ILLINOIS MATHEMATICS AND SCIENCE ACADEMY®

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

LEARNING OPPORTUNITIES 2025/2026

GRADUATION REQUIREMENTS AND COURSE LOAD

The graduation requirements of the Illinois Mathematics and Science Academy are established by the IMSA Board of Trustees. Each semester students must take a minimum of five academic courses (2.5 credits) for a letter grade (not Pass/Fail) not including SIR, Internship, Credentials and Independent Study. Students may enroll in a maximum of seven courses each semester including academic courses, SIR, Internship, Credentials, and Independent Study. The College and Academic Counselor approves enrollment for students in all courses and experiences. Academic courses must be taken for a grade in order to count towards graduation credit.

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) **Four credits (4.0) in Science, which include completion of the core science program.** The core science program consists of four one semester courses: SCI105, Scientific Inquiries - Chemistry; SCI115, Scientific Inquiries - Physics; SCI135, Methods in Scientific Inquiry; and one semester of core biology (SCI601/602: Biology: Evolution & Environment or SCI603/604: Biology: Molecular & Cellular). Students new to IMSA who demonstrate an exemplary past academic record in biology, physics, or chemistry may choose to take a placement exam in that particular subject. A satisfactory placement exam score will demonstrate competency in the subject matter of that particular course and the student will then be enrolled in an appropriate elective course in that subject matter.
  b) **Minimum three (3.0) credits in Mathematics or Computer Science.** Students must be enrolled in at least one Mathematics or Computer Science course each semester.
    i) **Mathematics.**
      - All students must enroll in core courses that move toward completion of AB or BC Calculus.
      - All students are required 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:
        - The student successfully completes at least two years of an integrated mathematics program or at least one semester of a geometry course prior to being admitted to IMSA; or
        - The student enrolls in and successfully completes an IMSA-approved geometry course with a B or higher after being accepted to IMSA and successfully completes the IMSA geometry proficiency exam; or
        - The student successfully completes Geometry at IMSA.

    ii) **Computer Science.**
      - Sophomores are required to complete CS100: Computer Science Inquiry.
      - Students who have already scored a 4 or higher on either the AP Computer Science A Exam or the AP Computer Science Principles Exam **prior** to the beginning of sophomore year may place out of CSI100: Computer Science Inquiry into a higher level Computer Science elective course.

  c) **One additional (1.0) credit (two courses) in either Mathematics, Computer Science, or Science.**
- **Three (3.0) credits in English,** which include Literary Explorations I, II, and III and three English electives. **Students must be enrolled in an English course each semester.**
- **Two and one-half (2.5) credits in History and Social Sciences,** which must include HSS101: American Studies and HSS202: The World in the Twentieth Century, as well as three History and Social Sciences electives during the junior and/or senior year.
- **Two (2.0) credits in World Languages.** All sophomores and juniors are required to be enrolled in a World Language course each semester. All students must progress to the completion of an IMSA Level II course or higher. All language changes may only be made with both teachers' approval. 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 (designee).
- **One-half (0.50) credit in Fine Arts** taken in the performing arts or the visual arts. All performance-based 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 (designee).
- **One (1.0) credit in Wellness** including a one-semester course of Foundations of Healthy Living and one elective.
- **SIR, Internship, and Level 2 Credentials** may be substituted for up to 2.0 graduation credits for elective requirements ONLY. These experiential learning opportunities cannot replace core requirements. The Principal or designee(s) will identify the content area for which these elective credits will be awarded based on the topic and description of the experiential learning opportunity.

All students are also required to:

1. Successfully complete two hundred (200) hours of Academy approved service by graduation.
2. Participate in required academic and development programs.

Modification of these requirements can be made only with prior approval of the Principal. Previous high school and virtual high school credits earned at another institution will not earn graduation credit at IMSA. Credits earned at accredited higher education institutions may be eligible for IMSA graduation credit per IMSA's Higher Education Transfer Credit policy (p.68)

Scheduling notes:

- The Learning Opportunities present the potential course offerings, and the listings in this document are intended to identify student needs and preferences during the course request process held in the Spring semester. Courses, particularly electives, are not guaranteed to run, pending variables such as student interest and staffing.
- All students' course requests are reviewed during the summer and may be changed based on performance.

MATHEMATICS

Courses marked "(core)" form the basic sequence of IMSA mathematics courses. Students are expected to complete geometry, the Mathematical Investigations sequence, and a calculus sequence in order, unless otherwise recommended by the IMSA mathematics department and approved by the Principal (designee), and will be enrolled in mathematics courses accordingly.

MAT101 (Fall)

Geometry (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.

MAT115 (Full Year)

Mathematical Investigations Principles

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

Mathematical Investigations is a four-semester pre-calculus sequence of courses. Students enrolled in Mathematical Investigations Principles delve into a series of foundational mathematical topics and skills, including sets, exponents, linear and nonlinear systems, and functions (linear, nonlinear, and exponential). This course also provides a comprehensive investigation into complex principles of geometry through the use of algebraic structures, logic and proof, spatial reasoning, properties of figures, and real-world applications. In an experiential, problem-centered approach, Mathematical Investigations Principles students will learn to document their thinking and reasoning using formal and informal mathematical expressions with each new topic they encounter. The graphical, analytical, and proof-based experience with functions, their domains, operations, and transformations will form the building blocks that prepare students for the study of calculus.

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.

MAT130/131 (Fall)
MAT132 (Spring)

Mathematical Investigations III (core)

Grade Level: Sophomore/Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Mathematical Investigations II or Mathematical Investigations I/II and completion of geometry requirement; 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. MAT130 and MAT131 will have a slightly different curricular emphasis, especially regarding polynomial and rational functions. Both sections will prepare students for students for Mathematical Investigations IV. Placement in these sections will be determined by the Math Department.

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. Mathematical Investigations 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.

The difference between the calculus sequences: Upon the completion of Mathematical Investigations IV (MI-4), IMSA students typically enter into one of three paths to learn calculus.

- AB Calculus I – II: This two-course sequence focuses on topics typically found in the first semester of college-level calculus. It generally includes a good amount of pre-calculus review, and is taught to be in close alignment with the College Board Calculus AB AP Exam Course Description and a textbook.
- BC Calculus I – II – II: This three-course sequence focuses on topics typically found in the first and second semesters of college-level calculus. Pedagogically, BC Calculus embraces the style of Mathematical Investigations; and students along this path will be exposed to activities asking them to derive calculus from its very foundation. As such, BC Calculus has strong expectations of the students' knowledge of algebraic and pre-calculus content.
- BC Calculus I/II – II/II: This two-course sequence also focuses on the topics typically found in the first two semesters of college-level calculus, but with greater attention to theory than would likely be found in a typical post-secondary setting. Given the rapid pace and heavy focus on theory, students should have a love of proof beyond the mechanics of problem-solving are expected to have complete mastery of algebraic and pre-calculus concepts.

All three of these paths feature courses approved by the College Board and provide students the opportunity to prepare for the AP calculus exams. Along the way, the students in each path are expected to exhibit a deep understanding of the content.

During course selection, students initially register for AB Calculus I or BC Calculus I. Each semester, additional details regarding these paths are made available to the MI-4 students; and there is an opportunity to adjust which calculus path a student initially registered for at that time. BC-1/2 is offered only in the Spring semester, and registration for that course occurs during the adjustment period in the immediately proceeding Fall semester rather than during the initial course selection process.

MAT202 (Spring)

Survey of Calculus (core)

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

Calculus is one of the greatest achievements of the human intellect. This course will give a broad overview of the two main branches of calculus: differential and integral. Students will sample the tools and techniques of calculus and survey a few of its many applications. This course is intended for students who want to know what calculus is before committing to a complete, in-depth course. Not intended to prepare students for the Advanced Placement exam.

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.

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 the concept and applications of integrals. Technology will be an important part of the development of the course.

MAT331 (Fall)
MAT332 (Spring)

BC Calculus III (core)

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.

MAT361 (Fall)
MAT362 (Spring)

BC Calculus I/II (core)

Grade Level: Sophomore/Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: MI IV and recommendation of MI Instructor(s) and completed approval form.

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 material of this course will not only be covered more quickly but also more deeply. Beyond simply learning the mechanics of problem solving, students should thrive on theory and love of proof. 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 the concept and applications of integrals. With help from technology, these will be seen from graphical, numerical, and analytic points of view.

MAT371 (Fall)
MAT372 (Spring)

BC Calculus II/III (core)

Grade Level: Sophomore/Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: BC Calculus I/II and recommendation of Instructor and completed approval form.

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.

MAT403 (Fall)

Introduction to Proofs

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

This course is designed to provide students with the fundamental skills to read, write, and reason when working with mathematics. Students will learn how to use proper mathematical notation and vocabulary to present arguments based in logic and deduction. After studying the basics of logical reasoning, students will learn common proof techniques and apply them to problems in various branches of mathematics including set theory, number theory, and combinatorics. Intended for students who are interested in taking rigorous math electives including but not limited to Abstract Algebra, Linear Algebra, Number Theory, and Theory of Analysis.

MAT407 (Fall or Spring)

Modern Geometries

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

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 may include axiom systems, projective, spherical, and hyperbolic geometry, constructions, knot theory, origami, and other topics initiated by teacher or students.

MAT411 (Fall)

Statistical Exploration and Description

Grade Level: Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Mathematical Investigations II 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 will prepare students to take the Advanced Placement exam in Statistics.

MAT421 (Fall or Spring)

Number Theory

Grade Level: Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Mathematical Investigations IV and Introduction to Proofs

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)

Problem Solving (Not Offered in 25-26)

Grade Level: Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Mathematical Investigations III

In this course, students will learn how to apply a broad range of problem-solving techniques and strategies that strengthen their reasoning abilities leading to discovery and appreciation of interrelationships between mathematical concepts. The course will emphasize both individual and group investigations through written and oral mathematical arguments with precision and appropriate rigor. The course will build up each student's inherent problem-solving skills to include strategies like working backward, solving a simpler problem, and searching for a pattern. Topics will change each semester and may be drawn from career fields, current societal events, or historical examples.

MAT435 (Spring)

Discrete Mathematics

Grade Level: Junior/Senior (Sophomores by placement of Math Department)
Length: One Semester
Credit: 0.50
Prerequisite: Mathematical Investigations III and recommendation of Instructor; or Mathematical Investivgations IV

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)
MAT442 (Spring)

Multi-Variable Calculus

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 placement by 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 (Spring)

Theory of Analysis

Grade Level: Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Introduction of Proofs and Multi-Variable Calculus or Linear Algebra.

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.

MAT452 (Spring)

Differential Equations

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

Differential equations are used to represent and model a wide variety of real-world situations. Students will study a number of approaches to analytic and numerical solutions to differential equations while they simultaneously investigate the models with computer software. After an introduction to the study of differential equations students will study both linear and non-linear models, and use both continuous and discrete approaches to determine the long-term behavior of the phenomena described by the equations.

MAT473 (Fall)

Linear Algebra

Grade Level: Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Mathematical Investigations IV and Introduction to Proofs or BC Calculus III or BC Calculus II/III.

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.

MAT474 (Spring)

Abstract Algebra

Grade Level: Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Number Theory

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 graded 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
Prerequisite: Multi-Variable Calculus and Number Theory, or Linear Algebra, or Abstract Algebra; and permission of Instructor and completed approval form.

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

CS100 (Fall or Spring)

Computer Science Inquiry (core)

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

This course will explore the fundamentals of computer science that are essential for students in the 21st 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, the foundations of privacy, and an introduction to Artificial Intelligence (time permitting).

CS205 (Fall or Spring)

Object Oriented Programming

Grade Level: Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Computer Science Inquiry, or a score of 4 or higher on the AP Computer Science Principles or AP Computer Science A Exam. It is recommended that only strong CSI students move on to Object Oriented Programming even after scoring a 4 or higher on the AP Computer Science A exam.

This one-semester course is designed to teach the fundamental concepts of computer programming using the 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. NO CREDIT CAN BE EARNED IN THIS COURSE IF THE STUDENT HAS SUCCESSFULLY COMPLETED CS305 Advanced Programming OR any Computer Seminar course.

CS230 (Fall or Spring)

Artificial Intelligence 1

Grade Level: Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Computer Science Inquiry, or a score of 4 or higher on the AP Computer Science Principles or AP Computer Science A Exam.

The Artifical Intielligence 1 course provides a comprehensive overview of Artificial Intelligence (AI), starting with the mathematical foundations, Python programming, and core data science concepts. Students will learn to analyze and visualize data, gaining practical skills in data handling. The curriculum covers machine learning (ML) techniques, with hands-on projects to apply these concepts. Additionally, the course introduces neural networks, their training processes, and addresses the ethical considerations of AI, including data privacy issues. By the end of the course, students will have the skills to implement AI techniques in real-world applications.

CS232 (Fall or Spring)

Artificial Intelligence 2

Grade Level: Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Artificial Intelligence 1 or Instructors approval

In this course we will cover Deep Learning, Natural Language Processing, and Computer Vision, students will learn about important AI techniques and how they work. This course focuses on deep learning, teaching students to create and use advanced neural networks. Through hands-on projects, learners will explore natural language processing, helping computers understand and generate human language. The course also covers computer vision, where students will develop skills to analyze and interpret images and videos. By the end of the course, participants will have a solid understanding of how these technologies are used in the real world.

CS235 (Fall/Spring)

Web Technologies

Grade Level: Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Computer Science Inquiry, or a score of 4 or higher on either the AP Computer Science A Exam or the AP Computer Science Principles Exam.

Building on the basic Web Technologies units in the Computer Science Inquiry course, students will learn to create more dynamic and interactive websites. Students will explore advanced HTML and CSS, and basic Javascript to enhance the client-side webpages. They will begin working with server-side scripting and web applications development. PHP and MySQL will allow the students to create dynamic websites that store, access, and use data stored in the database tables. NO CREDIT CAN BE EARNED IN THIS COURSE IF THE STUDENT HAS SUCCESSFULLY COMPLETED CS335 Advanced Web Technologies.

CS255 (Fall)

Elements of Computing Systems 1

Grade Level: Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Computer Science Inquiry or a score of 4 or higher on the AP Computer Science A Exam.

In this course, we will embark on an in-depth exploration of computer science fundamentals through the hands-on "Nand to Tetris" project. This curriculum guides students through the process of building a modern computer system from the ground up, starting with basic logic gates and culminating in the creation of a fully functioning computer system capable of running high-level programs. Throughout the course, students will engage in practical, project-based learning, gaining a comprehensive understanding of hardware design, machine architecture, and assembly language. By synthesizing theory with real-world application, this course aims to equip students with a robust understanding of the underlying principles of computing and empowering them to apply this knowledge in both theoretical and practical contexts.

CS260 (Spring)

Elements of Computing Systems 2

Grade Level: Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Elements of Computing Systems 1

In this second-semester course, we will continue exploring the core principles of computer science through engaging, hands-on projects. Building on the hardware concepts developed in the previous semester, students will now focus on the software stack. They will design a custom programming language, develop a compiler, and create a basic operating system—ultimately constructing the essential software components that power a modern computer. This course offers a comprehensive, practical experience that solidifies understanding of both the software and hardware that drive computer systems.

CS305 (Spring)

Advanced Programming

Grade Level: Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Object Oriented Programming or a score of 4 or higher on the AP Computer Science A exam while a student at IMSA.

This course continues to develop the ideas introduced in Object Oriented Programming. Topics may include: inheritance, interface, polymorphism, recursion, data structures, and advanced programming techniques including advanced sorts and searches. Programming projects in this course are designed to learn as many aspects of the programming algorithms and development as possible. The projects include different stages of developing software including design, coding, testing and refactoring.

CS315 (Fall)

Microcontroller Applications (CS)

Grade Level: Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Computer Science Inquiry, and Scientific Inquiries – Physics

In this course, students will use a microcontroller to take input from their users or environment, and manipulate the data to control external devices. In the process, students will learn to program and debug a popular, everyday microcontroller. They will also become acquainted with a variety of sensors, motors, and input/output devices. The first part of the class will focus on learning to use the tools while the latter portion will be dominated by one or more group projects. NOTE: Students enrolled in CS315 CANNOT take SCI315.

CS335 (Spring)

Advanced Web Technologies

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

The first part of this course is focused on building on the technologies that students encountered in CS235 Web Technologies. They will study advanced topics in PHP and MySQL after reviewing JavaScript and the JQuery Library and learning about Bootstrap to create responsive websites. They will learn about database design and the ERD diagrams as well as using more advanced queries on PHP. Object-oriented programming concepts will be emphasized in PHP. The second part focuses on using JavaScript as a client and Node.js as a server technology. Students will be introduced to JSON objects that primarily transmit data between a server and web application, serving as an alternative to XML. Students will have an opportunity to develop, test and deploy a real-world E-commerce site using these technologies for their final project. Students will explore many of these advanced topics through research and presentations.

CS421 (Fall or Spring)

CS Seminar: Android Apps Development

Grade Level: Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Object Oriented Programming or a score of 4 or higher on the AP Computer Science A Exam while a student at IMSA.

This seminar is designed for students who have prior knowledge of Java programming language and want to learn how to develop Android apps. Students will learn to create an Android project using Android studio and will learn to build a debuggable version of the app. Students will also be introduced to some Android architecture and the key principles underlying design. They will gain an understanding of the steps that are involved in developing an Android app and will become familiar with the Android development tools and user interface. Students will build two major apps for their two quarter projects. Students will explore many of the advanced topics through research and presentations.

CS450 (Full Year)
CS451

Introduction to Neural Computation

Grade Level: Junior/Senior
Length: Two Semesters
Credit: 1.0
Prerequisite: CSI or Artificial Intelligence 1 or score of 4 or higher on AP Computer Science A Exam while a student at IMSA, **and** BC Calculus-III or BC Calculus-II w/ instructor permission or MI-IV w/ instructor permission

Computational Neuroscience is an interdisciplinary course that integrates topics in: Computer Science, Mathematics, Statistics, Engineering and Neurobiology. In this two-course sequence, students understand the workings of the nervous system, motor neurons, brain and behavior. Students elucidate the principles of real neurons through mathematical models of subcellular, cellular, and network level systems. Students develop computational models of complex brain mechanisms that enable neuronal interactions informed by neuroscience experiments. Using linear and nonlinear analyses, model fitting, dimensionality reduction, dynamical systems and, stochastic approaches, assignments will prepare students to identify and produce multiscale, multidimensional computational neural models, ultimately to ask questions related to what happens, how it happens, and why it happens in the brain. This course is an attempt to show, how appealing to anatomical brain architectures enables to account for computational neural network architectures, ultimately, committing to establish a bridge between brain science and Artificial General Intelligence.

CS422 (Fall or Spring)

CS Seminar: Linux and Cybersecurity

Grade Level: Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Object Oriented Programming or score of 4 or higher on AP Computer Science A exam while a student at IMSA.

This course introduces students to the Linux operating system and its basic operations and file management system. Students are then introduced to the interdisciplinary field of cybersecurity by discussing the evolution of information security, cyber-crime, current trends in cyber-related strategies and policies, and cyber-related challenges facing the global community. Students will focus on cyber forensics and forensics investigations by researching advanced topics like DDoS, SQL injection, VPN, man-in-the-middle attacks, steganography, cryptography and social engineering among other topics. Students will be required to demonstrate their knowledge by participating in solving forensics challenges using virtual machines. Students will explore many of the advanced topics through research and presentations.

CS431 (Fall or Spring)

CS Seminar: Machine Learning (Not Offered in 25-26)

Grade Level: Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Mathematical Investigations IV and Object Oriented Programming or a score of 4 or higher on the AP Computer Science A Exam while a student at IMSA.

This introductory one-semester seminar is designed for students who have prior knowledge of programming experience, and knowledge of math and statistics (see prerequisites for details). We will study multiple classes of problems: supervised learning and unsupervised learning, reward etc.. We will use the Python programming language in the Anaconda development platform. In supervised learning, we will study problems of regression. For example, program the machine to predict the price of the house. In unsupervised learning, we will program the machine to answer questions, such as whether a given email is spam. We will study several problems in each category. The students are encouraged to research problems of their interest and work on those as part of their project assignments.

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, kinematics, gravitation, and the conservation laws of momentum and energy. Students learn concepts and skills through a combination of lab activities and experiments, guided inquiry, group discussion, collaborative problem solving and direct instruction. Students have the opportunity to place out of this course by opting to take a scheduled placement exam and demonstrating proficiency on the exam.

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.

SCI205 (Spring)

The Physical Chemistry of Materials

Grade Level: Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Scientific Inquiries - Chemistry or equivalent, Scientific Inquiries - Physics or equivalent and one semester of Calculus

This lab- and computer-based course will provide an in-depth look at how physical chemistry discovers the physical properties of atoms and molecules and what these properties reveal about the way chemical reactions work to produce practical materials. An overview of chemical thermodynamics, with an emphasis on real world (non-ideal) systems, will be covered. A review of chemical kinetics and reaction mechanisms, with an emphasis on determining energy reaction barriers, transition states, and reaction rates will be investigated. Quantum chemical computatio nal model descriptions of atoms and molecules will be used to determine important macroscopically observable properties such as electronic structure, t otal energy, ionization potential, molecular orbitals, and dipole moment and how light is used to understand the structure of chemical compounds. Topics will be further underscored by laboratory experiments based on the science of materials, e.g. solutions, polymers, and crystals, as well as computer experiments working with molecular modeling software, e.g. finding transition states. Because physical chemistry and materials science are based on chemistry, physics and math, familiarity with these methods is required but these principles will also be reviewed as necessary to help fully master the material.

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 in addition to lab technique, set-up and data-analysis. 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, synthesis, and spectroscopy. 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 in addition to enhancing 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 pre- or concurrently with Biology: Molecular and Cellular

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 (Not Offered in 25-26)

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 reflect 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.

SCI255 (Fall or Spring)

Medicinal Chemistry (Not Offered in 25-26)

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

This lab-based course will provide an in-depth look at how novel, pharmacologically active molecules are designed to treat human diseases. An overview of modern medicinal chemistry, from first principles of drug action to design and development of potential therapeutics, will be presented. The action and behavior of pharmaceutical compounds and the relationship between their structure and their chemical and therapeutic properties, and therefore, the chemical considerations in drug design will be explored. Structure activity relationships will be explored through case studies. Methods of drug discovery will be investigated, including the development of drugs from natural products, computer modeling and rational drug design.

SCI265 (Fall or Spring)

Biotechnology Techniques in Chemistry

Grade Level: Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Methods of Scientific Inquiry, Scientific Inquiries - Chemistry or equivalent, and Biology: Molecular and Cellular

This is a one semester course providing an introduction to the principles and practices of biotechnology. Students will explore the techniques, applications, and ethical issues related to biotechnology. This course is heavily lab-based and includes use of equipment, preparation and maintenance of microbial cultures, isolation of DNA, PCR, and other laboratory experiments to manipulate and analyze DNA and protein. Research projects and discussions will be integrated throughout the course to deepen understanding and foster critical thinking.

SCI316 (Spring)

Electronics

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

Students will learn basic concepts in electronics including voltage, current, resistance, circuits, and induction while constructing and testing working circuits. Students will utilize electronic components such as resistors, diodes, transistors, and transformers. Students will become familiar with test equipment, primarily multimeters, oscilloscopes, and signal generators while picking up skills such as soldering. Advanced topics will include power sources, rectification, amplifiers, and logic circuitry. A summative project will be done.

SCI330 (Fall or Spring)

Global Climate Change

Grade Level: Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Methods of Scientific Inquiry, Scientific Inquiries – Physics, and Biology: Evolution & Environment

Climate change is among the most complex and challenging problems that we have confronted as a civilization, but the responses and impacts will vary largely across space and the global population. The class will expose you to multiple facets of this widely interdisciplinary and encompassing field. You will be introduced to the physical science of our climate system, the contributing system components, and the basic mechanisms that govern how the climate system responds to drivers of change. We'll explore climate change from multiple perspectives: paleoclimatic change; recent historical variability and change; future climate projections; social and economic issues; as well as effective strategies and solutions for mitigation of the effects of climate change.

SCI402 (Fall or Spring)

Physics: Sound and Light

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

Physics: Sound and Light includes the study of mechanical oscillations, wave properties and interactions, sound, resonance 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 Calculus I or BC Calculus I. The co-requisite is AB Calculus II or BC Calculus II.

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 Calculus II or BC Calculus II, and either Calculus-Based Physics – Mechanics or a score of 4 or higher on the AP Physics C Mechanics exam.

Calculus-Based Physics/Electricity and Magnetism follows the typical sequence of a university physics course. The semester is devoted to topics in 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: 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 one or two extended projects, spanning the semester.

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.

SCI456 (Fall or Spring)

Introduction to Engineering

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

Introduction to Engineering focuses on the engineering cycle method of problem solving. Students gain hands-on experience studying problems, working in teams to design solutions and constructing their designs. For the final project students form teams to develop original products that advance the human condition and are related to United Nations Sustainable Development goals. Teams make a presentation on this project including a demonstration of their prototype.

SCI460 (Fall or Spring)

Engineering: Statics & Dynamics (Not Offered in 25-26)

Grade Level:	Junior/Senior
Length:	One Semester
Credit:	0.50
Prerequisite:	Scientific Inquiries - Physics; Concurrent enrollment in or completion of any AB or BC Calculus course

Students will learn engineering statics and dynamics through project-based challenges that employ skills in math, physics, chemistry, social science and art courses to solve real-world problems in civil and aerospace engineering. Engineering statics studies structures not in motion, such as bridges, towers and buildings. Engineering dynamics studies objects in motion, typically machines as simple as levers or as complex as spacecraft.

In this course, students will learn how to calculate forces in members within static structures using linear algebra principles (linear algebra is NOT a requirement for the course), design structures to minimize weaknesses, understand modes of failure in structures, and actually build structures to test their analysis. In the second half of the course, students will use principles of physics such as kinematics, forces, energy, impulse and momentum, combined with calculus of simple differential equations, to design and optimize a rocket and predict its performance. Students will then construct the rocket, test its characteristics using wind tunnel and finite element analysis, and launch it to verify their design and analysis.

SCI465 (Fall)

Biophysics

Grade Level:	Junior/Senior
Length:	One Semester
Credit:	0.50
Prerequisite:	Scientific Inquiries - Physics or equivalent and SI-Chemistry or equivalent or pre- or co-enrollment in either Biology: Evolution & Environment or Biology: Molecular & Cellular

Biophysics will build upon concepts from biology, physics, and 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 (Spring)

Computational Science

Grade Level:	Junior/Senior
Length:	One Semester
Credit:	0.50
Prerequisite:	Object Oriented Programming or a score of 4 or higher on the AP Computer Science A Exam or instructor approval

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.

SCI601 (Fall)
SCI602 (Spring)

Biology: Evolution & Environment (core)

Grade Level: Junior
Length: One Semester
Credit: 0.50
Prerequisite: Methods of Scientific Inquiry; Scientific Inquiries - Chemistry

Evolution and Environment is a semester-long, junior level course that will serve as an introduction to Environmental biology, including Earth History, Evolution, Metabolism, and Ecology. IMSA students will gain substantial understanding and experience working with foundational biological concepts in the context of current practice in the discipline. The course is part of our biology program, which is primarily focused on the United Nations Sustainable Development Goals, 1) Good Health and Well-Being; 2) Clean Water and Sanitation; and 3) Sustainable Cities and Communities. These UN goals will serve as focal points to give relevance and purpose to our study of essential areas in Biology. These areas are: the history and evolution of life on earth; 2) the metabolic processes of organisms and ecosystems, and the interactions and interdependence of organisms and the environment. Students will engage in learning designed to generate growth in select Standards of Significant Learning. Students have the opportunity to place out of this course by opting to take a scheduled placement exam and demonstrating proficiency on the exam, earning a score of 4 or higher on the AP Biology Exam, or with prior completion of an AP Biology course.

SCI603 (Fall)
SCI604 (Spring)

Biology: Molecular & Cellular (core)

Grade Level: Junior
Length: One Semester
Credit: 0.50
Prerequisite: Methods of Scientific Inquiry; Scientific Inquiries - Chemistry

Molecular and Cellular Biology is a semester long, junior level course that will serve as an introduction to cellular and molecular biology. IMSA students will gain substantial understanding and experience working with foundational biological concepts in the context of current practice in the discipline. The course is part of our biology program, which is primarily focused on the United Nations Sustainable Development Goals, 1) Good Health and Well-Being; 2) Clean Water and Sanitation; and 3) Sustainable Cities and Communities. These UN goals will serve as focal points to give relevance and purpose to our study of essential areas in Biology. These areas are: biological processes fundamental to cellular function, replication, and diversification, and the interactions and interdependence of organisms and the environment. Students will engage in learning designed to generate growth in select Standards of Significant Learning. Students have the opportunity to place out of this course by opting to take a scheduled placement exam and demonstrating proficiency on the exam, earning a score of 4 or higher on the AP Biology Exam, or with prior completion of an AP Biology course.

SCI605 (Fall or Spring)

Evolution, Biodiversity, and Ecology (Not Offered in 25-26)

Grade Level: Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: First Semester Advanced Biological Systems or Biology: Evolution & Environment

This is a one-semester course that explores the evolution and diversity of living organisms and their interactions with each other and the environment. Students will investigate patterns of biological diversity across geographical space and time, up through the current era. They will focus on ancestry, evolutionary mechanisms, speciation, behavior and ecological concepts with special context given to current issues.

SCI616 (Fall or Spring)

Cancer Biology

Grade Level: Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Biology: Molecular & Cellular

This course will be focused on the biology of cancer cells and tumor development. Students will examine cancer as a multi-faceted disease, drawing on many different molecular pathways, but also connecting to cell differentiation, the immune system, tissues formation, and many modern molecular techniques in research and medicine. This course will also have a significant lab component to help support students' understanding of these different aspects of cancer.

SCI626 (Fall or Spring)

Environmental Microbiology

Grade Level: Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Biology: Evolution & Environment or Biology: Molecular & Cellular

This is a one-semester course that explores topics related to microbes and their role in the environment and human health. Topics will be addressed through the lens of microbial ecology, origins and history, structure and function, pathogenesis, and food and industry. Students will study microbial life in a laboratory setting to learn methods for microbial culturing, isolation, and identification through determinative testing and independent research. Student identification of microbes will be presented to build scientific communication.

SCI630 (Fall or Spring)

Human Anatomy& Physiology 1

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

Human Anatomy & Physiology will provide students with a comprehensive understanding of the structure and fFunction of the human body. Students will learn about the anatomical and physiological levels of organization, from atoms to organ systems. Human Anatomy & Physiology I topics include Introduction to Anatomy & Physiology, Cellular and Tissue Levels of Organization, Integumentary System, Skeletal System, Muscular System, Cardiovascular System, Nervous System, & Special Senses.

SCI631 (Fall or Spring)

Human Anatomy& Physiology 2

Grade Level: Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Methods in Scientific Inquiry, Computer Science Inquiry, and Mathematical Investigations 1/2 or Mathematical Investigations II; and Scientific Inquiries – Chemistry or equivalent, Biology: Molecular and Cellular and Human Anatomy & Physiology 1

Human Anatomy & Physiology will provide students with a comprehensive understanding of the structure and fFunction of the human body. Students will learn about the anatomical and physiological levels of organization, from atoms to organ systems. Human Anatomy & Physiology II topics include the Endocrine System, Digestive System, Urinary System, Electrolytes Acid-Bases, Respiratory System, Reproductive System, and Immunology System.

SCI636 (Fall or Spring)

Pathophysiology

Grade Level: Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Methods in Scientific Inquiry, Computer Science Inquiry, and Mathematical Investigations 1/2 or Mathematical Investigations II; and Scientific Inquiries – Chemistry or equivalent and Biology: Molecular& Cellular and Human Anatomy & Physiology 1 & 2

It is widely understood that cells contain networks of thousands of biochemical interactions, the subsequent result of evolution selecting for the organisms that survive. Advances in experimental technology have shown that these biological networks have evolved in a specific way to perform essential functions. This kind of thinking is a tangential departure from traditional physiology by incorporating the biochemistry and physiology of biological systems to interpret the outcomes. In this course, students will learn how to build models of biological systems by examining the inputs, studying the interactions of the system with external and internal factors and finally predicting the possible outcomes of the system. Students will combine their understanding of biological systems with technology and programming to build their models, which will be represented by a combination of three-dimensional models, computer simulations and Arduino based tools of system measurement. Emphasis will be placed on the biochemical, molecular and physiological changes that control homeostatic cellular mechanisms and permit survival of the system. The final unit will be a compilation of student projects to demonstrate how the individual biological systems integrate to sustain the function of the whole organism with minimal expenditure of energy. Students will also reflect on how biological systems are designed to allow their essential function to be insensitive to the naturally occurring fluctuations in the system.

SCI645 (Fall or Spring)

Biology of Behavior

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

In this course, students will examine the different neural, biochemical, evolutionary, ecological, and social pressures that influence behavior in animals as well as humans specifically. Students will engage in research related to specific animal behaviors, take part in observations, and work through a few labs with model organisms to support their learning with firsthand experience and data. Special topics related to human behavior may include those related to mate choice, social dynamics, and behavioral disorders. The last unit will involve students' choice in researching more in depth of any of these topics, or new topics.

ENGLISH

ENG101 (Fall)
ENG102 (Spring)

Literary Explorations I (core)
Literary Explorations II (core)

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.

ENG201a/b/c (Fall)

Literary Explorations III (core)

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. In Literary Explorations III courses, students learn to consider works of literature in historical, literary, and linguistic context by focusing on a national or international tradition. All responsible literature classes put texts in context, of course, but these classes particularly center the connections between works of literature, between literary works and historical change, and between literary works and language change as much as they center the works themselves.

Literary Explorations III: American (201a) What – or who – is an "American?" Great minds have been trying to answer this question since America's colonial beginnings. In this course, we will join this conversation by exploring some of the literary works – poems, essays, speeches, stories, and books – that recorded and contributed to this nation's early history. By the end of this course, you will have a better sense of the early literature of this nation. You will be able to critically read, write, and form your own thoughts about the ideas and principles that helped form this country, divided it in a bitter war, and still continue to impact us – sometimes controversially – to this day.

Literary Explorations III: British (201b) As they explore readings of aesthetic and cultural significance from the beginnings of English literature to the 19th century, students think through the development of the English language and the formation of the canon of English literature. We will examine a variety of genres within foundational British literature, including poetry, drama, and fiction. Research-based student presentations will complement our readings and explore a range of historical topics related to the course. By the end of the course, students will have experienced, responded to, and analyzed many of the most influential works in English literature.

Literary Explorations III: World (201c) In this course, we ask what it means to consider a literary tradition that belongs to the whole world instead of individual nations. How do large separations in space and time change our notions of literary influence? If texts from across the world are available to us, how do we decide what to read? What experiences do people around the world share, and what differences can reading texts from around the world help us understand? This course will include works from the six populated continents from a variety of linguistic and cultural traditions and select theoretical works that consider different approaches to the idea of "world literature." Students will write thematic essays, consider translations of texts originally from the linguistic tradition of their World Languages courses, and introduce the class to select works from the traditions of world literature that we won't have time to read together as an entire class.

ENG212 (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 workshopping, a system by which an author receives informed, constructive feedback from a group of readers.

ENG242 (Fall)

Modern Theater

Grade Level: 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 (Fall)

Modern World Fiction

Grade Level: 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 literature. But what comes after – what builds upon these foundations today? 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 various 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.

ENG325 (Spring)

Digital Literary Studies

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

How have computers, smartphones, the internet, and generative AI changed the production and study of literature, and how do they promise to in the future? In this course, students will study new forms of literature made possible by digital technologies, representations of computing culture in contemporary print literature, and methods of studying historical literature enabled by digital tools. From poems generated on the fly from a series of programmed possibilities, to stories that intertwine English with programming language, to satiric representations of Silicon Valley, to algorithms that promise to "read" books without reading them, we'll encounter a series of texts and methods that imagine new possibilities for what it means to write and study literature. In addition to discussing texts and writing essays, students will make web resources, perform digital experiments, and produce imaginative electronic texts of their own.

ENG341 (Spring)

Gender Studies

Grade Level: Junior/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, issues of gender identification and identity) for how they showcase these dual explanations of gender among other questions. From there they will move into several readings that complicate the premises and assumptions of this debate. Students will also examine cultural nodes that illuminate the context of this debate, including politics, cinematic and media representations of the sexes, gender and finance, and questions of language use. The course catalyzes meaningful debate and calls on students to come to the course with an open mind, examine evidence, and think through their beliefs.

ENG345 (Spring)

Satire

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

A powerful and pervasive tool in contemporary media and popular culture, satire uses irony, humor, and exaggeration to diminish a subject by ridicule for personal, social, or political commentary and reform. By exploring satire as both a genre and a literary device through a variety of disruptive works and media, including visual and digital texts, we'll become acquainted with satire in its traditional and contemporary forms. Our approach will be historically expansive and theoretically eclectic as we study exemplars of satire from the past and present with an emphasis on their contexts, conventions, and targets. We'll also consider the difficult topics of offensiveness and structural elitism within the tradition of satire. Students will use their prior and developing knowledge of satire to introduce the class to selected satirical artifacts and methods and to deploy the elements of satire for their own purposes.

ENG351 (Spring)

Graphic Novels: Image and Text

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

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

ENG355 (Fall)

Adaptation: Literature and Film

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

Is the book really always better than the movie? In this course, students will explore the art, theory, and cultural politics of movie adaptations. Students will read literary texts and will also learn to "read" films as texts by studying formal cinematic elements and the basics of film analysis. Through readings, guided viewings, discussions, and writings about adaptations, students will critically examine the migration of these intertextual stories and ideas across media and time.

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. Our exploration 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. Depending on the teacher assigned to the course and the availability of texts, a given section of this course may begin with fantasy and lead to science fiction, or vice versa, as an organizational scheme.

ENG401e (Fall)

Authors & Topics: Banned Books (Not Offered in 25-26)

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

You can't read that! Ban that book! Protect the children! In our current era, censorship and book bans are on the rise–and schools and libraries are under constant scrutiny about the works they utilize. This course will delve into the controversies surrounding book bans and other forms of intellectual censorship. Students will explore specific works of literature that have been the subject to these bans, which include novels, works of drama, children's literature, films, and even graphic novels. Additionally, they will engage with questions about the cultures that choose to restrict these works and examine specific historical case studies involving government legislation, school board decisions, and special interest groups.

ENG410 (Fall)

Expression and Experiment in Poetry

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

In this class, we'll work to overcome fears of poetry and to find in it not just rhythm and meaning, but also pleasure and joy. Students will develop the necessary skills to read historical and contemporary poetry, explore cutting-edge contemporary poetic experiments, hone close-reading skills, and enter the world of poetry through creative imitations of a variety of genres and forms. Students will journal their reading of poems beyond the syllabus, introduce poems to other students, write focused close readings, remediate poems into other media, and explore the overlaps of and distinctions between "experiment" in science and the arts.

ENG415 (Fall)

Horror Fiction Studies

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

Horror enjoys a special position within the literary world both in terms of its extensive representation as well as its numerous forms. All human beings experience fear, and every culture and historical period has found ways to articulate that fear through artistic expression. This class aims to examine imaginative works through the lens of horror, in their thematic expressions as well as the harsh realities they so often reflect. Students will explore many literary traditions of horror ranging from chilling encounters with the paranormal to gripping dives into psychological terror. These stories from around the world will take the form of short fiction, novels, visual narratives, and films, and students will be given the opportunity to respond to them through reflective and analytical essays and creative projects.

ENG512 (Spring)

Victorian Fiction (Not Offered in 25-26)

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.

HISTORY AND SOCIAL SCIENCE

HSS100 (Fall or Spring)

American Studies (core)

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

American Studies considers United States history since the late nineteenth century. Beginning with a unit on the US Constitution, the course then considers the United States in the twentieth century through three thematic lenses: foreign policy, civil rights and immigration, and the economy. A composition component also runs through the curriculum.
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 6th century CE. This course will examine the origins of major systems of belief around the world, with special attention to the structural, cultural, and political 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. Students will seek to understand conflict at various points in world history and in various areas of the globe.

HSS201g (Fall)

Historic Global Commodities and Culture

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

This class focuses on cultural contacts as they are mediated by global commodities such as silk, tea, coffee, sugar, and opium, among others. While cultural contacts might be approached through more local mechanisms, such as war, migration, or trade between contiguous countries, the social relationships and cultural contacts that form around global commodities are remarkable in that they often occur across huge distances. Producers of a commodity may never meet the consumers of it, even though the two groups often transform each other's lives profoundly. Students will examine the cultural aspects of global economies in two main contexts – the Silk Roads of Asia (200BC-1200AD) and the British Empire (1630s-1900).

HSS201i (Fall)

Revolutions

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

What makes an event revolutionary? Revolutionary events may be political, technological, scientific, commercial, or even agricultural. In this course, we will study, evaluate, and debate the revolutionary character of historical events from the ancient world through the recent past. Alongside major events of the Atlantic Age of Revolutions, we will consider groundbreaking transformations in Asia, the Middle East, and Latin America.

HSS202 (Spring)

The World in the Twentieth Century (core)

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

The World in the Twentieth Century will address the major historical developments and changes that have occurred in the last two centuries. The 20th century was one of extremes, ranging from death and destruction on a global scale, to the establishment of many new nations and a golden age of progress for more people than at any time before, or since. The course will focus on key economic, social and political concepts as a way of bringing coherence to an inherently complex topic and prepare students for their elective choices in the senior year.

HSS311 (Fall)

Political Theory

Grade Level: Senior
Length: One Semester
Credit: 0.50
Prerequisite: 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, students 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 students' 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.

HSS325 (Fall)
HSS326 (Spring)

Modern Economics

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

Modern Economics provides an accelerated introduction to microeconomic and macroeconomic theory and applications. Traditionally, introductory economics courses have been broken down into two semesters, one focused on each of the above. In many colleges, the distinction is changing. This is particularly true for introductory courses that are geared at non-majors where a single semester survey is becoming more common. This course will move relatively quickly through the material and is designed for students who possess strong analytical skills. Students will make use of graphs, algebra, and mathematical reasoning. The course is not structured as an AP preparatory course but rather a survey class focusing more broadly on the important economic concepts with which students ought to be familiar. Economics is a field that is central to students' everyday lives regardless of what they choose to do in college and beyond. Given that students at the high school and college levels come to introductory economics courses with very little background, the course will balance deeper mathematical approaches and discussions about concepts and theories. As time permits, the course will also delve into topics including game theory, international political economy and behavioral economics.

HSS335 (Spring)

America in the Contemporary World

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

The modern IMSA student is bombarded with an array of information and opinions on political, economic, social and diplomatic events on a daily basis. In this course, students will research and discuss the nature of geopolitics and its relationship to domestic events, in both the United States and the greater World.

The goal of the course is two-fold. First, students will make use of the experiential model to research and bring understanding to current topics and recent history. Topics will be student driven. Second, they will leave the class more competent in their personal ability to consume information, in all its formats, in a critical but thoughtful manner.

HSS343 (Fall)

History of Biology and Medicine

Grade Level: Senior
Length: One Semester
Credit: 0.50
Prerequisite: American Studies and World in the Twentieth Century

This course will trace the varied attempts to explain and modify the living world from antiquity to the twentieth century, mostly through the history of medicine. Students will examine various religious, philosophical, and scientific approaches to the study of animal, vegetable, and human life and the interrelationships between living things, including an introduction to Charles Darwin. Since medicine and biology does not develop or get practiced in a vacuum, science will often be discussed in relation to the politics of the period of study. Students are free to select their own topic for final papers and presentations.

HSS352 (Spring)

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 (Fall)

US Government and the Constitution

Grade Level: Senior
Length: One Semester
Credit: 0.50
Prerequisite: 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.

HSS380 (Spring)

China in the World

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

This course allows students to explore China's place in world history and how the outside world has interacted with China. Students will be exposed to media and scholarship from and about China. Students will be able to explore topics of their interest and present them to classmates and the instructor.

HSS393 (Fall)

History of the Environment

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

This course will take us through two different types of environmental history that are closely related. The first type focuses on historical and modern ideas about what nature is and how we ought to interact with it. The second is based less on big ideas and more on examples or "on the ground" instances of the actual interaction between people and nature from the ancient world to the modern, in the east and the west. By investigating both ideas and action, we can see how one affect the other historically to form our own experience of the environment in twenty-first century America. We will ultimately work to understand why the environmentalist movement and environmental legislation in America in the twentieth century looks the way it does. Our final group project will be an integrated account of the state of the science, economics, and politics of climate change.

HSS394 (Spring)

Modern Conflict, Insurgency & Terrorism

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

Since 1945 the nature of conflict in the world has become a complicated, multi-faceted reality. Nation-States continue to deploy conventional armed forces while a few are armed with nuclear weapons. "Insurgencies," or guerrilla movements, have roiled the developing world, causing governments to fail and significant social displacement. In the last seventy years, and especially since 1970, terrorism has become a shadowy, frightening reality for modern governments and populations. Further the impact that conflict has had on economic development, social change, political systems and technological innovation will play an important role in the class. Added time will be given to the changing nature and technologies of conflict in the period from 2001 to the present. This course will examine the development of these three modern expressions of conflict through readings, discussion, case studies and simulations.

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 and recommendation of Instructor, or Proficiency Exam and recommendation of Instructor

Students build upon the skills developed in French I (with appropriate review of previously learned material). They develop greater proficiency in listening, speaking, reading, and writing. The topical context is expanded from the students' immediate world to the world of the target cultures. Topics may include shopping, cuisine, geography, 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 and recommendation of Instructor, or Proficiency Exam and recommendation of Instructor

In Level III, students continue to build communication skills developed in Levels I and II. Specifically, students aim to increase their performance from Intermediate Low to Intermediate High on the American Council on the Teaching of Foreign Languages proficiency scale. Students do this by actively participating in extended oral and written discourse, and using compound and complex sentences to provide information in a coherent and fluent manner. Students narrate and describe past and present events; predict future events; explore options in a given situation; and handle difficulties and unexpected events. They also learn to 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 the first semester, students review grammar from previous years, describe and discuss personal past events, and consider how they wish to live when they are adults. Second semester students examine the social, psychological, and cultural implications of fairy tales; explore current events from a French-language perspective, and consider literary techniques in writing. Reading selections may include La Belle et la Bête, other fairy tales from French-speaking countries, newspaper articles, and Le Petit Prince, etc. Some specific themes include: United Nations Sustainable Development Goals, education systems, world of work, 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

This advanced French class is dedicated to furthering students' understanding of French language but most importantly to exposing students to Francophone cultures and current events. Class discussions are aimed to push students to examine their values and contrast them with those of Francophone cultures. Students are expected to develop critical and complex ideas about cultural, moral and philosophical questions such as the formation of identity on a personal level but also on a national and international scale in a context of full immersion. The curriculum for this class is organized over two years, in a rotation that allows French IV and French V students to cover new topics.

WLG150 (Full Year)

French V

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

This advanced French class is dedicated to furthering students' understanding of French language but most importantly to exposing students to Francophone cultures and current events. Class discussions are aimed to push students to examine their values and contrast them with those of Francophone cultures. Students are expected to develop critical and complex ideas about cultural, moral and philosophical questions such as the formation of identity on a personal level but also on a national and international scale in a context of full immersion. The curriculum for this class is organized over two years, in a rotation that allows French IV and French V students to cover new topics.

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 family and home, childhood, holidays, daily routine, shopping, cuisine, geography, travel, education, wellness, leisure time activities, careers, and the 21st century. In the immersion setting, extensive class time is used to develop speaking and fluency in small group and whole class activities. Students will also keep listening and reading logs and a journal to improve their writing skills.

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 participate actively in extended oral and written discourse, using complex and compound sentences to provide information in a coherent and fluent manner. Students narrate and describe present and past 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 (e.g. artistic, historical, literary, personal, philosophical, political, scientific, social, socio-economic).

WLG240 (Full Year)

Spanish IV

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

In Level IV Spanish, students continue to develop and refine their listening, speaking, reading and writing skills. They read and comprehend authentic sources that include advanced grammatical structures (i.e. subjunctive and conditional, indirect discourse, passive voice) and topics that are historical, scientific, philosophical, and literary. Students' writing and speaking also reflect advanced grammatical structures and an ever-expanding, sophisticated, and eloquent vocabulary. Writing tasks will reflect the ability to analyze issues, engage in critical thinking, and move beyond simply descriptive prose. Students become more adept at comprehending the speech of native speakers speaking at a normal rate and in various situations.

WLG250 (Full Year)

Spanish V

Grade Level: Junior/Senior
Length: Two Semesters
Credit: 1.0
Prerequisite: Spanish IV and recommendation of Instructor, or Proficiency Exam and 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. This course will help prepare students to demonstrate their level of Spanish proficiency across three communicative modes — Interpersonal, Interpretive, and Presentational — and the five goal areas outlined in the *Standards for Foreign Language Learning in the 21st Century* (Communication, Cultures, Connections, Comparisons, and Communities). Students will acquire information from authentic sources in Spanish intended for native speakers: documentaries, films, podcasts, recordings, biographies, essays, literary texts, magazines, newspapers, research papers, websites, etc. in a variety of settings, types of discourse, styles, topics, registers, and broad regional variations. These sources include advanced grammatical structures (e.g., subjunctive and imperative moods; perfect tenses; indirect discourse; and passive voice), idiomatic expressions, and topics that are historical, literary, philosophical, sociopolitical, scientific, and technical. As the year progresses, students' oral and written 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). The learning experiences or units of study will be presented through themes that students will research and sometimes teach to the class.

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.

WLG610 (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.

WLG620 (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. Participation requires basic to intermediate technical proficiency on an instrument. 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 ILMEA District and All-State Festivals. Students will also perform with Pep Band. Private lessons are highly recommended. Students enrolled in an IMSA music program are eligible to participate in any music sponsored co-curricular activities 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. Participation requires advanced technical proficiency on an instrument. 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 ILMEA District and All-State Festivals. Students will also perform with Pep Band. Private lessons are highly recommended. Student participation in Wind Ensemble is based upon placement audition. This ensemble is comprised primarily of upperclassmen, 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 an IMSA music program are eligible to participate in any music sponsored co-curricular activities 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. Participation requires basic to intermediate technical proficiency on an instrument. 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 ILMEA District and All-State Festivals. Private lessons are highly recommended. Students enrolled in an IMSA music program are eligible to participate in any music sponsored co-curricular activities 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. Participation requires advanced technical proficiency on an instrument. 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 ILMEA District and All-State Festivals. Private lessons are highly recommended. Student participation in Chamber Strings is based upon placement audition. This ensemble is comprised primarily of upperclassmen, 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 an IMSA music program are eligible to participate in any music sponsored co-curricular activities 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 vocal technique, 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: Sophomore/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 staffs 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 20th 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: Sophomore/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 a historical and cultural perspective and extend musical awareness beyond music currently familiar to the student. This course focuses on the fundamentals of music theory, and this course alone may not fully prepare students for the AP Music Theory Exam.

FAR402 (Spring)

Art and Design

Grade Level: Sophomore/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 art-making. 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. This is a beginning art course, no prior art experience needed.

FAR411 (Spring)

Observational Drawing

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

This course will introduce students to the history of art, the elements of drawing, and how to use art as a form of communication. Students will learn basic drawing skills including contour drawing. In addition, they will learn to identify lines, curves, edges, perspective, hue and values, and will be able to reproduce these elements on paper. The class focuses on improving a student's ability to draw from observation in a representational manner. In addition to sighting and measuring techniques that will be introduced, there will be an emphasis on learning to draw using different media. This is a beginning art course, no prior art experience needed.

FAR416 (Fall or Spring)

Digital Photography

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

This course will introduce students to the basics of photography, including the history and advancements through the digital development of photography. This course will also introduce the fundamentals of photography. Four areas of instruction will be emphasized. These areas include: how cameras work, how composition works, how lighting works, and how to use photo editing software. This is a beginning art course; no prior art experience is needed and digital cameras are loaned out for the course.

FAR421 (Fall)

Scientific Illustration

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

This course will provide students with the skills and ability to produce their own visual models, gain an understanding of spatial concepts, and be able to produce the visualization of data needed for science course work. This introductory course will expose students to the history of illustration and its importance in the sciences. In addition, this course will shape the students' visual perception, drawing, and design skills via sketching practice. This is a beginning art course, no prior art experience needed.

FAR435 (Spring)

Printmaking

Grade Level: Sophomore/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. This is a beginning art course, no prior art experience needed.

FAR450 (Fall)

3D Design Foundations

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

This course introduces the history of 3D design and the advancements within design through the use of technology. Students will develop an understanding of how technology has progressed and influenced the world of art today. Students will learn computer software programs, including Photoshop, InDesign and Illustrator, which will advance their visual thinking. This is a beginning art course, no prior art experience is needed.

FAR452 (Fall)

Graphic Design and Technology

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

In this class, students learn the basic principles and elements of design, typography and layout while using Adobe CC design software. Students will be creating; posters, logos, digital drawings, advertisements, magazine layouts, and more. Students will engage the meaning and material of science and technology through the production of electronic objects and interfaces, 3D modeling, tactical media, bio-art, digital imaging, rapid prototyping, critical making, internet art and emerging forms.

They will explore the history of graphic design and the copyright law. Through the creative process students will explore how to use computer software along with 3D printers, CNC cutter, drawing tablets, 3D drawing tools. Using critical thinking and problem solving, students will finish the semester by creating a digital portfolio to showcase their work.

WELLNESS

WEL110 (Fall or Spring)

Foundations of Healthy Living (core)

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. This course utilizes a mastery/competency based approach to learning and grading.

WELLNESS ELECTIVES

After successful completion of Foundations of Healthy Living, students will enroll in a Wellness elective as a junior or senior. The elective program consists 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. Some Wellness electives include pre- and post- testing and all utilize a mastery/competency based approach to learning and grading.

WEL231 (Fall or Spring)

Outdoor and Indoor Games

Grade Level: Sophomore/Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Foundations of Healthy Living

This semester-long course consists 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 components of fitness. Activities will include games from target, fielding and striking, net and wall, and invasion. 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.

WEL251 (Fall or Spring)

Stress Management for Life

Grade Level: Sophomore/Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Foundations of Healthy Living

Stress Management for Life is a semester-long course that employs a multi-disciplinary approach that will allow students to explore stress and provide numerous techniques to reduce and manage it. Students will deepen their understanding of stress and the stress response, observe and analyze their personal stress response, and explore various stress management techniques. Physical movement is an essential part of this course.

WEL312 (Fall or Spring)

Dance

Grade Level: Sophomore/Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Foundations of Healthy Living

Basic figures 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, timing, 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.

WEL410 (Fall or Spring)

Psychology of Sport

Grade Level: Sophomore/Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Foundations of Healthy Living

Psychology of Sport will take an active approach to understanding the different concepts of Sport Psychology while participating in a variety of games and activities. The games will focus on a tactical approach to learning and understanding each game as well as the four main game categories: Target, Net and Wall, Fielding and Striking, and Invasion. Each week students will engage in the different games with a focus on a Sport Psychology topic following up with a deep dive into the topic asynchronously. Students will learn many different Sporty Psychology topics including cultural humility and sociological perspectives in sport. This course will use proficiency-based grading. Wellness does not round scores.

WEL420 (Fall or Spring)

Human Nutrition

Grade Level: Sophomore/Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Foundations of Healthy Living

The Nutrition course is a study of the science and fundamentals of human nutrition. Emphasis is placed on understanding the roles, functions and interactions of the macro- and micro-nutrients and of their ingestion, digestion, absorption, transport, metabolism, storage and excretion. Integration of these topics serve as a foundation for examination of food choices, health behaviors, and disease prevention. Practical application of diet and wellnesss behaviors are an essential aspect of this.

WEL525 (Fall or Spring)

Movement and Relaxation

Grade Level: Sophomore/Junior/Senior
Length: One Semester
Credit: 0.50
Prerequisite: Foundations of Healthy Living

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. Mindfulness activities such as 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.

EXPERIENTIAL LEARNING

The following are IMSA's transcripted experiential learning offerings: Student Inquiry and Research (SIR), Internships (INT), Independent Study (IS), and Level 2 Credentials (CR). SIR, INT, and CR offerings fulfill graduation requirements for elective course requirements only when formally approved by the Principal or designee(s). IS cannot be used for graduation requirements. Experiential learning offerings cannot replace core course requirements. Students cannot earn graduation credits multiple times for the same experience (ex: a student cannot earn graduation credit for SIR ***and*** graduation credit for a Level 2 Credential associated with the same SIR work.) Students will list selections on their course registration form and declare their interest in participating in one of the following programs during the course registration process.

Students may only be enrolled in one experiential learning program each semester (SIR, INT, IS, or CR). Experiential learning programs count toward a students' total academic load as defined in the graduation requirements on page 1 of the Learning Opportunities. Students requesting to enroll in two experiential learning programs concurrently must receive permission from their College and Academic Counselor (CAC), and receive permissions from the appropriate designees (as designated by the CAC) from each experiential program. Students who are given permission to enroll in two experiential learning programs must maintain satisfactory academic progress in all academic courses (grade of C or better) and experiential programs (grade of P). If a student's academic progress is at risk due to low grades, the CAC holds the right to withdraw a student from one or both experiential learning programs.

Students interested in changing their experiential learning program for the academic year may do so during the CAC Add/Drop process, following the same process as academic courses. Students may not add an experiential learning program after the Add/Drop process, but may withdraw from an experiential learning program following the same process and timelines as withdrawing from an academic course.

Student Inquiry and Research

SIR100 (1st SIR experience)
SIR200 (Following SIR100 and/or SIR103)
SIR300 (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 SIR Management Team.

SIR103 (Summer - 1st 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 SIR Management Team.

Student Inquiry and Research (SIR) connects students with on-campus or off-campus professional researchers. Students carry out a research investigation under the guidance of the researcher. SIR is a process enabling the student to learn about a field, generate an understanding of the outstanding questions in the field, and carry out an investigation centered around one question. Students may choose from pre-existing projects, proposed areas of research, or student generated projects approved by the SIR office. SIR receives a "pass," or "fail" grade, assessed by the SIR Management Team in consultation with the SIR advisor. Students may enroll either during summer or fall. Students may enroll in SIR for both their junior and senior years and/or in the summers before their junior and senior years.

SIR on-campus options

SIR100l/200l (Full Year)

SIR: Drug Discovery

Grade Level: Junior/Senior
Length: Two Semesters
Credit: 1.0
Prerequisite: Permission of instructor and permission from SIR Office

The Drug Discovery research program at IMSA is attempting to discover new medicines for various diseases. This group has collaborations with various academic institutions, pharmaceutical companies, international foundations and consortiums. Drug discovery is the process through which potential new medicines are identified. It involves a wide range of scientific disciplines, including biology, chemistry and pharmacology. Drug discovery efforts will combine lead generation, structure-activity investigations, organic synthesis, natural product isolation, testing compounds with biological assays, computer aided drug design (CADD), toxicology, and pharmacology. The strategy is to understand the relationship between the molecule and its biological activity. The goal is to design unique compounds that have the capacity to combat diseases for a wide range of disorders.

SIR100p (Full Year)

SIR: Particle Physics at the LHC

Grade Level: Junior
Length: Two Semesters
Credit: 1.0
Prerequisite: Co-requisite SCI445 Modern Physics in the Fall; Permission of instructor and permission from SIR Office

The IMSA-CMS research group works in cooperation with Fermilab and scientists around the world to conduct particle physics analyses with the Compact Muon Solenoid detector group at the Large Hadron Collider in Europe. Currently the group is focusing on searches for doubly charged Higgs bosons and dark photons. In the first year, students learn to program in C++ in a Linux environment and study fundamentals of particle physics and statistical analysis, and then embark on some simple analysis work in preparation for the larger jobs to come in the following year. Students must enroll in Modern Physics during the fall semester of their junior year to participate in this program. Students taking SIR100p are expected to continue into SIR200p Particle Physics at the LHC.

SIR200p (Full Year)

SIR: Particle Physics at the LHC

Grade Level: Senior
Length: Two Semesters
Credit: 1.0
Prerequisite: SIR 100p Particle Physics at the LHC; Permission of instructor and permission from SIR Office

The IMSA-CMS research group works in cooperation with Fermilab and scientists around the world to conduct particle physics analyses with the Compact Muon Solenoid detector group at the Large Hadron Collider in Europe. Currently the group is focusing on searches for doubly charged Higgs bosons and dark photons. In the second year, students complete projects in support of the overall analysis, such as systematic studies, code development, Monte Carlo generation, and statistical calculations. Students are expected to make a substantial contribution to the overall analysis by the end of the year, and their work will be included in CMS publications.

SIR100u/200u (Full Year)

SIR: NeuroAI

Grade Level: Junior/Senior
Length: Two Semesters
Credit: 1.0
Prerequisite: Permission of Instructor and permission from SIR Office

This research experience explores the convergent evolution of neuroscience and artificial intelligence (AI), specifically, neuromuscular medicine and myoneural interface. The SIR focuses on two major themes: understanding principles of biological movement using biomimicry, biomimetics and bioinspiration across multiple scales and systems. Students examine neuromuscular movement patterns to extract universal principles, identify optimal control strategies in biological systems, develop enhanced signal processing algorithms to capture subtle muscle activation and recruitment patterns, study real-time movement analysis to investigate rehabilitative medicine, treatment of neuromuscular disorders and surgical applications. Second theme is, the application of AI to accelerate the merging of body and machine, by investigating musculoskeletal design, muscle, and neuro-control methodologies — Using convolutional neural networks (CNN), natural language processing (NLP), reinforcement learning (RL) and foundation models (generative AI) to compare system features that affect representations, computations, and learning, to core shared concepts in neuro- and cognitive science. Through a combination of experimental design, engineering principles and practical computational implementation, students elucidate the underlying basis and the complex dynamics involved in neuromuscular systems. Students analyze plausible approaches to implementation of advanced myoneural interfaces with the aim of developing proprioception systems with complex human-like associative memory skills with efficient energy usage.

IMSA Internship

INT100 (1st Internship experience)
INT200 (Following INT100 and/or INT103)
INT300 (Following INT200 or INT 203)

Grade Level:	Junior/Senior
Length:	Two Semesters
Credit:	1.0 Note: Internship credit does not fulfill any graduation requirement
Prerequisite:	Permission of Internship Management Team.

INT103 (Summer - 1st Internship experience or following INT100)
INT203 (Following INT103 and/or INT200)

Grade Level:	Rising Junior/Senior
Length:	Summer
Credit:	1.0 Note: Internship credit does not fulfill any graduation requirement
Prerequisite:	Permission of Internship Management Team.

The IMSA Internship program connects students with authentic professional industry experiences in an on-campus or off-campus business setting. Students may enroll in the IMSA Internship for both their junior and senior years and/or in the summers before their junior and senior years.

The IMSA Internship program goals are designed to develop:

- Professional communication and information management skills
- Project management knowledge
- Applied industry, business or product research knowledge
- Networking and relationship development skills
- People and team management skills
- Understanding of organizational operations

IMSA Internship students receives a “pass” or “fail” grade, assessed by the Internship Program Manager in consultation with the Internship Program Team. The focus of each cohort term/type is as follows:

Summer/Annual Co-hort | Business Research Project

A supervised work experience where students to carry out industry, business or product focused project of inquiry/investigation under the guidance of the professional mentor.

Students may choose from pre-existing projects, proposed areas of industry, business or product research, or student generated business or product projects approved by the Internship Program Manager(s).

Minimum program requirements:

- 8 hours of seminar-style prep class
- 160 hours total cumulative hours
- Business Project Proposal
- Business Project Research Report
- Internship Evaluation
- IMSAloquium Presentation (not required for Summer co-hort)

Independent Study

Grade Level: Senior
Length: One Semester
Credit: 0.50 Note: Does not fulfill any graduation requirement unless Principal (designee) 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. A student may not enroll in more than one Independent Study course per semester. 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 (designee) for graduation credit.

An Independent Study Learning Proposal must be completed and **submitted to the Principal (designee) with all signatures by the first Wednesday of May.**

Credentials

IMSA is committed to piloting experiential learning opportunities where students can earn different levels of IMSA Credentials based on achieving competencies in a specific field of study, These credentials will be piloted in the 2025-26 academic year. Students who complete a Level 2 credential will be awarded 0.5 credits towards graduation to fulfill elective requirements only. The Principal/Chief Academic Officer or designee will approve all enrollments into the credential pilot program and determine the elective area for which these credentials can be awarded. Students may not earn both credential credit towards graduation and any other experiential learning credit towards graduation for the same course/project/enrollment.

Pilot credentials for the 2025-26 Academic Year may include:

- Artificial Intelligence Credential
- Teaching and Learning Credential
- Scientific Research Credential
- Entrepreneurship Credential
- Leadership Credential
- Engineering & Robotics Credential

CREXXX (Full Year)

Certified Nursing Assistant Program

Grade Level: Junior/Senior
Length: One Semester
Credit: X.XX
Prerequisite: Sixteen years of age or older at the start of class; Academic good standing - students on academic probation will not be considered for the program; Excellent attendance records; A copy of student 9-digit social security card provided to the course instructor during the course orientation; A physical exam dated within 12 months of the course start, up to date immunization records, and a 2 step TB test (or alternative proof of negative TB test) to the course instructor during the course orientation; Authorization for IMSA to enroll the student in the Illinois Department of Public Health's Health Care Workers Registry in accordance with IL Admin Code 77, Section 955.300 (both student and parent must sign the Health Care Registry Authorization and disclosure form). Annual Influenza and/or Covid vaccine may also be needed for clinical sites.

This Certified Nursing Assistant (CNA) course is a hands-on course that introduces students to the fundamentals of basic patient care under the supervision of a licensed nurse. Students will learn essential skills such as infection control, vital signs monitoring, personal care, patient mobility, and end of life care with a focus on compassionate, professional healthcare. Instruction includes both classroom learning and clinical experience in a long-term care facility, providing real-world application. Beyond the classroom, the CNA course provides valuable life skills like strong communication, empathy, patience, critical thinking, time management, adaptability, teamwork, basic medical knowledge, professionalism, and the ability to provide emotional support, all while gaining experience in caring for individuals with diverse needs in a healthcare setting. Upon successful completion, students will be eligible to take the CNA certification exam and begin their journey in the healthcare field. The Illinois Department of Public Health model program, per IL Admin Code 77, Section 365.300, will be used for the program content.

Course Fee: TBD
Maximum class size: 8 students

HIGHER EDUCATION TRANSFER CREDITS

Accepting transfer credits from accredited higher education institutions allows IMSA to (1) recognize and honor the diverse academic pathways students may take while ensuring they meet rigorous academic standards: (2) accommodate students' additional learning experiences in content areas not offered currently at IMSA, and (3) provide students additional opportunities to maintain sufficient academic progress toward graduation.

TRANSFER CREDIT DEFINITIONS AND ALLOWANCES

DEFINITIONS

Transfer credit from higher education institutions will fall into one of the following categories: (1) Transfer Credits and (2) Course Recovery Credits. Transfer Credits refers to a higher education course a student enrolls in for the purposes of seeking diverse academic pathways and/or engaging in content areas not offered currently at IMSA. Course Recovery Credits refers to a higher education course a student enrolls in as a means to earn necessary graduation credit after failing an IMSA course.

ALLOWANCES

Students are permitted to transfer a maximum of two (2) courses from an accredited higher education institution toward their graduation requirements for the purposes of Transfer Credits or Course Recovery Credits. Each approved course will be documented on the IMSA transcript as a 0.50 credit course in the appropriate discipline.

TRANSFER CREDIT PROCESS

Transfer Credits are subject to the following conditions:

1. **Pre-Approval Process**
    - Courses must be pre-approved by the College and Academic Counselor (CAC), the appropriate academic department, and the Principal's Office. An approval form is available through the CAC Office.
    - Courses completed without pre-approval will not be accepted for transfer credit.
2. **Course Eligibility**
    - Transfer courses **must not** be similar in content or scope to courses currently offered by IMSA. The pre-approval process will evaluate the course description, syllabus, and learning outcomes to ensure compliance with this requirement. It is the responsibility of the student to provide this information with their application.
    - External courses cannot replace IMSA core courses, unless there are unusual circumstances such as insufficient enrollment or space at IMSA.
    - Courses completed prior to the student's enrollment at IMSA and/or without pre-approval are not eligible for transfer credit.
    - External courses must be taken at a higher education institution that is recognized and accredited by a legitimate accrediting body, such as the Higher Learning Commission (HLC).
3. **Grade Requirement**
    - Only courses in which a student has earned a grade of C (2.0) or better are eligible for transfer.
4. **Documentation**
    - Students must provide official transcripts to IMSA's Registrar's Office as soon as transcripts are available to allow for timely review, acceptance, and documentation of the transfer credit.
    - Transfer credits will be recorded on the student's academic record as fulfilling graduation requirements but will not factor into the student's GPA.
5. **Financial Support**
    - IMSA will not provide financial assistance for students wishing to enroll in courses offered through an outside institution.

COURSE RECOVERY PROCESS

Course Recovery transfer credits are subject to the following conditions:

1. **Course Recovery Expectations**
    - Course Recovery through a higher education course is intended as an additional pathway for students to maintain pace toward IMSA graduation, and this option does not prevent students from participating in other IMSA recovery options, such as repeating a failed course or resolving Incomplete grades.
2. **Pre-Approval Process**
    - Courses must be pre-approved by the College and Academic Counselor (CAC), the appropriate academic department, and the Principal's Office. An approval form is available through the CAC Office.
    - Courses completed without pre-approval will not be accepted for transfer credit.
    - In instances of a student being issued a dismissal notice per Student Policy JECF, credit recovery options are contingent upon the student's continued enrollment at the academy.
3. **Course Eligibility**
    - For Course Recovery purposes, the transfer course may be similar in content or scope to courses currently offered by IMSA.
    - The pre-approval process will evaluate the course description, syllabus, and learning outcomes to ensure that the course is either (1) equivalent to the failed IMSA course or (2) satisfies an IMSA graduation credit in the same category as the failed course. It is the responsibility of the student to provide a course description, syllabus, and learning outcomes with their application.
    - Courses completed prior to the student's enrollment at IMSA and/or without pre-approval are not eligible for transfer credit.
    - External courses must be taken at a higher education institution that is recognized and accredited by a legitimate accrediting body, such as the Higher Learning Commission (HLC).
    - Departmental approval processes may vary, and acceptance of the external course for graduation credit may be contingent upon expectations such as earning a certain grade in the course or passing an IMSA assessment after completing the course.
4. **Grade Requirement**
    - Only courses in which a student has earned a grade of C (2.0) or better are eligible for transfer.
    - Departmental approval processes may vary, and acceptance of the external course for graduation credit may be contingent upon expectations such as passing an IMSA assessment after completing the course.
5. **Financial Assistance**
    - Students who qualify for Tier 1 and Tier 2 fees may request financial assistance through the Principal's Office in order to minimize the expense for students taking a recovery course.