

MULTIDISCIPLINARY COURSES

SOPHOMORE SEMINAR

Fall and winter terms; .25 course credit (each term)
Fall and spring terms; .25 course credit (each term)
Winter and spring terms; .25 course credit (each term)
MD201 and MD202

The Sophomore Seminar, required for all fourth formers, is designed to educate and facilitate discussion as students transition from adolescence to young adulthood. Topics include health and nutrition, growth and development, and at-risk behavior. The course meets one day per week, has assigned homework and is graded on a pass/fail basis. Students who have taken a course in health at a previous school are not exempt from this requirement.

REVERSE ENGINEERING: HOW THINGS WORK

Winter term; 1 course credit
MD230

This course introduces students to general principles of product design and function and examines some of the engineered items all around us. Students learn to take apart various mechanical and electrical devices and examine how component parts work together. Engineering skills such as sketching, 3D modeling, prototyping, testing, and clear communication are emphasized. An introduction to microcontrollers and programming is included and students build several devices of their own design. Hands-on experimentation is emphasized and students learn to use some 3D modeling software (Google SketchUp), 3D printers, and Arduino microcontrollers. Third and fourth form students have priority enrollment for this course; fifth and sixth form students may enroll with permission of the Science department.

TOPICS IN ENGINEERING

Winter, spring terms; 1 course credit
MD310

This introductory course is designed to provide students with an overview of some major engineering principles and applications, as well as an opportunity to implement those principles through experimentation, design-based projects, and presentations. Topics to be covered include graphical communication and drafting, basic material science, beam mechanics and deformation, and micro-engineering. The course will provide an interdisciplinary outlet for the mathematical skills and general scientific knowledge students have already acquired and also introduce new mathematical concepts to improve their understanding of how real-world systems are designed, modeled, and fabricated. Open to students who have completed one year of physics and Algebra II.

COGNITIVE NEUROSCIENCE, HONORS

Spring term, 1 course credit
MD330HO

One of the fastest growing research areas in science is neuroscience. Cognitive and behavioral studies have attracted considerable popular and scientific attention in recent years and new techniques have opened up novel avenues for exploration. This course provides an introduction to the cellular and molecular mechanisms of neuronal function, and examines how cognitive processes can be explained by the structure and function of the brain. Beyond foundational knowledge and empirical methodology in neuroscience, this class also explores data from current studies in neurobiology and cognitive sciences. Open to students who have completed Biology or Introduction to Psychology.

INTRODUCTION TO DESIGN: HOW TO MAKE ALMOST ANYTHING

All terms; 1 course credit
MD340

This course is a hands-on introduction to being a 21st century maker-scholar-inventor that meets students where they are. It is a makers' workshop, a design lab, and a creative-programming studio, intended to provide a supporting framework for students' research and development as they build innovative projects of their own design. This class focuses on storytelling and narrating what we do, documenting projects and generating a shared dialogue of what is observed and learned along the way. Meetings create a research space within which students pursue creative work that is conceptual, making vigorous engagements with historical, cultural and social aspects of the contemporary world. Students also create technical works that range from simple, "lo-fi" prototypes made from simple materials like cardboard to "HD" representations that might include virtual reality or e-textiles, for example, to make objects and products of their own design. This class is preeminently a place for students to ask questions, seek guidance, and exchange ideas. Course meetings consist of a combination of roundtable discussions, reflective writing, group "critiques," 5-minute presentations, design thinking exercises, and focused topic-and-tool-specific workshops. Open to fifth and sixth formers, and fourth formers with permission of the instructor.

CREATING COMMUNITY CREATIVITY

Spring term; 1 course credit
MD350

Are you ready to engage with your community at a deeper level? This course is designed to challenge students to break down the barriers to innovative thinking and action so as to positively and confidently impact a community with which they affiliate. Students are provided with the permission, the environment, and the tools to further develop their powers of insight, observation, effective communication and empathy along with those of creative expression and problem-solving. In the first half of the course, students examine aspects of creativity and the iterative design-thinking process through the interpretation of assigned materials (readings, videos, etc.) and interactive mini-projects. Students are encouraged to explore through regular reflection, feedback and exchange of ideas via synchronous and asynchronous discussion and interaction with the surrounding community including local innovators. In the second half of the course, as part of a final project, students work together or individually to propose and fully develop creative, practical solutions to identified community challenges. Open to fifth and sixth form students.

JOURNALISM AND NONFICTION STORYTELLING

Year; 3 course credits
MD375

This course offers opportunities to learn and practice good storytelling, a skill essential to any field of work or study. What are the essential elements of a good story? What makes a story compelling to a reader, viewer or listener? How can smart statistics, rhetoric, and even economy of words strengthen a story? Students study and analyze long article nonfiction work from contemporary writers such as Ta-Nehisi Coates, Janet Malcolm and John McPhee, and work both individually and collaboratively on writing projects and presentations that address a variety of contemporary issues and events. Feedback is an essential element of the course. Workshopping provides opportunity to both give and receive constructive feedback. Students also practice data-gathering skills through targeted lessons in statistics and probability. While these skills support journalism in a written form, they also allow students to explore media including infographics, podcasts, and photojournalism. The course will enhance students' abilities to tell compelling stories with well-sourced data that is contextualized in service of the personal narrative. Open to sixth formers.

Note: This course satisfies the sixth form English diploma requirement.

PUBLIC SPEAKING

All terms; 1 course credit
MD400

Effective oral expression is the first pillar of communication. In this course, students work toward expressing themselves with skill and purpose in all basic modes of public speaking: extempore, from notes, and from a formal text. The basics of good public speaking are discussed initially, and models from excellent addresses are observed frequently. Students also evaluate speakers on campus throughout the term. However, the majority of the class is spent speaking before one's peers. Students are responsible not only for planning and delivering as many as eight or nine speeches of different types, but also for both providing and profiting from the suggestions of one another. This experiential and analytic approach is the heart of the course. The iPad is used to further support the effort to help students "see" and imagine themselves as public speakers. Mixed among their more formal presentations, extemporaneous speaking is designed as both a fun and challenging change of pace. Confidence in and enthusiasm for self-expression are the twin goals. Open to all students.

INTRODUCTION TO LOGIC

Spring term; 1 course credit
MD406

Virtually every human activity involves reasoning and argumentation. We use reasoning and argumentation whenever we solve problems, make decisions, unravel mysteries, or interpret works of art. Logic seeks to clarify reasoning, to separate good reasoning from bad, and to analyze and appraise arguments. In this course, students approach logic from both formal and informal perspectives. Students study the principles of correct reasoning, construct proofs, and develop the skills that are required to apply these principles in everyday life. During the term, students work to solve many "brain teaser" type problems and answer practice questions from the Law School Admission Test. Issues of proof, meaning, and semantics that are found in introductory college-level philosophy and logic courses are also considered. Open to fifth and sixth formers, and fourth formers with permission of the instructor.

VISUAL MATHEMATICS

Spring term; 1 course credit
MA417

Mathematical concepts are embedded in many art forms—whether they were intended by the artist or as a result of what was aesthetically pleasing to the eye. This course offers students the opportunity to explore these connections from a mathematical perspective. Topics from geometry, such as constructions, proofs, the Golden Ratio, similarity, and polygons are explored. From analytic geometry and algebra, students work with transformations, compositions, vectors, matrices, fractals, and the Fibonacci sequence. Three dimensional constructs, including polyhedra, Platonic and Archimedean solids are included. Students complete art projects in relation to each topic throughout the term. Creations will include mandalas, friezes, and tessellations, as well as three-dimensional and computer-generated pieces. Open to students who have completed Geometry.

STRATEGIC DECISIONMAKING

Fall, spring terms; 1 course credit
MA418

This case study-driven course examines leadership, strategy and negotiation techniques responsible for successful boardroom turnarounds and perilous Mt. Everest summit failures. Simulating a practical environment, student teams apply a problem-based learning system to research and present conclusions throughout the term. Another course component exposes students to basic financial statement analysis and an introduction to industry recognized corporate valuation techniques. As the course concludes, teams apply these skills through an exploration of the energy markets, specifically targeting alternative and renewable energy companies. Specific case studies may vary across sections. Open to students who have completed Algebra II.

Note: This course earns one quantitative credit.

ISLAMIC CIVILIZATIONS OF THE MIDDLE EAST, HONORS

Spring term; 1 course credit
MD458HO

Mecca, Damascus, Baghdad, Isfahan, and Constantinople have all served as capitals for some of the most significant Islamic civilizations of the Middle East. From the rise of Islam through the fall of the Ottoman Empire, this course examines the values, traditions, and development of several Middle Eastern Islamic cultures and empires. Through the use of primary sources and visual materials, students explore the development of Middle Eastern Islamic religious thought, socio-political institutions, and cultural expressions such as art, literature, and architecture. Particular emphasis is placed on understanding works of art in their historical and social contexts. By studying a variety of primary and secondary sources students gain an understanding of and appreciation for the complexity of many of the Islamic cultures and civilizations that have called the Middle East home. Open to fifth and sixth formers, and fourth formers with the permission of the department.

Note: This course is required for students in the HPRSS Arabic and Middle Eastern Studies Program.

THE GREENING OF AMERICA: THE ENVIRONMENTAL MOVEMENT, HONORS

Fall term; 1 course credit
MD521HO

The environmental movement in the United States has been motivated by a wide range of factors, including the natural beauty of the country, the destruction of some of that beauty, the work of naturalists, ethicists, theologians, historians and authors, catastrophic events that have captured the public's attention, and activists schooled and fueled by the sweeping changes in the 1960s. This multi-disciplinary course weaves together all of these perspectives as it traces the development of the environmental movement in the United States and the impact of key people and events on this movement and on the environment itself. The course draws from many disciplines as it examines historical, political, ethical, religious, economic and cultural aspects of the environmental movement. This course includes an experiential component that involves contact with the natural world at Choate and potentially beyond. Open to fifth and sixth formers, and fourth formers with the permission of the HPRSS department.

SEMINAR IN ART HISTORY, HONORS

Spring term; 1 course credit
MD625HO

This seminar considers the architecture of Choate Rosemary Hall and its historical antecedents from Italy, England, and America. Considerable study is devoted to Ralph Adams Cram's Seymour St. John Chapel and Archbold Hall, I.M. Pei's Paul Mellon Arts Center and Icahn Center for Science, and Pelli Clarke Pelli's Lanphier Center. Students acquire an understanding of the principles of these buildings, their place in the history of architecture, and their impact on teaching and learning at our school. From examining the architectural components of a structure to appreciating the structure's physical and emotional impact on its surroundings, students learn to how to analyze a building critically. Students are expected to play an active role in seminar discussions, to read scholarly material, to complete a creative assignment, and to lead class discussions from time to time. While no prior knowledge of art history is required, students should have a strong interest in the subject and excellent analytical skills. This course earns one visual arts credit. Open to sixth formers, and fifth formers with permission of the instructor.