

# Illinois Mathematics and Science Academy®

*igniting and nurturing creative, ethical scientific minds that advance the human condition*

## LEARNING OPPORTUNITIES 2011/2012

### GRADUATION REQUIREMENTS AND COURSE LOAD

The graduation requirements of the Illinois Mathematics and Science Academy are in concert with those maintained by the State of Illinois with additional requirements as established by the IMSA Board of Trustees. Each semester students must take a minimum of 5 academic courses (2.5 credits) for a grade (not Pass/Fail). Fine Arts, Wellness, and Independent Study courses, or any course taken on a Pass/Fail basis do not count towards the 5 course (2.5 credits) minimum. Most students will take between 5 (2.5 credits) and 7 (3.5 credits) academic courses per semester. Only courses taken for a letter grade will count towards graduation credit. Students who take more than 5 courses may choose to take all courses for a grade. It is recommended that students who are approved to take 7 academic courses declare one elective Pass/Fail.

**Credit in courses taken at the Academy must total a minimum of 17 units in three years.** The credit distribution is:

- **Eight (8.0) credits in Science and Mathematics**, which include:
  - a) **Minimum four credits (4.0) in Science.**

The Core Science Program consists of four one semester courses: SCI105, Scientific Inquiries - Chemistry; SCI115, Scientific Inquiries - Physics; SCI125, Scientific Inquiries - Biology; and SCI135, Methods in Scientific Inquiry. **All students are required to complete SCI135, Methods in Scientific Inquiry.** Students new to IMSA who demonstrate an exemplary past academic record in biology, physics, or chemistry may choose to take a placement exam in that particular subject. A satisfactory placement exam score will demonstrate competency in the subject matter of that particular course and the student will then be enrolled in an appropriate elective course. Completion of the Science core program or its equivalent, i.e. satisfactory grades in the appropriate placement exams allows students to enroll in a large number of electives in earth/space science, biology, chemistry, physics, and applied sciences.
  - b) **Minimum three (3.0) credits in Mathematics**, which include core courses that move toward completion of AB or BC Calculus (including Geometry). **Students must be enrolled in at least one core Mathematics course each semester.** (Once the Calculus core sequence is completed, then any approved mathematics elective taken for grade will be considered to satisfy the core course enrollment requirement). All students are mandated to successfully complete the equivalent of a high school geometry course prior to graduation. This requirement can be met in one of the following ways:
    - i) A student completes geometry in own home school, prior to admission to IMSA; or
    - ii) A student completes an IMSA-approved geometry course by the end of junior year.Students who have not completed a geometry course prior to admission will automatically be placed into geometry in their sophomore year.
  - c) **One additional (1.0) credit (2 courses) in either Mathematics or Science.**
- **Three (3.0) credits in English**, which include Literary Explorations I, II and III and three English electives. **Students must be enrolled in an English course each semester.**
- **Two and one-half (2.5) credits in History and Social Sciences**, which include American Studies (1.0), a fall junior elective and the spring course The World in the Twentieth Century (which together makes 1.0) as well as one History and Social Sciences elective.
- **Two (2.0) credits (four semesters) in World Languages** taken two out of the three years at the Academy including completion of an Academy Level II course or higher. All World Languages courses are year-long courses and cannot be dropped at the end of the fall semester unless the student receives approval from the instructor and the Principal's Office.
- **One-half (0.50) credit in Fine Arts** taken in the performing arts or the visual arts. All Music courses are year-long courses and cannot be dropped at the end of the fall semester unless the student receives approval from the instructor and the Principals Office.
- **One (1.0) credit in Wellness** including a one-semester course of Moving and Learning and one elective.

All students are also required to:

1. Successfully complete two hundred (200) hours of Academy approved service by graduation.
2. Participate and successfully complete three years of Intersession programming.
5. Participate in Development programs (i.e. LEAD, Consideration in Ethics, and Navigation).

Modification of these requirements can be made only with prior approval of the Principal.

Previous high school, virtual high school, or college credits earned at another institution will not earn graduation credit at IMSA.

# MATHEMATICS

**MAT101** (Fall)  
**MAT102** (Spring)

## **Geometry I/II (core)**

Grade Level: Sophomore/Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Initial Placement by Math Department

This is a one semester accelerated course in Euclidean Geometry for students with a solid background in algebra. In addition to content from a standard year long geometry course, problem solving, algebra review, conjecture, and proof are emphasized. Students will also have the opportunity, using computers, to explore geometry dynamically.

**MAT110** (Full Year)

## **Mathematical Investigations I/II (core)**

Grade Level: Sophomore/Junior  
Length: Two Semesters  
Credit: 1.0  
Prerequisite: Initial Placement by Math Department

The Mathematical Investigations courses integrate topics from all areas of pre-calculus mathematics. In these courses, students will be expected to explore mathematical concepts, make conjectures and present logical, valid arguments for mathematical assertions. Both written and oral forms of communication are emphasized. Mathematical Investigations I/II is a two-semester sequence of courses. The first semester emphasizes advanced algebraic skills, linear relationships, equations and applications, data analysis and modeling, and an introduction to functions. The second semester concentrates on the study of matrices, beginning sequences, functions and function transformations, and exponential functions.

**MAT121** (Fall)  
**MAT122** (Spring)

## **Mathematical Investigations II (core)**

Grade Level: Sophomore/Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Initial Placement by Math Department

The Mathematical Investigations courses integrate topics from all areas of pre-calculus mathematics. In these courses, students will be expected to explore mathematical concepts, make conjectures and present logical, valid arguments for mathematical assertions. Both written and oral forms of communication are emphasized. MI-2 focuses on the study of matrices, linear relationships, functions and function transformations, while also introducing exponential functions and combinatorics.

**MAT131** (Fall)  
**MAT132** (Spring)

## **Mathematical Investigations III (core)**

Grade Level: Sophomore/Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Mathematical Investigations II or Initial Placement by Math Department

The Mathematical Investigations courses integrate topics from all areas of pre-calculus mathematics. In these courses, students will be expected to explore mathematical concepts, make conjectures and present logical, valid arguments for mathematical assertions. Both written and oral forms of communication are emphasized. MI-3 builds on MI-2, extending the concept of function and applications to include logarithmic functions, polynomial functions, rational functions, and trigonometric functions.

**MAT141** (Fall)  
**MAT142** (Spring)

### **Mathematical Investigations IV (core)**

Grade Level: Sophomore/Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Mathematical Investigations III or Initial Placement by Math Department

The Mathematical Investigations courses integrate topics from all areas of pre-calculus mathematics. In these courses, students will be expected to explore mathematical concepts, make conjectures and present logical, valid arguments for mathematical assertions. Both written and oral forms of communication are emphasized. MI-IV focuses on the study of sequences and series, vectors, advanced trigonometry, polar coordinates, complex numbers, and mathematical induction.

**MAT211** (Fall)

### **AB Calculus I (core)**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Mathematical Investigations IV and recommendation of MI Instructors

AB Calculus is a two-semester sequence, which includes the concepts presented in the Advanced Placement AB Calculus syllabus. The first semester course discusses limits, derivatives and their applications.

**MAT222** (Spring)

### **AB Calculus II (core)**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: AB Calculus I

The second semester of this sequence will include additional topics from the Advanced Placement AB Calculus syllabus with a concentration on the integral and its applications. Students completing AB Calculus I and II will have completed the equivalent of a semester of college level calculus.

**MAT311** (Fall)  
**MAT312** (Spring)

### **BC Calculus I (core)**

Grade Level: Sophomore/Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Mathematical Investigations IV and recommendation of MI Instructors

BC Calculus is a three-semester sequence, which includes the material covered in the Advanced Placement BC Calculus syllabus. This course will cover the foundations of calculus including concepts and applications of rates of change, derivatives, anti-derivatives, and limits. With help from technology, these will be seen from graphical, numerical, and analytic points of view.

**MAT321** (Fall)  
**MAT322** (Spring)

**BC Calculus II (core)**

Grade Level: Sophomore/Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: BC Calculus I

This second course will continue the study of derivatives and begin work on concepts and applications of integrals. Technology will be an important part of the development of the course.

**MAT331** (Fall)  
**MAT332** (Spring)

**BC Calculus III**

Grade Level: Sophomore/Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: BC Calculus II

The third course of the sequence will conclude the material covered in the Advanced Placement BC Calculus syllabus. Topics will include sequences and series, differential equations, and polar graphs.

**MAT362** (Spring)

**BC Calculus I/II (core)**

Grade Level: Sophomore/Junior  
Length: One Semester  
Credit: 0.50  
Prerequisite: MI IV and recommendation of MI Instructor(s) and Mathematics Operational Coordinator.

BC Calculus is a three-semester sequence, which includes the material covered in the Advanced Placement BC Calculus syllabus. This course, along with BC Calculus II/III, will cover the same content as the three-semester BC Calculus sequence. The pace of these courses will be much faster, and there will be even greater expectations on students to assist in developing the theory through small and large group interactions, both in and out of the classroom. This course will cover the foundations of calculus, including concepts and applications of rates of change, derivatives, anti-derivatives, and limits, and begin work on concepts and applications of integrals. With help from technology, these will be seen from graphical, numerical, and analytic points of view.

**MAT371** (Fall)

**BC Calculus II/III (core)**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: BC Calculus I/II and recommendation of Instructor and Mathematics Operational Coordinator.

The second course of the sequence will conclude and extend the material covered in the Advanced Placement BC Calculus syllabus. Topics will include applications of integrals, improper integrals, sequences and series, differential equations, and the calculus of polar coordinates and vector-valued functions.

**MAT402** (Spring)

### **Advanced Geometry**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisites: Mathematical Investigations III or recommendation of Instructor

This course is a study of advanced topics in geometry selected from such areas as: points of concurrence, pedal triangles, Miquel points, Wallace lines, non-Euclidean Geometries, the theorems of Ceva, Menelaus, Pascal, Desargues, and Pappus. The course emphasizes mathematical connections through individual and group explorations, discussions and problem solving.

**MAT422** (Spring)

### **Polyhedra and Geometric Sculpture**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisites: Mathematical Investigations IV

This course focuses on the theory and design of polyhedra (three-dimensional figures with planar sides, such as a cube) and geometric sculpture. Emphasis is on the construction of models (there are usually one or two laboratory periods per week) as well as studying their metrical properties using spherical trigonometry. Two and three-dimensional coordinate geometry, in conjunction with *Mathematica*, will be used in the design of geometric sculptures. These sculptures will be modular in nature, being assembled from pieces machined by a CNC ShopBot. In addition, polymer-based rapid prototyping will be explored. A substantial Final Project is integrated into the course so that students can pursue a particular topic of interest in depth.

**MAT432** (Spring)

### **Graph Theory with Applications**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisites: Mathematical Investigations IV or Discrete Mathematics

Graph Theory with Applications will examine graph theory both as a mathematical discipline and as a useful tool in scientific study. In this course, students will explore important concepts in graph theory, such as combinatorics, colorings, embeddings, matchings, and domination, and relevant theorems about them. Students will be expected to speak and read the mathematical language of graph theory and be able to prove some statements. Throughout the course, emphasis will be placed on discrete mathematics and the tools thereof. Applications of graph theory to chemistry, neurology, epidemiology, sociology, computer science, and operations research will be explored

**MAT411** (Fall)

### **Statistical Exploration and Description**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Mathematical Investigations III and Methods in Scientific Inquiry

This course will serve as an introduction to college level statistical thinking. It is built around two broad conceptual themes: 1) Exploring Data: It will make use of graphical and numerical techniques to study patterns and departures from patterns. 2) Planning and conducting surveys and planning and conducting experiments. It will serve as an introductory course to Statistical Experimentation and Inference.

**MAT412** (Spring)

### **Statistical Experimentation and Inference**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Statistical Exploration and Description

This course provides college-level work in statistics. It will engage students in the major concepts and tools for analyzing, and drawing conclusions from data. The study of random variables will set the stage for developing models that will allow inferences to be drawn from data. It will emphasize sound statistical thinking rather than routine procedures and prepare students to take the Advanced Placement exam in Statistics.

**MAT415** (Fall or Spring)

### **Mathematica and Mathematics**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Mathematical Investigations IV or Mathematical Investigations III and permission of instructor.

Students will learn how to use Mathematica computer software to help model and explore mathematical topics. Much of the course will be project oriented, including creating interactive notebooks and programming, depending upon individual student backgrounds and interests. Possible topics for projects include math, physics, chemistry, astronomy, economics, music, image editing, and many others options. Students will work with 2D and 3D graphics, colors, and animations. No prior experience with Mathematica or with computer programming is necessary.

**MAT421** (Fall)

### **Number Theory**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: BC Calculus I (which in exceptional cases may be taken concurrently) and permission of Instructor and Mathematics Operational Coordinator

Number Theory challenges students to question the number systems they have used all their lives. The integers are defined axiomatically, and familiar properties of arithmetic are proven. Exploration then turns to divisibility, primes, the Fundamental Theorem of Arithmetic, the GCD, and linear diophantine equations. Linear congruence problems and multiple congruences (Chinese Remainder Theorem) are followed by special congruences (Theorems of Wilson and Euler-Fermat). This is then used to study decimal expansions of rational and real numbers. Further topics may include primality testing, continued fractions, introductory cryptography, and quadratic reciprocity. This course is centered around a dual emphasis on calculation techniques and rigorous proof.

**MAT425** (Fall or Spring)

### **Problem Solving**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Mathematical Investigations III or recommendation of Instructor

In this course, students will learn how to apply a broad range of problem solving techniques and strategies while making inter and intra-disciplinary mathematical connections. The course will emphasize both individual and group investigations and explorations. Students will not receive credit for Problem Solving if they have prior credit in Advanced Problem Solving.

**MAT431** (Fall)

### **Advanced Problem Solving**

Grade Level: Junior/Senior  
 Length: One Semester  
 Credit: 0.50  
 Prerequisite: BC Calculus I, or permission of Instructor; and Mathematics Operational Coordinator. Student should have a very strong score on the AMC contest, though need not be a mathlete.

In this course, students study problem solving from many perspectives. Weekly problem sets requiring written solutions in paragraph form give students opportunities to hone their problem-solving skills. These problem sets include the writing of an original problem on a topic selected by the student. In addition, students select an area of study which they would like to explore further; one class day per week is used for this purpose, culminating in end-of-semester presentations. Weekly topics are partially determined by student interest.

**MAT435 (Fall or Spring)      Discrete Mathematics**

Grade Level: Junior/Senior  
 Length: One Semester  
 Credit: 0.50  
 Prerequisite: Mathematical Investigations III or recommendation of Instructor

This course is a study of topics that are based on concepts, ideas, and algorithms in mathematics that can, in some manner, be divided into "separate" or "discontinuous" (and thus, discrete) parts. Major areas of mathematical content addressed in the course can include social applications and decision making (such as voting theory), techniques of counting, permutations, combinations, probability, graph theory (including applications of paths and circuits in graphs, graph coloring, and spanning trees), recursion, algorithm development, pattern generation and recognition in a variety of contexts, Pascal-type triangles and their connection to other mathematical content, modular math, and modeling. Individual and group investigations and explorations are emphasized throughout the course.

**MAT441 (Fall)                      Multi-Variable Calculus**  
**MAT442 (Spring)**

Grade Level: Junior/Senior  
 Length: One Semester  
 Credit: 0.50  
 Prerequisite: BC Calculus III and recommendation of Instructor

Multi-Variable Calculus will apply the tools of calculus to functions of several variables. Topics will include the algebra and geometry of vectors, a study of functions of several variables, applications of partial derivatives, multiple integrals, line and surface integrals, and (time permitting) Green's, Stokes' and Gauss' Theorems.

**MAT445 (Fall or Spring)      Theory of Analysis**

Grade Level: Junior/Senior  
 Length: One Semester  
 Credit: 0.50  
 Prerequisite: Multi-variable Calculus or Advanced Problem Solving or Number Theory and permission of the Instructor and Mathematics Operational Coordinator.

This course provides a theoretical look at many of the important concepts studied in the BC Calculus sequence. The emphasis in this course will be upon rigorous mathematical proof. Major ideas addressed in this course include: mathematical proof, theory of sets, sequences, topology of the real numbers, limits, continuity, and differentiation. Enrollment in this course requires a high degree of mathematical maturity along with a deep understanding of the concepts covered in the BC Calculus sequence. There will be opportunity for the class to take excursions into related theory when students in the class take the lead. There will be an emphasis on group work and student presentations to the class.

**MAT451** (Fall)  
**MAT452** (Spring)

## **Differential Equations**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: BC Calculus II (or AB Calculus II with permission of Instructor)

The theory of differential equations is interesting as a mathematical topic and has special relevance because it describes a surprising diversity of real world situations. In this course, we will investigate the behavior of solutions to linear and nonlinear differential equations. Special emphasis will be given to applications in the physical and biological sciences. Upon completion of this course, a student will be able to choose, trouble-shoot, customize, or develop a variety of differential equation modeling schemes to suit his or her own particular needs.

**MAT462**(Spring)  
**MAT472**(Spring)

## **Introduction to Algebraic Structures I** **Introduction to Algebraic Structures II** (Use **MAT472** only if enrolled in **MAT462** last year.)

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Multi-variable Calculus or Advanced Problem Solving or Number Theory and permission of the Instructor and Mathematics Operational Coordinator.

Algebraic Structures I and II are advanced course offerings for students working at a level beyond Calculus. One of the two course options described below will be chosen by the mathematics department to be taught each spring semester. Students taking the course for the first time should sign up for enrollment in Algebraic Structures I (MAT462). Students who have already received credit for course number MAT462 should sign up for enrollment in Algebraic Structures II (MAT472) after discussion with instructor or department coordinator.

### **OPTION 1 (Linear Algebra)**

This course concentrates on the theory of simultaneous linear equations. Gaussian elimination is used as a tool to solve linear systems and to investigate the subspace structure of a matrix (kernel, range, etc.) Extensions of these ideas include orthogonality and least squares. Determinants are examined from several perspectives. Eigenvalues and eigenvectors are introduced, including a discussion of special matrices (symmetric, unitary, normal, etc.). Applications may include singular value decomposition and the Fast Fourier transform.

### **OPTION 2 (Abstract Algebra)**

The content of this course is flexible, but is generally an introduction to abstract algebra. Students learn about groups, subgroups, homomorphisms, and the structure of various groups (such as the structure theorem for finitely generated Abelian groups, the Sylow theorems, etc.) Students also investigate the basics of rings. Ring topics include ideals and homomorphisms; PIDs, UFDs, and Euclidean domains; fields and (time permitting) field extensions including applications such as constructibility. All aspects of the course are presented with full mathematical rigor, and students are expected to produce proofs of equivalent quality to mathematics majors at a university.

**MAT700** (Spring)

## **Computational Thinking**

Grade Level: Sophomore/Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisites: None

The primary goal of Computational Thinking is to provide an introduction to the fundamental concepts found throughout the field of computer science. As an overview of the discipline, the course covers a breadth of topics including algorithmic foundations of computer science; hardware issues such as number systems and computer architectures; and software issues such as operating systems, programming languages, compilers, networks, and human-computer interaction. More than just teach students how to program, this course will teach them how to think more methodically and how to solve problems more effectively. This course will aim to provide students with an understanding of the role computation can play in solving problems.

**MAT711** (Fall)

## **Web Technologies I**

Grade Level: Sophomore/Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisites: None

This course is an overview of the modern Web technologies used for the Web development. The purpose of this course is to give students the basic understanding of how things work in the Web world from the technology point of view as well as to give the basic overview of the different technologies. The idea of this course is not that the students will learn how to use all of these technologies, but to help them understand the basics and find out where to start. The topics include (although in some cases briefly): History of the Web, Hypertext Markup Language (HTML), JavaScript, Cascading Style Sheets (CSS), Extensible Markup Language (XML) and Extensible HTML (XHTML). We will follow the guidance of the World Wide Web Consortium (W3C) to create interoperable and functional websites.

**MAT712** (Spring)

### **Web Technologies II**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisites: Web Technologies I

This course is an overview of the server side of web technologies. It will introduce students to the concept of server-side scripting and web applications development. Students will gain understanding of PHP (Hypertext Preprocessor) and SQL (Structured Query Language) to develop dynamic web sites. Topics will include conditionals, functions, form processing, arrays, and loops. Students will create a dynamic web site by developing database tables in SQL on the server. They will connect to these tables from the client side, using PHP and then add/evaluate the content of the web pages.

**MAT725** (Fall or Spring)

### **Object Oriented Programming**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Mathematical Investigations III or recommendation of Instructor

This one-semester course is designed to teach the fundamental concepts of computer programming using object oriented programming language, java. The course emphasis is on the creation and use of "objects" as the basic tool for developing various program algorithms (such as finding the lowest common divisor, sorting an array), data structures (such as arrays, structures, strings), and programming processes (such as manipulating data files, passing parameters by value and by reference). Throughout the course there is an emphasis on the use of existing "classes" and the development of new, project-related classes.

**MAT731** (Fall)

### **Computer Seminar**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Object Oriented Programming or recommendation of Instructor

This course will study advanced computer science topics including object oriented programming. Students will be expected to complete several individual and group projects that will involve research, programming, and presentation of results.

**MAT732** (Spring)

### **Advanced Programming Computer Science**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Object Oriented Programming or recommendation of Instructor

This course continues to develop the ideas introduced in Object Oriented Programming. Topics may include: inheritance, interface, polymorphism, recursion, stacks, queues, trees, hashmaps, hashsets, linked lists, and advanced programming techniques including advanced sorts and searches. A major focus of the course will be an analysis of the AP Computer Science case study. This course will support students' preparation for the AP Computer Science exam.

**MAT801** (Fall)

### **Advanced Topics in Mathematics**

**MAT802** (Spring)

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisites: Multi-Variable Calculus and one of Advanced Problem Solving, Number Theory, or Algebraic Structures I and permission of Instructor and Mathematics Operational Coordinator

Students who have finished the core mathematics program and for whom there is no other appropriate mathematics course available can petition for this as an option. Student and instructor will select topics jointly. Course may be used as core mathematics course.

## SCIENCE

**SCI105** (Fall or Spring)

### **Scientific Inquiries - Chemistry**

Grade Level: Sophomore  
Length: One Semester  
Credit: 0.50  
Prerequisite: None

The course is a one semester course designed to engage the students in foundational concepts in chemistry and to prepare them for advanced study in science. The content explored includes: the periodic table and periodic trends, inorganic nomenclature, writing and balancing equations, stoichiometric relationships and their applications, phases of matter, solutions, chemical equilibria, acids and bases, and energetics. This content is encountered through a combination of lab-based activities, guided inquiry, group discussion and direct instruction.

**SCI115** (Fall or Spring)

### **Scientific Inquiries - Physics**

Grade Level: Sophomore  
Length: One Semester  
Credit: 0.50  
Prerequisite: None

The course addresses the fundamental principles of classical mechanics including Newton's laws of motion and the conservation laws of momentum and energy. Students learn concepts and skills through a combination of lab activities and experiments, guided inquiry, group discussion, collaborative problem solving and direct instruction. Students work through the material at their own pace and grading is based on proficiency.

**SCI125** (Fall or Spring)

### **Scientific Inquiries - Biology**

Grade Level: Sophomore  
Length: One Semester  
Credit: 0.50  
Prerequisite: None

The course focuses on cell structure and function and molecular processes, as well as Evolution. Students in this course are expected to actively build their understanding through questions, explanations, and data analysis. Collaboration and formatives (practice assessments) are also key.

**SCI135** (Fall or Spring)

### **Methods in Scientific Inquiry**

Grade Level: Sophomore  
Length: One Semester  
Credit: 0.50  
Prerequisite: None

The course explicitly addresses three broad areas encompassed by the nature of science: data acquisition and analysis, experimental design, and written and oral communication. Activities will support the development of basic skills across the science disciplines and promote an understanding of scientific inquiry and the nature of research.

SCI201 (Fall)

### **Advanced Chemistry - Structure and Properties**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Scientific Inquiries - Chemistry or equivalent

This course places an emphasis on relating physical and chemical features (properties) of substances to their atomic, molecular, or ionic makeup (structure). The class is laboratory-based and allows students to actively engage in learning and applying fundamental chemical principles. Topics studied include molecular modeling, intermolecular forces, stoichiometry, states of matter, solutions, spectrophotometry, and chemical kinetics. The relationship of chemical principles to highly relevant issues will be highlighted where appropriate. Examples include topics as diverse as how polarity of molecules affects biological systems and climate to how salt lowers the freezing point of ice on roads but helps to cook spaghetti faster. In keeping with the philosophy of the academy, students are expected to construct an understanding of chemistry concepts through laboratory experiences, collaborative work, and asking questions.

SCI202 (Spring)

### **Advanced Chemistry - Chemical Reactions**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Scientific Inquiries - Chemistry or equivalent

This course places an emphasis on learning fundamental chemical concepts by exploring chemical reactions. The class is laboratory-based and allows students to actively engage in learning and applying fundamental chemical principles. Topics studied include chemical equilibrium, acids and bases, thermochemistry, electrochemistry, and qualitative analysis. The relationship of chemical principles to highly relevant issues will be highlighted. Examples include diverse topics such as how acid-base buffers play important roles in biological systems, how the calorie content of foods is measured, and the theory behind how batteries work. In keeping with the philosophy of the academy, students are expected to construct an understanding of chemistry concepts through laboratory experiences, collaborative work, and asking questions.

SCI215 (Fall or Spring)

### **Organic Chemistry I**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Scientific Inquiries – Chemistry or equivalent

The purpose of this course is to provide students with basic understanding of the underlying processes of hydrocarbon chemistry and the skills needed to be successful in university level organic chemistry. The curriculum includes a study of nomenclature, basic reactions, and lab technique and set-up. This course presents organic chemistry as a progressive and systematic building of molecules from methane to acetaminophen. The course is hands-on, inquiry-based, and places heavy emphasis on lab work. Because much of introductory organic chemistry lab involves learning organic chemistry laboratory techniques, lab experiences at times reinforce concepts being learned in the classroom, but at other times are intended as stand-alone learning opportunities intended to enhance the student's organic chemistry skills. Applications of the lab and homework problems will culminate with the separation and identification of organic compound unknowns.

SCI222 (Spring)

## Organic Chemistry II

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Organic Chemistry I

The purpose of this course is to provide students with basic understanding of the underlying principles associated with several of the organic functional groups and the skills needed to be successful in university level organic chemistry. The curriculum includes a study of stereochemistry, nomenclature, basic reactions, mechanisms, and laboratory analysis. This course presents organic chemistry as a progressive and systematic building of molecules from alcohols to carboxylic acids and its derivatives. The course is hands-on, inquiry-based, and places heavy emphasis on lab work. Most of the organic chemistry lab activities involve reinforcing concepts being learned in the classroom that also enhance the student's organic chemistry lab skills. Applications of the lab and homework problems will culminate with the identification of organic compound unknowns.

SCI235 (Fall or Spring)

## Biochemistry

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Scientific Inquiries - Chemistry or equivalent and Scientific Inquiries - Biology or equivalent

This is a one-semester course that extends fundamental concepts in chemistry, such as equilibrium, acid/base and thermodynamics into an exploration of biology. The content explored includes: buffers, amino acid structures, protein folding, enzyme kinetics, drug inhibitions, and carbohydrate structure and metabolism. The content is encountered through guided inquiry and group discussions. Students will use bio-techniques to apply the content to address the current research questions in the field.

SCI245 (Fall or Spring)

## Environmental Chemistry

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Scientific Inquiries - Chemistry or equivalent

This is a one-semester integrated course that explores topics related to chemical effects in the natural environment. Students will study the sources, transport and short and long-term effect of chemical pollutants in the environment and the chemical reactions involved. Students will study current regional, national and global issues such as watersheds in Illinois, oil spills in the Gulf of Mexico and air quality in China. Students will work in research groups to find the causes and policies that lead to these situations and propose well supported changes that could be made by industries and governments to prevent further degradation of the environment.

SCI401 (Spring)

## Physics: Applied Mechanics

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Scientific Inquiries - Physics or equivalent

The purpose of this course is to provide students with the tools needed to understand the behavior of the physical world. The curriculum includes a study of mechanics, including two dimensional and rotational motions. This course presents physics as a unified approach to explaining and predicting the behavior of the world, rather than as a collection of unrelated topics. The course is hands-on and inquiry-based, with heavy emphasis on lab and project work. Applications of the lab and homework problems will be incorporated into the various projects assigned throughout the semester.

SCI402 (Fall)

### **Physics: Light and Sound**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Scientific Inquiries - Physics or equivalent

The purpose of this course is to provide students with the concepts needed to understand waves, sound, and light. This course presents material on mechanical oscillations, wave properties and interactions, sound, resonances and musical instruments, light, and optics. The course is hands-on and inquiry-based, with an emphasis on lab and project work.

SCI411 (Fall)

### **Physics: Calculus-based Mechanics**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Scientific Inquiries - Physics or equivalent and Mathematical Investigations IV. Successful completion of AB I or BC I Calculus is strongly recommended.

Calculus-based Physics/Mechanics follows the typical sequence of a university physics course. The semester is devoted to topics in classical mechanics including Newton's laws of motion, conservation of momentum and conservation of energy as they apply to both translational and rotational motion. Gravitation and simple harmonic motion are also studied. The major emphasis of the course is on problem-solving including hands-on projects, labs, and theoretical problems. There is strong overlap between the curriculum and the AP Physics C Mechanics exam. There is also strong overlap between the curriculum and Physics: Applied Mechanics; therefore those students who have taken Applied Mechanics need instructor approval to enroll.

SCI412 (Spring)

### **Physics: Calculus-based Electricity/Magnetism**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Scientific Inquiries - Physics or equivalent and AB I or BC I Calculus. Successful completion of Calculus-based Physics – Mechanics is strongly recommended.

Calculus-based Physics/Electricity and Magnetism follows the typical sequence of a university physics course. Topics include electrostatics, circuits, magnetism, and induction. The major emphasis of the course is on problem-solving including hands-on projects, labs, and theoretical problems. There is strong overlap between the curriculum and the AP Physics C Electricity and Magnetism exam.

SCI425 (Fall or Spring)

### **Planetary Science**

Grade Level: Sophomore/Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: None

This course will introduce students to basic concepts in planetary science and the dynamic processes of planetary formation and evolution. This course will briefly cover the Big Bang, stellar evolution, and planetary formation to allow students to better understand the initial conditions out of which the Earth formed. This course will cover in a mostly qualitative way the many interactions and relationships between the properties of the Earth, and how these interactions caused our planet to change and evolve over time. The last section of the course will then take what we have learned about the Earth, and apply it to other planets and moons in our Solar System. The student's grade for the course will be mostly based on exams, and on a semester long project, where a group of students will work together on a simulated mission to send a robotic probe to explore another moon or planet in our Solar System.

SCI445 (Fall or Spring)

### **Modern Physics**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Scientific Inquiries - Physics or equivalent

Modern Physics is a one-semester course covering major concepts of twentieth-century physics. The course focuses on special relativity, nonrelativistic quantum mechanics, and elementary particle physics, emphasizing conceptual understanding and the ability to solve problems in novel situations. The class culminates in a final research project and a field trip to the Fermi National Accelerator Laboratory to see modern physics research in action.

SCI455 (Fall or Spring)

### **Applied Engineering**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Students need special permission to enroll in both Applied Engineering and an on-campus Student Inquiry and Research project.

Applied Engineering's curriculum is centered on two major goals. First, students will explore the many branches of engineering and the highly diverse opportunities within the field. They will investigate this through several opportunities and assignments. Students interview engineers, take field trips to universities and/or businesses and attend guest speaker lectures. Students write reflective narratives after each of their experiences. The second goal of the course is to give students hands-on experience studying problems, working on teams to design solutions and constructing their designs through group projects. Reflection on projects is integral to this process. This course meets on Inquiry Days.

SCI465 (Fall or Spring)

### **Biophysics**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisites: Scientific Inquiries – Physics, Scientific Inquiries- Biology and Scientific Inquiries- Chemistry or their equivalents

Biophysics will draw upon concepts from SI Physics, SI Biology, and SI Chemistry to study energy, power, efficiency, diffusion, thermal transfer, and fluid flow. These concepts will be developed in the context of plant and animal function, adaptation, and evolution. In addition to homework, laboratory reports, and exams, students will also report on topics they have researched and participate in design challenges.

SCI605 (Fall or Spring)

### **Evolution, Biodiversity, and Ecology**

Grade level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Scientific Inquiries - Biology or equivalent and Methods in Scientific Inquiry

This is a one-semester course that explores the diversity of living organisms and their interactions with each other and the environment. Students will investigate the biological species concept, mechanisms of evolution and speciation, causes of extinction, and patterns of biological diversity across geographic space and time. They will also study the varied ways that organisms interact with members of their own species, with different species, and with their physical surroundings. Some field trips and/or outdoor activities will be included as a part of this course.

SCI615 (Fall or Spring)

### **Molecular and Cellular Biology**

Grade level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Scientific Inquiries - Biology or equivalent, Scientific Inquiries – Chemistry or equivalent and Methods in Scientific Inquiry

This is a one-semester course that explores modern molecular and cellular biology as well as its basis in Mendelian genetics. Students will investigate transmission genetics, biomolecule structure and function, control of the cell cycle, cellular signaling pathways, and emerging genetic and molecular techniques.

SCI625 (Fall or Spring)

### **Microbes and Disease**

Grade level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Scientific Inquiries - Biology or equivalent, Scientific Inquiries – Chemistry or equivalent and Methods in Scientific Inquiry

This is a one-semester integrated course that explores topics related to microbes and the relationship between infection and human defense mechanisms. Topics include the germ theory, microbial structure and function, invasiveness and pathogenicity, the human immune system, epidemiology, and an introduction to emerging infectious diseases. Microbial life will be studied in the laboratory setting by using non-pathogenic microbes so that students attain the appropriate laboratory skills.

SCI635 (Fall or Spring)

### **Physiology and Disease**

Grade level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Scientific Inquiries - Biology or equivalent, Scientific Inquiries – Chemistry or equivalent and Methods in Scientific Inquiry

This is a one-semester integrated course that explores topics of human physiology and the changes in human physiology that result from non-infectious disease or other physiological conditions. Topics include cellular physiology; disorders of the neuromuscular, immune, cardiovascular and respiratory systems; and other disorders of homeostasis. A significant student inquiry opportunity is presented through student-designed labs. The course ends with student-led seminars that detail their understanding of the etiology and physiology of different non-infectious diseases and conditions.

**SCI646** (Offered Fall of 2011)

**Seminar in Biology: Virology**

Grade level: Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Microbes and Disease (MAD)

This seminar course will introduce students to the general field of virology and will focus on the properties of viruses that cause human disease. Topics covered may include viral structure, life cycle, replication, genetics, pathogenesis, host response, tumor induction, prevention and control of disease, and emerging viral infections. The seminar will be largely based on student presentations of current literature and research.

**SCI671** (Offered Fall of 2012)

**Seminar in Biology: Stem Cell Biology**

Grade level: Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Molecular and Cellular Biology (MCB)

This seminar course will explore the biology of stem cells, including origins of the different types of stem cells, the development of tissues from stem cells, and potential medical uses. Molecular control in the differentiation of stem cells into target cell types will be featured in the discussions. Many of the seminars will be developed and led by students and will be based in current scientific literature.

# ENGLISH

**ENG101** (Fall)  
**ENG102** (Spring)

## **Literary Explorations I** **Literary Explorations II**

Grade Level: Sophomore  
Length: Two Semesters  
Credit: 0.50 per semester  
Prerequisite: None

This course introduces students to a variety of genres in literature, to the processes of effective reading, to the work of discussion and performance as a response to literature, and to the processes of writing in various forms for different purposes, but with an emphasis on critical essays. Students will explore readings of aesthetic and cultural significance primarily from American literature, focusing in particular on their thematic and historical connections.

**ENG201** (Fall)

## **Literary Explorations III**

Grade Level: Junior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Literary Explorations II

Students continue to develop their skills in reading, writing, discussion, and performance. Juniors will explore readings of aesthetic and cultural significance from medieval to early nineteenth-century British literature, focusing in particular on their thematic and historical connections. Commonly taught works include Geoffrey Chaucer's *Canterbury Tales*, William Shakespeare's *Hamlet*, John Milton's *Paradise Lost*, and Mary Shelley's *Frankenstein*.

**ENG 212** (Fall or Spring)

## **Creative Writing Workshop**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Literary Explorations III

This class offers you and your peers an opportunity to experiment with a variety of written genres and hone your creative writing skills in the hopes of helping you produce work of publishable quality. As with many English classes, we'll do a lot of reading, examining the work of successful artists for "what makes them tick." Ultimately, though, the heart of this class is student work and workshopping, a system by which an author receives informed, constructive feedback from a group of readers.

**ENG 232** (Spring)

## **20th Century Poetry**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Literary Explorations III

In this class students will analyze poems and develop arguments about them. The class will draw primarily from 20th century poets writing in English, though the class may read some late 19th and early 21st century poetry as well as a few poems in translation. The course will investigate both the meanings and means of poetry – that is, what poems mean and how they manage to mean those things. At its best, the class experience will draw from both the laboratory and the debate hall, with students drawing up competing poetic interpretations and pitting them against each other. The course will engage with some technical elements of poetry (figurative language, meter, structure) so that students can best develop their arguments. In addition, students will occasionally write their own poems in order to approach poetry from the inside out. Some topics within the class are highly interdisciplinary, and may be taught through the lens of other subjects.

ENG 242 (Spring)

### **Modern Theater**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Literary Explorations III

As the world becomes increasingly “captured on film,” and those captured images are increasingly manipulated to present altered reality to the viewers, often without their awareness, students may find it fruitful to experience an art form in which real time, real space and real humans are the parameters of the aesthetic experience. In addition, Modern Theater will make the case that, in many ways, all the rituals of life are a form of theater. We will examine works of the major dramatists of the second half of the twentieth century, among them Samuel Beckett, Harold Pinter, David Mamet, Friedrich Duerenmatt, Tom Stoppard, Eugene Ionesco and Berthold Brecht. The course will offer opportunities to direct and perform segments, write both theater reviews and critical analysis, and view live performances.

ENG301 (Fall)

### **Topics in World Literature: Modern World Fiction**

Grade Level: Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Literary Explorations III

We will read a selection of texts spanning the twentieth century (and samples from the turn of the millennium), and the globe. We will look at this literature (mostly in the form of short fiction, ranging from such writers as Borges, Faulkner and Kafka, to Achebe, Bei Dao, and Akutagawa) as defining and expressive of modernism and post-modernism, in their many facets. More specifically, we will consider kinds of, approaches to, and functions of realism; challenges to realism; what constitutes a “modern aesthetic sensibility,” and what ends such a sensibility serves; and some major thematic issues particularly relevant to the twentieth century.

ENG322 (Spring)

### **Portraits of Creativity**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Literary Explorations III

We will examine the lives and work of creative people in several of the arts (including literature, music, and painting) and the sciences, posing questions concerning the nature of artistic and scientific work, the roles of the artist and scientist in our culture, and the relationship between Apollonian order and Dionysian spontaneity in creative work. Through discovery, students will consider issues of creativity in their own lives.

ENG341 (Fall)

### **Gender Studies**

Grade level: Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Literary Explorations III

This course will examine gender as a social construction--i.e., roles, assumptions, and beliefs that are built up by societies over time. These constructions become particularly visible and important when conflicts arise; we'll examine some of these conflicts in literature and history for what they can tell us about how our ideas of gender arose. This class requires an openness to questioning many of your long-held, most cherished assumptions about sex, gender, and sexuality. You'll also be required to read and write carefully and critically, questioning the assumptions of the authors we study.

ENG 351 (Fall)

## Graphic Novels: Image and Text

Grade Level: Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Literary Explorations III

Since the 1980s, the so-called graphic novel, or long-form comic, has become a popular and accomplished literary and artistic form. Transcending its origins in pulp fantasy and adolescent entertainment, this evolving and hybrid medium represents, in the words of author and artist Eddie Campbell, "an emerging new literature of our times in which word, picture, and typography interact meaningfully and which is in tune with the complexity of modern life . . ." This course offers a survey of some of the best graphic novels of the last thirty years, and it provides the skills for reading comics critically in terms of what they say and how they say it.

ENG365 (Spring)

## Speculative Fiction Studies

Grade level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Literary Explorations III

Speculative Fiction Studies explores and illuminates a genre apart from, and in some ways broader than, the traditional canon of literary fiction. The goal of this course is to explore in what sense the act of "speculation" is central to all literature, but particularly crucial to this genre, which encompasses what we recognize today as fantasy and science fiction as well as alternative histories and futures, utopias and dystopias. Beginning with some of the grandfathers of speculative fiction (H.G. Wells and Jules Verne) and advancing into the contemporary era, students will explore the evolution of this lively, diverse genre, and consider how its themes and tropes act as allegories for the problems of the human condition. The course will focus on a variety of short- and long-form readings, with class discussion, individual and group projects, analytical writing, speculative writing, and finally research writing as the avenues of assessment. Students will also be presented with scholarship and literary theory in the field of speculative fiction, the better to understand the deep philosophical, literary, and cultural implications of this genre.

ENG502 (Spring)

## The Idea of the Individual

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Literary Explorations III

The focus of this course is the individual: what is this being we call the individual? What is the self? What is the relationship of society, culture, and the self? Is there any such thing as a fully free individual? What forces threaten our individuality? These are just some of the many questions we will consider as we read works as diverse as Dostoevsky's *Crime and Punishment*, Joyce's *Portrait of the Artist as a Young Man*, Kafka's *Metamorphosis*, Shakespeare's *King Lear*, and a variety of poetry and short fiction, as well as supplemental selections from theologians, philosophers, psychologists and natural scientists. The whole notion of the self, from its roots in antiquity, to the revolution of evolution, to today's possibilities of genetic manipulation in human beings, certainly suggests that we need to consider this topic if we are to make meaningful, powerful choices about what we want to be, and can be, both for ourselves and in our relations with others.

ENG512 (Spring)

### **Topics in World Literature: Victorian Fiction**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Literary Explorations III

This course will focus specifically on Victorian fiction (1837-1901), which represents the Golden Age of the novel in English. One of our main objectives will be to explore the parallels between Britain of the nineteenth century and America of the new millennium. Much like our society today, Britain during this time was a nation facing unprecedented technological growth and social change. Through the study of the novel and the short story, this course will examine the social, political, and cultural ideology of Britain during an era in which it rose to dominance as both a nation and an empire. Some of the issues we will investigate include the effects of the industrial revolution and urbanization, the implications of advances in science and technology such as the railroad and the telegraph, and the ethics of imperialism. We will look at works by Emily Brontë, Charles Dickens, Arthur Conan Doyle, Elizabeth Gaskell, and H. G. Wells, among others.

ENG532 (Spring)

### **Film Study: History and Criticism**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Literary Explorations III

In this class, students will study the following: the development of film as an art form and method of documentation; the language of film; a selection of influential American and international films and filmmakers; genres of film criticism; methods of adapting prose to film; and cultural influences of popular cinema. Students can expect to be tested on their knowledge of film history and language, to read and write critical reviews, to research an aspect of film production, to compare print and film texts, and to demonstrate understanding of film language through a creative project. In addition to the regular daytime schedule, the course scheduling requires students to be free twice a month on Tuesday evenings between 6:00 and 9:00 P.M. for film screenings.

ENG542 (Fall)

### **IMSATube: Non-Fiction Film Study**

Grade level: Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Literary Explorations III

In learning to become critical viewers and effective, versatile communicators, students will study the definition, history, cultural influence, and types of non-fiction film. In addition to reading film and media theory and writing critical reviews of documentary films, students will learn to communicate in this medium by planning, shooting, and editing their own non-fiction videos. Skills involved in making non-fiction videos include the technical aspects of production and also planning and composing skills such as choosing a topic, shaping a focus, researching, scripting, narrating, interviewing, and editing. Students will write descriptive and reflective reports on their video work.

## HISTORY AND SOCIAL SCIENCE

**HSS100** (Full Year)

### **American Studies**

Grade Level: Sophomore  
Length: Two Semesters  
Credit: 1.0  
Prerequisite: None

The American Studies survey serves a dual function at the Academy. Through a rigorous curriculum, it introduces students to college-level reading, research, and writing skills. Through compelling historical content, it seeks to foster such values as citizenship, patriotism, and stewardship. American history is an unfinished drama, an experiment unlike any that has come before. Through the use of primary documents, quantitative data, and narrative, the course seeks to enlist the students into that experiment by showing them its origins and challenging them to carry it forward into their own time.

**HSS201a** (Fall)

### **Cities of God: Religion and Philosophy in the Ancient World**

Grade Level: Junior  
Length: One Semester  
Credit: 0.50  
Prerequisite: American Studies

The ancient world has had an enduring influence on global culture and politics, for most of the major world religions crystallize before the 6<sup>th</sup> century CE. This course will examine the origins of major systems of belief around the world, with special attention to the political and cultural contexts in which they grew. In addition, the course will explore the origins of philosophical thinking in Greece and China, and consider the relationship between religious and philosophical ideas.

**HSS201b** (Fall)

### **Conflict in World History**

Grade Level: Junior  
Length: One Semester  
Credit: 0.50  
Prerequisite: American Studies

This course will examine the role of warfare as a transformational force in world history. The causes of conflict range from the personal, to the ideological, to the political, to the economic, and reflect on the very nature of power in all its forms. Further, warfare often serves as a catalyst for technological and social transformation, as well as significant political change. The course will seek to understand conflict at various points in world history and in various areas of the globe.

**HSS201c** (Fall)

### **Medieval Societies: Hierarchy, Order, and Catastrophe**

Grade Level: Junior  
Length: One Semester  
Credit: 0.50  
Prerequisite: American Studies

The Middle Ages (roughly 500-1500 C.E.) represent a formative period in the development of many cultures. Royal power, military nobility, warfare, peasant agriculture, dominant religious structures, philosophy – all play significant roles. This course will examine these forces in two or three societies of the period: Europe, Japan, China, the Middle East, Africa, and Meso-America.

**HSS201d** (Fall)

## **Power and Authority in History**

Grade Level: Junior  
Length: One Semester  
Credit: 0.50  
Prerequisite: American Studies

Drawing from several theoretical approaches, the Power and Authority in History course explores in comparative perspective the origins of political authority and power through the mid-nineteenth century. The course offers a number of different theoretical and historical perspectives to explain how power and authority have been wielded and reacted to. In this course students will be expected to develop critical thinking and communications skills, as well as knowledge of geography, examination of political and economic power, identification of cultural, and other connections between world regions.

**HSS202** (Spring)

## **The World in the Twentieth Century**

Grade Level: Junior  
Length: One Semester  
Credit: 0.50  
Prerequisite: American Studies

During second semester The World in the Twentieth Century will address the recent history of the world we live in today, i.e. the twentieth century. It was a century of extremes ranging from death and destruction on a major global scale to the establishment of new nations and a golden age for more people than at any time before, or since 1989 for that matter. The course will focus on some key concepts as a way of bringing coherence to a massive amount of material.

**HSS301** (Fall)

## **European History**

Grade Level: Senior  
Length: One Semester  
Credit: 0.50  
Prerequisites: One Credit Junior History

Our contemporary world was forged in the heat of Europe's twentieth century wars. By 1900, Europe stood astride the globe, and from this apex she slid into a fiery maelstrom of extremism, greed, and horror sucking the rest of the world with her. Fed by the blood of tens of millions, the fires of two great wars and the hammers of dictatorship destroyed Europe and changed the world. Phoenix like she rose from the ashes but now, yielding much to others, reclaimed only part of her former position of power and glory in a very different world. In this world, from East Jerusalem to England's once again green and pleasant hills, the "White Man's Burden" has made boom boxes everyman's bittersweet joy. The course will explore several dimensions of the birth, and development of the modern Europe, and its purported death at the hands of a global and non-national, nomadic power elite. Both the history and the historiography of these phenomena will be addressed. Moreover, the investigation of this specific subject matter will lead into an exploration of the nature of the historical process and will facilitate students in their acquisition of a historical consciousness, a prerequisite for leadership in any field.

**HSS302** (Spring)

## **International Relations**

Grade Level: Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: One Credit Junior History

Nation-states play a "Great Game," to use Kipling's expression, sometimes cordial, sometimes deadly. This course will explore that game, its spirit, and its players, in the context of historical and contemporary events. Students will confront diplomatic problem through source analysis and simulation, and they will have the opportunity to attempt to resolve some of the world's most pressing problems. The course places special emphasis on the truly global issues that transcend the interests of any single state.

**HSS311** (Fall)

## **Political Theory**

Grade Level: Senior  
Length: One Semester  
Credit: 0.50  
Prerequisites: One Credit Junior History

Political Theory will survey the most significant theoretical and philosophical contributions made to Western political thought starting with the Classical Greeks. Students will be required to understand and speak of the formulation of ideas, as they concern society and politics, over the past 3,000 years. In doing so, the student can see the continuities and failures in the Western Effort to balance the need for security with a desire for political and individual freedoms. The introduction to these specific political theories will also crystallize the student's experience and knowledge gained in the American Studies and Junior history courses. Students will accomplish this by reading excerpts from the actual writers, looking at the historical background, and through extensive class discussion.

**HSS321** (Fall)

## **Macroeconomics**

Grade Level: Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: One Credit Junior History

Macroeconomics is an issues oriented course in which basic macroeconomics 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 macroeconomics principles, concepts and theories. An exploration of economic thought provides the background for debates, discussions, simulations, and research that will be the tools for analysis. Students will also have an opportunity to participate in a mock international currency and interest rate vehicle trading exercise that should give their newly acquired knowledge of macroeconomics concepts certain immediacy.

**HSS322** (Spring)

## **Microeconomics**

Grade Level: Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: One Credit Junior History

Microeconomics is an issues oriented course in which basic microeconomics 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 microeconomics 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 that will be the tools for analysis. Students will have an opportunity to guide the fortunes of a fictitious multinational conglomerate through the hazards of a simulated international business environment that should give their newly acquired knowledge of microeconomics concepts certain immediacy.

**HSS331** (Fall)

### **Topics in Recent United States History**

Grade Level: Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: One Credit Junior History

This course will focus on the years 1945 to the present. Recent U.S. History will present many of the topics, themes, issues, personalities, and events which are often not covered because time runs out in regular History courses. Therefore, this course will permit greater flexibility within the IMSA American Studies curriculum. The teacher and students will select units from among various themes and topics, a few of which include: The Cold War, Diversity: Counter-culture movements, Justice and Equality: Civil Rights and Civil Liberties in Post-War America, Power: Who Runs America?, The Seventies and the Issues of Scarcity and Limitations, The Significance of the Vietnam War in American History, American Post-War Popular Culture, Literature, and Movies, Evaluating the Reagan-Bush 80's: The Good or Bad Decade and many other possible options. The themes and topics will be presented, in many instances, from an inter-disciplinary perspective incorporating Science, Literature, Political Science, International Relations, Sociology, Economics, and Art and Music.

**HSS341** (Fall)

### **Mind and Cosmos: A Cultural History of Astronomy**

Grade Level: Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: One Credit Junior History

Astronomy serves as the perfect vehicle for the examination of the history of science and its relationship with culture as a whole. Humanity has sought to explain the phenomena of the heavens for thousands of years, and those explanations have taken a variety of forms: mythological, philosophical, and scientific. In addition, many of the scientific revolutions that have transformed humanity's views of physical nature have centered on astronomical and cosmological questions. This course will concentrate on three major themes: the study of developments in astronomy, cosmology, and physics from antiquity to the 20th century; the analysis of different approaches to truth, certainty, and method; and the relationship of astronomy and physics to philosophy, society, and religion.

**HSS352** (Spring)

### **A History of Technology and Culture**

Grade Level: Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: One Credit Junior History

Technology defines culture; it shapes human interactions and mediates the relationship of humanity to the physical environment. Conversely, culture defines technology; existing social structures and intellectual systems determine the nature of technical innovation. This course will examine the complex dialogue between technology and culture through a series of case studies, distributed in time and space. In the process, we will explore a number of dominant themes in the history of technology: the role of science, the impact of warfare, the significance of economic forces, and the importance of custom and class. The course will conclude with an extended problem-based unit, as students construct a case study of their own.

**HSS342** (Spring)

### **Genesis Rewritten: A Cultural History of Biology**

Grade Level: Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: One Credit Junior History

This course will trace the varied attempts to explain the living world from the late Renaissance to the 21st century. We will examine varied religious, philosophical and scientific approaches to the questions of life and the complex interrelationships of living things. We will study the links between physiology and chemistry, and we will pay special attention to the ideas of Darwin and the influence of Darwinian evolution on the way we view nature (and ourselves). We will explore the human drive to order the living world, and the effect of recent notions mass extinction on such systems of order. Finally, we will consider the changing views of the relationship of mind and body and the effect of such notions on culture and social policy.

HSS351 (Fall)

## **A History of Philosophy: Nature, Certainty, and the Self**

Grade Level: Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: One Credit Junior History

How do we know what we know? Epistemology, the philosophy of knowing, is essential to the other fields of philosophy, and arguably, most other fields of thought. The definition of the knowable, or the nature of the true, serves as a foundation for the treatment of other crucial topics: the character of virtue, the foundations of authority, or the basis of beauty. However, in the process of defining the knowable, philosophers have had to confront the nature of the knower – the human mind or the human self. This course will trace the complex relationship between views of knowledge, views of the human mind, and the relationship of both to the understanding of the physical universe. While we will concentrate on the study of primary texts, we will also apply those texts to contemporary topics of interest in class and in a series of four or five evening seminars.

HSS392 (Spring)

## **Environmental History**

Grade Level: Senior  
Length: One Semester  
Credit: 0.50  
Prerequisites: One Credit Junior History

How has the natural world affected humanity? How has humanity affected the natural world? Should we be concerned about these impacts? In this course students will discover forests long since cut, germs that should not be forgotten, the effects of carbon on the atmosphere and what, if anything, is to be done about any of it. This course examines environmental history and United States environmental policy. It begins with a consideration of the philosophical understanding of the natural world, the effects of natural forces upon the human population, and the human population's impact upon the planet. The second half of the course is devoted to an exploration of policy debates addressing conservation and global warming.

# WORLD LANGUAGES

**WLG110** (Full Year)

## **French I**

Grade Level: Sophomore/Junior/Senior  
Length: Two Semesters  
Credit: 1.0  
Prerequisite: None. This course is not open to students with prior experience in French.

In this course, students begin to develop proficiency in listening, speaking, reading, and writing. Topics revolve around the students' immediate world, including self, family, friends, school and home communities, interests, food, health, transportation, holidays, seasons, and clothes. Students build good pronunciation and listening skills, and read simple authentic texts.

**WLG120** (Full Year)

## **French II**

Grade Level: Sophomore/Junior/Senior  
Length: Two Semesters  
Credit: 1.0  
Prerequisite: French I and recommendation of Instructor or Proficiency Exam and recommendation of Instructor

Students build upon the skills developed in French I (with appropriate review of previously learned material). They develop greater proficiency in listening, speaking, reading, and writing. The topical context is expanded from the students' immediate world to the world of the target cultures. Topics may include shopping, cuisine, geography, travel, wellness, leisure time activities, and careers. Students will be required to write compositions on a regular basis.

**WLG130** (Full Year)

## **French III**

Grade Level: Sophomore/Junior/Senior  
Length: Two Semesters  
Credit: 1.0  
Prerequisite: French II and recommendation of Instructor or Proficiency Exam and recommendation of Instructor

In Level III, students continue to build communication skills developed in Levels I and II. Specifically, students participate actively in extended oral and written discourse, using compound and complex sentences to provide information in a coherent and fluent manner. Students narrate and describe past and present events; they predict future events. They develop critiquing skills. Students explore options in a given situation, and handle difficulties and unexpected events. They also learn to initiate and sustain a conversation, discussion, or debate. Students demonstrate these language functions in various contexts (personal, social, political, socio-economic, scientific, literary, artistic, historical and philosophical). Students keep a journal throughout the school year as a reflective process and assessment tool. During second semester students examine the social, psychological, and cultural implications of fairy tales. Reading selections may include three famous French novels: *Le Petit Nicolas*, *La Belle et la Bête*, and *Le Petit Prince*.

**WLG140** (Full Year)**French IV**

Grade Level: Sophomore/Junior/Senior  
 Length: Two Semesters  
 Credit: 1.0  
 Prerequisite: French III and recommendation of Instructor or Proficiency Exam and recommendation of Instructor

**WLG150** (Full Year)**French V**

Grade Level: Junior/Senior  
 Length: Two Semesters  
 Credit: 1.0  
 Prerequisite: French IV and recommendation of Instructor

Students of French IV and V are in the same class and follow the same curriculum for the academic year. The curriculum is a two-year cycle, alternating every other year. The first quarter of each year is devoted to an in-depth grammar review, and new grammatical structures will be introduced and reviewed throughout the year. Students read authentic texts that include advanced grammatical structures (i.e. passive voice, subjunctive and conditional moods, indirect discourse), and topics that are technical, scientific, philosophical, and literary.

Learning experience designs for French IV and French V include:

Slice of Time--an interdisciplinary approach to the study of a selected period of history, beginning with a piece of literature, a film, a historical period, a philosophical movement, or an art movement, etc. as a focal point. Examples of learning experiences may include: French Presence in Indochina; French Presence in Africa and post-colonial France; Questions of the Individual, Identity, and Existentialism; Questions of Religion, Loss of Innocence, and Life in France Today; etc.

Visual Thinking--Visual Thinking--based on the belief that art reflects the perspectives, practices and products of a culture. The study of art from the French-speaking world involves careful observation and analysis. It encourages deductive reasoning, speculation about possible meaning, interpretation, and judgment.

Le Septième Art—French cinéma is appreciated and renowned throughout the world. Within France, cinema is held in such high esteem that it has been called “The Seventh Art”. Students will explore a particular theme as it is developed through film. Film selections may include classics, and more recent productions, as well as films from francophone countries beyond France. Examples of themes: Revolution; Liberty, Equality, and Fraternity; and Youth, Family, and Society.

Current Events - Newsworthy events regarding France, the francophone world, the European Union, and the United States will be discussed as they present themselves throughout the year. The instructor will present topics for discussion and students are encouraged to do so as well. Every effort will be made to find readings in French about current events, but some may be in English.

Level IV students continue to build on the skills from the first three levels of their study of French by developing and refining the five major skills of listening, speaking, reading, writing, and cultural competency. As the year progresses, students’ written and oral French is expected to reflect advanced grammatical structures and an ever-expanding, sophisticated, precise, and eloquent vocabulary. Students become more adept at comprehending the speech of native speakers, speaking at a normal rate of speed, in most situations.

Expectations for performance and progress are higher for French V students. Students at level V of French continue to build on the five skills. Due to their experience with and exposure to the language and francophone cultures, they are expected to assess and demonstrate greater mastery of the grammar and vocabulary in their written and oral communication. As the year progresses, students will be expected to demonstrate increasingly effective communication through the creative use of vocabulary in context, and grammatical and syntactical accuracy. For example, their written French will demonstrate increasing fluency, more concise expression when necessary, and greater control of the mechanics of the written and spoken language. Spoken French will reflect more accurate pronunciation, increasing fluency, and authentic French intonation.

**WLG220 (Full Year)****Spanish II**

Grade Level: Sophomore/Junior/Senior  
 Length: Two Semesters  
 Credit: 1.0  
 Prerequisite: Spanish I and recommendation of Instructor or Proficiency Exam and recommendation of Instructor

Students build upon the skills developed in Spanish I (with appropriate review of previously learned material). They develop greater proficiency in listening, speaking, reading, and writing. The topical context is expanded from the students' immediate world to the world of the target cultures. Topics may include shopping, cuisine, geography, travel, education, wellness, leisure time activities, careers, and the 21st century. Students will also keep a journal to improve their writing.

**WLG230 (Full Year)****Spanish III**

Grade Level: Sophomore/Junior/Senior  
 Length: Two Semesters  
 Credit: 1.0  
 Prerequisite: Spanish II and recommendation of Instructor or Proficiency Exam and recommendation of Instructor

In Level III, students continue to build communication skills developed in Levels I and II. Specifically, students participate actively in extended oral and written discourse, using compound and complex sentences to provide information in a coherent and fluent manner. Students narrate and describe past and present events; they predict future events. They develop critiquing skills. Students explore options in a given situation, and handle difficulties and unexpected events. They also learn to initiate and sustain a conversation, discussion, or debate. Students demonstrate these language functions in various contexts (personal, social, political, socio-economic, scientific, literary, artistic, historical and philosophical). Students keep a journal throughout the school year as a reflective process and assessment tool. Some of the topics covered in Spanish III are music, family, friendship and love, Latin American civilizations, environment, and poetry.

**WLG240 (Full Year)****Spanish IV**

Grade Level: Sophomore/Junior/Senior  
 Length: Two Semesters  
 Credit: 1.0  
 Prerequisite: Spanish III and recommendation of Instructor or Proficiency Exam and recommendation of Instructor

In Level IV students continue to develop and refine the major skills of listening, speaking, reading and writing. They read and comprehend authentic texts that include advanced grammatical structures (i.e. passive voice, subjunctive and conditional moods, indirect discourse), and topics that are technical, scientific, philosophical and literary. Students' writing and speaking also reflect advanced grammatical structures and an ever-expanding, sophisticated, and eloquent vocabulary. Students become more adept at comprehending the speech of native speakers, speaking at a normal rate of speed, in most situations.

Learning experience designs include:

Slice of Time--an interdisciplinary approach to the study of a selected period of history, beginning with a piece of literature, a film, a historical period, a philosophical movement, or an art movement, etc. as a focal point. Some recent learning experiences have been: Medieval Spanish Literature, The Origins of the Spanish Language, Surrealist Spanish Painting, Revolutionary Movements in Twentieth Century Latin American, and Immigration: Myths and Reality.

Visual Thinking--Visual Thinking--based on the belief that art reflects the perspectives, practices and products of a culture. The study of art from the Spanish-speaking world involves careful observation and analysis. It encourages deductive reasoning, speculation about possible meaning, interpretation, and judgment.

Science and Ethics--designed so that students can examine a scientific problem that affects individuals and society as a whole. The choice of "problem" may vary from year to year; however, the problem must reflect an ethical dilemma. Examples of topics are: the pros and cons of nuclear energy, the effects of oil spills, genetics engineering, euthanasia, forestry

management, use/misuse of the information superhighway, the political role of environmental groups, the responsibility of the scientist in society, etc.

**WLG250** (Full Year)**Spanish V**

Grade Level:	Sophomore/Junior/Senior
Length:	Two Semesters
Credit:	1.0
Prerequisite:	Spanish IV <u>and</u> recommendation of Instructor or Proficiency Exam <u>and</u> recommendation of Instructor

In Level V, students build on the skills developed in previous years of study in order to enhance all aspects of communicative and cultural competency. The goal is to acquire greater proficiency in conversation, reading, writing, and listening comprehension. There is an in-depth review of grammar. Throughout the course, we examine aspects of Spanish culture and civilization through the study of history, literature, art and cinema.

**WLG310** (Full Year)**German I**

Grade Level:	Sophomore/Junior/Senior
Length:	Two Semesters
Credit:	1.0
Prerequisite:	None. This course is not open to students with prior experience in German.

In this course, students begin to develop proficiency in listening, speaking, reading, and writing. Topics revolve around the students' immediate world, including self, family, friends, school and home communities, interests, food, health, holidays, and clothes. Students build good pronunciation and listening skills, and read simple texts. In addition this course seeks to develop and enhance an understanding of the diverse cultures of the German-speaking world.

**WLG320** (Full Year)**German II**

Grade Level:	Sophomore/Junior/Senior
Length:	Two Semesters
Credit:	1.0
Prerequisite:	German I <u>and</u> recommendation of Instructor or Proficiency Exam <u>and</u> recommendation of Instructor

Students build upon the skills developed in German I (with appropriate review of previously learned material). They develop greater proficiency in listening, speaking, reading, and writing. The topical context is expanded from the students' immediate world to the world of the target cultures. Topics may include shopping, cuisine, geography, travel, wellness, leisure time activities, and careers.

**WLG330** (Full Year)**German III**

Grade Level:	Sophomore/Junior/Senior
Length:	Two Semesters
Credit:	1.0
Prerequisite:	German II <u>and</u> recommendation of Instructor or Proficiency Exam <u>and</u> recommendation of Instructor

In Level III, students continue to build communication skills developed in Levels I and II. Specifically, students participate actively in extended oral and written discourse, using compound and complex sentences to provide information in a coherent and fluent manner. Students narrate and describe past and present events; they predict future events. They develop critiquing skills. Students explore options in a given situation, and handle difficulties and unexpected events. They also learn to initiate and sustain a conversation, discussion, or debate. Students demonstrate these language functions in various contexts (personal, social, political, socioeconomic, scientific, literary, artistic, historical and philosophical). Each semester students will be expected to complete a project that requires them to gather and process information in the target language. Students may be asked to keep a journal throughout the school year as a reflective process and assessment tool. They will read selected authentic texts (fiction and non-fiction) that will provide the impetus for discussions. Typical topics for German III include: Post-War History of Germany and Reunification, Contemporary Sociological Issues and Issues of Public Discourse in German Speaking World, Regional Traditions and National Identity: A Tour Through German Culture and History, The Age of Goethe, Germany's Urban Landscape and Architecture, Environmental Issues and Green Energy – the German Solution, Pop Culture and Contemporary Music Scene.

**WLG340** (Full Year)**German IV**

Grade Level: Sophomore/Junior/Senior  
 Length: Two Semesters  
 Credit: 1.0  
 Prerequisite: German III and recommendation of Instructor or Proficiency Exam and recommendation of Instructor

**WLG350** (Full Year)**German V**

Grade Level: Sophomore/Junior/Senior  
 Length: Two Semesters  
 Credit: 1.0  
 Prerequisite: German IV and recommendation of Instructor

In Levels IV and V students continue to develop and refine the major skills of listening, speaking, reading and writing. They read and comprehend authentic texts that include advanced grammatical structures (i.e. passive voice, subjunctive and conditional moods, indirect discourse), and topics that are technical, scientific, philosophical and literary. Students' writing and speaking also reflect advanced grammatical structures and an ever-expanding, sophisticated, and eloquent vocabulary. Students become more adept at comprehending the speech of native speakers, speaking at a normal rate of speed, in most situations.

Learning experiences include: Slice of Time--an interdisciplinary approach to the study of a selected period of history, beginning with a piece of literature, a film, a historical period, a philosophical movement, or an art movement, etc. as a focal point. Some recent learning experiences have been: The Weimar Republic, literary selections such as Deutschstunde and Der Richter und Sein Henker, 40 Year DDR / BRD and Politics and Contemporary Germany. Other topics include:

Visual Thinking--based on the belief that art reflects the perspectives, practices and products of a culture. The study of art from the Spanish-speaking world involves careful observation and analysis. It encourages deductive reasoning, speculation about possible meaning, interpretation, and judgment.

Science and Ethics--designed so that students can examine a scientific problem that affects individuals and society as a whole. The choice of "problem" may vary from year to year; however, the problem must reflect an ethical dilemma. Examples of topics are: the pros and cons of nuclear energy, the effects of oil spills, genetics engineering, euthanasia, forestry management, use/misuse of the information superhighway, the political role of environmental groups, the responsibility of the scientist in society, etc.

**WLG410** (Full Year)**Japanese I**

Grade Level: Sophomore/Junior/Senior  
 Length: Two Semesters  
 Credit: 1.0  
 Prerequisite: None. This course is not open to students with prior experience in Japanese.

In this course, students begin to develop proficiency in listening, speaking, reading, and writing. Topics revolve around the students' immediate world, and include self, family, friends, school and home communities, interests, food, transportation, holidays, seasons, and clothes. Students build good pronunciation and listening skills, and learn to read and write in both katakana and hiragana (phonetic writing systems) and a small number of kanji/Chinese characters. In addition this course seeks to develop and enhance an understanding of Japanese culture.

**WLG420** (Full Year)

## **Japanese II**

Grade Level: Sophomore/Junior/Senior  
Length: Two Semesters  
Credit: 1.0  
Prerequisite: Japanese I and recommendation of Instructor

Students build upon the skills developed in Japanese I (with appropriate review of previously learned material). They develop greater proficiency in listening, speaking, reading, and writing. The topical context is expanded from the students' immediate world to the world of the target culture. Topics may include shopping, cuisine, geography, travel, education, wellness, leisure time activities, careers, and the 21st century. Students will continue to develop their hiragana and katakana writing skills, and will learn more kanji.

**WLG430** (Full Year)

## **Japanese III**

Grade Level: Sophomore/Junior/Senior  
Length: Two Semesters  
Credit: 1.0  
Prerequisite: Japanese II and recommendation of Instructor

The overall theme for Level III is "Living in Japan". Students imagine going to Japan as part of an exchange program, and within that context, they develop practical, real-world skills that they would need if they were to travel to Japan and live with a host family. They also learn more about the Japanese lifestyle and culture so that they can interact and speak appropriately with Japanese people. Level III continues the patterns established at Levels I and II. The main emphasis is still on spoken communication and communicative competency; however, students will be expected to do more reading and writing than at Level II. Furthermore, students will tackle some challenging ideas and grammatical structures, including the passive construction (which is significantly different from passive in English), the verbs of giving and receiving (which reveal much about Japanese society and mindset), and provisional, conditional, and potential tenses.

**WLG510** (Full Year)

## **Russian I**

Grade Level: Sophomore/Junior/Senior  
Length: Two Semesters  
Credit: 1.0  
Prerequisite: None. This course is not open to students with prior experience in Russian.

In this course, students are expected to master the Cyrillic alphabet in order to develop proficiency in listening, speaking, reading, and writing. Students are expected to master Russian penmanship. Topics revolve around the students' immediate world, including self, family, friends, home communities, interests, food, professions, health, transportation, holidays, and seasons. In addition this course seeks to develop and enhance an understanding of Russian culture.

**WLG520** (Full Year)

## **Russian II**

Grade Level: Sophomore/Junior/Senior  
Length: Two Semesters  
Credit: 1.0  
Prerequisite: Russian I and recommendation of Instructor

Students build upon the skills developed in Russian I (with appropriate review of previously learned material). They develop greater proficiency in listening, speaking, reading, and writing. The topical context is expanded from the students' immediate world to the world of the target cultures. Topics include cuisine, geography, education, seasons and holidays, family, and character traits. Students build good pronunciation and listening skills, and read simple authentic texts. Russian II students are required to keep a journal throughout the school year.

**WLG530 (Full Year)****Russian III**

Grade Level: Sophomore/Junior/Senior  
 Length: Two Semesters  
 Credit: 1.0  
 Prerequisite: Russian II and recommendation of Instructor

In Level III students continue to build communication skills developed in Levels I and II. Students are expected to regularly demonstrate and improve the following language skills: participate actively in class conversations, discussions, and debates; use compound and complex sentences to provide information in a coherent and fluent manner; develop critiquing skills. Students will continue to regularly write in journals for the purpose of mastering reflective thinking skills and grammatical accuracy.

Reading authentic Russian literary texts is at the foundation of the Russian III curriculum. Russian III students will read short stories by Aleksander Pushkin and Anton Chekhov, as well as a selection of Russian fairytales, and poetry by various 19th and 20th century Russian poets. In order to develop better reading skills, students will read abstracts and short articles from Russian newspapers and learn to summarize their content. Written assessments will include short writes, quizzes, and longer essays. Oral performance will be assessed by means of class contributions and in-class presentations.

**WL610 (Full Year)****Mandarin Chinese I**

Grade Level: Sophomore/Junior/Senior  
 Length: Two Semesters  
 Credit: 1.0  
 Prerequisite: None. This course is not open to students with prior experience in Mandarin Chinese.

In Chinese I students begin to develop proficiency in listening, speaking, reading, and writing. Topics revolve around the students' immediate world: introducing self, family, friends, school and home communities, interests, food, professions, and holidays. Students build good pronunciation and listening skills, and read simple authentic texts. Students learn Pinyin Romanization system along with the Chinese writing system and progress to recognizing Chinese characters (hanzi). In addition, this course seeks to develop and enhance an understanding of Chinese culture.

**WL620 (Full Year)****Mandarin Chinese II**

Grade Level: Sophomore/Junior/Senior  
 Length: Two Semesters  
 Credit: 1.0  
 Prerequisite: Mandarin Chinese I and recommendation of Instructor or Proficiency Exam and recommendation of Instructor

Students build upon the skills developed in Mandarin Chinese I (with appropriate review of previously learned material). They develop greater proficiency in listening, speaking, reading, and writing. The topical context is expanded from the students' immediate world to the world of the target culture. Topics may include shopping, cuisine, geography, travel, education, wellness, leisure time activities, and careers. Students will continue to develop their Chinese character (hanzi) writing skills, and will learn more hanzi.

**WLG630** (Full Year)

## **Mandarin Chinese III**

Grade Level: Sophomore/Junior/Senior  
Length: Two Semesters  
Credit: 1.0  
Prerequisite: Mandarin Chinese II and recommendation of Instructor or Proficiency Exam and recommendation of Instructor

In Level III, students continue to build communication skills developed in Levels I and II. Specifically, students participate actively in extended oral and written discourse, using compound and complex sentences to provide information in a coherent and fluent manner. Students narrate, describe, and predict events within context. They develop critiquing skills. Students explore options in a given situation, and handle difficulties and unexpected events. They also learn to initiate and sustain a conversation, discussion, or debate. Students read their first full-length book in Chinese. Students demonstrate these language functions in various contexts. Students may be asked to keep a journal throughout the school year as a reflective process and assessment tool.

## FINE ARTS

**FAR100** (Full Year)

### **Concert Band**

Grade Level: Sophomore / Junior / Senior  
Length: Two Semesters  
Credit: 1.0  
Prerequisite: Audition and approval of Instructor

The Concert Band will explore the music of different composers via analysis, rehearsal and performance. This exploration will provide students with an overview of the visual, auditory and aesthetic dimensions of instrumental music. Particular attention will be paid to ensemble participation in the context of rehearsal and performance. Students will develop further technical proficiency and enhance their musical understanding through problem based learning, critical thinking skills, reflection, analysis and practice. Students will perform in formal concerts as well as will have the opportunity to audition for and participate in the IHSA Solo/Ensemble Contest and in the IMEA Music Program are eligible to participate in any music sponsored co-curricular activities and/or events.

**FAR110** (Full Year)

### **Wind Ensemble**

Grade Level: Sophomore / Junior / Senior  
Length: Two Semesters  
Credit: 1.0  
Prerequisite: Audition and approval of Instructor

The Wind Ensemble will explore the music of different composers via analysis, rehearsal and performance. This exploration will provide students with an overview of the visual, auditory and aesthetic dimensions of instrumental music. Particular attention will be paid to ensemble participation in the context of rehearsal and performance. Students will develop further technical proficiency and enhance their musical understanding through problem based learning, critical thinking skills, reflection, analysis and practice. Students will perform in formal concerts as well as have the opportunity to audition for and participate in the IHSA Solo/Ensemble Contest and in the IMEA District and All-State Festivals. Private lessons are highly recommended. Student participation on the Wind Ensemble is based upon a placement audition. This group is primarily comprised of upper classmen, and only 3-5% of the ensemble includes sophomores. Students will perform advanced band literature and original transcriptions. Students enrolled in the IMSA Music Program are eligible to participate in any music sponsored co-curricular activities and/or events.

**FAR120** (Full Year)

### **String Orchestra**

Grade Level: Sophomore / Junior / Senior  
Length: Two Semesters  
Credit: 1.0  
Prerequisite: Audition and approval of Instructor

The String Orchestra will explore the music of different composers via analysis, rehearsal and performance. This exploration will provide students with an overview of the visual, auditory and aesthetic dimensions of instrumental music. Particular attention will be paid to ensemble participation in the context of rehearsal and performance. Students will develop further technical proficiency and enhance their musical understanding through problem based learning, critical thinking skills, reflection, analysis and practice. Students will perform in formal concerts as well as have the opportunity to audition for and participate in the IHSA Solo/Ensemble Contest and in the IMEA District and All-State Festivals. Private lessons are highly recommended. Students enrolled in the IMSA Music Program are eligible to participate in any music sponsored co-curricular activities and/or events.

**FAR130 (Full Year)****Chamber Strings**

Grade Level: Sophomore / Junior / Senior  
 Length: Two Semesters  
 Credit: 1.0  
 Prerequisite: Audition and approval of Instructor

The Chamber Strings will explore the music of different composers via analysis, rehearsal and performance. This exploration will provide students with an overview of the visual, auditory and aesthetic dimensions of instrumental music. Particular attention will be paid to ensemble participation in the context of rehearsal and performance. Students will develop further technical proficiency and enhance their musical understanding through problem based learning, critical thinking skills, reflection, analysis and practice. Students will perform in formal concerts as well as have the opportunity to audition for and participate in the IHSA Solo/Ensemble Contest and in the IMEA District and All-State Festivals. Private lessons are highly recommended. Student participation on the Wind Ensemble is based upon a placement audition. This group is primarily comprised of upper classmen, and only 3-5% of the ensemble includes sophomores. Students will perform advanced banc literature and original transcriptions. Students enrolled in the IMSA Music Program are eligible to participate in any music sponsored co-curricular activities and/or events.

**FAR200 (Full Year)****Concert Choir**

Grade Level: Sophomore/Junior/Senior  
 Length: Two Semesters  
 Credit: 1.0  
 Prerequisite: None

This course provides students with the opportunity to explore choral music on many levels. As performers they will discover and practice multiple aspects of singing including the development of proper vocal technique, the interpretation of music with stylistic and historical accuracy and the synergy of ensemble singing. Students will develop critical thinking and problem solving skills through rehearsal in small and large group settings, score study, regular sight-singing experiences as well as through observation and critiques of both their own and other ensembles' performances. Two major concerts are scheduled each semester. (Students enrolled in the Music Program are eligible to participate in any music sponsored co-curricular activity.)

**FAR210(Full Year)****Chamber Choir**

Grade Level: Junior/Senior  
 Length: Two Semesters  
 Credit: 1.0  
 Prerequisite: Participation in IMSA Concert Choir or by audition, moderate to good music reading skills, and instructor's approval.

This course provides experienced singers with the opportunity to explore and perform advanced-level choral literature. Both semesters provide opportunities for solo, as well as small and large ensemble singing through many diverse performing venues. Students will be challenged to continue developing their musical literacy, interpretive performing skills and aesthetic sensitivity through their study of a great variety of choral music. Two to four major concerts are scheduled each semester. (Students enrolled in the Music Program are eligible to participate in any music sponsored co-curricular activity.)

**FAR402** (Spring)

### **Art Design**

Grade Level: Sophomore/Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: None

Students will investigate the elements and principals of design by examining various styles and periods of art and art history. Students will create both two and three-dimensional solutions to design problems. An emphasis will be placed on drawing, problem solving, aesthetics and reflection.

**FAR405** (Fall or Spring)

### **Ceramics**

Grade Level: Sophomore/Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: None

This course will provide students with the opportunity to explore methods of working with clay including hand building and throwing on the potter's wheel. Students will solve design problems in clay by considering aesthetic, historical, and technical processes related to ceramics. Students will have the opportunity to investigate traditional as well as new advances in technology with their learning, including firing methods, clay and glaze formulation and function. Demonstration of student learning will take place through production, critique and self-assessment.

**FAR415** (Fall or Spring)

### **Photography**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: None

This course will provide students with the opportunity to obtain a general overview of the uses for and history of photography. The course will allow students to create with both black & white and digital photography. Students will learn to use photographic and aesthetic terminology and obtain practice in picture taking, film processing, 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 digital cameras and batteries.

**FAR425** (Fall or Spring)

### **Advanced Ceramics**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: A grade of "A" in Ceramics (FAR405) or permission of instructor

This course will provide students who have proven themselves proficient in basic Ceramics, an opportunity to perfect basic skills, explore advanced techniques, and express their interests and creativity through individualized projects in clay. An emphasis will be placed on creativity, problem solving as well as using appropriate technologies to advance learning.

## WELLNESS

**WEL105** (Fall or Spring)

### **Moving and Learning**

Grade Level: Sophomore  
Length: One Semester  
Credit: 0.50  
Prerequisite: None

This semester-long course is the foundational wellness class for all sophomores. It is designed to develop physically educated individuals who have the knowledge, skills, and confidence to enjoy a lifetime of healthful physical activity. This conceptual-based course emphasizes the kinesthetic concepts and principles of motor learning, motor development, biomechanics, and health-related physical fitness. Learning experiences will focus on tactics and strategies for a variety of physical activities, conceptual understanding of improving motor performance and physical fitness. Additional focus will be placed upon the importance of nutrition and sleep as they relate to overall fitness and stress management. Students are required to participate in the President's Challenge Fitness pre- and post-test.

### **WELLNESS ELECTIVES**

After successful completion of Moving and Learning, students will enroll in a Wellness elective. The elective program is comprised of beginning level physical activities. Students are eligible to enroll in those courses for which they have no prior formal, professional instruction, or coaching. A student is not eligible to enroll in a course even if they have had prior experience in only one of the two learning opportunities provided. The Wellness Team believes in the promotion of and engagement in regular physical activity and as an academic experience should be obtained through varied physical activity learning experiences. Students should seek to explore new venues for physical movement, seeking breadth in new learning and depth in that experience. All Wellness electives include pre- and post-fitness testing.

**WEL201** (Fall)

### **Tennis and Badminton**

Grade Level: Sophomore/Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Moving and Learning and must have Instructor permission

This tennis and badminton course will follow a tactical games approach for students to understand and demonstrate tennis and badminton tactics, skills, and positive sporting behavior, etiquette, safety, and fair play. As tactical complexity increases, students will develop understanding and performance of skills that enable them to make successful shot selection and placement and court positioning. Biomechanical principles of movement will be integrated in the learning experiences to enhance the connection between science and sport. Students will participate in game play involving singles, doubles and mixed doubles. All students are encouraged to have fun as they discover the tactical and social aspects of tennis and badminton. Learning experiences begin exploring the game of tennis followed by badminton.

**WEL211** (Fall)

## **Golf and Indoor Games**

Grade Level: Sophomore/Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Moving and Learning and must have Instructor permission

This course is designed to help students develop the tactics and skills necessary to play the game of golf. It includes an understanding of the history, rules, etiquette, strategies, and the social, emotional, and physical values of the game. Video tape analysis of the golf swing will be used as an assessment tool. Biomechanics principles as they apply to the golf swing will be discussed.

Indoor Games is comprised of multiple motor skills to produce further development and success in games and sports. Students will actively participate in athletic opportunities and leisure-time activities to build on the skill- and health-related fitness experiences introduced in the sophomore curriculum. Activities will include games and activities from invasion, net/wall, striking/fielding, and/or target categories. Students will be exposed to the tactical approach to learning games and activities drawing connections of both the strategies and skills associated with the games in each category. They will become thinking players, learning to react to and deal with the challenge presented in a game situation. This approach to learning game play provides quality opportunities for the student to give and receive feedback.

**WEL221** (Fall)

## **Lifeguarding and Water Polo**

Grade Level: Sophomore/Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Moving and Learning and must have Instructor permission

In this course, basic rules, techniques, and strategies of water polo will be discussed, demonstrated, and implemented in game situations. Elements of the tactical games approach to understanding sports will be used. Olympic water polo videos will be shown. Students will be assessed on skill and strategy improvement through use of video-taping. Ability to swim one length of the pool (25 yards) and tread water for at least two minutes is required.

The lifeguarding class is a certification program through the American Red Cross for those students at least 15 years of age on or before the last scheduled session, and wishing to be lifeguards at summer pools or at IMSA for work service. There are two swimming pre-requisites for this course which all students must successfully complete the first class session. They are:

Swim 300 yards continuously using breaststroke and front crawl (100 yards front crawl, 100 yards breaststroke, 100 yards front crawl-breaststroke combo). Timed Event: Swim 20 yards using front crawl or breaststroke, surface dive to a depth of 7-10 feet, retrieve a 10 pound object, return to the surface, and swim 20 yards back to the starting point with the object. Exit the pool without using steps or ladder. Timed event must be completed in 1 minute 40 seconds or less.

There are two certifications earned with the successful completion of this course: Lifeguard Training and First Aid (valid for three years), and CPR for the Professional Rescuer (valid for one year). A \$25 Lab Fee is required for the CPR portion of this class.

WEL231 (Fall)

### **Outdoor and Indoor Games**

Grade Level: Sophomore/Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Moving and Learning and must have Instructor permission

This semester long course is comprised of multiple motor skills to produce further development and success in games and sports. Students will actively participate in athletic opportunities and leisure-time activities to build on the skill and health related fitness experiences introduced in the sophomore curriculum. Activities will include traditional games and activities such as basketball, flag football and volleyball. Students will be exposed to the tactical approach to learning games and activities drawing connections of both the strategies and skills associated with the games in each category. They will become thinking players, learning to react to and deal with the challenge presented in a game situation. This approach to learning game play provides quality opportunities for the student to give and receive feedback.

WEL232 (Spring)

### **Outdoor and Indoor Games**

Grade Level: Sophomore/Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Moving and Learning and must have Instructor permission

This semester long course is comprised of multiple motor skills to produce further development and success in games and sports. Students will actively participate in athletic opportunities and leisure-time activities to build on the skill and health related fitness experiences introduced in the sophomore curriculum. Activities will include non-traditional games and activities such as disc golf, rugby and sepak takraw. Students will be exposed to the tactical approach to learning games and activities drawing connections of both the strategies and skills associated with the games in each category. They will become thinking players, learning to react to and deal with the challenge presented in a game situation. This approach to learning game play provides quality opportunities for the student to give and receive feedback.

WEL241 (Fall)

### **Beginning and Intermediate Swimming**

Grade Level: Sophomore/Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Moving and Learning and must have Instructor permission

This course is for students who would like to learn to swim better but need one on one attention to progress beyond non-swimmer status. Starting with basic floats and glides, the student will progress to elementary backstroke and crawl stroke during beginning swimming and will learn sidestroke, backstroke, and breaststroke during the intermediate level. In addition, the swimmer's ability to swim farther continuously will be improved with the idea of using swimming as a fitness activity. Video tape analysis will be used extensively as an assessment tool. Biomechanical principles as related to efficient movement in water will be discussed. Drills for improving efficient movement will be implemented.

WEL322 (Spring)

### **Badminton and Tennis**

Grade Level: Sophomore/Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Moving and Learning and must have Instructor permission

This badminton and tennis course will follow a tactical games approach for students to understand and demonstrate badminton and tennis tactics, skills, and positive sporting behavior, etiquette, safety, and fair play. As tactical complexity increases, students will develop understanding and performance of skills that enable them to make successful shot selection and placement and court positioning. Biomechanical principles of movement will be integrated in the learning experiences to enhance the connection between science and sport. Students will participate in game play involving singles, doubles and mixed doubles. All students are encouraged to have fun as they discover the tactical and social aspects of badminton and tennis. Learning experiences begin exploring badminton followed by tennis.

WEL332 (Spring)

## **Basketball and Soccer**

Grade Level: Sophomore/Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Moving and Learning and must have Instructor permission

This basketball and soccer course is designed to help students develop the skills, tactics, and strategies necessary to play the game. These sports are paired together providing students with the opportunity to develop hand-eye and foot-eye coordination in the same semester by engaging in two fast-moving sports which are also excellent for developing cardiovascular endurance. The tactical approach will be utilized so that students learn the “overall picture” of how basketball and soccer is played effectively. Skills and strategies will be taught as they will be used in the game, not in isolation. Basic rules will be learned, and student will gain an appreciation for the history of the game. In addition, the social, emotional, and physical values of the game are explored. Students will experience skill drill work, skill assessments, and modified and regular game play throughout the course. Video-tape assessments of skill and for understanding will be used.

WEL342 (Fall or Spring)

## **Current Fitness Trends**

Grade Level: Sophomore/Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Moving and Learning and must have Instructor permission

This semester long course is designed to provide learning opportunities that allow students to explore and participate in current trends in fitness to enhance ones physical fitness. Students will research and experiences group fitness style formats such as kickboxing, step, boot camp and circuit training. Video analysis will be used for assessment.

WEL505 (Fall or Spring)

## **Outdoor Games and Bowling**

Grade Level: Sophomore/Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Moving and Learning and must have Instructor permission

Outdoor Games is comprised of multiple motor skills to produce further development and success in games and sports. Students will actively participate in athletic opportunities and leisure-time activities to build on the skill- and health-related fitness experiences introduced in the sophomore curriculum. Activities will include games and activities from invasion, net/wall, striking/fielding, and/or target categories. Students will be exposed to the tactical approach to learning games and activities drawing connections of both the strategies and skills associated with the games in each category. They will become thinking players, learning to react to and deal with the challenge presented in a game situation. This approach to learning game play provides quality opportunities for the student to give and receive feedback.

Bowling will follow a tactical games approach in order for students to understand and demonstrate bowling tactics, skills, positive sporting behavior, etiquette, safety, and fair play. As tactical complexity increases, students will develop understanding and performance of skills that enable them to make successful preshot decisions, attain proper pin action and adjust delivery for picking up spares. Biomechanical principles of movement will be integrated in the learning experiences to enhance the connection between science and sport.

WEL515 (Fall or Spring)

## **Individualized Physical Fitness**

Grade Level: Sophomore/Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Moving and Learning and must have Instructor permission

This semester long course will enable students to extend their knowledge and practice in all health-related fitness components as well as any of the skill-related components of their choice. As a member of the common exercise group, students will have the opportunity to establish factors that enable exercise adherence for themselves and others. There will be frequent guidance, support, and structures for periodic evaluation and motivation of individual fitness plans. This course is designed for a mature, self-motivated exerciser who is willing to extend their potential for physical development.

**WEL525** (Fall or Spring)

## **Movement and Relaxation**

Grade Level: Sophomore/Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Moving and Learning and must have Instructor permission

Movement and Relaxation is a semester long course that will allow students to explore and practice various methods of movement which produce and promote relaxation. Students will discuss stress, its causes, its signs and symptoms and will learn methods for preventing, coping with, and relieving stress. Yoga, Pilates, Qi Gong, and Tai Chi will be examined and performed within this course. Movement origins and historical foundations will initiate each movement method explored. Students will individually perform activities, occasionally assisting each other for correct posture and form. Video analysis will be used for assessment.