Upper School Course Catalog

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Students may take as few as four or as many as six academic courses at any one time. In unusual circumstances, a student may petition the faculty to take more than six. Academic courses include English, history, math, science, modern language, computer science, and the arts. Re-enrolling students register for courses early in the spring term. After conferring with the advisor regarding recommended courses and graduation requirements, students take a preliminary schedule home for discussion with parents. Course offerings are sometimes based upon student needs brought to light by the registration process. Adjustments in teaching assignments are sometimes necessary, and the resulting information is compiled for the academic schedule by the registrar.

During the admission process, prospective students indicate their choice of modern language, and computer and arts classes. Those choices, along with transcript information and placement testing, enable the departments and registrar to forecast an academic program for each newly enrolled student.

Conflicts between courses do sometimes arise, and students are encouraged to participate in resolving the problem.

All students must complete minimum core requirements. In addition, they may choose elective courses. Students and their advisors plan as broad a program as possible, taking possible college requirements into consideration.
A diploma from Catlin Gabel indicates successful completion of four years of high school experience or its equivalent. For most students this means completion of a minimum of 18 academic credits. Departmental requirements may be waived upon petition. Students are expected to take a minimum of four academic courses at any time.

<table>
<thead>
<tr>
<th>Requirements for Graduation</th>
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<tbody>
<tr>
<td>Arts</td>
</tr>
<tr>
<td>Two years of coursework in music, theater, and/or the visual arts</td>
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<tr>
<td>Computer Science</td>
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<tr>
<td>Optional</td>
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<tr>
<td>English</td>
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<tr>
<td>Four years, including freshman, sophomore, and junior English and a year of senior electives</td>
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<tr>
<td>History</td>
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<tr>
<td>Three years, including Human Crossroads, The Modern World, and United States History</td>
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<tr>
<td>Math</td>
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<tr>
<td>Successful completion of Geometry and Algebra II</td>
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<tr>
<td>Modern Language</td>
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<tr>
<td>Three years of the same language beginning in ninth grade</td>
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<tr>
<td>PE and Health</td>
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<tr>
<td>Nine trimesters including Lifetime Fitness, Health 9 and Health 10 (does not count toward the overall 18-credit requirement)</td>
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<tr>
<td>Science</td>
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<tr>
<td>Three years, including Science I, Science II, and a year of electives (may include up to one semester of a Global Online Academy science offering)</td>
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* Please note: Oregon School Activities Association rules require students to be enrolled in, and passing, five academic courses to play interscholastic sports, both while they are participating and in the prior semester.
**Arts**

**Performing:**
- AM Choir (9, 10, 11, 12; Year)
- CG Players Troupe (Audition; Fall, Winter or Spring Trimesters)
- CG Theater Tech (9, 10, 11, 12; Year)
- Improvisational Theater (9, 10, 11, 12; Fall)
- Intro to Acting (9, 10, 11, 12; Fall)
- Jazz Band (Audition; Year)
- Music Commentary: Social Justice (9, 10, 11, 12; Spring)
- Improvisational Theater (9, 10, 11, 12; Fall)
- Chamber Music (9, 10, 11, 12; Year)
- Jazz Band (Audition; Year)
- Rock Band (Audition; Year)
- Scene Study (9, 10, 11, 12; Spring)
- Musical Theater Workshop (9, 10, 11, 12; Fall)
- Theater: Performance Intensive (9, 10, 11, 12; Spring)
- Theater Tech: Lighting (9, 10, 11, 12; Spring)
- Theater Tech: Makeup (9, 10, 11, 12; Spring)
- Theater Tech: Sound (9, 10, 11, 12; Fall)

**Visual:**
- Beginning Sewing (9, 10, 11, 12; Fall)
- The Canvas: Draw/Paint Intensive (9, 10, 11, 12; Spring)
- Ceramics (11, 12; Year)
- CGS Productions (11, 12; Year; Honors)
- CGS Storycorps (Prereq: Creative Writing, Intro to Acting, Media Arts or Consent of Instructor; Year)
- Drawing (9, 10, 11, 12; Fall)
- Fashion Design (10, 11, 12; Fall or Spring)
- Honors Portfolio (Prereq 2D or 3D arts course; Seniors in Fall, Juniors in Spring; Honors)
- Media Arts (9, 10, 11, 12; Year)
- Photography (9, 10, 11, 12; Fall or Spring)
- Printmaking (9, 10, 11, 12; Spring)
- Woodworking (9, 10, 11, 12; Year)

**Computer Science**
- Computer Science I: Programming (9, 10, 11, 12; Year)
- Honors Computer Science II: Data Structures (Prereq Intro to Comp Sci or Consent of Instructor; Honors; Year)
- Honors Computer Science III: Advanced Topics (Prereq Adv Computer Science or Consent of Instructor; Honors; Year)
- Honors Computer Science Independent Research (Consent of Instructor; Honors; Year)
- Teaching Assistant (CS I and Consent of Instructor)

**English**

**Required:**
- Freshman English (9; Year)
- Sophomore English (10; Year)
- Junior English (11; Year)
- Senior English (12; Fall, Spring; Honors)
- Creative Writing (10, 11, 12; Year; .5 Credit; Pass/Fail)
- Crime and Punishment (Palma Seminar; 9, 10, 11, 12; Year; Honors)
- Middle School Teaching Assistant (11, 12; Consent of Department, Year or Semester)

**History**

**Required:**
- Human Crossroads: Confronting Global Challenges through Time, Identity, and Place (Year)
- The Modern World (Prereq Human Crossroads; Year)
- United States History (Prereq Modern World; Year)

**Year Electives:**
- Crime and Punishment (Palma Seminar; 9, 10, 11, 12; Year; Honors)
- Leading Community Conversations (10, 11, 12; Year; Pass/Fail)
- Life Worth Living (12; Year; Pass/Fail)
- New Media Studies (10, 11, 12; Year; .5 Credit)
- Revolutionaries (Palma Seminar; 9, 10, 11, 12; Year; Honors)

**Mathematics**

**Required:**
- Foundations Algebra I / Geometry / Algebra II (Placement; Year)
- Algebra Ib (Prereq Algebra Ia; Year)
- Geometry (Prereq Algebra Ia; Year)
- Algebra II (Prereq Geometry; Year)
- Adv Algebra II (Consent of Teacher and Dept. Chair; Honors; Year)

**Intermediate Electives:**
- Functions, Statistics, and Trigonometry (Prereq Year 2 or Algebra II; Year)
- Statistics 1 (Prereq Year 2, Algebra II; Fall)
- Statistics 2 (Prereq Year 2, Algebra II; Spring)
- Teaching Assistants (Consent of Department, Year)

**Advanced Electives:**
- Precalculus (Prereq Year 2, Algebra II; Year)
- Advanced Precalculus (Consent of Teacher and Dept. Chair; Honors; Year)
- Honors Statistics (Prereq Adv Precalculus or Consent of Teacher and Dept. Chair; Year; Honors)
- Calculus (Prereq Precalculus; Year)
- Honors Calculus I (Prereq Adv Precalculus or Consent of Teacher and Dept. Chair; Year; Honors)
- Honors Calculus II (Prereq Honors Calculus I; Year; Honors)
- Advanced Mathematics Seminar (Prereq Honors Calculus I or Consent of Teacher and Dept. Chair; Year; Honors)
Modern Languages

Chinese I (Year)
Chinese II (Prereq Chinese I; Year)
Chinese III (Prereq Chinese II; Year)
Chinese IV (Prereq Chinese III; Year)
Chinese V (Prereq Chinese IV; Year; Honors)
Chinese VI (Prereq Chinese V; Year; Honors)

French I: Communication and Comprehension (Year)
French II: Interpersonal Communication (Prereq French I; Year)
French III: Interpretive Communication (Prereq French II; Year)
French IV: Conversation & Composition (Prereq French III; Year)
French V: Global Issues (Prereq French IV; Year; Honors)
French VI: Global Issues (Prereq French IV; Year; Honors)

Spanish I: Foundations (Year)
Spanish II: Communication A (Prereq Spanish I; Year)
Spanish III: Communication B (Prereq Spanish II; Year)
Spanish IV: Composition & Conversation (Prereq Spanish III; Year)
Honors Spanish: Seminar B (Prereq Spanish IV; Honors; Year)

Electives:
Beginning Tennis (After School; Fall)
Fitness by Design (After School; Winter)
Games / Fitness (During School; Fall, Winter, or Spring)
Nordic Walking (After School; Fall)
Outdoor Leadership and Adventure (After School; Fall)
POM / Dance (After School; Fall or Winter)
Rock Climbing (After School; Winter)
Yoga (After School; Spring)

Independent PE (Fall, Winter or Spring)
Interscholastic Sports (page 28)

Science

Required:
Science I (Year)
Accelerated Science I (Consent of Department; Year; Honors)
Science II (Prereq Science I; Year)
Accelerated Science II (Consent of Department; Year; Honors)

General Electives, Year:
Astronomy (Prereq Science II; Year)
Teaching Assistant (Consent of Department; Year or Semester)

General Electives, Semester:
Anatomy and Physiology (Prereq Science II; Spring)
The Chemistry and Microbiology of Food (Prereq Science II; Fall)
Ecology (Prereq Science II; Spring)

Advanced Electives:
Advanced Biology: Molecular, Cellular, and Biomedical Science (Consent of Instructor; Year; Honors)
Advanced Chemistry (Consent of Instructor; Year; Honors)
Advanced Physics (Consent of Instructor; Year; Honors)
Science Research (Consent of Instructor; Year; Honors)

Physical Education, Health, Outdoor Program, Athletics

Required:
Health 9 (9; Fall or Spring)
Health 10 (10; Year)
Lifetime Fitness (9; Year)

Electives:
Environmental Science (Prereq Science II; Spring)
Evolutionary Biology (Prereq Science II; Fall)
Experimental Chemistry (Prereq Science II; Fall or Spring)
Neurobiology (Prereq Science II; Spring)
Pathogens and Parasites (Prereq Science II; Fall)
Physics A: Mechanics (Prereq Science II; Fall)
Physics D: Modern Physics (Prereq Science II; Spring)
Physics E: Electrical Engineering (Prereq Science II; Fall)
Structural Design and Engineering (Prereq Science II; Spring)
Performing Arts

**AM Choir (7:25–7:55 a.m., Tue–Fri; Year)**

There is power in numbers. Historically the Chamber Choir was the crown gem of the Catlin Gabel Arts program. Under the leadership of former Choir director C. Glenn Burnett, the Choir recorded albums and toured internationally. In more recent years, Choir was scheduled during the regular school day, which resulted in scheduling conflicts due to everyone’s vastly different academic loads. Now we can return the Choir to its glory. Wake up your brains, hearts and lungs and join the Chamber Singers Tuesday–Fridays in the CAC from 7:25 to 7:55 a.m. Workload is minimal, which means you can do choir AND another arts elective!

**CG Players Troupe (After School; Fall, Winter, Spring)**

Based on a small-troupe model, this class will focus on the production of one of the year’s mainstage after-school offerings. Class will meet after school, and students who are enrolled (on an audition-only basis) will be guaranteed participation in that trimester’s play. Students can choose to focus on acting, directing, or dramaturgy, but will be involved in all aspects of rehearsal for the show. Auditions take place prior to the start of the trimester.

**CG Theater Tech (Year)**

This class will support all of the events happening in the Cabell and Black Box theaters throughout the entire school year by building sets and preparing all of the technical needs for each production. Students will have the opportunity to learn by doing in the areas of lighting, sound, costumes, props and sets. Interested students can participate in design for any of the Cabell Center productions that take place throughout the year. These students will support the technical needs for assemblies and special events in both theaters. This class will help to manage the theater and take care of its every need. No experience is necessary. Students will learn by doing. No matter your level of experience, there is room for you to advance and develop your expertise. If you enjoy working with your hands, problem solving and becoming part of a team, then this is the class for you.

**Chamber Music (Year)**

Students in chamber music will be able to take part in an instrumental setting, participating in various combinations of chamber ensembles. (For example, string quartet,
piano quintet, saxophone choir, etc.) Repertoire will be chosen based on the combination of groups that can be made. Students will have input about repertoire and will be able to design a concert based on their interests. The class will prepare for performances that will take place on and off campus.

Improvisational Theater (Fall)

Students have the opportunity to explore the world of improvisational and non-traditional theater through ensemble-based work, theater games and improvisation, devising, and student created work. Open to both beginners and experienced performers.

Intro to Acting (Fall)

This course will provide an opportunity to explore theater performance in a low-stress environment while learning the basics of acting, script analysis, character creation, and performance skills. Students will work on developing partner and small group scenes, as well as learning ensemble building, attending theatrical performances, and honing their analytical skills.

Jazz Band (Year)

Intermediate and advanced instrumental students have the opportunity to study and perform jazz. Typical instrumentation includes trumpet, trombone, clarinet, saxophone, electric or string bass, guitar, piano, and drums. Auditions take place in June.

Music Commentary: Social Justice (Spring)

Throughout history, music and art were used as a means of making a statement or commenting on a political matter. This class will explore the music side. From Mozart’s “The Marriage of Figaro,” to Beyonce’s “Formation,” students will explore what the composer/singer/songwriter’s intent and purpose for creating a piece of music in response to various political climates.

Musical Theater Workshop (Fall)

In musical theater workshop, students will produce scenes from the realm of musical theater. It will culminate in a performance of the scenes which were rehearsed throughout the semester. Students will take on the role of director, music director, choreographer, costumer, makeup artist, actor, etc. Because of this, students will have a strong hand in selecting the scenes to be performed. This is an opportunity for students to be a part of a production from various angles, not working solely on the stage or behind the scenes.

Rock Band (Year)

A companion to the Upper School Jazz Band, this course invites guitarists, horn, keyboard, and percussionists to ROCK. Auditions take place in June.

Scene Study (Spring)

Students will build on their theatrical foundations by delving into scene study and text analysis. This course will combine in depth play analysis with practical application of acting theories and techniques ranging from Stanislavski to Meisner. Texts will draw from across the theatrical canon. Open to all students.

Theater: Performance Intensive (Spring)

This elective will focus on a specialized element/style of theater performance that is TBA. Drawing on the unique experience and expertise of next year’s theater teacher, this course will provide a special opportunity for students to learn new styles and performance techniques and round out their skill sets. More information on this new opportunity will be forthcoming very soon!

Theater Tech: Lighting (Spring)

This class will focus on both design and technical skills involved in working as a lighting designer for theater, film and dance. Students will learn about the equipment, explore the various control consoles, learn how to set up and program intelligent lighting fixtures and create a variety of designs for photography, film and theater. Interested students may design the lighting of our musical production or the student One-Acts as part of their class work.

Theater Tech: Makeup Design (Spring)

This class will focus on theatrical makeup design. We will create a variety of designs over the semester including
fantasy, old-age, animal, and classic beauty designs from the 1920s through modern day. If there is interest we can expand the class to include mask making and hair/wig design. This is a great class for you if you enjoy exploring with color, form and reinvention. Interested students will have the opportunity to design makeup and hair for the US Musical Production or the US One Act Plays.

Theater Tech: Sound (Fall)

This class will focus on both design and technical skills needed for a sound designer. We will cover reinforcement systems as well as design for theatrical and music venues. We will learn about the equipment involved, programming with various sound consoles and will use a variety of computer software programs for creating audio designs. No experience is necessary. Students will have the opportunity to design for the US Drama production.

Visual Arts

Beginning Sewing (Fall)

This is a great class for students interested in learning how to make things with fabric and fiber. We will begin with several projects in hand sewing and craft construction. Students will choose and design projects of their own interest in order to develop their skills. We will move onto machine sewing – learning the basics of the equipment and exploring a variety of projects from clothing to crafts. Beginner and seasoned veteran alike will have plenty of opportunities to advance. If you like working with your hands, enjoy making things and like the opportunity to express your creative ideas in 3d form, then this is a great class for you. No experience is necessary.

The Canvas: Draw / Paint Intensive (Spring)

If you like drawing and painting, you’ll love this course. Students will learn how to work with a variety of drawing and painting media including water-based oils, acrylic, inks, charcoal, and more. Emphasis will be placed on producing large-scale works.

Ceramics (Year)

Students work with clay and glazes in both functional and sculptural projects. They acquire the basic skills required to throw simple forms on the potter’s wheel and work with slabs and coils to construct hand-built forms. Many specific projects are assigned, but time will always be available for students to work on projects of their own design. This course is open to Juniors and Seniors.

CGS Productions (Year; Honors)

Students will work collaboratively as a production company, rotating through roles of writer, director, editor, director of photography and sound engineer. Open to Juniors and Seniors or by Consent of Instructor.

CGS Storycorps (Year)

Students will produce videos, audio podcasts, illustrated animations of stories. We will also learn how to tell strong oral stories that can be translated to film, video, and augmented by sound. Prerequisite: Creative Writing, Media Arts, Improv, or Consent of Instructor.

Drawing (Fall)

Students will explore a wide variety of “drawing” materials and processes. We will challenge a number of preconceptions and expectations of what a “drawing” can be. You will explore mark-making in 2-D, 3-D and Mixed Media. So you may begin your semester as someone experienced creating pencil drawings on paper, but then you may start using ball point pen on wood, acrylic paint on a discarded coffee table, stringing wire across a public space to divide it up, or making a self-portrait with a sewing machine.

Fashion Design (Fall or Spring)

Chris Mateer and visiting artist Bobby Bonaparte (CGS alumni, Lift Label, Olderbrother) will lead this studio intensive focusing on the design and creation of unique pieces of clothing, accessories, sculptural objects, and / or wearable art. Processes to explore will include pattern and template design, sewing, alternative fabrication methods, utilizing non-traditional materials, various methods of dyeing, photography, screen printing & block printing, and drawing. In addition to making things, students will study the fundamental elements of graphic design and three-dimensional design, as well as learn about historical and contemporary fashion designers, artists, and how to identify and spark their own trending ideas and concepts. Throughout the course, Bobby will introduce the class to his professional networks, artists community, and share his personal experiences and insights into the fashion field. The course will culminate with a group fashion show and/or installation. Open to Sophomores, Juniors and Seniors.

Honors Portfolio (Seniors: Fall, Juniors: Spring; Honors)

Honors Portfolio is a studio-intensive course where advanced students in fine arts (drawing, painting,
sculpture), design (fashion, industrial, and product design) and digital arts (photography, graphic arts, and multimedia/video art) can develop portfolios for college admission. Student artists are given creative prompts to work through based on trends in contemporary and historical artistic practice. Students develop a “Concentration” consisting of a series of pieces linked by materials, process, and/or thematic concept. In addition, artists collaborate and critique one another’s work and meet one on one with teachers for instruction in technique. This is a demanding course requiring a dedication to individual studio practice, in-depth inquiry, and a commitment to outside of assigned class meeting times. **Prerequisite: 2D or 3D arts class.**

**Media Arts (Year)**

Students will learn the fundamentals of video production including lighting, cinematography, sound recording, and editing. Although intended for the novice filmmaker, experienced students are welcome, and projects will be adapted to challenge their individual skill levels. Class time will be primarily devoted to projects that may include video poetry, music videos, public service announcements, short features, and documentary projects. Our emphasis will be on developing projects from concept (preproduction) through construction (production and postproduction) to culmination (screening).

**Photography: People (Fall)**

This offering may be taken in sequence with Photo: Places in the spring or independently. Students in this class will learn foundational skills in photography including how to operate a DSLR, supplemental lighting tools, and editing software to produce amazing images every time. Projects will range from portraiture to fashion to photojournalism. We’ll work in the studio and on the streets of Portland to build a portfolio of our best work.

**Photography: Places (Spring)**

This semester offering may be taken on its own or in sequence with the fall course Photo: Places. Students will learn foundational skills in photography including how to operate a DSLR, supplemental lighting tools, and editing software to produce amazing images every time. Projects will have students shooting still life, architecture, street art, landscape and action. We’ll work in the studio and on the streets of Portland to build a portfolio of our best work.

**Printmaking (Spring)**

Students will work in a number of different printmaking processes such as woodcuts, linocuts, etchings, lithographs, monoprints and digital prints. We will create individual works on paper (and other surfaces), edition a series of multiples, exchange prints with each other, work on some large scale collaborative pieces, and learn to make unique artist books.

**Woodworking (Year)**

Students will work on a variety of assigned and independent projects, using both hand and power tools. Examples of projects include bowls, plates, and lamps (lathe work), tables and chairs, jewelry, mask, tools, and sculpture. Some of the techniques we explore include lamination, steam bending, jig design and construction, and mechanical drawing. Interest, imagination, and perseverance are the essential ingredients needed for this course.
Computer Science

Computer Science I: Programming (Year)
This class focuses on designing and writing computer programs. No prior experience with computer programming is assumed. Students are taught to analyze a problem, describe a solution, and implement their solution in a computer-programming language. Currently, the class uses the Python programming language. Students use functions and classes to organize their programs. Programming projects include graphics (2D and 3D) in addition to data processing. Throughout the course, the emphasis is on the careful, elegant design of a computer program. Before taking the course, students are expected to be comfortable using a computer and to be familiar with variables from algebra. This course is open to all Upper School Students.

Honors Computer Science II: Data Structures (Year; Honors)
The advanced course is similar in content to a first-year college-level computer science course. The focus is on data structures and algorithms: how to organize and manipulate information using a computer. Students implement and analyze alternative methods for structuring data, including arrays, linked lists, and binary trees. A variety of alternative algorithms for searching and sorting data are covered, including binary search, hash tables, mergesort, and quicksort. Students are taught standard notation for categorizing the expected efficiency of an algorithm. Object-oriented programming is stressed, and students are responsible for writing programs with multiple well-designed classes. The programming language Java is taught and used for all assignments. Students have the option of taking the Advanced Placement Computer Science Exam in May. Prerequisite: Introduction to Computer Science or Consent of Instructor.

Honors Computer Science III: Advanced Topics (Year; Honors)
The Advanced Topics course exposes students to several of the subfields of computer science that a student would encounter as a college major in the field. Assignments are more open-ended and require a greater degree of initiative from the students. The topics covered vary somewhat from year to year, in response to student and teacher interest. Examples of typical topics include digital-logic circuits (including basic logic gates, designing combinatorial and sequential circuits, and basic computer architecture), three-dimensional computer graphics (including mathematical fundamentals, transformations, perspective, and rendering techniques), networking (TCP/IP concepts and socket programming), and artificial intelligence (philosophy, logic, search, heuristics, and neural networks). Student projects include designing and building a simple programmable computer on breadboards and implementing a 3D renderer without using a 3D library. Prerequisite: Advanced Computer Science or Consent of Instructor.

Honors Computer Science Independent Research (Year; Honors)
In this independent study, students develop year-long projects focusing on topics of interest. Prerequisite: Consent of Instructor.

Computer Science Teaching Assistant
Teaching assistants are vital contributors to our classes. TAs attend class each day, help students with practice problems and resolve homework difficulties, answer questions, and grade homework. In addition, they run review and extra-help sessions. As the year progresses, TAs plan and teach full lessons. Prerequisite: CSI and Consent of Instructor.
Freshman English

Freshman English focuses on writing as a process and on reading culturally diverse works that center on the journey as a defining experience in the creation of personal identity. Students concentrate on the process of developing their essays through such stages as pre-writing, outlining, first and second drafts, peer reviews, and metacritical essays. Students are introduced to elements of style while also learning how to structure arguable persuasive essays, compelling narratives, and imaginative poems. They acquire the fundamental patterns of critical thinking and the vocabulary necessary for written and spoken analysis of literary texts. Other skills important to a student’s Upper School career, such as class participation, note-taking, recitations, and presentations, reinforce the school values of collaboration and community. The literature of the course includes Homer’s *The Odyssey*, Shakespeare’s *Romeo and Juliet*, and Lan Samantha Chang’s *Hunger*, as well as selected poems and short stories reflecting diverse voices and points of view.

Sophomore English

Sophomore English is a genre survey course designed to examine questions of personal and cultural identity, to develop analytical and persuasive skills, and to impart the vocabulary necessary for literary analysis. The fall begins with a unit entitled “Postcolonial Literature: The Empire Writes Back,” a study of the work of writers from the former British Empire. Students examine poems by Achebe, Walcott, Yeats, and Wright; Ngugi’s novel, *A Grain of Wheat*; and Fugard’s play, “Master Harold”… and the boys. In the winter, students continue their exploration of identity and culture—including issues of race and “othering”—with Shakespeare’s *Othello*. The second semester begins with a formal consideration of lyric poetry, with students focusing on “fixed \ forms” such as the villanelle and the sestina, as well as on “shaping forms” such as the ode and the elegy. Students also write a paper and teach a lesson on a Romantic or Victorian poem. “Whan that Aprill with his shoures soote” arrives, students examine *The Canterbury Tales*, and again return to the topics of identity and culture through a consideration of class, occupation, and religion. They end the semester with a study of the essay. Over the year, students write essays that include literary analyses and creative narratives, generated through a collaborative process that includes multiple drafting, peer editing, and metacritical reflection. Participants give two formal presentations based on their writing. Students memorize and recite the School Chapter, the opening lines of *The Canterbury Tales*, and two lyric poems. Class traditions include The Winter’s Tale, Chaucer Day, and the sophomores’ epistolary project.

Junior English

Junior English offers an opportunity to study some of the key texts of American literature from the colonial to the contemporary period, with a special focus on the periods of the American Renaissance, the late nineteenth century, and Modernism, and a consistent interrogation of the ways in which categories of gender, race, and social class have inflected the question of what it means to be an American. Readings include selections from Benjamin Franklin, Ralph Waldo Emerson, Henry David Thoreau, Walt Whitman, Emily Dickinson, Mark Twain, Charles Chesnutt, Charlotte Perkins Gilman, F. Scott Fitzgerald, Ernest Hemingway, William Faulkner, Allen Ginsberg, Toni Morrison, and Junot Diaz. The course continues development of students’ analytical abilities by drawing on and extending the interpretive skills developed in English 9 and 10, and also seeks to increase students’ reading speed in anticipation of the demands of college humanities courses. Writing assignments continue the development of narrative and analytical skills, and include a personal narrative designed to serve as a first draft for the college application essay. Over the course of the year, students continue to develop their presentational abilities; by the end of the year, they are responsible for planning and teaching the majority of class sessions.

Senior English

Seniors must successfully complete one English class during each semester. Students often lead the seminar-style senior electives. Fall courses include research papers; in the spring courses, public collaborative projects are required. **Offerings in senior English are slightly different each year, with new course listings released each May.**

Electives

Creative Writing (Year)

The creative-writing elective is open to students who want to develop their individual voices and hone their skills as writers of poetry and prose by participating as members of a writers’ workshop. We will craft a mix of genre explorations that will allow us to read and experiment in
lyric poetry, short prose fiction, and the brief personal essay. Reading is light, and each student is responsible for submitting either one draft or one revision each week for collection in two term-long portfolios. During each convivial workshop, students discuss examples from the world’s great writers and study the work of members of the class. This class will meet twice per rotation for the entire year; upon completion, students will receive a half-credit graded Pass / No Pass. **This course does not meet our English requirements.**

**Crime and Punishment (Palma Seminar; Honors; Year)**

Justice, we believe, resides at the intersection of law and order, and in the swift, even-handed, and transparent response to crime with punishment. Western society prides itself on the establishment and preeminence of the rule of law, celebrating the triumph of reason and civilization over the so-called rule of the jungle. And yet, the halls of justice bear their share of inconsistency and unfairness, and the constructed notions of innocence and guilt permeate our culture(s) in manifold complex ways. This interdisciplinary, full-year seminar will explore crime and punishment from a number of different angles, including the Judeo-Christian origins of our legal system, a review of the specific criminal and legal mechanisms in the USA, philosophical and critical responses to innocence and guilt, the psychology of violent crime, forensic science, literary perspectives (featuring Dostoevsky and Kafka), and contemporary cases, with special attention paid to Ferguson and the case against Adnan Syed (as featured in the Serial podcast). Experiential learning opportunities are a critical part of this course, so students should be prepared for occasional obligations outside of school hours. **This course is open to all Upper School students. Students will receive a half-credit in History and a half-credit in English for the year. The English credit may count toward a spring-semester Senior English elective.**

**Middle School Teaching Assistants**

Assist our eighth grade English teacher Holly Walsh in the classroom. Build your communication, facilitation, presentation, and mentoring skills for your future career. Those interested in this exciting opportunity will set up an interview with Holly during which she will explain her expectations and the rubric for assessment. Decisions will be made before Memorial Day. **This offering is open to Juniors and Seniors and may be requested for the Year or Semester. This course does not meet our English requirements.**
Human Crossroads: Confronting Global Challenges through Time, Identity, and Place

Human Crossroads asks students to respond to some of the world’s greatest challenges using an interdisciplinary approach that draws from the intersection of geography, history, anthropology, and sociology. The curriculum is composed of units dedicated to central thematic questions ranging from the meaning of human identity to the value of borders, the possibility of religious pluralism, and vexing problems of global inequities. Each unit starts by asking, “What is where, why there, why care?” using maps. Course material and projects include current events, academic texts, online resources, and data visualizations. Students learn to read actively, analyze maps, interpret data, write thesis-driven essays, and synthesize information, with according skill-based assessments. This class is not only intended to develop academic skills, but to foster curiosity, self-reflection, global citizenship, and a renewed commitment to the pursuit of truth, love, and justice in the world.

The Modern World

First, the good news: many people alive today are better off than all other humans who have preceded them. That may not surprise you. But, the bad news will: many others alive today are actually worse off than their predecessors. That includes medieval serfs, African tribesmen, and even prehistoric cavemen! How can this be? The modern world, loosely defined as the last two centuries of human life, has witnessed some of the most dramatic transformations in our history. Yet, those transformations have often functioned as a double-edged sword, bringing great reward to some and devastation to others. Why did these changes occur in the first place? Why did certain countries and people benefit while others suffered? And what does this say about the world we live in now, and where we’re headed in the future? This course endeavors to answer those questions through a wide-ranging study of the last 200+ years, from the Industrial Revolution through to the present.

United States History

While chronological, this course focuses on several themes that have reverberated throughout the American experience. The central theme is the epochal tug-of-war between Jefferson’s credo of equality and its paradoxical partners: conquest, slavery, and racism amidst a diversity of historic proportions; gender discrimination; and the class inequalities generated within a dynamic economy. Accordingly, we will pay significant attention to the history of movements that challenge the dominant meaning of equality, such as labor unions, suffragists, and the multitude of civil rights movements across time. The nation’s history is also traced through the tensions between a deep-rooted fear of centralized power and the drive for an efficient and powerful federal government. Lastly, significant time is given to U.S. involvement in global affairs, with a particular stress on presidential decision-making, and its impact both abroad and at home. While classic political issues are at the core of the course, there are times—such as the era between Reconstruction and World War I—when the magnitude of cultural and economic changes are at the heart of an era. We will use a very wide range of primary and college-level secondary sources.

Year Electives

Crime and Punishment (Palma Seminar; Honors)

Justice, we believe, resides at the intersection of law and order, and in the swift, even-handed, and transparent response to crime with punishment. Western society prides itself on the establishment and preeminence of the rule of law, celebrating the triumph of reason and civilization over the so-called rule of the jungle. And yet, the halls of justice bear their share of inconsistency and unfairness, and the constructed notions of innocence and guilt permeate our culture(s) in manifold complex ways. This interdisciplinary, full-year seminar will explore crime and punishment from a number of different angles, including the Judeo-Christian origins of our legal system, a review of the specific criminal and legal mechanisms in the USA, philosophical and critical responses to innocence and guilt, the psychology of violent crime, forensic science, literary perspectives (featuring Dostoevsky and Kafka), and contemporary cases, with special attention paid to Ferguson and the case against Adnan Syed (as featured in the Serial podcast). Experiential learning opportunities are a critical part of this course, so students should be prepared for occasional obligations outside of school hours. This course is open to all Upper School students, and it will count for a half-credit in History and a half-credit in English for the year.

Leading Community Conversations for Justice

In this course, students from Catlin Gabel School and De La Salle North Catholic High School will come together
to lead positive change in our communities. Students will develop research, planning, and project management skills as we create events that engage our communities in social and environmental issues selected by the students. We may explore content related to environmental justice, racial prejudice, gentrification, climate change, homelessness, affordable housing, mass incarceration, educational equity, and political representation.

Students will examine their own worldview, positionality, and leadership style, in order to determine how each informs collaboration, discourse, and problem solving in a community of diverse leaders. This is a student-led course, created with the goal of providing authentic opportunities to have students lead community conversations about the most pressing justice-related issues, while building a stronger relationship between our schools.

You will be expected to miss one lunch period a cycle to attend class together at The CENTER where we will learn, teach and lead together, while building authentic relationships across school borders. **This course is open to Sophomores, Juniors and Seniors.**

**Life Worth Living**

What does it mean for a life to be “lived well?” What shape would a “life worth living” take? Institutions of education were founded on principles of preparing young people for life, yet in a culture built around success, achievement, and consumption, it is easy to lose track of these ideals. This course, adapted from a Yale University seminar in collaboration with the Yale faculty, will allow us to consider how we can reconcile working toward ambitious goals and living a meaningful life. We will explore the above questions by reading fundamental religious, historical, economic, science, and philosophical texts, and examine the place of money, power, and sex in a good life. The course will also feature visits from Portland-area religious, social, and political leaders whose lives are shaped by the traditions in question.

As we read great works and meet these individuals we’ll ask: What does it mean for a person to lead his or her life well? What reasons and/or motivations do different thinkers offer for a vision of a life worth living? How do our peers, the Catlin Gabel environment, and society as a whole define what it means to live a meaningful life? How can each of us lead a meaningful life in high school, college, and beyond?

This is a full-year seminar course that will meet twice per cycle. The class will be pass-fail; preparation and participation in group discussions and completion of three major assessments will be required. **The class is open to all Seniors** and will be co-taught by Aline, Dan, and Tim, who will work closely with the Yale Center for Faith & Culture.

**New Media Studies**

This collaborative yearlong, half-credit, course combines study of print media history, news in the digital age, and core journalistic skills while allowing students to practice writing for an audience as the *CatlinSpeak* staff. *CatlinSpeak* is an award-winning online news magazine and print newspaper that is designed, written, and published by students in grades ten through twelve. The first six weeks focus on learning the fundamentals of journalistic writing, understanding the historical arc of journalism, and becoming comfortable with online tools such as Twitter and Wordpress, which are used by news sites around the world. Students gain applied skills such as layout, blogging, vlogging, and news tweeting as well as the crafting of story budget lines, leads, op-eds, blurbs, features, photo essays, and graphics. The staff members work as a team to produce daily written and video content for the website and quarterly print editions. In addition, students research, discuss, and write about current events from around school to around the world.

**Revolutionaries (Palma Seminar; Honors)**

What makes a person, an idea, or an event revolutionary? History’s first great “revolutionary,” Copernicus, coined the term in a quite literal manner, by proving that the earth revolved around the sun. Over time, the term extended to our more common association, focusing on individuals armed with weapons and provocative ideas. However, revolutionaries cut across all places, times, and fields, profoundly transforming our understanding of the world through their work in everything from art to mathematics, from political science to astrophysics. This interdisciplinary, full-year seminar will examine, problematize, and critique revolutions and revolutionaries, exploring questions like: what makes for a successful revolutionary, what allows for a revolution to be genuinely transformative, and what are the common qualities of revolutions across different fields and disciplines? **This course is open to all Upper School students.**
Semester Electives

Economics (Fall; Honors)

What are the smartest economic choices to make for your financial future? How can we create and measure economic growth? What is the value of a dollar? What is the value of an ocean? Why did the housing market collapse in 2007, and what is the best way to respond to this problem? To what extent can economic models help us predict the future? This course introduces students to the economic tools and reasoning required to address these—and many other—sophisticated questions, and to help inform student choices as consumers, workers, and citizens. In addition, this course is focused on redefining and framing economic ideas, issues and models for a new generation – Generation Z – a generation that will inherit and create a new economic world. Both national and international contexts will be engaged through economic models, books and journalism to examine economic issues now and in the future. This course is open to Juniors and Seniors.

Election 2016: The American Presidency (Fall; Honors)

In this semester-long course, we will explore the institution of the American presidency, both throughout history and in its current form. We will ask: who is the American president? How is the American president picked and who really does the picking? And what are the president’s powers and where do these powers come from? To answer these questions, our sources will range from blogs, twitter feeds and pundits, to the Constitution and core voices in American political philosophy. We’ll track developments of the 2016 election in real time while also informing our thinking from a historical perspective, following the evolution of the elections process and the institution of the presidency throughout its nearly 230-year history. Course assessment will involve analytical writing, group project-based work and public speaking. Students will finish the class with a stronger understanding of the unique role of the American president, the complexities of the American electoral system and ideally, having shaped their own views of what they seek in executive branch leadership. This course is open to Seniors.

Globalization: Debates & Controversies (Fall; Honors)

Catlin’s course on Globalization is truly globalized. Students in this elective will have the opportunity to discuss and debate the issues that define their generation—technological change, climate change, mass migration and political instability—with students in other nations. Such interaction is key because controversies, such as how to care for the warming, polluted, over-fished oceans, cannot be solved locally. The key to finding solutions begins with study and dialogue.

First, we will learn about the processes of outsourcing and offshoring, thinking about how they affect lives everywhere. Does allowing goods and services to flow globally create more opportunity for all? Or is it a new form of colonialism forcing poorer nations to fall back on exporting their natural resources and brightest citizens?

We will address issue of climate change at length, a vexing global issue that demonstrates the intimate interplay between nations, peoples, institutions, and cultures. But rather than simply decrying the situation, we will sustain our focus, looking at solutions. What are Catlin Gabel, Portland, the State of Oregon, the USA, and the “global community” doing to stem climate change, what’s working and how can we push policy in the right direction? Students will meet with local leaders and discuss the best way forward with students abroad as well. What are other countries doing? How do peers overseas feel about this issue?

Most people agree that the free flow of ideas is a positive thing about our era. Most are happy that goods move around the world more easily, enriching our lives and our diets. But what of the movement of people? Is it a basic human right to move across national borders in pursuit of physical safety? What about economic opportunity? In Europe and the Middle East, this is a very real and powerful question. Over 1,000,000 migrants arrived in Europe in 2015 and thousands died trying. Must wealthy nations accept these refugees? Should people in countries like Germany, Hungary, or Sweden simply accept that their nations are going to have to fundamentally change as they absorb hundreds of thousands of new citizens?

Other topics of study will include the global spread of American culture. How do people abroad feel about the fact that their government-run television networks show The Simpsons and Madam Secretary every day? Does an open Internet mean more American dominance and is this a bad thing, especially in non-democratic nations?
Work in this semester-long elective will be group-based and experiential. We will focus on “learning by doing,” understanding the debates around global issues by taking part in them. **This course is open to Juniors and Seniors.**

**Modern Middle East (Spring; Honors)**

Where did ISIS come from? What tools do experts use to predict the fate of Syria? What hopes are there for improving Palestinian-Israeli relations? How is the world’s greatest refugee crisis (from Syria) transforming neighboring states? What the heck is going on with the price of gasoline? What happened to the bright lights of the Arab Spring, and how will the struggle for supremacy between Saudi Arabia and Iran play out, particularly in the shadow of U.S. efforts to challenge Iran’s nuclear policy? These and other questions will be engaged in this course, which starts in the late 19th century, with the spread of Western imperialism in the region, examines the rise of secular nationalism in the age of decolonization, and lands squarely in today’s cauldron of religious ferment, ethnic conflict, and revolutionary hopes for a better tomorrow. Student research and oral presentations will be the major form of assessment in the class, which will adapt to the events as they are unfolding. **This course is open to Seniors.**

**The Oregon Immigration Project (Spring; Honors)**

The Oregon Immigration Project (OIP) is a new class open to Juniors and Seniors. Its focus is immigration and immigrants in the greater-Portland area, especially Washington County where 1 in 6 residents is foreign-born. The course begins with readings from important works in immigration history, then drill down deeper into patterns of immigration to the West Coast specifically, moving on to recent trends in migration, in Oregon and also globally. We will focus especially on Spanish-speaking immigrants and recent arrivals served by groups such as the Immigrant and Refugee Community Organization. What are the opportunities and challenges ahead as Oregon diversifies in terms of politics, education, culture, and city life? How are refugees from Syria and other strife-torn nations welcomed to our community? The bulk of the OIP will be work on a project, documenting recent trends and events. This could be an oral history project, a website, a video for public viewing, or a community event. Students will decide on the form and shape of the project in conjunction with the instructor. We will meet with new immigrants, new Americans, immigrant aid organizations and government officials.

**Transitional Justice (Spring; Honors)**

How can a country, scarred by genocide, ever recover and regain a sense of normalcy? How can two rival factions, each guilty of committing horrible atrocities against the other, ever learn to live together in peace again? How can victims of torture rebuild their internal worlds while their external circumstances remain equally fractured? This course studies the field of transitional justice, through which countries and the international community endeavor to move from chaos to stability, to punish the guilty, to document the historical truth, and to help the victims heal. Subjects include the Holocaust and the experience of surviving German Jews after the war, apartheid-era South Africa and the Truth and Reconciliation Commission, and the Argentine military dictatorship and the struggle to find children kidnapped from the government’s victims. People interested in law, history, international relations, human rights, and current events will be interested in this class. **This course is open to Seniors.**
Mathematics

Required

Foundations for Algebra / Geometry / Algebra II (Year)
The Catlin Gabel Upper School Math Department believes in the integrity and value of the US Math Program and that all students can successfully learn the mathematics involved in our graduation requirement. At the same time, we believe each student is the unit of consideration and recognize that a small minority of students may require an alternative environment or approach to meet their learning needs. Therefore, we have created an alternative pathway for such students. Using a hybrid of teacher support and an intelligent tutoring system, students will move through the curriculum following an individualized plan. Students will meet one-on-one with the instructor to set personal goals and orally report on recent learning. While timeline and approach may differ from a traditional classroom environment, the topics are aligned to the traditional courses (Algebra I, Geometry, Algebra II). Placement is made by the math department after conversations with teachers, advisors, parents and students that meet qualifications.

Algebra Ib (Year)
Algebra Ib provides the opportunity for students to finish mastering fundamental algebraic topics and techniques including evaluation and simplification of algebraic expressions, solving and graphing linear equations, linear systems, operations with polynomials, radical and rational expressions, and factoring. New topics examined in Algebra Ib include exponential equations and functions, graphing and solving quadratic and rational equations, and an introduction to data analysis and descriptive statistics. Throughout the course, students will have opportunities to develop their problem-solving strategies and number sense by using multiple methods to understand abstract concepts, mathematically interpreting problems and selecting appropriate functions, and using graphical, numeric, and algebraic representations. Graphing technology (e.g., graphing calculators and Desmos) is also introduced to aid in problem solving.

Prerequisite: Algebra Ia, the equivalent, or placement.
Geometry (Year)

Geometry focuses on concepts of Euclidean Geometry with opportunities for students to apply and practice their Algebra I skills. Geometric topics examined include parallel and perpendicular lines, transformations, triangle congruence and similarity, quadrilaterals, right triangle trigonometry, circles, and area and volume. The dynamic geometry software GeoGebra is used to develop students’ inductive and deductive reasoning, to explore fundamental geometric and algebraic relationships, and to aid in geometric problem-solving. In addition, students will be expected to develop patience and resilience as they solve more lengthy Application Tasks and communicate their results through formal write-ups and oral presentations. This course will have an Advanced option that will cover all of the above topics, but with greater emphasis on problem solving, deductive proofs, and independence. Section teachers will determine which students have the option of receiving credit for Advanced Geometry. However, all students are welcome to challenge themselves at any time with the advanced problems. **Prerequisite: Algebra I, Algebra Ib, Foundations for Algebra, the equivalent, or placement.**

Algebra II (Year)

In Algebra II, students apply new elementary functions and algebraic techniques to model and solve problems that extend their work in Algebra and Geometry. Topics examined include transforming and modeling with linear functions, complex numbers, applications using polynomial, radical, exponential, and logarithmic functions, an introduction to rational functions, basic circular trigonometry and the sine and cosine functions, and an introduction to probability and data analysis. In addition, students continue to refine their problem-solving abilities by engaging with Application Tasks that require independently making mathematical conjectures about patterns and relationships using technology (e.g., graphing calculators, Desmos, and GeoGebra). They are expected to communicate their results through persuasive oral presentations and formal reports that integrate written prose, presentation of collected data using tables and graphical representations, and mathematical justification. **Prerequisite: Geometry, the equivalent, or placement.**

Advanced Algebra II (Year; Honors)

Advanced Algebra II will cover all of the topics of Algebra II at a greater level of depth (but not speed) and emphasis on problem solving, deductive proofs, and independence. Additional topics may be presented as time allows. **Prerequisite: Adv Geometry, the equivalent, by teacher recommendation, or placement; consent of the teacher and department chair.**

Intermediate Electives

Functions, Statistics, and Trigonometry (Year)

This year-long course provides instruction on functions, statistics, probability, and trigonometry for the general college preparatory student. Emphasis is placed on examining polynomial, exponential, logarithmic, and rational functions, and the development and use of the trigonometric functions on the unit circle (including the study of right and oblique triangle applications). FST also includes a component on the gathering and use of data to address real-world issues, statistical inference, and probability. **Prerequisite: Year 2, Algebra II, the equivalent, or placement.**

Statistics 1: Descriptive Statistics (Fall)

In Descriptive Statistics, students obtain the tools to assess the validity of data that they are confronted with in the media and their everyday lives. Students will learn how to describe and analyze professional data sets or data that they gather (e.g., through conducting censuses, surveys, and other experiments) and communicate the results of their analyses orally and through formal write-ups. Statistical topics examined include central tendency and variation, data displays (e.g., bar charts, histograms, box plots, line plots, scatter plots, time series graphs, and bubble charts), the normal model, and bivariate linear regression. Concepts and data analysis will be enhanced by technology including spreadsheets, plot.ly, and the dynamic data software Fathom. In addition, students are introduced to SAS, an industry standard software package for statistical practice, and learn basic SAS coding. Each fall, the learned statistical methods will be connected to a focused discipline or topic that will vary depending on current events and students’ backgrounds and interests. To take advantage of the mayoral and presidential elections, the topic for Fall 2016 will be The Science of Polling and Elections. **Prerequisite: Year 2, Algebra II, or the equivalent.**
Statistics 2: Inferential Statistics (Spring)

In Inferential Statistics, students learn to analyze variation in data by using confidence intervals and apply inferential statistical tests to professional data sets on, for example, economics, education, politics, weather, and other topics of their choosing. Statistical methods examined include hypothesis tests for regression, proportions, and means (including, if time allows, the one-way analysis of variance). Students will learn to code using the industry standard statistical package SAS and emphasis is placed on using SAS to analyze data, interpreting the statistical output, and communicating the results of analysis. Each spring, examples and readings will be focused on applying the learned statistical methods to a specific discipline or topic that will vary depending on current events and students’ backgrounds and interests. The topic for Spring 2017 will be The Science and Politics of Testing. Prerequisite: Year 2, Algebra II, or the equivalent. Statistics 1 is not required, but recommended.

Math Teaching Assistants (Year)

Teaching assistants are vital contributors to our classes. TAs attend class each day, help students with practice problems and resolve homework difficulties, answer questions, and grade homework. In addition, they run review and extra-help sessions. As the year progresses, TAs plan and teach full lessons. Prerequisite: Consent of Department.

Advanced Electives

Precalculus (Year)

Precalculus begins with a short review of the concepts of functions and their properties and is followed by a thorough study of circular and triangular trigonometry. Students study conic sections, logarithmic and exponential functions, the graphs of rational functions, the Binomial Theorem, arithmetic and geometric sequences and series, polar coordinates, 2-D vectors, polynomial graphs and functions, and parametric equations. Students will also have the opportunity to put together and use all of the graphical representations, technology, and resources that have learned in their core math classes. Prerequisite: Year 2, Algebra II, the equivalent, or placement.

Advanced Precalculus (Year; Honors)

Advanced Precalculus will cover all of the topics of Precalculus at a greater level of depth (but not speed). In addition, Advanced Precalculus includes 3-D vectors, DeMoivre’s Theorem, and mathematical induction. Prerequisite: Advanced Year 2, Advanced Algebra II, the equivalent, or Year 2 / Algebra II with teacher recommendation; consent of the teacher and the department chair.

Honors Statistics (Year; Honors)

Honors Statistics is a reading-intensive honors seminar in applied statistics. We begin by examining the topics of central tendency and variation, data displays, and probability. This leads to the study of the concepts of statistical models and use of samples, variation, statistical measures, sampling distributions, probability theory, tests of significance, one-way and factorial analysis of variance and covariance and elementary experimental design, multiple linear regression and correlational design, and chi-square. Students will be expected to critically analyze quantitative research, evaluate the evidence on which generalizations are made, and write quantitative methods papers by analyzing a professional data set on a topic of their choosing. In addition, students will learn to code using the industry standard statistical package SAS and emphasis is placed on using SAS to perform statistical analysis of multivariate and longitudinal data. In the past, additional topics including continuous random variables, moment-generating functions, the gamma distribution, multivariate analysis of variance, and hierarchical linear modeling have been introduced as time permits to accommodate student interests.

Note: To capitalize on opportunities to meaningfully engage in real-world research, during some years Honors Statistics is conducted as a research practicum where students take on the role of student-researchers and learn the above topics by immersing and participating in all aspects of a professional research study that culminates in professional conference presentations and co-authoring papers on the research in the spring. Experiential learning opportunities are a critical part of learning in this type of professional design practice setting and students enrolling during these years should be prepared for occasional obligations and travel during and outside of school hours. During the 2016-17 school year, Honors Statistics will be taught as a research practicum in Lifespan Developmental Psychology and students will be part of a research team examining reactivity to daily stressors and their effects on physical symptoms and psychological distress.

Prerequisite: Precalculus, Advanced Precalculus, or the equivalent; consent of the teacher and the department chair. Strong reading and writing skills. Year 2/Algebra II, or FST may be considered by petitioning the teacher and agreeing to summer work on summation notation and series.
Calculus (Year)

Calculus will introduce students to the basics of differential and integral calculus. Concepts of the derivative as a slope and the integral as area will be explored using real-world examples as well as from a numerical, algebraic, visual, and verbal perspective. Activities using technology (e.g., GeoGebra, Desmos, Graphing calculators, etc.) will be utilized to help students understand concepts. Introductory rules for finding derivatives and integrals will be mastered and applied.

Prerequisite: Precalculus, the equivalent, or placement.

Honors Calculus I (Year; Honors)

Honors Calculus I includes the study of limits, continuity, derivatives, integrals and their applications, slope fields, and differential equations. Concepts are approached through a four-step process: Graphically, numerically, analytically, and verbally. Graphical analysis plays a major part in the development of many concepts. Students are prepared to take the Advanced Placement Calculus AB exam in May.

Prerequisite: Advanced Precalculus, the equivalent, Precalculus with teacher recommendation, or placement; consent of the teacher and the department chair.

Honors Calculus II (Year; Honors)

Honors Calculus II is recommended for students with strong backgrounds in the problem-solving aspects of one-variable calculus and emphasizes the theoretical aspects of one-variable analysis. Students gain comfort in proving the key theorems and results from first year calculus, especially rigorous definitions of the various limiting processes, and understand the importance of seemingly inconsequential theorems and properties of the real numbers. In addition, students make connections between calculus and other disciplines through modeling with differential equations. Topics examined include limits and continuous mappings, the interval theorems, Darboux integrability, first order differential equations, improper integrals and the Cauchy Principal Value, techniques of integration, sequences and series, Taylor polynomials, and parametric curves and polar coordinates. Students are prepared to take the Advanced Placement Calculus BC exam in May.

In the past, additional topics such as the topology and construction of the real line, multivariable methods, and metric spaces have been introduced as time permits to accommodate student interests.

Prerequisite: Honors Calculus I, the equivalent, Calculus with teacher recommendation; consent of the teacher and the department chair.

Advanced Mathematics Seminar (Year; Honors)

Advanced Mathematics Seminar is an advanced course for motivated and curious mathematicians. Each year the course format and topics will vary depending on students’ backgrounds and interests. Students will work collaboratively and independently on a variety of challenging problems; some intended to integrate previously-studied material in new and deeper ways, while others will provide an introduction to new areas of mathematics. Students will be expected to read advanced mathematics texts and follow presentations oriented around theorems and their proofs. They also will be asked to do creative work in deriving mathematical results and presenting them in a rigorous fashion. For the study of some topics during the term, students will work toward a solution to a research problem creating a final report on the status of their research, which may be used as a starting point for future seminar students. The choice of topics will be determined by the Upper School math department in collaboration with the students taking the course. Therefore, the course may be repeated multiple years. Topics in the past have included differential equations, complex numbers, differential calculus, number theory, graph theory, and probability distributions.

Prerequisite: Honors Calculus I, Honors Calculus II, the equivalent, or Calculus with teacher recommendation; consent of the teacher and the department chair.
Modern Languages

Chinese

Chinese I

Chinese I is designed to introduce Mandarin Chinese to students who have no or very little background in the language. It is a basic introduction to Chinese language and culture. Students start to learn Chinese phonetic system (pin yin) and Chinese characters. It introduces basic vocabulary and basic linguistic skills including introduction, greetings, directions, who and how questions, time, locations, dates and numbers, what questions, and expressions.

Chinese II

Chinese II continues to develop the language skills learned in Chinese I. Students should be able to explain cause and effect, compare and contrast ideas and objects, and participate in simple discussions on a wide variety of topics including personal care and entertainment, clothes shopping, sports and recreation, and telephone queries.

Chinese III

Chinese III begins with a review of grammatical concepts and usage learned in Chinese II. The class will continue to learn grammar that will enable them to express their opinions, intentions, desires, and personal interests. They will learn about gifts and holidays, weather, travel, dining and meals. Chinese will be the official language of the classroom.

Chinese IV

Chinese IV reviews the grammatical concepts and structures learned in Chinese III and use those concepts as the building blocks for new and more complex constructions. Students continue to study characters and to develop more sophisticated reading and writing skills. Students read short stories and articles in Chinese adapted from authentic materials. Students practice conversational skills in a broad range of topics.

Chinese V (Honors)

In Chinese V, students learn more grammar and concepts that enable them to communicate accurately in various social and cultural contexts. New Chinese characters and vocabulary are continually introduced to increase skills to read authentic materials. Students also focus on reading short stories and paragraphs from novels and start to build translation skills. We will focus on increasing conversational skills, building vocabulary that is not covered in the textbook, and developing skills of exchanging one’s opinion and critical thoughts. Current issues from the newspaper and TV news are frequently discussed. Video or culturally authentic materials and literature will be employed as they tie in with the theme of each chapter.

Chinese VI (Honors)

This honor-level course polishes students’ speaking, reading, and writing skills as they explore Chinese literature, philosophy, and current events. Authentic Chinese materials are used: novels, magazine articles, television programs, and full-length movies. As students engage in literary discussion, debate, or simple daily conversation, and as they write creative and expository papers, they are encouraged to put aside their own cultural vision of life in order to interpret what they see or read from another culture’s set of values. They review and deepen their understanding of Chinese grammar to develop greater sophistication in oral and written expression.

French

French I: Communication and Comprehension

This course is designed for new students of French and for those with previous experience who are not sufficiently prepared for French II. Students acquire basic vocabulary and grammatical structures, including present, past, and future tenses. It gives students the ability to function adequately in French as they use oral and written expression, listening, reading, and interactive intensive speaking skills. The course is generally conducted in French, but grammar is often explained in English. Cultural awareness is introduced through different media: tapes, videos, slides, French website resources, short readings, periodicals, and native guest speakers. Students explore Paris and its neighborhoods, architecture, and
historical sites. Classes are student oriented. Students are often engaged in small group activities, short-guided conversations, and games.

**French II: Interpersonal Communication**

Building on the previous level, French II involves continued work on acquiring structures and vocabulary, as well as developing greater competence in speaking, listening, reading, and writing. Two objectives are kept in mind: a massive review and the development of basic vocabulary and grammar structures that will allow students to recount their lives in writing (through the creation of a book) and in speaking. During the second half of the year, students develop their reading skills and become fluent in reading and discussing “Le petit Nicolas.” They also explore the Francophone world through short films. In the process, students increase their cultural knowledge, through the lens of social justice, incorporating the concepts of global citizenship, conflict resolution, diversity, human rights, interdependence, sustainable development, values and perceptions, as these are an integral part of language learning and successful communication. Writing follows all French formats, with focus on knowing how, when, and why to say and write to whom. Students continue the study of grammar (review and new rules) and vocabulary (extensive new sophisticated vocabulary) with complex grammatical structures and all of the major verb tenses and moods, including the conditional and the subjunctive.

**French IV: Conversation & Composition**

Students read, discuss and analyze a wide variety of French and Francophone literary texts from the late 19th century to the present, including excerpts, short stories, poems, novels and a screenplay. The class also investigates the lives of the authors and the historical and cultural contexts in which the literature was produced. Students ask questions about the function of literature in society and offer varied and nuanced answers to these questions. In this course, students go beyond the fundamentals of language to study more complex structures and use more sophisticated language, which helps them develop increasing accuracy in written and oral expression as they narrate, describe and persuade in paragraph length discourse. Students improve their interpretation of written and audio-visual sources, participate in conversations, and work on oral and written presentations. World events are followed throughout the year on Francophone media, raising student awareness of French and Francophone perspectives on current events.

**French III: Interpretive Communication**

Communication, cultures, connections, comparisons, communities…. It is with this philosophy in mind that this course is taught. Oral and written communication is at the heart of this course, whether the communication in French is face-to-face, digital and visual, in writing or across centuries through the reading of literature (17th, 18th and 19th century) with Molière, Jean de la Fontaine and Voltaire. The objectives and content of French III aims to further develop the four communicative skills while introducing students to the concept of “La Francophonie” as represented in historical and contemporary literature and films. Active team based learning strategies involving research, reflection, and discussion emphasize that students are responsible for their own learning. Audio CDs, DVD, podcasts and online activities further encourage and promote independent support and autonomy. In the process, students increase their cultural knowledge, through the lens of social justice, incorporating the concepts of global citizenship, conflict resolution, diversity, human rights, interdependence, sustainable development, values and perceptions, as these are an integral part of language learning and successful communication. Writing follows all French formats, with focus on knowing how, when, and why to say and write to whom. Students continue the study of grammar (review and new rules) and vocabulary (extensive new sophisticated vocabulary) with complex grammatical structures and all of the major verb tenses and moods, including the conditional and the subjunctive.

**French V / VI: Global Issues and Culture (Honors)**

This course provides an examination of global issues through authentic French and Francophone sources. Students explore a range of topics, depending upon class interest, which may include personal and social identity, human rights and responsibilities, science and technology, economic development, education, health and the environment. Through exposure to multimedia sources, independent research, group projects, and dialogue with Francophone students in other parts of the world, students develop a large vocabulary and the ability to communicate about major issues of our time. Students learn to present information and ideas, to develop cogent arguments and hypotheses, and to participate in conversations in a collaborative way. Students produce creative writing, as well as analytic and persuasive essays, and discuss and debate the issues. Course materials
include journalistic articles, podcasts, official reports, websites, novels, film, television, advertising, comic strips, poems and songs related to our themes. The investigation of these topics through a French and Francophone lens allows students to broaden their understanding of world cultures and to grow as global citizens. French V and VI students work alongside one another, on tiered and open-ended assignments, creating many opportunities for peer mentoring.

Spanish

Spanish I: Foundations

In level one the oral, writing, reading, and cultural aspects of beginning Spanish are fundamental. Students are encouraged to engage in spontaneous and practical conversation using the present and near future tenses. At the same time, they learn to write simple, grammatically accurate phrases in an environment stressing cooperation, creativity, and familiarity with the culture. Students hear and employ a gradually increasing amount of Spanish in class. We incorporate the textbook Vistas I, as well as tapes, videos, games, and slides, and guest speakers are incorporated into the main curriculum.

Spanish II: Communication A

This course is designed to refine further students’ listening, speaking, writing, and study skills in a communicative classroom. Students will master and expand upon foundational skills by focusing on more detailed accuracy in their language acquisition, as well as decreasing their dependence on English thought and speech patterns. Increased emphasis will be placed on oral production and the ability to communicate in real-world situations on a vast range of topics. Class will be held primarily in Spanish.

Spanish III: Communication B

This course builds upon knowledge gained in Spanish I and Spanish II and emphasizes developing confidence in speaking through intensive conversation practice. Students will use Spanish as the principal means of communication during class. In addition to oral conversations, dialogues and oral presentations, students will be asked to write short compositions and present research on a variety of cultural topics. Students will be expected to expand their vocabulary range to include more sophisticated terms, use advanced idiomatic expressions, and manipulate multiple verb tenses including the pluperfect and the subjunctive mood. A variety of methodologies will be used, including the use of technology and multimedia, as well as incorporating authentic materials.

Spanish IV: Composition & Conversation

This course reviews complex grammatical structures, the acquisition of specialized vocabulary and idiomatic expressions, and the development of a sound oral and written abilities in all three modes of communication: interpretive, interpersonal, and presentational. This course is theme-based. In close relationship with those themes, many different kinds of texts will be studied, analyzed and interpreted on each unit, from informal writing/oral texts, to newspaper articles, music, commercials, literature, and film. Students will verbally engage in class discussions and debates—always in the target language— and will frequently write analytical responses, research papers and personal reflections about the topics presented in class. Descriptive, persuasive, expository, and narrative compositions will frequently be part of homework, and a peer review system will be in place to ensure a high quality production of texts in the target language. Classes are held fully in Spanish.

Honors Spanish: Seminar B (Honors)

This course focuses on a selection of contemporary Hispanic literature (short stories, poems, novels, plays) and movies that relate to the readings thematically. During the second semester, students will write an original Spanish play and eventually produce it on stage. Students are expected to participate in discussion and write comparative and analytical essays on the works studied. In addition, students will engage in a variety of speaking activities (oral presentations, debates), teach at least one class, learn a considerable amount of new vocabulary and idiomatic expressions, and discuss contemporary issues as they occur in the Hispanic world.
Required

Health 9 (Fall or Spring)

Health 9 is required semester-long course for freshmen that meets on alternating days with Foundations, Study Group, and Lifetime Fitness.

We will center our learning around three human body systems: the digestive system, the reproductive system, and the nervous system. We will study digestive system anatomy and physiology as a springboard for discussing nutrition. Using this knowledge, we will approach nutrition from a biochemical standpoint by discussing how the body processes the different types of macromolecules in the foods we eat. Next, we will root our knowledge about the reproductive system in anatomy and physiology. The course will provide comprehensive coverage of contraceptive methods and “safer sex” methods. We will learn about the health impacts of sexually transmitted infections (STIs) and how to prevent contracting or spreading STIs. We will also spend some time exploring identity – such as the differences among sex, gender, gender expression, and sexuality – and stressing the importance of consent. Lastly, we will discuss the effects that drugs (including alcohol) can have on the nervous system. Students will learn the basics of neuroscience and will discuss the impacts that various drugs can have on the body, with special emphasis placed on how certain drugs can affect the developing brain.

Health 10: Social Influences of Behavior (Year)

Health 10 is required for all sophomores. This course meets during the short class meetings of the Sophomore Health / PE block for the year. Students learn that mental and physical health are essential to their future happiness, are not automatic, and must be actively maintained. Information about substance abuse issues, dealing with emotions, stress management skills, and communication with family and friends is introduced.

Lifetime Fitness (Year)

All freshmen take Lifetime Fitness. This course provides an introduction to the components of physical fitness, including cardio-respiratory fitness, muscular strength, endurance, flexibility, balance, and agility. Each student maintains a personal exercise workout journal, tracks progress, assesses level of physical fitness, and sets personal goals.
**Electives**

**Beginning Tennis (Fall; After School)**

This course teaches students who are new to the game the fundamentals of tennis. Instruction will include the proper technique and key mechanical components to successfully hit forehands, backhands, serves, volleys, and overheads. Drills and team match play, rules, and etiquette are included.

**Fitness by Design (Winter; After School)**

In this after-school elective, work out in the weight room with a personalized workout regime or join a group instructor-led workout.

**Games / Fitness (Fall, Winter, or Spring; During School)**

This class will include a variety of activities depending on class size and weather. Some classes may include games such as disc golf, volleyball, tennis, and badminton. On other days, students might participate in strength training and endurance activities to improve fitness. Weight room activities will use a variety of equipment including kettle bells, medicine balls, dumbbells, TRX, and rowing machines with the goal of improving strength, flexibility, coordination, and balance.

**Nordic Walking (Fall; After School)**

Nordic Walking is fitness walking with specially designed Nordic Walking poles and offers a very efficient aerobic workout and easy way to improve your physical fitness. Nordic walking is one of the most effective cardiovascular workouts because it works all major muscle groups in the body. Nordic walking fully engages both large upper and lower body muscles, similar to cross-country skiing, and can achieve similar benefits.

**Outdoor Leadership and Adventure (Fall; After School)**

The program is a group-oriented effort to expose students to new skills and experiences associated with outdoor education. It is progressive and is designed so that individual sessions build on previous ones. Attendance at all events is important for success, for both the individual and the group. Activities include a ropes and challenge course, orienteering, GPS work, canoeing, rock climbing, Ultimate Frisbee, rappelling, ecology, hiking, route finding, and mountain biking. To meet a one-term PE requirement, a student must participate in 36 hours of OLA activities. There is one required weekend trip over the course of the term. A fee will be charged to student accounts.

**POM / Dance / Cheer (Fall or Winter; After School)**

This is a co-ed group that meets regularly to choreographed dances, learn cheers, and promote school spirit. If you have any interest in dance, screaming for our Eagles, or if you just love to perform, this group is for you.

**Rock Climbing (Winter; After School)**

Students learn the basics of climbing and belay techniques, equipment maintenance, climbing safety, and risk assessment. A fee will be charged to student accounts.

**Yoga (Spring; After School)**

Co-ed Yoga is an after-school elective for students wishing to learn the practice of yoga. No previous knowledge required. A fee will be charged to student accounts.

**Independent PE**

Independent PE credit is an option for students engaged in regular, coached athletics outside of school. Examples include club soccer, gymnastics, and dance. Students must apply to the PE department using the application found at www.catlin.edu. Students may apply for credit in the fall, winter, and/or spring trimesters, as well as over the summer. The activity must last 12 weeks for an average of at least four hours each week, totalling at least 50 hours. A coach or supervisor other than a parent or friend will be asked to confirm that requirements have been met. A student may only receive credit if the activity is not offered at Catlin Gabel during the term requested.
Seasonal Offerings

Physical Education elective offerings, the outdoor program, and our athletic program operate on a trimester schedule: The fall trimester starts the first day of school and goes through Thanksgiving break; winter trimester begins after Thanksgiving break and goes through spring break; finally, the spring trimester begins after spring break and ends on the last day of school. (Please note: Spring sports often begin practice before spring break.)

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Science

Science I & Science II

These courses are a two-year integrated sequence of biology, chemistry, and physics. We will explore the fundamental concepts of energy, chemical and physical properties of matter, electricity, chemical reactions, biochemistry, cell biology, physiology, evolution, and ecology. Current issues in science will be used to establish a sound foundation in science while highlighting the links between disciplines. In doing so, students will acquire skills in laboratory techniques, critical thinking, the scientific process, and the philosophy and theory of science. Students will learn to write lab reports, translate scientific inquiry into experimental design, and apply mathematical problem-solving to scientific analysis. In the process, students will become informed about current developments in science.

Accelerated Science I & Science II (Honors Level)

These courses cover all of the topics of Science I and II at an accelerated pace and a greater level of depth. Additional topics may be included. Prerequisite: Consent of the Instructor and the Department Chair.

General Electives, Year

Astronomy (Year)

This year-long course starts with the solar system, and how we know what we know about all the interestingly varied bodies that comprise it. Students will make their own measuring instruments to perform naked-eye astronomy, learning major constellations and how to locate planets along the way. Historical methods of astronomical scientific discovery will be discussed and used, leading to an appreciation of how our knowledge of the solar system has blossomed. The underlying physical principles governing the makeup and operation of the solar system will be investigated in activities, reading, and discussion. In the second semester, we will extend our study beyond the solar system and investigate the larger universe beyond our immediate neighborhood, using the recent advances in science and technology that have led to a rapid expansion of our understanding of the operation of the universe. Extensive use is made of audiovisual material in presenting the historical, scientific, and aesthetic aspects of the material covered. Prerequisite: Science II

Science Teaching Assistant (Year or Semester)

Teaching assistants are vital contributors to our Science I and Science II classes. TA's attend class each day and work directly with students. TA's help check daily homework, help students having difficulty with the material, set-up and take down labs, and assist in the lab. As the year progress TA's may be involved in planning and teaching the class. Prerequisite: Approval of Department. (Note: Students receive science credit, but this course does not count towards the three-year science requirement.)

General Electives, Semester

Prerequisite: Science II

Anatomy and Physiology (Spring)

In this course, students will study form and function across a wide range of plants and animals to understand how organisms maintain homeostasis. The class uses a comparative approach to investigate how organism structure relates to function, including highlights of specialized features in organisms adapted to unique conditions. Laboratory activities will include experimentation, dissection, and microscopy work.

The Chemistry and Microbiology of Food (Fall)

This semester-long course examines the biology and chemistry of food. We will look at foods and food systems in scientific terms and investigate how basic scientific principles explain the processing, preparing, and storage of foods for human consumption. Included will be the production of fermented foods, the chemistry of baking reactions and the properties of proteins that are important for food function. The course will also examine food safety and the risks posed by toxins to our food supply. Practical exercises will include bread-making and fermented food production.

Ecology (Spring)

Ecology is the scientific study of how living things interact with each other and with their environments. In this course, we will begin at the small scale by studying population ecology and learning the ways in which populations can grow (and be limited). Next, we will study how different
populations interact in a community. Finally, we will take the most “zoomed out” approach to address how large-scale ecosystems and biomes function. Along the way, we will discuss experimental and sampling techniques, properly analyze and present data, read primary and secondary scientific sources, and learn many of the native plant species on campus in order to perform a forest structure study.

**Environmental Science (Spring)**

This course will focus on educating students to become discerning and actively engaged citizens regarding a range of environmental dilemmas. Topics covered will include Environmental Justice, an in depth comparison of renewable and non-renewable energy sources and the future of energy, the chemistry of air and water pollution, and the conservation/preservation of selected natural ecosystems. Recommended (but not required) prerequisite: Ecology.

**Evolutionary Biology (Fall)**

This course focuses on the processes of evolution and the patterns generated by these processes. The aim is to develop a scientific way of thinking about biological diversity. How can we account for the extinction of (non-avian) dinosaurs and the existence of mites that crawl around our eyelashes? How did some insects come to look so much like sticks? We will seek explanations for such patterns of diversity and for the apparent “good fit” of organisms to their environment. Topics covered include the theory of evolution by natural selection (review of Science II), concepts of fitness and adaptation, the genetic basis of evolutionary change, modes of speciation, molecular evolution, principles of systematic biology, extinction, paleontology and macroevolutionary trends in evolution, and human evolution.

**Experimental Chemistry (Fall or Spring)**

This semester-long course investigates fundamental chemistry concepts through frequent experimentation. Topics covered include chemical bonding, reaction stoichiometry, solution chemistry and colligative properties, chemical equilibrium, acid-base chemistry, and oxidation and reduction. This course is a prerequisite for Advanced Chemistry. **Experimental and / or Organic Chemistry are recommended prior to enrollment in Advanced Biology.**

**Neurobiology (Spring)**

How does a single neuron work? How do collections of neurons cooperate with each other? How does an entire nervous system function to sense and interact within an environment? In this class, we will study the molecular and
cellular processes that underlie sensation and perception. Then, by exploring the basic structure and function of nervous systems across a wide range of organisms, we will find patterns in how an organism’s sensory and perception abilities are determined by specific features of its nervous system. Finally, we will examine complex behaviors as emergent properties of these neurobiological systems.

Pathogens and Parasites (Fall)

This course applies microbiology, cell biology, and immunology to study the transmission, diagnosis, treatment and prevention of disease. Students will become familiar with the workings of bacterial, fungal, viral, and other parasitic organisms. We will also address how organisms protect against disease, the progression of infection, and the immune system. We will then apply these scientific principles to the historical and social impact of disease epidemiology.

Physics A: Mechanics (Fall)

This semester-long course will investigate the physics of motion: how and why things move. Kinematics and Newton’s Laws of Motion (Dynamics) will be the main focus. Motion in one dimension will lead to projectiles moving in two dimensions and objects moving in circular motion. Energy transformations and conservation of momentum will also be studied. This study of mechanics will conclude with an investigation of simple machines. This course will include extensive hands-on lab work.

Physics D: Modern Physics (Spring)

This semester-long course investigates developments in physics during the last century. The photoelectric effect, particle-wave duality, the nature of the atom, quantum ideas, nuclear physics, and cosmology will be discussed. Where practical, labs will be done, but modern physics is mostly done on vast, expensive instruments, so audiovisual and Internet resources will also be used.

Physics E: Electrical Engineering (Fall)

In this one semester course we will learn about many types of electrical circuit components: capacitors, inductors, diodes, transistors, potentiometers, oscillators, and integrated circuits. We will investigate their use in both analog and digital circuits. We will use our new-found theoretical understanding to design, breadboard and construct actual circuits. Examples might include a crystal radio, burglar alarm, stop watch, and binary calculator. This course is oriented towards the practical application of electronics to electrical devices, and will provide lots of hands-on experience working with electronics components and electric circuits.
Structural Design & Engineering (Spring)

Why do buildings, sculptures, and objects stand up? What geometries lead to stability? How does material choice inform the structure and design process? How can we connect form with function? What factors do you need to consider in creating an effective and aesthetic design? This project-based course explores the basic principles of designing and building functional and beautiful structures, objects, and mechanisms. Main topics include statics (loads, force, and torque), material science, and the design process. Students will be presented with a series of challenges to design and build. Attention will be paid to structural stability, use of materials, cost-effectiveness, and beauty and elegance of design. The class will involve field trips around Portland and research into current and historical structural design. It will also involve drawing, sculpting, prototyping, calculating, and hands-on building.

Advanced Electives, Year

Advanced Biology: Molecular, Cellular, and Biomedical Science (Year; Honors)

This course begins with an in-depth study of molecular biology, emphasizing eukaryotic genetics and its manipulation. This leads into an in-depth study of human systems. Students engage in a term-long project in which they shadow a scientist in their field and delve into the topic based on their experience. Laboratory work includes genetic transformation of bacteria through plasmids, size exclusion and hydrophobic interaction chromatography, enzyme-linked immunosorbent assay, gel electrophoresis, and PCR. The second half of the year involves discussion of clinical cases, a number of animal organ dissections, field trips to the OHSU cadaver lab and/or the primate research center and hands-on experiences. Suggested (not required) prior coursework: Experimental or Organic Chemistry, biology electives. Prerequisite: Consent of Instructor.

Advanced Chemistry (Year; Honors)

This lab-intensive course provides an in-depth look at many chemical concepts introduced in previous courses, as well as explorations of new ideas. Topics will include molecular structures and bonding theories, properties of solutions, kinetics, thermodynamics, organic reactions, nuclear chemistry, and buffers and acid/base equilibria. Prerequisite: Experimental Chemistry and Consent of Instructor.

Advanced Physics (Year; Honors)

This course explores further topics in physics using methods of calculus and other specialized and advanced applications of mathematics (which will be presented in class). These topics include kinematics, rotation, equilibrium, gravitation, fluids, Gauss’ Law, electric potential, capacitance, induction, and Maxwell’s Equations. The year will wrap up with a consideration of the theory of special relativity. Co-Requisite: Enrollment in Calculus. Suggested (not required) prior coursework: Any of Physics A-D. Prerequisite: Consent of Instructor.

Science Research (Year; Honors)

The purpose of this class is to give students experience in designing and implementing their own independent research project. Through an extensive search of scientific literature, students develop their own novel research question to investigate over the course of the year. Next, they develop protocols to address the topic of study and collect data and analyze it. Analysis of the collected data may include such tools as graphs and statistical analysis, and then students will write a discussion summarizing the findings. Students will present their work in an oral seminar format at the Junior Academy of Science and in poster format at the Northwest Science Expo for feedback from scientists. (Students may take this course for credit more than once.) Prerequisite: Consent of Instructor.