

# Illinois Mathematics and Science Academy®

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

## LEARNING OPPORTUNITIES 2016/2017

### 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 academic 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 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.**
  - d) All students are required to demonstrate competency in Computer Science concepts and skills. **Sophomores are required to complete Computer Science Inquiry (0.5 credit)** unless they have already scored a 4 or higher on the AP Computer Science A Exam prior to the beginning of sophomore year.
- **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. Starting with the class of 2018, the 2.5 credits will include American Studies (0.5), a fall junior elective and the spring course The World in the Twentieth Century (which together makes 1.0), as well as two History and Social Sciences electives.
- **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 Principal's 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 in Development programs (i.e. LEAD, Consideration in Ethics, 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.

**ALL course requests are reviewed during the summer and may be changed based on performance.**

## **MATHEMATICS and COMPUTER SCIENCE**

**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 emphasis is placed on problem solving, algebra review, conjecture, and proof. Students will also have the opportunity, using computers, to explore geometry dynamically.

**MAT110** (Full Year)

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

Grade Level: Sophomore  
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  
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. Mathematical Investigations II focuses on the study of matrices, linear relationships, functions and function transformations, and also introduces 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. Mathematical Investigations III builds on Mathematical Investigations II, 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.

#### **Note about calculus:**

Experience has shown that students who attempt to learn calculus on their own or with only the assistance of a tutor are not prepared sufficiently to succeed in subsequent calculus courses. Therefore, *no self-study in calculus will be accepted for placement in the IMSA calculus program.* Additionally, only high school courses from schools with AP-approved programs or IMSA pre-approved college courses will be considered for placement beyond the beginning IMSA calculus course. Students considering accelerating their mathematics education during the summer via calculus coursework are strongly advised to consider a different aspect of mathematics, allowing calculus to be learned as a cohesive subject.

**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 one 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, or initial placement by math department

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 or initial placement by math department

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 or initial placement by math department

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.

**MAT407** (Spring)

### **Modern Geometries**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Mathematical Investigations IV or equivalent

Geometry, literally “measuring the earth,” was created when the earth was thought to be flat. In the modern world the earth, and indeed the universe itself, are curved. Geometry has adapted, and is now a much richer field than ever before. Students in this class explore ideas that take geometry well beyond the Euclidean plane. Topics will include axiom systems, metric spaces, curvature, projections, inversions, duality, constructions, symmetry, tilings, and solid geometry.

**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—making 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. The course 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, with project choice depending upon individual student backgrounds and interests. Possible topic areas for projects include math, physics, chemistry, astronomy, economics, music, image processing, and 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 investigate 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, linear diophantine equations, and multiplicative functions. 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 (Sophomores by placement of math department)  
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 may include the creation of original problems. Students are also expected to work on additional problems of their own selection from outside sources. Topics of in-class study are partially determined by student interest.

**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

**MAT435** (Fall or Spring)

### **Discrete Mathematics**

Grade Level: Junior/Senior (Sophomores by placement of math department)  
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 (Sophomores by placement of math department)  
Length: One Semester  
Credit: 0.50  
Prerequisite: BC Calculus III and recommendation of Instructor, or by placement of math department

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)

### **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)

### **Differential Equations**

**MAT452** (Spring)

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

Differential equations can be studied as an application of mathematics to real-world situations as well as from a theoretical viewpoint. In this course, students will investigate the behavior of solutions to both 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 Mathematics Operational 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.

MAT801 (Fall)  
MAT802 (Spring)

**Advanced Topics in Mathematics**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisites: Multi-Variable Calculus and 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.

Computer science courses will fulfill earned credits requirement in mathematics for graduation. In addition, enrollment in a computer science course will fulfill the requirement that a student enroll in at least one mathematics course each semester at IMSA.

A student may not earn credit in a 100-level course (Computational Thinking and Web Technologies I) after earning credit in any higher-level computer science course.

### CS100 (Fall or Spring) **Computer Science Inquiry**

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

This course will explore the fundamentals of computer science that are essential for students in the 21<sup>st</sup> century. The principles of computer science are taught with two concurrent themes. **Creativity Theme** topics: Computing as a creative activity, processing of data creates knowledge, abstraction, levels of abstraction, managing complexity, computational thinking, problem solving, programming (in Python) and debugging. **Principles Theme** topics: Data and information, algorithms, basic ideas behind technologies including computers, hardware, software and networks, Internet and search engines, and multimedia, social uses and abuses of information, and the foundations of privacy.

**Successful completion of this course will satisfy the computer science graduation requirement.**

### CS105 (Fall or Spring) **Computational Thinking**

Grade Level: 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.

**Successful completion of this course will satisfy the computer science graduation requirement.**

### CS125 (Fall or Spring) **Web Technologies I**

Grade Level: 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), and Extensible HTML (XHTML). We will follow the guidance of the World Wide Web Consortium (W3C) to create interoperable and functional websites.

**Successful completion of this course will satisfy the computer science graduation requirement.**

CS205 (Fall or Spring)

## Object Oriented Programming

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

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, 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.

**Successful completion of this course will satisfy the computer science graduation requirement.**

CS215 (Fall)

## Robotics Programming

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

The robotics programming course will permit students to learn robotics behavior by building and programming robots by completing several projects. These projects will include both remote controlled and autonomous modes of the robots. For most projects, the students will work in teams. Since each project would have several tasks, students will be responsible for completing project benchmarks in order to complete the overall project. The students are not expected to know any programming language, nor any prior knowledge of robotics. Java programming language will be studied as part of the course. The robots will be programmed using Java programming.

**Successful completion of this course will satisfy the computer science graduation requirement.**

CS235 (Fall/Spring)

## Web Technologies

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Computer Science Inquiry or permission of Instructor

Building on the basic Web Technologies units in the CSI course, students will learn to create more dynamic and interactive websites. Advanced HTML and CSS, and basic Javascript enhance the client-side webpages, and students will begin working with server-side scripting and web applications development. PHP and MySQL will allow students to create dynamic websites that store, access, and use data stored in database tables.

**Successful completion of this course will satisfy the computer science graduation requirement.**

CS305 (Spring)

## Advanced Programming

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Object Oriented Programming, Robotics 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.

**Successful completion of this course will satisfy the computer science graduation requirement.**

CS405 (Fall)

## Computer Seminar

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

The content of this course may vary. Common topics are cyber security and Android app development. Students will learn the foundations of security, basic procedures of security, desktop, network, and information security, administering Windows security, security threats and attacks, incident response, secure Internet access and working securely on the Internet. For their next topic, they will be introduced to programming in the Android environment. They will examine the basic components and concepts that define the Android platform, and then move on to cover the specific structure that comprises an Android application. Students will get an overview of the most common tools and techniques for writing Android applications.

**Successful completion of this course will satisfy the computer science graduation requirement.**

## 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, chemical equilibria, and acids and bases. This content is encountered through a combination of lab-based activities, guided inquiry, group discussion and direct instruction. Students will be given the opportunity to place out of Scientific Inquiries – Chemistry by demonstrating proficiency on a placement exam.

**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. In addition, fields and waves are introduced. Students learn concepts and skills through a combination of lab activities and experiments, guided inquiry, group discussion, collaborative problem solving and direct instruction. The course is proficiency-based. Students have the opportunity to place out of this course by opting to take a scheduled placement exam and demonstrating proficiency on the exam.

**SCI125** (Fall or Spring)

### **Scientific Inquiries - Biology**

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

This course is required of all IMSA sophomores. The course addresses six broad conceptual areas: the nature of the scientific process, structure and function relationships, evolution, heredity, metabolism, and ecosystem disruption. Students will engage in learning through a combination of laboratory activities and classroom discussion. This course focuses heavily on student writing and presentations as means to communicate understanding.

**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, and electrochemistry. 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.

SCI211 (Fall)

### Survey of Organic Chemistry

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

**Students who successfully complete Survey of Organic Chemistry are not eligible to enroll in Organic Chemistry I or Organic Chemistry II.**

Survey of Organic Chemistry is a one semester blended course composed of an in-class and an on-line component. The purpose of this course is to provide students with basic understanding of the concepts of the theory of organic chemistry and the skills needed to be successful at the university level. The curriculum includes a study of functional group structure and nomenclature, basic reactions, and lab technique and data analysis. The course presents organic chemistry in a holistic fashion identifying structure-function relationships and discovering similarities and differences among organic compounds. The course is inquiry-based, and places emphasis on hands-on and virtual lab work allowing students opportunities to better understand concepts. 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.

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 benzene. 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 explorations and discussions 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 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 classroom concepts and lab explorations 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: 1) applying equilibrium process to study biochemical reactions as well as cell structure, 2) studying the structure and function of amino acids and proteins, 3) analyzing the kinetic parameters of enzymes including different mechanisms of how drugs are used to inhibit enzymes, and 4) understanding and making connections in metabolism. The course is lab-based and students will gain experience in various bio-techniques to investigate these topics. The majority of the content is encountered through a guided inquiry process.

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. Chemistry topics include atomic, molecular, ionic and radical structures, stoichiometry, thermochemistry, gas laws, acid/base, equilibrium and oxidation/reduction. Environmental topics include the sources, reactions, transport, effects and fates of chemical species in the soil, water and air. These two areas are woven together in daily work and larger projects. This course is divided into four major parts that reflects the most pressing issues in Environmental Chemistry today: Atmospheric Chemistry; Water Chemistry; Pollution and Toxic Organic Compounds; and Energy and Climate Change. Students will perform laboratories that will involve sampling, quantitative detection and data analysis.

SCI402 (Fall)

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

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Scientific Inquiries - Physics or equivalent; Mathematical Investigations III or co-requisite of Mathematical Investigations III and instructor approval.

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, AB I or BC I Calculus, or instructor approval. The co-requisite is AB II or BC II Calculus or instructor approval.

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. The major emphasis of the course is on problem-solving including laboratory experiments, and theoretical problems. There is strong overlap with the AP Physics C Mechanics exam.

SCI412 (Spring)

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

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Scientific Inquiries - Physics or equivalent, AB II or BC II Calculus, Calculus-based Physics – Mechanics, or instructor approval.

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 laboratory experiments 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 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. Students will complete a large project that requires them to learn in depth about topics in modern physics.

SCI455 (Fall or Spring)

## Engineering

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

Engineering's curriculum is grounded in IMSA's mission of advancing the human condition. Students will explore the many branches of engineering and the highly diverse opportunities within the field through interviews with engineers. Students will also gain hands-on experience studying problems, working on teams to design solutions and constructing their designs. As students work on projects, they may utilize mechanics, electronics, chemistry, biology, CAD, rapid prototyping and programming. Students will form teams to develop original products that advance the human condition and make a presentation including a demonstration of their prototype.

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 animal function, adaptation, and evolution. In addition to homework, laboratory reports, and exams, students will also pursue projects of their own design.

SCI505 (Fall or Spring)

### **Computational Science**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Object Oriented Programming or Robotics Programming or demonstrated proficiency on the OOP exit exam

Computational Science offers an introduction to using computer programming to solve science problems. Students will learn to apply programs they have written to real problems in physics, chemistry, biology, and other sciences. The course will discuss Monte Carlo methodology, minimization, finite element analysis, machine learning, and simulations. Assignments apply object orientation, polymorphism, and data structures to problems such as projectile motion, thermodynamics, reaction rates, natural selection, gravitational interactions, and population dynamics.

SCI605 (Fall or Spring)

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

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

This is a one-semester course that explores modern molecular and cellular biology as well as its basis in Mendelian genetics. Students will investigate biomolecule structure and function, control of the cell cycle, cellular signaling pathways, and emerging genetic and molecular techniques. The final project brings all of the content learned in this course to understand the fundamental changes that result in cancer

SCI625 (Fall or Spring)

### **Microbes and Disease**

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

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, select bacterial and viral structure and function, invasiveness and pathogenicity, the human immune system, 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 Scientific Inquiries – Chemistry or equivalent, and Methods in Scientific Inquiry

This is a one-semester integrated course that explores the basics of human physiology and the physiological changes that result in pathological, non- pathological or other physiological conditions. Emphasis is placed upon understanding and integrating physiological concepts with related concepts from other scientific disciplines. Topics include cellular physiology; disorders of the neuromuscular, immune, cardiovascular and respiratory systems; and other related disorders of homeostasis. Significant student inquiry opportunities are presented through student-designed labs and projects. The course ends with student-led seminars that detail understanding of the etiology and physiology of different human diseases and conditions.

SCI646 (Offered Fall of 2016)

### **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.

SCI656 (Offered Fall of 2017)

### **Seminar in Biology: Development**

Grade level: Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Molecular and Cellular Biology (MCB); Physiology and Disease (PAD) is recommended

This seminar course will introduce students to the general field of cellular differentiation and organismal development. Topics covered may include the development of the central and peripheral nervous systems, the reproductive system and germ line cell differentiation. Other systems will be considered as chosen by the student participants. Topics may also include the impact of epigenetic controls on development as well as the implication in developmental disease. The seminar will be largely based on student presentations of current literature and research.

## 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. LE I begins with a focus on composition and rhetoric in the fall, continuing into LE II in the spring, where the students will focus on literary analysis. 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 sixteenth to late nineteenth-century British literature, focusing in particular on their thematic and historical connections. Commonly taught works include a play by William Shakespeare, John Milton's *Paradise Lost*, and Mary Shelley's *Frankenstein*.

**ENG 212** (Spring)

### **Creative Writing Workshop**

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

This class offers students an opportunity to experiment with a variety of written genres and hone their creative writing skills in the hopes of helping them produce work of publishable quality. As with many English classes, students will 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 workshoping, a system by which an author receives informed, constructive feedback from a group of readers.

**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 video," 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. Students will examine works of the major dramatists of the second half of the twentieth century, among them Samuel Beckett, Harold Pinter, 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 (Spring)

## Topics in World Literature: Modern World Fiction

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

As an IMSA student, you spent your first year-and-a-half in the core English courses, learning about foundational texts of British and American literature. But what comes after – what builds upon these foundations today? And what about the literatures of non-western cultures? This course endeavors to explore and to answer these questions. In *Modern World Fiction*, students will examine some of the most acclaimed world authors of the late 20th and early 21st centuries. In so doing, they will attempt to uncover not only the modern concerns – personal, social, and sometimes political – unique to these cultures, but also the universal questions and topics that have fascinated all of humankind over time.

ENG315 (Fall)

## Shakespeare

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

In this course, students will read a selection of sonnets and plays by William Shakespeare, representing the four genres of comedy, tragedy, history, and romance. Discussion will focus on the plays in their historical setting, in an effort to understand how contemporary interests and events inform our understanding of Shakespeare's drama. Assignments will include reading quizzes, group work, theoretical essay summaries, literary analysis papers, and stage performances. Students should be prepared to engage with Shakespeare's language in new ways. They will perform plays in class, explore interpretative choices, and critique filmed performances. A new literary theory (which will guide analysis and discussion of Shakespeare's drama) will be introduced in each unit.

ENG341 (Fall)

## Gender Studies

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

This course considers gender as a social construction – i.e., a set of sex-appropriate identities and behaviors that are created and changed by societies over time – and places this theory in conversation with competing essentialist explanations. Students will examine some particular debates (e.g., the underrepresentation of women in high-level STEM fields, the sexual double standard, the intersection of gender and race) for how they showcase these dual explanations of gender. From there they will move into several readings that complicate the premises and assumptions of this debate; these readings analyze intersexuality, and the historical one-sex model, among other topics. Students will also examine cultural nodes that illuminate the context of this debate, including politics, cinematic representations of the sexes, gender and finance, and questions of language use. The course catalyzes meaningful debate and calls on students to gather evidence and think through their beliefs.

ENG 351 (Fall or Spring)

### **Graphic Novels: Image and Text**

Grade Level: Senior (Fall) or Junior/Senior (Spring)  
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.

ENG 361 (Fall)

### **Tolkien: Language and Literature**

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

J.R.R. Tolkien is best known for his *Lord of the Rings*, but his career encompasses much more. To a student of English, perhaps no other author so perfectly captures three of the most essential elements to the study of English: language, creativity, and scholarship. As an Oxford professor, Tolkien studied and taught languages, including Latin and Anglo-Saxon. As a creative force, he invented the languages and stories of *The Lord of the Rings* and *The Hobbit*, among others. And as a scholar, he wrote important criticism, including an essay on *Beowulf* that is still widely read today, three quarters of a century after he wrote it. This course will challenge students to understand the study of English and three of its primary points of emphasis – language, literature, and scholarship – through examining the life and works of J.R.R. Tolkien.

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, distant futures, utopias and dystopias. Beginning with some of the grandfathers of speculative fiction (authors such as H.G. Wells, Edgar Allan Poe, E.M. Forster) 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, creative writing, and multi-modal 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 many philosophical, literary, and cultural implications of this genre.

ENG502 (Fall)

## **The Idea of the Individual**

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

The course focuses on the vast and myriad portrayals of the “individual” within literature. How is the idea of the individual constructed? How do we make meaning of the individual’s role, and how does that role alter and change in different constructs? Text considerations are at the discretion of the instructor, but will include both novels and short stories, and, in some cases, drama and poetry. From classics like *Brave New World* and *Fahrenheit 451* to newer stories such as Gus Lee’s *China Boy* and extremely contemporary works such as “Tenth of December”, students are challenged to see how the literary individual intersects with their own definitions. The course also has a great deal of writing emphasis, use of individual and small group presentations, and highly critical and close reading.

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 the 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 students 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. Students will look at works by Emily Brontë, Charles Dickens, Arthur Conan Doyle, Elizabeth Gaskell, and H. G. Wells, among others.

ENG532 (Fall)

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

Grade Level: 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.

# HISTORY AND SOCIAL SCIENCE

**HSS100** (Fall or Spring)

## **American Studies**

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

American Studies considers our Constitutional and institutional history from the seventeenth century to the present. It begins with the origins of the Constitution as its precepts were forged in the colonial period and the Revolution. The course then looks at the challenges to the compromises that shaped the Constitution and eventually result in Civil War. The final section of the course considers historical legacies that inform contemporary American politics including issues of race, gender, and immigration. While the course is structured around the Constitution and contains some civics, the course itself is historical and contains a progressive arc that is not merely thematic. A composition component also runs through the curriculum and will teach expository writing.

**Successful completion of this course fulfills the federal and state Constitution requirements.**

**HSS201a** (Fall)

## **Ancient World Religion and Philosophy**

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.

**HSS201e (Fall)**

## **A History of Cultural Contact: When Worlds Collide**

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

Cultures do not develop in a vacuum. World History is punctuated with moments of great demographic or cultural movement, episodes when societies change rapidly as a result of the influx of new ideas, products, and peoples. Such new influences may change economies, affect agriculture and dietary customs, overturn dominant worldviews, incite revolutions, introduce new pathogens, challenge dominant models of morality, alter ideals of beauty and fashion, or lead to violent military conflict. For a given people or culture, the results of these events may range from the beneficial to the disastrous. This course will examine a series of such cultural contacts, and explore the complex consequences that transformed the lives of people and nations.

**HSS201f (Fall)**

## **Art, Worldview, and Society in History**

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

Images came before written words, and buildings before books. A survey of art and architecture serves as an excellent vehicle for a comparative study of world cultural history. In this course, students will examine works of art and architecture from a variety of civilizations and cultures, from antiquity to the end of the 19<sup>th</sup> century. They will analyze the visual elements of these works, and place them in the context of the societies that produced them. Through extensive reading of primary sources that culturally correspond to the visual material, students will trace the complex connections between art and ideology. Finally, they will use their visual experiences as the basis of cultural comparison.

**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. 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.

**HSS307** (Spring)

## **Topics in Current Affairs**

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

New drilling technologies make the United States a leading producer of natural gas and petroleum. This contributes to a decline in global oil prices. As a result, Russian companies and the Russian government make less profit from their own energy exports. This, combined with economic sanctions imposed on the Russian banking sector because of Russian military action in the Ukraine, leads to a sharp decline in the value of the Russian currency. Consumer prices rise in Russia, and the Russian people pressure their government for relief. This affects the popularity of the government, and forces them to reconsider their actions in the Ukraine. Ultimately, an international settlement is reached in the region.

The above scenario is happening now (except for the happy ending). It demonstrates the complex web of political, economic, and diplomatic forces that tie the contemporary world together. In this course, students will explore the nature of geopolitics and its relationship to domestic events, in America and elsewhere. They will do so by examining a series of contemporary issues in all their fascinating complexity.

**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.

**HSS336** (Fall)

## **The Rise of the Atlantic World, 1492-1815**

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

This course explores European expansion in the New World and Africa from the time of Columbus to the War of 1812. Using readings, films, and game simulations, the course will examine the weapons, technologies, and ideas which made this expansion possible. It will also consider how the histories of four continents came to be intricately intertwined. Europeans subjugated indigenous peoples wherever they went, but not before these cultures had laid down profound challenges to everything Europeans had thought they knew about themselves. These challenges served as an important foundation of the Enlightenment and the Age of Revolution, transformations that would ultimately topple the civilizations of the conquerors nearly as completely as those they conquered. The world we live in today is the result.

**HSS341** (Fall)

### **A 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.

**HSS342** (Spring)

### **A 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. Students will examine varied religious, philosophical and scientific approaches to the questions of life and the complex interrelationships of living things. Students will study the links between physiology and chemistry, and they will pay special attention to the ideas of Darwin and the influence of Darwinian evolution on the way we view nature (and ourselves). They will explore the human drive to order the living world, and the effect of recent notions mass extinction on such systems of order. Finally, students 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**

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 students will concentrate on the study of primary texts, they will also apply those texts to contemporary topics of interest in class.

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, students 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.

HSS361 (Spring)

## **United States Government and the Constitution**

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

This course will give students a broad, introductory analytical perspective on government and politics in the United States with the Constitution as a central document informing class discussions. In addition to becoming familiar with the Constitution, students also learn about the interactions of various institutions, political groups, beliefs, and ideas that constitute U.S. government and political life as well as a variety of theoretical perspectives for understanding these interactions. The course also aligns with a significant number of content expectations of the AP exam.

## 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. In addition this course seeks to develop and enhance an understanding of the diverse cultures of the French-speaking world.

### WLG120 (Full Year)

#### French II

Grade Level:	Sophomore/Junior/Senior
Length:	Two Semesters
Credit:	1.0
Prerequisite:	French I <u>and</u> recommendation of Instructor or Proficiency Exam <u>and</u> 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, camping, housing, holidays, wellness, and leisure time activities. Students will be required to write compositions, present skits, and complete video assessments on a regular basis.

### WLG130 (Full Year)

#### French III

Grade Level:	Sophomore/Junior/Senior
Length:	Two Semesters
Credit:	1.0
Prerequisite:	French 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 actively participate 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). During second semester students examine the social, psychological, and cultural implications of fairy tales. Reading selections may include three famous French novellas: *Le Petit Nicolas*, *La Belle et la Bête*, and *Le Petit Prince*. Specific themes include the following: world of work, childhood, cultural identity and cross-cultural experiences.

**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.

Essential Questions will guide the learning experience designs for French IV and French V. The following are examples of learning experiences:

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.

France Today --This study of contemporary culture in France will consider these and other questions: What is culture? How does culture manifest itself? How is culture created? Who creates culture? What do cultural artifacts say about the people who create and use them? The film *Le fabuleux destin d'Amélie Poulain* will be the starting point for this study with the goals of raising awareness and deepening understanding of what life is like in France today, using as one example, life in the neighborhood of Montmartre in Paris This study of contemporary France will also allow us to examine culture in America, and its physical manifestations.

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 Spanish Level III, students continue to build communication skills developed in Levels I and II. Specifically, students actively participate 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, and predict future events. Students develop critiquing skills, 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 and immigration, the environment, and ancient Latin-American civilizations: Aztecs, Mayans, Incas, Guarani, and Mapuches

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

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

In Spanish 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:	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 Spanish Level V, students continue to build communication skills developed in the first four levels of Spanish by refining the five major skills of listening, speaking, reading, writing, and cultural competency. Spanish V course will prepare students to demonstrate their level of Spanish proficiency across three communicative modes (Interpersonal [interactive communication], Interpretive [receptive communication], and Presentational [productive communication]), and the five goal areas: Communication, Cultures, Connections, Comparisons, and Communities). Students will acquire information from authentic sources in Spanish intended for native speakers: films, documentaries, recordings, podcasts, literary texts, newspapers, magazines, essays, research papers, biographies, websites, etc. in a variety of settings, types of discourse, styles, topics, registers, and broad regional variations. As the year progresses, students' written and oral Spanish is expected to reflect advanced grammatical structures and an ever-expanding, sophisticated, precise, and eloquent vocabulary. Students will demonstrate an increasing strong command of Spanish linguistic skills (including grammatical accuracy, fluency, a more accurate pronunciation, and an authentic Spanish intonation). Spanish V will cover the study of sociopolitical issues during the late 20<sup>th</sup> Century in Latin America the first semester and the Civil War Era in Spain the second semester.

**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 German I, 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, professions, holidays, seasons, weather, and leisure time activities. Students build good pronunciation and listening skills, and read simple authentic 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 and recommendation of Instructor or Proficiency Exam and recommendation of Instructor

German II is designed to build upon and expand the communicative language competency that students developed in German I. The goals are to extend student ability to comprehend, express and negotiate ideas and opinions, and to assist them in developing a strategic ability to approach authentic material and new situations. Instruction will target all language skills: speaking, listening, reading and writing within a cultural context. The topical context is expanded from the focus on the student's immediate world to the world of the target cultures. Topics may include comparisons of eating habits, wellness, community/urban living in Germany and Illinois, holiday traditions, leisure time activities, childhood and fairy tales, travel, and geography.

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

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

In Level III, students continue to build upon communication skills developed in Levels I and II. Specifically, students actively participate 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 and 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). 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, Germany's Urban Landscape and Architecture, Environmental Issues and Green Energy – the German Solution, Pop Culture and Contemporary Music Scene.

**WLG420** (Full Year)

## **Japanese II**

Grade Level: 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: 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, hobbies, professions, holidays and leisure time activities. 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 student life, food, shopping, weather, home geography, and wellness. Students will continue to develop their Chinese character (hanzi) writing skills, and will learn more hanzi.

**WLG630** (Full Year)

### **Mandarin Chinese III**

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

In Level III, students continue to build communication skills developed in Levels I and II. Specifically, students actively participate 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

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, sight-reading exercises, tone development and intonation exercises, 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. Students will also perform with Pep Band. Private lessons are highly recommended. Music students 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, sight-reading exercises, tone development and intonation exercises, 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. Students will also perform with Pep Band. Private lessons are highly recommended. Student participation in 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. The top students from each section will perform with the Symphony Orchestra. 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

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, sight-reading exercises, tone development and intonation exercises, 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, sight-reading exercises, tone development and intonation exercises, 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 in the Chamber Strings is based upon a placement audition. This group is primarily comprised of upper classmen, and only 3-5% of the ensemble includes sophomores. Students from this ensemble will also perform with the Symphony Orchestra. Students will perform advanced orchestral 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 at a beginning to intermediate level. 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 IMSA Music Program are eligible to participate in any music sponsored co-curricular activities and/or events.

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

Grade Level: Sophomore/Junior/Senior  
Length: Two Semesters  
Credit: 1.0  
Prerequisite: Participation in IMSA Concert Choir or by audition, intermediate to advanced 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 major concerts are scheduled each semester. Students enrolled in the IMSA Music Program are eligible to participate in any music sponsored co-curricular activities and/or events.

**FAR300 (Spring)****Music Appreciation**

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

In Music Appreciation, the students will recognize the development of music from an historical and cultural perspective. The course will begin with a survey of the elements of music. Students will study how to read notes on treble and bass clef staves and discover basic music terminology, instrument families, tempo, rhythm, form and meter. These elements will then be used throughout the course as a foundation for discussion of music throughout history. Eras covered will include Medieval, Renaissance, Baroque, Classical, Romantic and a variety of 20<sup>th</sup> century genres. Students will gain an understanding of the context in which music was created by recognizing and aurally identifying style characteristics, genres, and representative masterworks from various periods.

**FAR301(Fall)****Music Theory**

Grade Level: Junior/Senior  
 Length: One Semester  
 Credit: 0.50  
 Prerequisite: Play a musical instrument or proficient at reading music

In Music Theory, students will implement higher-level musical language and grammar skills including musical notation, harmonic analysis, and part-writing which will lead to a thorough understanding of music composition and music theory. Two to three weeks of introduction/review will give cohesion to the classroom before going into more complex concepts. Students will obtain and practice ear training skills and skills required for sight reading musical literature. They will apply their knowledge by creating their own compositions. Students will recognize the development of music from an historical and cultural perspective and extend musical awareness beyond music currently familiar to the student.

**FAR402 (Fall)****Art Design**

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

Students will investigate the Elements of Art and the Principles of Design, using both two-dimensional and three-dimensional solutions to art and design problems. As the class progresses, a variety of mediums will be explored as students learn to use the basic tools of artmaking. This course focuses on problem solving and creativity; critical thinking and project development. Technique and craftsmanship are emphasized as well as the opportunity to study famous artworks related to the mediums explored.

**FAR435 (Spring)****Printmaking**

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

Students are guided through a structural program which includes historical, cultural and conceptual aspects of printmaking. A variety of printmaking techniques will be explored. Basic Elements of Art and Principles of Design will be stressed within printed compositions. Class activities are project based giving students an opportunity to practice art fundamentals while learning technical skills in printmaking. To succeed, students must meet the required criteria given for all assignments, be prepared to question and critique their own work as well as the work of other artists, and approach each art process with an open mind and positive attitude.

## WELLNESS

**WEL105** (Fall or Spring)

### **Moving and Learning**

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

This one semester 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 participate in 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 is placed upon the importance of nutrition and sleep as they relate to overall fitness and stress management. Students are required to participate in the physical fitness pre- and post-test. Wellness courses utilize proficiency-based grading.

### **WELLNESS ELECTIVES**

After successful completion of Moving and Learning, students will enroll in a Wellness elective as a junior or senior. 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 this 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- testing and proficiency-based grading.

**WEL221** (Fall or Spring)

### **Lifeguarding and Water Polo**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Moving and Learning

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 three (3) swimming requirements for this course which all students must successfully complete by the last class session of the semester. They are:

Swim 300 yards continuously using breaststroke or front crawl. 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. Tread water for two (2) minutes using legs only with hands placed under armpits.

There are two certifications earned with the successful completion of this course: Lifeguard Training and First Aid and CPR for the Professional Rescuer. Both certifications are valid for two years.

\*\*There is a \$35.00 fee for students who wish to become certified lifeguards through the American Red Cross. This fee is due during the first week of the course. This fee does not guarantee certification; the fee allows students the use of online tools and the opportunity to become certified at the end of the course. Students may enroll in this course without paying the fee and still have the opportunity to be successful in the course and not become a certified lifeguard.

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. Ability to swim one length of the pool (25 yards) and tread water for at least two minutes is required.

**WEL231** (Fall or Spring)

## **Outdoor and Indoor Games**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Moving and Learning

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 games from invasion, net/wall, fielding/striking, and target games. 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.

**WEL312** (Fall or Spring)

## **Dance**

Grade Level: Junior/Senior  
Length: One semester  
Credit: 0.50  
Prerequisite: Moving and Learning

Basic step and movement patterns in dances, such as, the waltz, fox trot, cha cha, and merengue will be explored in this course. Leading and following techniques, dance patterns, transitions, rhythm, tempo and style will be emphasized throughout. Historical context will be discussed for each dance. Circle, partner, solo, and mixer dances will be performed to music, enabling participants to cross cultures and participate in the nonverbal language of dance.

**WEL525** (Fall or Spring)

## **Movement and Relaxation**

Grade Level: Junior/Senior  
Length: One Semester  
Credit: 0.50  
Prerequisite: Moving and Learning

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.

These offerings do not fulfill graduation requirements and are included here for planning purposes only...you do not need to list these courses on your course registration form.

## Student Inquiry and Research

**SIR100** (Full Year - 1<sup>st</sup> SIR experience)

**SIR200** (Full Year - following SIR100 and/or SIR103)

**SIR300** (Full Year - following SIR 200 and/or SIR203)

Grade Level: Junior/Senior  
Length: Two Semesters  
Credit: 1.0 Note: SIR credit does not fulfill any graduation requirement  
Prerequisite: Permission of Director of SIR. Students must discuss plans with and get permission from the Director of SIR before enrolling in SIR.

**SIR103** (Summer – 1<sup>st</sup> SIR experience or following SIR100)

**SIR203** (Summer – following SIR103 and/or SIR200)

Grade Level: Rising Junior/Rising Senior  
Length: Summer  
Credit: 1.0 Note: SIR credit does not fulfill any graduation requirement  
Prerequisite: Permission of Director of SIR. Students must discuss plans with and get permission from the Director of SIR before enrolling in SIR.

Student Inquiry and Research (SIR) is an interactive partnership that pairs students with on-campus and off-campus professionals so that they can actively pursue an in-depth investigation into a topic that they are passionate about. The SIR standards center on planning, investigating, analyzing, and communicating. Requirements include a proposal, investigation notebook, active engagement, progress report, final paper, and presentation at IMSAloquium. Due to the independent nature of this course, active investigations must be started before mid-September or students will be dropped from course enrollment. SIR does not count toward the minimum course requirements for graduation, and maximum course credits apply as stated in the student handbook. SIR receives a "pass with distinction," "pass," or "fail" grade, assessed by the Director of Student Inquiry and Research in consultation with the SIR advisor. Students may enroll in SIR for both their junior and senior years and/or in the summers before their junior and senior years.

## Independent Study

Grade Level: Senior  
Length: One Semester  
Credit: 0.50 Note: Does not fulfill any graduation requirement unless Principal approves  
Prerequisite: None

Independent Study provides students the opportunity to personalize learning beyond the course catalog. In contrast to Student Inquiry and Research, which requires the investigation of a single, driving question, Independent Study encourages students to explore a topic or body of knowledge with more freedom and flexibility, requiring a level of work similar to a senior elective. Only seniors under the direction of an IMSA faculty member are eligible for a one or two-semester study. Exceptions require the CAC's permission. For an Independent Study, students earn 0.5 credits each semester receiving a "pass with distinction," "pass," or "fail" grade, assessed by the advisor. Independent Study credit does not count towards the course requirements for graduation. If a student enrolls in an Independent Study because he or she has exhausted the IMSA course catalog in a certain field, he or she may, with the advisor's consent, appeal to the Principal for graduation credit.

An Independent Study Learning Proposal must be completed and **submitted to the Principal's Office with all signatures: The first Wednesday of May for FALL or Year-long Independent Study. The third Wednesday of October for SPRING Independent Study.**