designs of projects the student will be creating.

123 Photography

Grade Level: Junior/Senior
Length: One Semester
Credit: .50 Pass/Fail option
Prerequisite: None

This course will provide students with the opportunity to obtain a general overview of the uses and history of photography. The course is specific to black and white photography. Students will learn to use photographic and aesthetic terminology and obtain practice in picture taking, film processing, photo printing, and professional display techniques. Through these experiences, students will gain confidence in both creating and evaluating photography as an art form. Students must supply their own 35mm SLR cameras and batteries.

FOREIGN LANGUAGE

201 Latin I

Grade Level: Sophomore/Junior/Senior
Length: One Year
Credit: 1.00 Pass/Fail option
Prerequisite: None

The student receives a solid foundation in Latin grammar and vocabulary through the study of syntax and etymology. Through reading and translating Latin stories, the student is introduced to Roman mythology and culture in order to gain a sense of his relevant past.

202 Latin II

Grade Level: Sophomore/Junior/Senior
Length: One Year
Credit: 1.00 Pass/Fail option
Prerequisite: Latin I

A broader range of vocabulary and the more complex aspects of Latin grammar are studied. Selected Latin phrases, terms, and abbreviations commonly used in English are studied. Through readings from Caesar's Gallic Wars and Livy, the student comes into contact with achievements of great human significance, such as Roman law, poetry, architecture, and models of government.

203 Latin III

Grade Level: Sophomore/Junior/Senior
Length: One Year
Credit: 1.00 Pass/Fail option
Prerequisite: Latin II

This prose course is based on Cicero's orations and selected stories from other Roman authors. Roman government and society are also studied.

204 Latin IV

Grade Level: Sophomore/Junior/Senior
Length: One Year
Credit: 1.00 Pass/Fail option
Prerequisite: Latin III

This poetry course provides for intensive study of the Roman poets Virgil (Books 1-6 Aeneid) and Ovid. Roman daily life and culture in the Age of Augustus are also studied.

210 French I

Grade Level: Sophomore/Junior/Senior
Length: One Year
Credit: 1.00 Pass/Fail option
Prerequisite: None

Students will be expected to be able to read, speak, and write about topics such as school, family, shopping, the weather, and personal interests such as sports, music, or travel. The student's proficiency at the end of the course should be at an upper beginning level as set down by the oral proficiency standards of ACTFL.

211 French II

Grade Level: Sophomore/Junior/Senior
Length: One Year
Credit: 1.00 Pass/Fail option
Prerequisite: French I

Students will be expected to be able to read, speak, and write about topics such as travel, career interests, personal ailments, car repairs, and official business. The student's proficiency at the end of the course should be at the middle intermediate level as set down by the ACTFL oral proficiency standards.

212 French III

Grade Level: Sophomore/Junior/Senior
Length: One Year
Credit: 1.00 Pass/Fail option
Prerequisite: French II

Students will be expected to be able to read, speak, and write about such topics as the comparative political systems of France and French-speaking countries, the educational systems as set up under colonial France and after liberation vs. the American system. The student's proficiency level at the end of the course should be at the beginning advanced level as set down by the ACTFL oral proficiency standards.

213 French IV

Grade Level: Sophomore/Junior/Senior
Length: One Year
Credit: 1.00 Pass/Fail option
Prerequisite: French III

Students will be expected to be able to read, speak, and write about topics in French and francophonic literature (Quebec, Tahiti, Senegal, and Cameroons). They should be able to converse about science, history, and current events. Individual and team projects will afford the students the ability to research and exchange knowledge with one another. The student's proficiency at the end of the course should be at the advanced level as set down by the ACTFL oral proficiency standards.

220 Spanish I

Grade Level: Sophomore/Junior/Senior
Length: One Year
Credit: 1.00 Pass/Fail option
Prerequisite: None

Students will be expected to be able to read, speak, and write about topics such as school, family, shopping, the weather, and personal interests such as sports, music, or travel. The student's proficiency at the end of the course should be at an upper beginning level as set down by oral proficiency standards of ACTFL.

221 Spanish II

Grade Level: Sophomore/Junior/Senior
Length: One Year
Credit: 1.00 Pass/Fail option
Prerequisite: Spanish I

Students will be expected to be able to read, speak, and write about topics such as travel, career interests, personal ailments, car repairs, and official business. The student's proficiency at the end of the course should be at the middle intermediate level as set down by the ACTFL oral proficiency standards.

222 Spanish III

Grade Level: Sophomore/Junior/Senior
Length: One Year
Credit: 1.00 Pass/Fail option
Prerequisite: Spanish II

Students will be expected to be able to read, speak, and write about topics such as the comparative political systems of Spanish speaking countries, and the Spanish educational system vs. the American system. The student's proficiency level at the end of the course should be at the beginning advanced level as set down by the ACTFL oral proficiency standards.

223 Spanish IV

Grade Level: Sophomore/Junior/Senior
Length: One Year
Credit: 1.00 Pass/Fail option
Prerequisite: Spanish III

Students will be expected to be able to read, speak, and write about topics in Spanish and Latin American literature, science, history, and/or current events. The student's proficiency level at the end of the course should be at the advanced level as set down by the ACTFL oral proficiency standards.

230 German I

Grade Level: Sophomore/Junior/Senior
Length: One Year
Credit: 1.00 Pass/Fail option
Prerequisite: None

Students will be expected to be able to read, speak, and write about topics such as school, family, shopping, the weather, and personal interests such as sports, music, or travel. The student's proficiency at the end of the course should be at an upper beginning level as set down by the oral proficiency standards of ACTFL.

231 German II

Grade Level: Sophomore/Junior/Senior
Length: One Year
Credit: 1.00 Pass/Fail option
Prerequisite: German I

Students will be expected to be able to read, speak, and write about topics such as travel, career interest, personal ailments, car repairs, and official business. The student's proficiency at the end of the course should be at the middle intermediate level as set down by ACTFL oral proficiency standards.

232 German III

Grade Level: Sophomore/Junior/Senior
Length: One Year
Credit: 1.00 Pass/Fail option
Prerequisite: German II

Students will be expected to be able to read, speak, and write about topics such as the comparative political systems of German-speaking countries, and the German educational system vs. the American system. The student's proficiency at the end of the course should be at the beginning advanced level as set down by ACTFL oral proficiency standards.

240 Japanese I

Grade Level: Sophomore/Junior/Senior
Length: One Year
Credit: 1.00 Pass/Fail option
Prerequisite: None

The Japanese language is introduced through the basic skills of speaking, listening, reading, and writing. Special emphasis is placed on the development of single grammatical construction necessary for simple communications. Students are given an introduction to Japanese culture.

241 Japanese II

Length: One Year
Credit: 1.00 Pass/Fail option
Prerequisite: Japanese I

A continuation of the first year course not only expands on the basic skills, but places further emphasis on vocabulary building and written and oral self-expression. The study of Japanese culture is continued as an integral part of the course.

250 Russian I

Grade Level: Sophomore/Junior/Senior
Length: One Year
Credit: 1.00 Pass/Fail option
Prerequisite: None

Students will learn Cyrillic script and Russian phonetics. They will practice reading, writing, and conversation on everyday themes at an elementary level an they will be able to ask and respond to any possible question relative to the content of elementary reading material. Successful completion of Russian I is required for eligibility for participation in the US/USSR Partnership Program.

251 Russian II

Grade Level: Sophomore/Junior/Senior
Length: One Year
Credit: 1.00 Pass/Fail option
Prerequisite: Russian I

Students will learn more complex grammatical structures and expand their vocabulary through reading and discussion of literature and popular periodicals. They will practice translating, interpreting, and speech-making at an intermediate level. They will begin to learn the vocabulary and conventions of mathematical and scientific discourse in Russian. High competency in Russian II is required for eligibility for participation in the US/USSR Partnership Program.

252 Russian III

Grade Level: Sophomore/Junior/Senior
Length: One Year
Credit: 1.00 Pass/Fail option
Prerequisite: Russian II

Students will learn advanced Russian grammar and word formation. The course will include reading and discussion of literary and scholarly texts in Russian. The primary emphasis toward the end of the year will be on the vocabulary and conventions of mathematics and scientific discourse.

MATHEMATICS

300(F) Geometry I

Grade Level: Sophomore/Junior/Senior
Length: One Semester (Fall)
Credit: .50
Prerequisite: Recommendation of Instructor

This is the first semester of a two semester sequence of study that will include the study of plane and solid geometry. Emphasis will be placed on the concepts of proof and problem solving as well as topics necessary for the advanced study of mathematics.

301(S) Geometry II

Grade Level: Sophomore/Junior/Senior
Length: One Semester (Spring)
Credit: .50
Prerequisite: Recommendation of Instructor

This is the second semester of a two semester sequence that will include the study of plane and solid geometry. Emphasis will be placed on the concepts of proof and problem solving as well as topics necessary for the advanced study of mathematics.

302(F) Geometry I/II

Grade Level: Sophomore/Junior/Senior
Length: One Semester (Fall)
Credit: .50
Prerequisite: Recommendation of Instructor

This is a one semester, accelerated course in Euclidean Geometry for students with a solid background in Advanced Algebra. In addition to the content of a standard year long Geometry course, problem solving and proof are emphasized. The course is designed for students with strong independent study skills.

303(F) Analysis I

Grade Level: Sophomore/Junior/Senior
Length: One Semester (Fall)
Credit: .50
Prerequisite: Recommendation of Instructor

The first of a four semester pre-calculus sequence of courses including content drawn from advanced algebra, trigonometry, college algebra, and analytic geometry.

304(F) Analysis II
305(S)

Grade Level: Sophomore/Junior/Senior
Length: One Semester
Credit: .50
Prerequisite: Recommendation of Instructor

The second of a four semester pre-calculus sequence of courses including content drawn from advanced algebra, trigonometry, college algebra, and analytic geometry.

306(F) Analysis III
307(S)

Grade Level: Sophomore/Junior/Senior
Length: One Semester
Credit: .50
Prerequisite: Recommendation of Instructor

The third of a four semester pre-calculus sequence of courses including content drawn from advanced algebra, trigonometry, college algebra, and analytic geometry.

308(F) Analysis IV
309(S)

Grade Level: Sophomore/Junior/Senior
Length: One Semester
Credit: .50
Prerequisite: Recommendation of Instructor

The fourth of a four semester pre-calculus sequence of courses including content drawn from advanced algebra, trigonometry, college algebra, and analytic geometry.

310(F) AP Calculus I
311(S)

Grade Level: Sophomore/Junior/Senior
Length: One Semester
Credit: .50
Prerequisite: Recommendation of Instructor

The first of a three semester sequence which will include the material covered in the Advanced Placement BC Calculus syllabus. In addition to some concepts from analytic geometry, this course will cover the foundations of calculus including concepts and applications of limits, continuity, the derivative, and the integral. Polynomial, rational, and transcendental functions will be studied.

312(F) AP Calculus II
313(S)

Grade Level: Sophomore/Junior/Senior
Length: One Semester
Credit: .50
Prerequisite: AP Calculus I

The second of a three semester sequence which will include the material covered in the Advanced Placement BC Calculus syllabus. Topics will include concepts and applications of advanced techniques of integration, improper integrals, indeterminant forms, and parametric and polar equations.

314(F) AP Calculus III
315(S)

Grade Level: Sophomore/Junior/Senior
Length: One Semester
Credit: .50
Prerequisite: AP Calculus II

The third of a three semester sequence which will include the material covered in the Advanced Placement BC Calculus syllabus. Topics will include concepts and applications of hyperbolic functions, sequences and series, vectors, and solid analytic geometry.

316(S) Advanced Geometry

Grade Level: Junior/Senior
Length: One Semester
Credit: .50 Pass/Fail option
Prerequisite: Be enrolled in or have completed Analysis II

A study of advanced Euclidean geometry and non-Euclidean geometries, with topics selected from finite geometry, spherical and hyperbolic geometries, geometric constructions by Euclidean and Mascheroni methods, conics, the Golden rectangle, and transformational geometry.

317(S) Data Analysis

Grade Level: Junior/Senior
Length: One Semester
Credit: .50 Pass/Fail option
Prerequisite: Be enrolled in or have completed Analysis II

A study of descriptive statistics and measures of central tendency and dispersion. Topics will include: Normal, Binomial, and Poisson Distributions, probability, Chi-square distributions, curve fitting, regression, correlation, and hypotheses testing.

318(S) Differential Equations

Grade Level: Junior/Senior
Length: One Semester (Spring)
Credit: .50 Pass/Fail option
Prerequisite: Multi-Variable Calculus or Recommendation of Instructor

The course includes the study of first and higher order differential equations, linear differential equations, homogeneous and non-homogeneous equations, differential operators, and LaPlace transformations.

319(F) Exploring Math Topics Using "Mathematica©"

Grade Level: Junior/Senior
Length: One Semester
Credit: .50 Pass/Fail option
Prerequisite: Enrollment in Calculus. Recommendation of the instructor. Familiarity with a Macintosh computer is advisable.

The focus of this course will be to explore topics found in mathematics. Students and faculty will use the computer environment made possible by the "MATHEMATICA" software to view these topics from multiple perspectives. Prior experience in programming is helpful but not required because the course will include training on the software. Enrollment will be limited by the size of the Macintosh II laboratory.

320(F) Multi-Variable Calculus
321(S)

Grade Level: Junior/Senior
Length: One Semester
Credit: .50 Pass/Fail option
Prerequisite: AP Calculus III

Topics will include a study of functions of several variables, applications of partial derivatives, multiple integrals, line integrals, and an introduction to differential equations.

322(F) Number Theory

Grade Level: Junior/Senior
Length: One Semester
Credit: .50 Pass/Fail option
Prerequisite: Analysis III and Recommendation of Instructor.

The course covers a good part of traditional undergraduate level number theory including the study of prime numbers and divisibility of integers, solving congruence, Diophantine Equations and introduction of other extended number theory concepts. The material will be delivered with full mathematical

rigor including logical proof in addition to intuitive understanding of number phenomena. The presentation can be viewed as a continuation of the algebra portion of the secondary school mathematics.

323 Problem Solving

Grade Level: Junior/Senior
Length: One Semester
Credit: .50 Pass/Fail option
Prerequisite: Analysis II or Recommendation of Instructor.

A study of various types of problems that occur in mathematics, including MAA problems, Illinois Mathematics League problems, the study of Pascal's Triangle, and selected topics from geometry, number theory, and probability.

324(F) Discrete Mathematics

Grade Level: Junior/Senior
Length: One Semester
Credit: .50 Pass/Fail option
Prerequisite: Analysis III

A study of sets, relations, functions, logic, Boolean Algebra, Graph Theory, networks, combinatorics, recurrence relations, and finite state machines.

350 Introduction to Pascal

Grade Level: Junior/Senior
Length: One Semester
Credit: .50 Pass/Fail option
Prerequisite: Be enrolled in or have completed Analysis II

An introduction of programming and computer science using the Pascal language. A significant amount of the AP Computer Science A/B syllabus will be discussed.

351(S) AP Computer Science

Grade Level: Junior/Senior
Length: One Semester (Spring)
Credit: .50 Pass/Fail option
Prerequisite: Computer Languages-Pascal or Recommendation of Instructor

This course will complete the AP Computer Science AB syllabus. Topics may include: pointer variables, recursion, stacks, queues, trees, linked lists, advanced programming techniques including advanced sorts and searches. In addition, each student will develop a major program.

352(F) Computer Seminar

Grade Level: Junior/Senior
Length: One Semester (Fall)
Credit: .50 Pass/Fail option
Prerequisite: Computer Applications or Recommendation of Instructor

This class will explore advanced programming languages, such as C and Prolog. In addition, the class will collectively produce a major program using one of these languages.

PHYSICAL EDUCATION

401(F) Physical Education
402(S)

Grade Level: Sophomore or Junior year
Length: One Year if not combined with Health requirement
Credit: Pass/Fail - no issued.
Prerequisite: None

This course consists of an integrated curriculum of individual and dual sports, team activities, and the teaching of concepts and exercises promoting health-related fitness. Helping students incorporate physical activities they enjoy into their daily lifestyle is stressed.

410(F) Health
411(S)

Grade Level: Sophomore/Junior
Length: One Semester
Credit: Pass/Fail No credit issued.
Prerequisite: None

Throughout the semester, students will be exposed to a variety of topics relating to personal and community health. This exposure will be accomplished through lectures, group discussions, other participatory group activities, self-assessment, and research.

SCIENCE

501 Sophomore Chemistry

Grade Level: Sophomore
Length: One Year
Credit: 1.00
Prerequisite: None

This entry level core course is required for all first year students at the Academy. It is a complete introductory college course in chemistry investigating topics such as inorganic structure, chemical equilibrium, reaction kinetics, and chemical

thermodynamics through extensive laboratory activities. Students use the computer for acquisition and handling of scientific data.

502 Advanced Chemistry

Grade Level: Junior/Senior
Length: One Semester
Credit: .50 Pass/Fail option
Prerequisite: Sophomore Chemistry

This course continues the study of inorganic chemistry that began in Sophomore Chemistry. Concepts introduced in Sophomore Chemistry are reviewed and expanded upon. Emphasis is on lecture and problem-solving as well as laboratory experiments. This course is strongly recommended for those students who plan on taking the AP Chemistry exam.

504(F) * Organic Chemistry I

Grade Level: Junior/Senior
Length: One Semester
Credit: .50 Pass/Fail option
Prerequisite: Sophomore Chemistry

505(S) * Organic Chemistry II

Grade Level: Junior/Senior
Length: One Semester
Credit: .50 Pass/Fail option
Prerequisite: Organic Chemistry I

* These courses are designed as an introduction to the main functional groups of organic chemistry and their reactions. Emphasis is placed on understanding the theory behind organic reactions. Experiments are included to introduce laboratory techniques as well as demonstrate concepts. State-of-the-art instruments will be utilized in the laboratory.

506(S) Biochemistry

Grade Level: Junior/Senior
Length: One Semester
Credit: .50 Pass/Fail option
Prerequisite: Organic Chemistry I

Many fundamental and interesting applications of chemistry to life will be discussed and studied in the laboratory. Topics include the structure of carbohydrates, lipids, amino acids, proteins, and vitamins as well as the metabolic pathways by which these compounds are interconverted.

508(S) Facets of Thermodynamics

Grade Level: Junior/Senior
Length: One Semester
Credit: .50 Pass/Fail option
Prerequisite: Sophomore Chemistry and Sophomore Physics

The thermodynamics course will present an in-depth, non-calculus view of three laws of thermodynamics and the related concepts of work, heat, thermal efficiency and the state functions as applied to real-world examples. Many aspects of entropy, a state function, will be examined. Practical lab work and field trips to companies where thermodynamics is an integral part of their operation will be included. Recommended for students interested in majoring in engineering and applied science.

521 Sophomore Physics

Grade Level: Sophomore
Length: One Year
Credit: 1.00
Prerequisite: None

This entry-level core course is required for all first year students at the Academy. It presents the foundational concepts of physics and the skills needed to investigate physical systems using a laboratory approach. It involves observation, data analysis, model building and prediction. It emphasizes conceptual development to be used in problem solving. Basic course content: mechanics, wave phenomena and light, kinetic theory, geometrical optics, electricity and magnetism.

522 Advanced Physics

Grade Level: Junior/Senior
Length: One Semester
Credit: .50 Pass/Fail option
Prerequisite: Sophomore Physics

This course completes the study of basic physics concepts begun in Sophomore Physics. It reviews some previously covered topics and presents additional material in rotational mechanics, thermodynamics, optics, electricity and magnetism, and modern physics. The emphasis throughout is on problem solving techniques and laboratory analysis. This course is strongly recommended for students who intend to take the AP Physics B exam.

523(F) * Calculus-based Physics - Mechanics

Grade Level: Junior/Senior
Length: One Semester (Fall)
Credit: .50 Pass/Fail option
Prerequisite: Sophomore Physics and AP Calculus I

524(S) * Calculus-based Physics - Electricity/Magnetism

Grade Level: Junior/Senior
Length: One Semester (Spring)
Credit: .50 Pass/Fail option
Prerequisite: Sophomore Physics and AP Calculus I

* Calculus-based physics follows the typical sequence of a University Physics course. The first semester is devoted to topics in mechanics, while the second semester develops the ideas of electricity and magnetism. The major emphasis of the course is on problem solving and calculus is used throughout. This course is strongly recommended for students who intend to take the AP Physics C exam.

525 Astrophysics

Grade Level: Junior/Senior
Length: One Semester
Credit: .50 Pass/Fail option
Prerequisite: Sophomore Physics

The major content emphasis of Astrophysics is on Stellar Evolution. Techniques from classical mechanics, electromagnetism, nuclear and atomic physics are utilized to examine the inter-relationship between theoretical models and observational evidence. Topics include astronomical instrumentation, stellar characteristics, the interstellar medium and the various models of stellar formation. The evolutionary phases of stars and the manner in which they end their existences are all explored.

526 Observational Astronomy

Grade Level: Junior/Senior
Length: One Semester
Credit: .50 Pass/Fail option
Prerequisite: Sophomore Physics

Observational Astronomy is a course for students who wish to gain an understanding of the night sky. The identification of stars and their patterns, the use of coordinate systems, and celestial mechanics are the topics of emphasis. The naked-eye, binoculars, telescopes, and astrophotography will be utilized extensively to examine the universe around us. There will be one evening meeting per week.

527 Electronics

Grade Level: Junior/Senior
Length: One Semester
Credit: .50 Pass/Fail option
Prerequisite: Sophomore Physics

Electronics is a hands-on laboratory-centered course which utilizes state-of-the-art instrumentation for the examination and analysis of electronic phenomena. The curriculum will include laboratory activities utilizing solid state devices such as operational amplifiers, transistors, and integrated circuits. Problem finding and problem solving skills will be developed, and the role of electronics in other disciplines will be illustrated.

528 Topics in Modern Physics

Grade Level: Junior/Senior
Length: One Semester
Credit: .50 Pass/Fail option
Prerequisite: Sophomore Physics

This course includes topics in physics beyond the scope of Sophomore Physics which relate to phenomena and devices of importance to modern physicists. These include: quantum and atomic physics, relativity (special/general), cosmology, accelerators and detectors, particle physics, nuclear physics, symmetry, superconductivity. This course and Advanced Physics is strongly recommended for students who intend to take the AP Physics B exam.

541 University Biology

Grade Level: Junior
Length: One Year
Credit: 1.00
Prerequisite: Sophomore Chemistry and Sophomore Physics

This core course is required for all Junior students at the Academy. It is a survey course for students with a background in chemistry and physics. Topics include molecular biology, cell biology, ecology, and the genesis and diversity of organisms. Extensive laboratory experiences are provided and concepts are developed by the inquiry method.

542(F) Ecology

Grade Level: Senior
Length: One Semester (Fall)
Credit: .50 Pass/Fail option
Prerequisite: University Biology

Interactions among organisms, and among organisms and their environments. Theoretical and applied aspects, including current environmental issues. Lectures, field trips, presentations, labs, and other activities.

543 Human Anatomy and Physiology

Grade Level: Senior
Length: One Semester
Credit: .50 Pass/Fail option
Prerequisite: University Biology

This course covers the current information about the structure and function of the human body. Emphasis is placed on the cardiovascular, respiratory, nervous, and endocrine systems. Laboratory work utilizes the open-ended investigative format. Computers are used for data acquisition and analysis. Value analysis activities covering various aspects of human biology are included in discussion sections. A class project and field trips are integral parts of the course.

544 General Microbiology

Grade Level: Junior/Senior
Length: One Semester
Credit: .50 Pass/Fail option
Prerequisite: 1st Semester of University Biology

An examination of microbial diversity which emphasizes the inter-relationships of bacteria with their environment. This includes aspects of cell structure, metabolism, growth, genetic structure/change in microorganisms, immunology, and medical microbiology. Laboratory exercises will include microscopy, staining techniques, pure culture techniques, control of microbial growth, quantitative techniques, physiological testing and serology. A series of unknown cultures will be presented to the student to test their mastery of the above techniques.

545(S) Pathogenic Microbiology

Grade Level: Senior
Length: One Semester (Spring)
Credit: .50 Pass/Fail option
Prerequisite: General Microbiology

Survey of the bacteria, protozoa, viruses, and fungi associated with infectious disease, including study of morphology, physiology, immunology, of these host/parasite interactions. A library research paper dealing with some disease-causing microbe will be required.

546 Genetics

Grade Level: Junior/Senior
Length: One Semester (Spring)
Credit: .50 Pass/Fail option
Prerequisite: 1st Semester of University Biology

Coverage of traditional and modern aspects, including population genetics, Mendelian genetics, sex linkage, mutation, DNA manipulation, gene mapping, statistical applications, and ethical dilemmas posed by recent technological advances. Varied activities, including labs, presentations, discussions, and lectures.

549(F) Cell Biology

Grade Level: Junior/Senior
Length: One Semester
Credit: .50 Pass/Fail option
Prerequisite: 1st Semester of University Biology

The focus in this course will be the cell. Topics of exploration include the structure, growth, chemistry, metabolism, regulation, genetics, and organelle function of biological cells. The tools and techniques by which scientists study these processes will also be discussed. Students will gain practical experience in these techniques in the laboratory portion of this class.

581(F) Junior Project in Science
582(S)

Grade Level: Junior
Length: One - Two Semester(s)
Credit: .50 - 2.00 Pass/Fail option
Prerequisite: Science Team and Director of Academic Programs approval

Independent projects or research which enable juniors to investigate an approved science topic of their choice under the sponsorship of a faculty advisor. The project must be designed and appropriate approval granted before the beginning of the

project term. The process of this project is as important as the product. The outcome of some of the activities may result in competition with peers or publication.

627(F) Science, Society and the Future

Grade Level: Senior
Length: One Semester
Credit: 1.00**(.50 Social Science and .50 Science)**
Pass/Fail option
Prerequisite: None

Exploration of issues which result from the collision of science and society is the focus of this course. The investigations will be lead by a team of instructors from science and social science. The roots, controversies and ethical implications of each issue will be examined in a "think tank" environment with special attention given to analysis of the behavior of complex systems using basic science knowledge and mathematical modeling. Attention is also given to the potential impact each solution might have on society. **This course will count as two academic courses towards the minimum five academic classes required each semester.**

SOCIAL SCIENCE

601 American Studies

Grade Level: Sophomore
Length: One Year
Credit: 1.00
Prerequisite: None

This course explores the events, trends, personalities, and complex series of connections which help explain the global nature of modern America. Through simulation, problem-solving, and research, students investigate relationships between the past and the present, especially the evolution of an increasingly globalized human experience. All the skills of the social scientist are used during this course with special attention given to the expression of ideas through writing.

610 World Studies

Grade Level: Junior
Length: One Year
Credit: 1.00
Prerequisite: American Studies

Our world's history and the major issues confronting its people have assumed an increasingly global character. An understanding of the roots of our global era is developed through a humanities approach which focuses on the ideas, events, trends, ideologies,

and the creative expressions of humankind. Students continue using their social science skills and writing ability for investigation and communication.

620(F) Political Science

Grade Level: Senior
Length: One Semester
Credit: .50 Pass/Fail option
Prerequisite: None

Politics, power, and government are the focus of study for the political scientist. Students will compare major political systems in the world, discover the dynamics of the election process, investigate the power of special interest groups and the media in politics, and experience the nature of government and politics through simulation and field study.

621(S) International Relations

Grade Level: Senior
Length: One Semester
Credit: .50 Pass/Fail option
Prerequisite: None

The theory and conduct of relations between nations will be investigated from a historical and "crisis management" point of view. Of special interest will be America's rise and response to its position as a world power. Examples of cooperation and conflict will be studied to gain insights into the relations between superpowers and the management of international problems such as terrorism, hunger, debt, pollution, racism, and the arms race.

623 Psychology

Grade Level: Senior
Length: One Semester
Credit: .50 Pass/Fail option
Prerequisite: None

Psychology the scientific study of behavior and mental processes, organizes and investigates information regarding the inherently fascinating subjects of ourselves and the people around us. This course will survey such topics as physiological psychology, sensation, perception, learning, problem solving, memory, motivation, life cycle development, interpersonal relations, stress, and abnormal psychology. The overall goals of Psychology include the development of an awareness of the complexity of human behavior and a concomitant increase in the understanding of self and others. Along with content knowledge and hands-on activities, students in this class will work on developing their abilities to analyze, interpret, relate and communicate information orally and in writing.

625(F) Macroeconomics

Grade Level: Senior
Length: One Semester (Fall)
Credit: .50 Pass/Fail option
Prerequisite: None

Macroeconomics is an issues oriented course in which basic macroeconomic concepts and theories (scarcity, supply and demand, inflation, unemployment, fiscal and monetary policy) are presented through the exploration and analysis of specific political and social realities. The issues themselves are ordered so as to facilitate a logical and systematic development of macroeconomic principles, concepts and theories. An exploration of economic thought provides the background for debates, discussions, simulations, and research which will be our tools for analysis.

The students will also have an opportunity to participate in a mock international currency and interest rate vehicle trading exercise which should give their newly acquired knowledge of macroeconomics concepts a certain immediacy.

626(S) Microeconomics

Grade Level: Senior
Length: One Semester (Spring)
Credit: .50 Pass/Fail option
Prerequisite: None

Microeconomics is an issues oriented course in which basic microeconomic concepts and theories (demand and consumer choice, the firm, monopoly, oligopoly, capital, interest, profits, labor unions and collective bargaining) are presented through the exploration and analysis of specific political and social realities. The issues themselves are ordered so as to facilitate a logical and systematic development of microeconomic principles, concepts, and theories. An exploration into the historical development of the modern corporation and capitalism provides the background for debates, discussions, simulations and research which will be our tools for analysis.

The students will have an opportunity to guide the fortunes of a fictitious multinational conglomerate through the hazards of a simulated international business environment which should give their newly acquired knowledge of microeconomic concepts a certain immediacy.

627(F) Science, Society and the Future

Grade Level: Senior
Length: One Semester
Credit: 1.00**(.50 Social Science and .50 Science)**
Pass/Fail option
Prerequisite: None

Exploration of issues which result from the collision of science and society is the focus of this course. The investigations will be lead by a team of instructors from science and social science. The roots, controversies and ethical implications of each issue will be examined in a "think tank" environment with special attention given to analysis of the behavior of complex systems using basic science knowledge and mathematical modeling. Attention is also given to the potential impact each solution might have on society. **This course will count as two academic courses towards the minimum five academic classes required each semester.**

628(S) Theories of War - Theories of Peace

Grade Level: Senior
Length: One Semester
Credit: .50 Pass/Fail option
Prerequisite: None

Christ, Machiavelli, Clausewitz, Gandhi, Mao and Dr. Martin Luther King all had different ideas about how conflicts could and should be resolved. This course will explore the theoretic framework each of these thinkers developed and then go on to assess their theories in the context of specific historical events. In the second part of the course an effort will be made to examine the impact of technology on war. TV, lasers, computers and industrialization will all be examined. World Wars I and II, Vietnam and the 1973 Arab-Israeli War will provide the context for this portion of the course.

Senior Project

Grade Level: Senior
Length: One - Two Semester(s)
Credit: .50 - 2.00 Pass/Fail option
Prerequisite: Team and Director of Academic Programs approval

Team	Fall	Spring	Team	Fall	Spring
English	090	091	Health	492	493
Music	190	191	Science	590	591
Art	192	193	Chemistry	592	593
For. Lang.	290	291	Physics	594	595
Math	390	391	Biology	596	597
Comp. Sci.	392	393	Soc. Science	690	691
Phy. Ed.	490	491	Academy Research	790	791

Independent projects or research which enable seniors to investigate an approved topic of their choice under the sponsorship of a faculty advisor. The project must be designed and appropriate approval granted before the close of the student's junior year.

Significant progress on the project must be demonstrated to the faculty advisor at the beginning of the student's senior year, at the close of the first quarter of that year, and at the close of the first semester. The project must be completed by the third quarter of the student's senior year. The process of this project is as important as the product: a journal-record/research notebook and an annotated bibliography must, therefore, precede submission of the final product, which may be a performance, a lecture, a work of fine art, or a paper.

Projects to be submitted for credit to more than one department must be approved by all participating departments prior to the completion of the student's junior year. Each participating department will monitor the progress of the project at critical checkpoints.

The student's finished product will be presented to their project review committee during the second semester of the student's senior year for determination of credit. Students may be called upon to present the results of their research in other settings as well.

(June, 1990)