

DON BOSCO TECHNICAL INSTITUTE

2026-2027 COURSE CATALOG



Last updated 9/30/2026

DON BOSCO TECHNICAL INSTITUTE COURSE CATALOG

ACADEMIC EDUCATION COURSES

A/B course number extensions designate first (A) or second (B) semesters.

These letters appear on transcripts only for summer term classes

(AP = Advanced Placement)

ENGLISH

EN101 A/B ENGLISH 1,2 (Composition and Literature)

(Full Year, College preparatory, UC-B, 5 high school units per semester)

Students taking this course will read literature from a variety of genres, including the novel, drama, and poetry. These readings will serve as a basis of discussion as well as written expression. The focus of composition in this course is the improvement of written communication skills with emphasis on sentence structure and paragraph development. An emphasis on identifying logical fallacies in rhetoric will also be taught. The student will learn to address formal essay prompts (MLA format), examination essays, and informal response statements.

EN101H A/B HONORS ENGLISH 1,2 (Honors Composition and Literature)

(Full Year, College preparatory, UC-B, DBTI Honors course, 5 high school units per semester)

English 101 Honors encompasses various literary genres (mythology, novels, plays, poems, short stories, and other media), and the development of a multi-paragraph essay. This class refines reading and reading comprehension skills. Furthermore, it molds grammar, punctuation, vocabulary, writing, speaking, PSAT, and critical thinking skills. Archetypes and mythology set the foundation for coursework, and for the next four years at Bosco Tech. Projects are an application & extension of themes found in the novels. By the end of English I: students should be thoroughly conversant in the identification and analysis of literary terms, literary elements, and the ability to write a multi-paragraph essay.

EN201 A/B ENGLISH 3,4 (Composition and Literature)

(Full Year, College preparatory, UC-B, 5 high school units per semester)

The major theme of study is growth and change in adolescent development. Through fiction and non-fiction readings, short stories, and essays about and by young people, students will discuss major factors that aid or hinder young people's growth into ~~young~~ adults. Students will, in turn, reflect upon and evaluate their own lives and growth processes. During the year, students will explore composition through short writings, timed writings, and processed essays. The final product will be the creation of an autobiography.

EN201H A/B HONORS ENGLISH 3,4 (Honors Composition and Literature)

(Full Year, College preparatory, UC-B, UC Honors course, 5 high school units per semester)

English 201 Honors continues the critical analysis of various literary genres and the composition of a multi-paragraph essay. ~~Thematic focus is on adolescent development.~~ The composition foci are thesis statements, concrete details, and insightful commentary. The opportunity to prepare for the following year's college applications comes through the study of memoir & the creation of an extended autobiographical essay. It further cultivates grammar, punctuation, vocabulary, writing, speaking, PSAT, and critical thinking skills. Students will strengthen their skills in identification & analysis of literary terms, writing multi-paragraph and autobiographical essays (in accordance with MLA formatting guidelines), and writing extemporaneously in timed situations.

EN301 A/B ENGLISH 5,6 (American Literature)

(Full Year, College preparatory, UC-B, 5 high school units per semester)

This course introduces students to American Literature, focusing on our literary tradition from early Colonial writing to contemporary texts. Students will engage the material, critically reading for archetypes, overarching themes, and parallels between the text and current issues in society, emphasizing analysis and interpretation within the many genres and movements of literature. Students will write open-ended, argument, and literary analysis essays to articulate their point(s) of view and contribute to the discussion on American Literature.

EN307 A/B AP LANGUAGE AND COMPOSITION

(Full Year, College preparatory, UC-B, UC Honors course, 5 high school units per semester)

AP Language and Composition is an introductory college-level composition course. Students cultivate their understanding of writing and rhetorical arguments through reading, analyzing, and writing texts as they explore topics like rhetorical situations, claims and evidence, reasoning and organization, and style.

EN408 A/B WRITING & RHETORIC

(Full Year, College preparatory, UC-B, 5 high school units per semester)

The purpose of Writing and Rhetoric is to improve and develop students' writing skills in various creative genres from thought process to final product. Students will write poems, short stories, memoir, and creative non-fiction (speeches such as introduction of self, demonstration speeches, and persuasive rhetorical speeches based on a current social or political issue), emulating the structures and styles of various authors and mentor texts. Students will perform finished pieces out loud, as well as perform out loud during the revision process to get feedback from peers, teacher, and guest artists. Students will additionally reflect on their growth and improvement as writers, and gain an understanding of the significance of writing to people's lives. This will help students have the skills needed to further any future opportunities they may have including professionally and within the community.

EN402 A/B ENGLISH 7,8 (British Literature)

(Full Year, College preparatory, UC-B, 5 high school units per semester)

The focus of this course is the preparation of students for college writing and reading. Students will be introduced to composition and research techniques, culminating in diverse writing prompts of argument, rhetoric, and persuasion. Students will also engage in the study of and the evaluation and analysis of British Literature, primarily in the form of discussion and writing. The course material will foster the student's appreciation and understanding of British Literature and familiarize the student with genres and movements within British literature, as well as historical events and people that impacted British literature.

EN407 A/B AP COMPOSITION AND LITERATURE

(Full Year, College preparatory, UC-B, UC Honors course, 5 high school units per semester)

The AP English Literature and Composition course focuses on reading, analyzing, and writing about imaginative literature (fiction, poetry, drama) from various periods. Students engage in close reading and critical analysis of imaginative literature to deepen their understanding of the ways writers use language to provide both meaning and pleasure. As they read, Students consider a work's structure, style, and themes, as well as its use of figurative language, imagery, and symbolism. Writing assignments include expository, analytical, and argumentative essays that require students to analyze and interpret literary works.

FINE ARTS

FA201 A/B VISUAL ARTS (Art Appreciation)

(Full Year, College preparatory, UC-F, 5 high school units per semester)

This course provides students with an introduction to the visual arts, including: an exploration of the nature, processes, and materials of art; a study of elements and principles of design through an examination of two and three-dimensional artworks; and a survey of the world's art—in cultural context—from the prehistoric to the

present. Students will have the opportunity to create and evaluate their own artworks based on an informed understanding of the aesthetics, design, and various styles of art. -- Beginning Level

FA202 A/B INTRODUCTION TO MUSIC (Music Appreciation)

(Full Year, College preparatory, UC-F, 5 high school units per semester)

This course provides students with an introduction to music through the study of music theory, musical styles, periods, and forms. With the instructor's assistance, students will select an instrument to study, and be given instruction in understanding, manipulating, and playing it proficiently. The student develops an understanding and appreciation of artistic expression and the ability to discuss and write with discrimination about the musical literature studied. Extra practices and performances are mandatory. -- Beginning Level

HE103 A/B MARCHING BAND

(5 high school units, this class may be used to meet the DBTI diploma requirements for physical education)

This course develops student's musical skills through appropriate techniques specific to a marching band, including: reading musical notation accurately, performing musical exercises and written music with good tone quality, and discriminating between various marching styles. Students are provided opportunities to develop the skills necessary to function as team members and discover methods for attaining ensemble success. Students will become public representatives of Don Bosco Technical Institute at school events, competitions and at various school and community activities. Extra practices and performances are mandatory. Advanced Level—Fall Semester

FA203 A/B JAZZ ENSEMBLE

(Full Year, College preparatory, UC-F, 5 high school units per semester)

This course addresses the fundamental concepts of Jazz performance and theory. Through focused study on traditional Jazz instruments, students will learn improvisational techniques, lead-sheet reading, arranging, articulation, and styles appropriate to the Jazz idiom. Students develop the ability to perform on an instrument with accurate skill and technique, analyze a musical work, and apply it to their playing, artistically express musical ideas, and develop understanding for the historical importance and function of Jazz in society. Extra practices and performances are mandatory. Advanced Level—Spring Semester

FA208 A/B SYMPHONIC BAND

(Full Year, College preparatory, UC-F, 5 high school units per semester)

This course provides exposure to classical concert literature and other musical forms. Through focused study on traditional wind instruments, students will analyze scores and apply proper technique, balance, tone, theory, structure, and timber specific to the art form. The students will develop the ability to perform, improve ensemble playing, understand historical relevance, develop critical thinking as it applies to the score, and discover methods for attaining ensemble success. Extra practices and performances are mandatory. Advanced Level—Spring Semester

WORLD LANGUAGES (LOTE)

FL102 A/B SPANISH I (1,2)

(Full Year, College preparatory, UC-E, 5 high school units per semester)

This course is a study of the fundamentals of the Spanish language with an emphasis on the ability to understand, speak, read and write elementary Spanish. Students are also provided with an introduction to the cultures of Spanish-speaking nations.

FL104 A/B BILINGUAL SPANISH I (1,2)

(Full Year, College preparatory, UC-E, 5 high school units per semester)

Conducted in Spanish, this course is designed to develop necessary skills in grammar, spelling, writing, vocabulary, and sentence structure. Students develop skills in oral communication and reading comprehension of Spanish, and are given an introduction to the different cultures of Spanish-speaking nations, and their literature.

FL105 A/B JAPANESE I (1,2)

(Full Year, College preparatory, UC-E, 5 high school units per semester)

This course provides students opportunities in which the basic skills of listening, speaking, reading and writing Japanese are practiced. Emphasis is placed on students attaining listening skills and oral language experiences to acquire essential Japanese language survival skills.

FL202 A/B SPANISH II (3,4)

(Full Year, College preparatory, UC-E, 5 high school units per semester)

This course is a review of basic Spanish. It advances the skills students were introduced to in Spanish I (1,2) with an emphasis on oral, reading and writing expression and a more detailed study of the cultures of Spanish-speaking peoples.

FL204 A/B BILINGUAL SPANISH II (3,4)

(Full Year, College preparatory, UC-E, 5 high school units per semester)

In this course, a continued emphasis is placed on the student's understanding of the parts of speech, punctuation, capitalization and proper usage of Spanish. The course includes further study of Spanish-American literature and the cultures of Spanish-speaking nations. This course also serves as a preparation for AP Spanish language exam if students decide to take it (with teacher recommendation).

FL205 A/B JAPANESE II (3,4)

(Full Year, College preparatory, UC-E, 5 high school units per semester)

This course builds on the previous learning of the Japanese language students gained in Japanese I (1, 2). It expands and advances the use of grammar and sentence structure so as to allow students to carry on conversations about basic topics in daily life. In addition, students will be further immersed in Japanese culture and society.

FL302 A/B SPANISH III (5,6)

(Full Year, College preparatory, UC-E, 5 high school units per semester)

This course is a review and advancement of skills students were introduced to in Spanish II (3,4) with an increased emphasis on oral, reading and writing expression. Further in-depth study of the cultures of Spanish-speaking people, and an introduction to selected Spanish writers are emphasized.

FL304 A/B AP SPANISH LANGUAGE AND CULTURE

(Full Year, College preparatory, UC-E, UC Honors course, 5 high school units per semester)

This course is a comprehensive review of the Spanish language as well as a preparation for the AP test. The course is designed as a college equivalency course for students, and the expected work level is paralleled to the skill of a third-year college-level student in composition and conversation. Students are required to take the AP exam in May.

FL305 A/B JAPANESE III (5,6)

(Full Year, College preparatory, UC-E, 5 high school units per semester)

This class builds on two-years of previous learning while it continues to develop communicative and cultural proficiency and literacy in Japanese language. It focuses on communication with three modes: interpretive, interpersonal, and presentational. Students learn to communicate by listening, speaking, reading, and writing, especially using authentic or semi-authentic materials. Through this course,

students acquire the ability to acquire knowledge of products, practices and perspectives of Japanese culture; they compare it with their own culture so that they have a wide point of view and appreciation of the other cultures and practices as well as their own. This course includes additional grammar, vocabulary, reading, composition and culture, integrated with the usage of technology.

The topics chosen in the Japanese 3 course revolve around the students' real world including shopping with comparison of items, sports games, folktales, directions, cooking, celebration of cultural events, and travel. The class uses authentic videos, materials, educational apps, internet sites and various hand-on activities to enhance students' learning.

FL401 A/B AP SPANISH LITERATURE AND CULTURE

(Full Year, College preparatory, UC-E, UC Honors course, 5 high school units per semester)

This course covers the equivalent of a college-level course in Spanish Literature and Culture. Students will focus on the reading, writing and understanding of the literature (poems, stories, novels, short stories, drama and other genres), and the cultures of the various Spanish-speaking societies that produced them. This course is a preparation for the AP Spanish Literature exam, which all students are required to take.

HEALTH AND PHYSICAL EDUCATION

HE110 A/B HEALTHY LIVING

(Full Year, College preparatory, 10 high school units)

Healthy Living is an integrated course of Health and Physical Education. This is a year-long course that will consist of the student partaking in physical activity, as well as attending classroom sessions for the health portion of the class. Students will learn proper stretching and cool-down techniques, as well as participating in competitive drills, weight lifting, and sports. The classroom portion will educate the students on such topics as introductory anatomy and physiology, self-esteem, stress, mental disorders, family relationships, food and nutrition, alcohol, drugs, tobacco, diseases, and sexual education.

HE103 A/B MARCHING BAND

(5 high school units, this class may be used to meet the DBTI diploma requirements for physical education)

This course develops student's musical skills through appropriate techniques specific to a marching band, including: reading musical notation accurately, performing musical exercises and written music with good tone quality, and discriminating between various marching styles. Students are provided opportunities to develop the skills necessary to function as team members and discover methods for attaining ensemble success. Students will become public representatives of Don Bosco Technical Institute at school events, competitions and at various school and community activities. Extra practices and performances are mandatory. Advanced Level—Fall Semester

MATHEMATICS

MA111 A/B INTEGRATED MATH I

(Full Year, College preparatory, UC-C, 5 high school units per semester)

Integrated Mathematics I A/B is a first year, college preparatory mathematics course that serves as both a graduation and California state requirement. The fundamental math skill sets, stemming from both Algebra and Geometry, are vital to success in both the short and long term. A study of expressions, equations, and functions; solving and graphing linear equations, functions, and inequalities; writing linear equations; systems of linear equations and inequalities; exponents and exponential functions; radicals and geometry connections; rational

equations and functions; parallel and perpendicular lines; congruent triangles; quadrilaterals. This course will prepare students for Integrated Mathematics II A/B.

MA211 A/B INTEGRATED MATH II

(Full Year, College preparatory, UC-C, 5 high school units per semester)

Integrated Mathematics II is the second course of a three-course sequence including MA111, MA211, and MA311. Topics include study of quadratic expressions, functions, equations and relations; exponential and logarithmic functions and relations; concepts of formal proof, exploring the properties of two- and three-dimensional objects, working within the rectangular coordinate system to verify geometric relationships, and proving basic theorems about circles. Students also use the language of set theory to compute and interpret probabilities for compound events, and trigonometric basic tools for analyzing and measuring right triangles, acute and obtuse triangles, and complex shapes.

MA311 A/B INTEGRATED MATH III

(Full Year, College preparatory, UC-C, 5 high school units per semester)

Integrated Math III is the third course of a three-course sequence including MA111, MA211, and MA311. Topics include content standards from Algebra 1, Geometry, Algebra 2 and Statistics at an intermediate to advanced level including coordinate geometry, circles and other conic sections, binomial distributions, permutations and combinations, exponential and logarithmic functions, rates of change, derivatives, trigonometry and quadratics. Students will examine polynomial functions, exponents and logs, trigonometric functions (equations and applications), triangle trigonometry (laws of sine and cosine), trigonometric addition formulas, and solving trigonometric equations. Students will continue by examining analytic geometry, polar coordinates, geometric representation of complex numbers, powers of complex numbers, roots of complex numbers, vectors and determinants, sequences, series, limits and iterated functions, and introduction to calculus, including finding derivatives of curves, using derivatives in curve sketching, extreme value problems, and velocity and acceleration.

MA303 A/B PRECALCULUS 1,2

(Full Year, College preparatory, UC-C, 5 high school units per semester)

This exploration of functions is designed to better prepare students for college-level calculus and provide grounding for other advanced STEM courses and careers. Throughout this course, students study a wide variety of functions, including their algebraic manipulations, graphs, and applications. The topics covered in this course are polynomial and rational functions; exponential and logarithmic functions; trigonometric functions; analytic trigonometry; applications of trigonometry; linear systems and matrices; probability and counting techniques; analytic geometry; limits and an introduction to calculus.

MA401 A/B CALCULUS 1,2

(Full Year, College preparatory, UC-C, 5 high school units per semester)

Functions, graphs and limits; derivatives of algebraic, trigonometric, inverse trigonometric, exponential and logarithmic functions; applications of the derivative to include maxima and minima, points of inflection, concavity, related rates, the differential and linear approximation; integrals; properties of the definite integral; substitution method of integration; applications of integration to areas and solids of revolution; differential equations with separable variables, slope fields.

MA403 A/B STATISTICS 1,2

(Full Year, College preparatory, UC-C, 5 high school units per semester)

A study of how to collect, organize, analyze and interpret numerical information from data through the understanding of random samples; experimental design; organization of data such as frequency distributions and histograms; measures of central tendency; measures of variation; percentiles and box and whisker plots; scatter diagrams and linear correlation; linear regression and coefficient determination; elementary probability theory; binomial probability distribution; normal curves and sampling distributions; estimation of a population;

hypothesis testing; tests involving paired differences; inferences about the difference of two means and two proportions; inferences using the chi-square distribution; inferences relating to linear regression.

MA406 A/B AP CALCULUS AB

(Full Year, College preparatory, UC-C, UC Honors course, 5 high school units per semester)

AP Calculus AB is designed to be the equivalent of a first-semester college calculus course devoted to topics in differential and integral calculus. Starting with foundational materials such as functions, graphs and limits, the course then moves on to study derivatives of a wide variety of functions, including algebraic, trigonometric, inverse trigonometric, exponential and logarithmic functions. Derivatives are applied to finding maxima and minima, points of inflection, and concavity, as well as solving problems of optimization, related rates, and both differential and linear approximations. A wide variety of methods are taught for solving both integral, as well as their applications to areas and solids of revolution, differential equations with separable variables, and slope fields. The courses feature a multi-representational approach to calculus, with concepts, results, and problems expressed graphically, numerically, analytically, and verbally. Students are required to take the AP examination in May.

MA407 A/B AP CALCULUS BC

(Full Year, College preparatory, UC-C, UC Honors course, 5 units per semester)

AP Calculus BC is designed to be equivalent to both first and second-semester college calculus courses. AP Calculus BC applies the content and skills learned in AP Calculus AB to parametrically defined curves, polar curves, and vector-valued functions; develops additional integration techniques and applications; and introduces the topics of sequences and series. Exploring connections among these representations builds an understanding of how calculus applies limits to develop important ideas, definitions, formulas, and theorems. Students are required to take the AP examination in May.

MA408 A/B AP STATISTICS

(Full Year, College preparatory, UC-C, UC Honors course, 5 high school units per semester)

The AP Statistics course is equivalent to a one-semester, introductory, non-calculus-based college course in statistics. The course introduces students to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. There are four themes in the AP Statistics course: exploring data, sampling and experimentation, anticipating patterns, and statistical inference. Students use technology, investigations, problem solving, and writing as they build conceptual understanding.

SCIENCE

SC203 A/B BIOLOGY 1,2

(Full Year, College preparatory, UC-D, 5 high school units per semester)

This college preparatory course is designed to introduce students to the fundamentals of biology including cell biology, genetics, molecular biology, evolution, and ecology. Students focus on understanding and applying the material and on grasping big picture concepts. Emphasis is placed on cultivating critical thinking, problem-solving skills, and effective study habits throughout the course, in order to reinforce students' abilities to grasp complex concepts and to retain and apply knowledge. By the end of this course, students have a foundation which they can develop as they continue their science education.

SC203H A/B HONORS BIOLOGY 1,2

(Full Year, College preparatory, UC-D, UC Honors course, 5 high school units per semester)

This honors-level college preparatory course is designed to introduce students to the fundamentals of biology including cell biology, genetics, molecular biology, evolution, and ecology. Students should focus on understanding and applying the material and on grasping big picture concepts. Emphasis is placed on cultivating critical thinking, problem-solving skills, and effective study habits throughout the course, in order to reinforce

students' abilities to grasp complex concepts and to retain and apply knowledge. By the end of this course, students will have the proper foundation which they can develop as they continue their science education. The lectures in this course delve deeper into subject matter compared to the standard SC203 class, and students will engage in class activities, complete assignments, and undergo assessments that embody a heightened level of rigor consistent with the expectations of an honors-level class.

SC205 A/B PHYSICAL SCIENCE FOR ENGINEERING

(Full Year, College preparatory, UC-D, 5 high school units per semester)

This college-preparatory course introduces students to the fundamentals of physics and chemistry, preparing them for upper-division science and technology courses. In the chemistry units, students learn about atomic and molecular structures, the periodic table, chemical bonding, and the principles of conservation of mass and energy. Topics in physics include Newtonian mechanics and the conservation of energy and momentum, the fundamentals of thermodynamics, and heat transfer.

SC210 A/B AP BIOLOGY

(Full Year, College preparatory, UC-D, UC Honors course, 5 high school units per semester)

AP Biology is an introductory college-level biology course equivalent to a two-semester introductory biology course for biology majors. Students cultivate their understanding of biology through inquiry-based investigations as they explore evolution, cellular processes, energy and communication, genetic information transfer, ecology, and biological interactions. The course is organized into eight comprehensive units: chemistry of life, cell structure and function, cellular energetics, cell communication and the cell cycle, heredity, gene expression and regulation, natural selection, and ecology. Instruction is structured around big ideas, enduring understandings, and science practices that emphasize data analysis, modeling, experimental design, and scientific reasoning. Students develop an appreciation for biology as a unified science while learning to apply core principles across diverse biological systems. In contrast to a traditional high school biology course, AP Biology entails heightened rigor and expectations and emphasizes college-level academic skills, analytical thinking, and written scientific communication. A summer assignment must be completed prior to the start of the fall semester. Students are required to take the College Board AP Biology examination in the spring semester.

SC301 A/B GENERAL CHEMISTRY 1,2

(Full Year, College preparatory, UC-D, 5 high school units per semester)

This college-preparatory year-long course is designed to give students a basic but well-rounded understanding of the structure and properties of matter. The first topic covered is atomic structure, including the history of its discovery, atomic models, electron configurations, and the periodic table of elements. Other topics include metric measurements and conversions, determination of density, states of matter, chemical formulas and equations, classifying chemical reactions and predicting their products, energy from reactions, stoichiometry, bonding, and the Gas Laws. Because of the integration of many labs throughout the course, safety and use of equipment are emphasized. Labs are performed regularly, written up in a formal manner.

SC301H A/B HONORS CHEMISTRY 1,2

(Full Year, College preparatory, UC-D, UC honors course, 5 high school units per semester)

This course is offered primarily to sophomore students as a preparation for AP Chemistry in the junior year. The chemical concepts and principles of this course are presented in such a way that the students will have a basic understanding of the structure and properties of matter. Topics include: the scientific method and its applications, symbols & the metric system, matter, formulas, chemical equations, atomic structure, stoichiometry, thermo-chemistry, nuclear chemistry, gasses, solutions, bonding, acid-base theory, oxidation-reduction, pH, and equilibrium. Frequent laboratory experiments and science fair projects will emphasize laboratory report writing and safety.

SC302 A/B AP CHEMISTRY

(Full Year, College preparatory, UC-D, UC Honors course, 5 high school units per semester)

This in-depth, college preparatory course provides students an opportunity to gain an understanding of chemical phenomena and their application. Emphasis is placed on the major principles covered in the AP Chemistry exam. In addition to a major emphasis on problem solving, the scientific method is reinforced in weekly lab experiments which emphasize the scientific method as well as laboratory procedures and report writing. Students are required to take the AP exam in May.

SC401 A/B PRINCIPLES OF PHYSICS 1,2

(Full Year, College preparatory, UC-D, 5 high school units per semester)

In this college-preparatory course, students gain an understanding of physical phenomena and their applications. Emphasis is placed on the major principles of physics, including motion, forces, momentum, mechanical energy, and waves. In addition to extensive algebraic problem solving, the scientific method is reinforced through lab experiments that apply scientific methods, laboratory techniques, and report writing.

SC403 A/B AP PHYSICS C – MECHANICS

(Full Year, College preparatory, UC-D, UC Honors course, 5 high school units per semester)

AP Physics C: Mechanics is a calculus-based, introductory, college-level physics course. Students cultivate their understanding of physics by developing and applying models of physical phenomena through inquiry-based investigations. Throughout the course, students strengthen their ability to analyze and solve problems as they study kinematics; forces and translational dynamics; work, energy, and power; linear momentum; torque and rotational dynamics; energy and momentum of rotating systems; and oscillations.

SC404 A/B ANATOMY AND PHYSIOLOGY

(Full Year, College preparatory, UC-G, 5 high school units per semester)

Anatomy & Physiology is a sophomore year course in BMET and a senior year science course option which covers both the anatomy (structures) and the physiology (functions) of the human body. Students first review chemistry, biology, and histology. This course then covers all eleven organ systems of the human body focusing on the main function of the system, its main organs, and its role in homeostasis. Various pathologies, drugs, or alcohol are covered as they relate to a particular system. As time permits we will also look objectively and factually into current healthcare issues. Labs are performed on a regular basis and include dissections.

SOCIAL SCIENCES

SO101 A/B WORLD HISTORY 1,2

(Full Year, College preparatory, UC-A, 5 high school units per semester)

This course will focus on the history of the world from the Enlightenment to the present time. A brief review of history prior to the Renaissance and Reformation will serve as a prelude to the course. Major historical eras, events, individuals and movements will be studied within the context of the present to illustrate the contributions and influences of the past on today's society. The course will be holistic and interrelate different aspects of world history such as the political, social, economic, religious, artistic and cultural elements so as to determine their relationships to each other and to ourselves. Students study major turning points that shaped the modern world including the cause and course of the two world wars. They trace the rise of democratic ideas and develop an understanding of the historical roots of current world issues, especially as they pertain to international relations. They extrapolate from the American experience that democratic ideals are often achieved at a high price, remain vulnerable, and are not practiced everywhere in the world. Students develop an understanding of current world issues and relate them to their historical, geographic, political, economic, and cultural contexts. Students consider multiple accounts of events in order to understand international relations from a variety of perspectives.

SO101H A/B HONORS WORLD HISTORY 1,2

(Full Year, College preparatory, UC-A, DBTI Honors course, 5 high school units per semester)

While following the general outline of SO 101AB: World History 1, 2 described above, this honors section provides an additional layer of work by concentrating on a year-long theme developed from STEM related subjects. Students are provided additional readings, essay topics and projects to enhance their experience. Admission to the class is based on reading, composition and social studies grades in the 7th and 8th grades or by student petition.

SO301 A/B UNITED STATES HISTORY 1,2

(Full Year, College preparatory, UC-A, 5 high school units per semester)

This course is a survey of the major turning points in American history from the Civil War to the present with an emphasis on the twentieth century. Following a brief review of key events prior to the Civil War, students study the major eras and events of the late-nineteenth and twentieth centuries including the impact of the industrial revolution and the development of a corporate economy, the changes in the ethnic composition of the American population, the movement toward equal rights for racial minorities and women, and the development of the United States as a world power. Students will also trace the historical development of contemporary social problems and the various attempts to solve them.

SO302 A/B AP UNITED STATES HISTORY

(Full Year, College preparatory, UC-A, UC Honors course, 5 high school units per semester)

This course is designed to prepare students to take the AP Exam in United States History. The course will cover American history beginning with the Age of Exploration up until the present era. Some eras are studied in greater detail so as to correspond with the published curriculum for all AP United States History courses. The course is structured holistically and attempts to contextualize the different aspects of American history by studying them in juxtaposition to other historical eras. Students are trained to write essays that conform to the College Board rubrics. Students are required to take the AP exam in May.

SO401 U.S. GOVERNMENT

(Half Year, College preparatory, UC-A, 5 high school units)

Students in grade twelve pursue a deeper understanding of the institutions of American government. They compare systems of government in the world today and analyze the history and changing interpretations of the Constitution, the Bill of Rights, and the current state of the legislative, executive, and judiciary branches of government. An emphasis is placed on analyzing the relationship among federal, state, and local governments, with particular attention paid to important historical documents such as the Federalist Papers. These standards represent the culmination of civic literacy as students prepare to vote, participate in community activities, and assume the responsibilities of citizenship.

SO402 AP UNITED STATES GOVERNMENT AND POLITICS

(Half Year, College preparatory, UC-A, UC Honors course, 5 high school units)

This course is designed to give students an analytical perspective on government and politics in the United States. It includes both the study of general concepts used to interpret U.S. politics and the analysis of specific examples. The course focuses on the various institutions, groups, beliefs, and ideas that constitute U.S. politics. The class is taught at a level equivalent to that found in a typical introductory college-level course in American government and politics and prepares students to take the AP exam in United States Government and Politics. General topics include: The Background and Content of the Constitutional and Bill of Rights; The Relationships between the States and the Federal Government in a Federal System; The Political Beliefs and Behaviors of Americans; The Roles and Functions of Political Parties, Interest Groups, and the Mass Media in American Government and Politics; The Structure, Operations, and Role of the Institutions of National Government – the Congress, the Presidency, the Bureaucracy, and the Courts; The Formulation, Enactment, Implementation, and Interpretation of Public Policy; and, Civil Rights and Civil Liberties in America. Students are required to take the AP exam in May.

SO403 AP MACROECONOMICS

(Half Year, College preparatory, UC-G, UC Honors course, 5 high school units)

An analytical approach to economic principles with an emphasis on macroeconomic theory. Among the topics discussed are supply and demand, national income accounting, the income-expenditures approach to equilibrium, inflation, banking, the Federal Reserve System, business cycles, and international trade and finance. Students are required to take the AP exam in May.

SO404 PRINCIPLES OF ECONOMICS

(Half Year, College preparatory, UC-G, 5 high school units)

This introductory course stresses a non-analytical approach to economic principles with an emphasis equally divided on topics from microeconomics and macroeconomics. Topics include the theory of the firm; supply and demand; pure competition, oligopoly, and monopoly; national income accounting; inflation and deflation; banking and the Federal Reserve System; business cycles; and international trade.

SO410 A/B AP HUMAN GEOGRAPHY

(Full Year, College preparatory, UC-G, UC Honors course, 5 high school units per semester)

This course focuses on the patterns of human life on Earth. Topics include population and migration, as well as culture, language, religion, and ethnicity. Also, political geography, urban geography, and various aspects that make up economic geography will be covered. Students will learn the different ways geographers think in approaching topics in the world around us; be able to see and identifying global and local patterns of human action, distribution and diffusion; interpret various maps and spatial data and also display information in a variety of methods; make connections between various facets of human activity; define regions and evaluate the regionalization process; and characterize and analyze changing interconnections among places. Students who enroll in this course are required to take the AP exam.

RELIGION/THEOLOGY

THEO101 REVELATION (The Revelation Of Jesus Christ In Sacred Scripture)

(Half Year, College preparatory, UC-G, 5 high school units)

The purpose of this course is to give students a general knowledge and appreciation of the Sacred Scriptures. Through their study of the Bible, they will come to encounter the living Word of God, Jesus Christ. Students will learn about the Bible, authored by God through Inspiration, and its value to people throughout the world. If they have not been taught this earlier, they will learn how to read the Bible and will become familiar with the major sections and the books included in each section. The students will pay particular attention to the Gospels, where they may grow to know and love Jesus Christ more personally.

THEO102 JESUS CHRIST (Who Is Jesus Christ?)

(Half Year, College preparatory, UC-G, 5 high school units)

The purpose of this course is to introduce students to the mystery of Jesus Christ, the living Word of God, the Second Person of the Blessed Trinity. Students will understand that Jesus Christ is the ultimate Revelation from God. In learning about who he is, the students will also learn who he calls them to be.

THEO201 PASCHAL MYSTERY (The Mission Of Jesus Christ)

(Half Year, College preparatory, UC-G, 5 high school units)

The purpose of this course is to help students understand all that God has done for us through his Son, Jesus Christ. They will learn that from all eternity, God has planned for us to share eternal happiness with him, which is accomplished through the redemption Christ won for us. Students will learn that they share in this redemption only in and through Jesus Christ. They will also be introduced to what it means to be a disciple of Christ and what life as a disciple entails.

THEO202 THE CHURCH (Jesus Christ's Mission Continues Through The Church)

(Half Year, College preparatory, UC-G, 5 high school units)

The purpose of this course is to help the students understand that in and through the Church they encounter the living Jesus Christ. They will be introduced to the fact that the Church was founded by Christ through the Apostles and is sustained by him through the Holy Spirit. The students will come to know that the Church is the living Body of Christ today.

THEO301 SACRAMENTS (Sacraments As Privileged Encounters With Jesus Christ)

(Half Year, College preparatory, UC-G, 5 high school units)

The purpose of this course is to help students understand that they can encounter Christ today in a full and real way in and through the sacraments, and especially through the Eucharist. Students will examine each of the sacraments in detail so as to learn how they may encounter Christ throughout life.

THEO302 MORALITY (Life In Jesus Christ)

(Half Year, College preparatory, UC-G, 5 high school units)

The purpose of this course is to help students understand that it is only through Christ that they can fully live out God's plans for their lives. Students will learn the moral concepts and precepts that govern the lives of Christ's disciples.

THEO401 VOCATIONS (Responding To The Call Of Jesus Christ)

(Half Year, College preparatory, UC-G, 5 high school units)

The purpose of this course is to help students understand the common baptismal call to love God and serve others. Students will learn that it can be lived out in four unique ways: married life, single life, ordained life and consecrated life. They will learn how to apply the discernment process to their lives.

THEO402 SOCIAL JUSTICE (Living As A Disciple Of Jesus Christ In Society)

(Half Year, College preparatory, UC-G, 5 high school units)

The purpose of this course is to introduce students to the Church's social teaching. In this course, students are to learn how Christ's concern for others, especially the poor and needy, is present today in the Church's social teaching and mission.

TECHNOLOGY EDUCATION DEPARTMENTS & COURSES

FRESHMEN TECHNOLOGY ROTATION COURSES

(First semester of freshman year only)

ACE111 INTRODUCTION TO ARCHITECTURE & CONSTRUCTION ENGINEERING

(Six-weeks-long, 3 high school units)

This course is an overview of the Architecture & Construction Engineering (ACE) program. An introduction to architecture, construction and engineering processes with discussions of occupations within these industry sectors opens the course. Additional topics include basic measuring and layout methods, review of construction materials, use of basic hand tools, some modeling experiences in structural design, safety training in and the proper use of a limited number of power tools. The major project is the design and construction of a wood project that will show how engineering processes work.

BMET101 INTRODUCTION TO BIOLOGICAL, MEDICAL AND ENVIRONMENTAL TECHNOLOGY

(Six-weeks-long, 3 high school units)

This course is designed to introduce students to the fundamentals of the biological, medical, and environmental technological fields. Over the course of the rotation each main topic will be covered; biological/medical (cell cycle and cancer unit), environmental (plastic waste inventory project plus selected literature), as well as an intro to biotechnology (gel electrophoresis of candy dyes). As this is a college preparatory course, its rigors will reflect a shift towards a college level of work. Students should not simply memorize the material presented to them, but focus on understanding and applying the material. Students should concentrate on grasping the big picture rather than the minor details.

CSEE100 INTRODUCTION TO COMPUTER SCIENCE AND ELECTRICAL ENGINEERING

(Six-weeks-long, 3 high school units)

This course is an overview of the Computer Science & Electrical Engineering program for freshmen who are considering choosing CSEE as their technology major. Students gain an introductory level of knowledge as well as first-hand laboratory experience in both computers (including personal computer hardware and introductory programming) and electronics (including wiring, measuring instruments, analog/digital circuits, and soldering). In addition, students learn about various education and career paths associated with the computer science and electrical engineering disciplines.

IDEA100 INTRODUCTION TO INTEGRATED DESIGN, ENGINEERING & ART

(Six-weeks-long, 3 high school units)

This course introduces students to engineering design and manufacturing, the core of the Integrated Design, Engineering & Art (IDEA) pathway. Students design a personal ID tag in SolidWorks, the industry-standard 3D design software, and the tag is cut and engraved on the department's fiber laser. Each student then designs a hook under a strict weight limit, 3D prints it, and tests how much load it holds before breaking in a class competition. Working through a station-by-station production line, students measure, mill, saw, turn, drill, tap threads, and deburr a small hexagonal hub. That hub becomes the center of a spinning top that each team designs and builds for a head-to-head tournament. Throughout the rotation, students keep an engineering notebook and must be able to explain every design decision in their own words. If students earn a satisfactory grade, they will be given a letter of recommendation at the conclusion of the course.

MAT101 INTRODUCTION TO MEDIA ARTS & TECHNOLOGY

(Six-weeks-long, 3 high school units)

This course is an overview of the Media Arts & Technology program for freshmen who are considering choosing MAT as their technology major. Students gain an introductory level of knowledge as well as first-hand laboratory experience working with a selected group of computer production software (Adobe Photoshop, Illustrator, After

Effects, and Blender). Freshman projects include hands-on computer animation and programming a simple interactive computer game. In addition, students learn about various educational and career paths associated with the media arts field.

MSET100 INTRODUCTION TO MATERIALS SCIENCE, ENGINEERING AND TECHNOLOGY

(Six-weeks-long, 3 high school units)

This course introduces students to various aspects of these career and educational pathways which serve as the thematic core for the Materials Science, Engineering and Technology major. Students gain firsthand experiences along with an introductory level of knowledge (both in theory and laboratory) in: fundamentals of foundry, welding, mechanical and nondestructive testing, basic chemical analysis, basic microscopy, metallography, careers and related safety practices. During this course students are evaluated by the department faculty on their performance and aptitude. Students likewise are able to evaluate the technology as part of their overall rotation program experience which is designed to assist them in ultimately choosing a Technology major. Students who successfully meet all of the requirements of this course receive a "recommendation" as part of their evaluation and thus satisfy the technological qualification for this program of study.

ARCHITECTURE AND CONSTRUCTION ENGINEERING

ACE123 FOUNDATIONS OF RESIDENTIAL & COMMERCIAL CONSTRUCTION (BITA 1)

(Half Year, College preparatory, UC-G, 10 high school units)

Building Industry Technology Academy 1 (BITA 1) is the foundation course for a two-year high school construction program called Eco-Design. Green construction, also known as sustainable building, will be a central and ongoing theme throughout the two-year program curriculum. Participating students will learn how to design and build structures that are environmentally responsible and resource efficient. BITA 1 introduces students to the art of residential construction while laying the foundation for future careers in construction and architecture. Year one offers students the opportunity to gain basic construction skills in the use of hand tools, operation of machine tools, types of regular and green construction materials, construction and organizational operations, sub-flooring, framing, roofing, blueprint reading, surveying and construction-specific mathematics. During the introductory year, students will work in teams to build a tiny house. Students will begin and develop career portfolios, participate in field trip experiences and be exposed to networking opportunities. Core academic standards and skills are integrated into the construction curriculum, providing students the connection between course technical skills and academic classes. Colleges and universities recommend that students who are interested in careers in architecture engineering take the BITA pathway to prepare them for post-secondary related studies.

ACE231 ARCHITECTURAL DESIGN

(Half Year, College preparatory, UC-F, 10 high school units)

This is an introductory course where students learn the fundamentals of architectural design. This includes the nature of space, balance, hierarchy, form, volume, texture, rhythm, composition, and geometry in 2 and 3 dimensions. In addition students learn the history of architecture design, architectural styles and related careers. Students will increase awareness of building form, both residential and commercial, and understand the relationship of the built environment with the people that occupy the space. Using knowledge gained through personal experience, instruction, and research, students will develop conceptual plans for a 1,200 Sq. Ft. house of their own design, following a program provided by a mythical client. Student designs will be completed using mediums such as pencils and Photoshop. The use of Building Information Modeling (BIM) software will facilitate the development of working drawings for their original house design, including plans, elevations, sections and details that conform to architectural document standards.

ACE241 STUDY OF MODERN CRAFTSMANSHIP AND INFRASTRUCTURE (BITA 2)

(Half Year, College preparatory, UC-G, 10 high school units)

The Study of Ancient Civilization Infrastructure and Craftsmanship course is designed to gain an in-depth understanding of the history behind construction, materials, and trades in the industry. Students will use Primary Sources and become Construction Historians as they reconstruct the advancement of the trades, materials, and tools that are now being used in residential and commercial construction. The course covers a more advanced knowledge of safety, use of hand and power tools, blueprint reading, geometry, and estimating. Integrated throughout the course are foundation standards, which include communication, ethics, interpersonal/team skills, critical thinking and other employment skills needed for the 21st Century. Upon completion of this course, students will be able to perform the duties of an entry-level building construction technician with the knowledge of Construction Codes and general and trade-specific terminology.

ACE313 GREEN & ENERGY EFFICIENT ENGINEERING

(Half Year, College preparatory, UC-D, 10 high school units)

Introduction to Green Technology will prepare students for learning in the emerging engineering fields of green technology, environmental technology and renewable energy forms. The focus of the course is on physics and environmental science, which also includes a laboratory component. Students will analyze various energy forms, such as: thermodynamics, forces, kinetic energy, renewable energy and electromagnetism. Students will conduct hands-on experiments to help aid and increase content retention. Overall, the course is a project-based laboratory course in physics and environmental science that will help prepare students for careers in emerging fields of green technology, environmental science and renewable energy forms.

ACE323 BRIDGES AND STRUCTURES ENGINEERING

(Half Year, College preparatory, UC-D, 10 high school units)

This course teaches the evolution and history of bridge design, from ancient Roman arches to the modern cable-stay bridge, and steel reinforced concrete freeway overpasses. Students will build testing devices and samples of struts and girders to test for tensile and compressive strength as it relates to mass and application. Each student will design a bridge using engineering software that will calculate loads, stresses and forces applicable to their design. Students will use their design to build a scale model that will be entered in a design-build competition hosted by the Building Industry Association. The course concludes with an introduction to highway and transportation design and engineering.

ACE413 SENIOR PROJECT

(Half Year, College preparatory, UC-G, 10 high school units)

Students will explore the many different ways to present their new and unique ideas and designs using story boards, conceptual and scale models, and presentation drawings. The capstone projects require students to utilize the architectural theory, construction applications, engineering considerations and Revit CAD software abilities they have developed throughout the ACE program. Each student will prepare a theme park attraction storyline, story board and scale conceptual model. These story boards and models are critiqued by industry professionals. Another project will have students reimagining and designing an abandoned commercial property into something new and current to acknowledge gentrification of an inner-city up-and-coming area. The project will include architectural presentation drawings and scale model from those presentation drawings, following criteria provided by an inter-school design competition our school participates in. Requirements include: preparing floor plans, exterior elevations, cross-sections, 3-D renderings, a fully realized site plan with detailed landscaping, and includes interior design and architectural symbols, and adding sustainability and ADA information relevant to their design. The scale model will reflect the same details that are found on the plans, excluding interior details. Approved designs are entered into the annual Building Industry Association design competition.

ACE421 EMERGING CONSTRUCTION ADVANCES & CHANGES (BITA 4)

(Half Year, College preparatory, UC-G, 10 high school units)

Students move to a higher level of competency and are tasked to complete a service-learning project, capstone project, which can include an independent research paper on a question or problem of their choice with the guidance of a faculty mentor or participate in an internship. Some samples of previous projects include designing and building tiny houses for our veterans and homeless, playhouses which are donated to local children's non-profits, sheds for neighborhoods, doghouses for local rescue organizations, and special projects such as snack-shacks and benches for their campuses. While learning a trade, students are making our communities a better place to live.

BIOLOGICAL, MEDICAL AND ENVIRONMENTAL TECHNOLOGY

BMET103 PRINCIPLES OF BIOMEDICAL SCIENCE & BIOENGINEERING

(Half Year, College preparatory, UC-D, 10 high school units)

This course serves as an engaging introduction to the fascinating field of biotechnology, designed specifically for high school freshmen who have selected BMET as their technology focus here at Don Bosco. Students will explore the fundamental concepts and practical applications of biotechnology, including but not limited to laboratory experience with techniques of DNA analysis, bacterial transformation, and the polymerase chain reaction. Through this combination of theoretical knowledge and hands-on activities, students will gain a solid foundation in the key principles and techniques utilized in biotechnology. The course aims to foster curiosity, critical thinking, and scientific inquiry while emphasizing the ethical considerations and societal impact of biotechnological advancements.

BMET203 MEDICAL AND ENVIRONMENTAL INTERVENTIONS

(Full Year, College preparatory, UC-D, 5 high school units per semester)

Medical and Environmental Systems will be broken into two semesters. The first will cover the major systems of the human body that interrelate to maintain homeostasis. This sequence offers a comprehensive study of gross human anatomy with physiology at the cellular, histological, and organ system levels of organization. Dissection of preserved specimens is required. The second semester will focus on environmental systems as well as a culminating project examining and comparing organ systems of the various dissected organisms. We will look at different aspects within environmental systems including biogeochemical cycles, ecosystem services, and human population dynamics. This sequence will give you different survey and monitor techniques to use when working in the field. Medical and environmental interventions will be included toward the end of the first semester and will guide our learning in the second semester.

BMET301 BIOMEDICAL & ENVIRONMENTAL INNOVATIONS

(Half year, College preparatory, UC-G, 10 high school units)

In this capstone course, students apply their knowledge and skills to answer questions or solve problems related to the biomedical sciences. Students design innovative solutions for the health challenges of the 21st century as they work through progressively challenging open-ended problems, addressing topics such as clinical medicine, physiology, biomedical engineering, and public health. They have the opportunity to work on an independent project (see BMET303) and may work with a mentor or advisor from a university, hospital, physician's office, or industry. Throughout the course, students are expected to present their work to an adult audience that may include representatives from the local business and healthcare community.

Students will be asked to apply what they have learned in the previous BMET courses to solve unique problems in science, medicine, and healthcare. Students will work systematically through required problems before completing optional directed problems or independent work. Each problem is staged as a mission – a unique set of tasks the students must work through to achieve their desired objective. Students are presented with each problem in a Mission File – a document that includes a case brief, a list of completion tasks, links to available resources, as well as a reflection section. Working through the missions not only

exposes students to current issues in biomedical science, but it also provides skills-based instruction in research and experimentation – tools students will use to design innovative solutions to real-world problems. Students will use what they learn in these missions as they develop and implement their independent project at the end of the year (BMET303).

BMET303 ADVANCED METHODS IN BMET

(Half year, College preparatory, UC-D, 10 high school units)

The course is designed to allow students to create, design, and analyze their own individual research project. Students will be using science and engineering practices to research a topic of choice, formulate a question and hypothesis. Students will design research methods for their project. They will collect data and analyze results. Students will have a chance to discuss their results with the scientific community if they choose to enter their research project into a competition. If students do not choose to enter into a competition (LA County Science and Engineering Fair) results will be shared with the BMET community.

BMET401 ADVANCED MEDICAL BIOTECHNOLOGY A/B

(Full Year, College preparatory, UC-D, 5 high school units per semester)

Advanced Medical Biotechnology is a course that is intended for students who have completed the first 3 years of BMET scope and sequence. Students will gain additional knowledge in upper-level biochemistry, molecular biology, and laboratory techniques. The course will examine the tools and techniques of DNA and protein manipulation and analysis. Lessons will engage students in conducting laboratory experiments, collecting and analyzing real data, researching and communicating scientific information, and critically discussing the ethical and social issues surrounding the use of biotechnology in today's society.

BMET405 A/B AP ENVIRONMENTAL SCIENCE

(Full Year, College preparatory, UC-D, UC Honors course, 5 high school units per semester)

AP Environmental Science is designed to engage students with the scientific principles, concepts, and methodologies required to understand the interrelationships within the natural world. The course is equivalent to a one-semester introductory college course in environmental science. Students identify and analyze natural and human-made environmental problems, evaluate associated risks, and examine alternative solutions for preventing and resolving them. Environmental science is interdisciplinary, integrating topics from geology, biology, chemistry, geography, and environmental studies. The course is organized into nine comprehensive units: the living world (ecosystems), the living world (biodiversity), populations, Earth systems and resources, land and water use, energy resources and consumption, atmospheric pollution, aquatic and terrestrial pollution, and global change. Instruction is structured around big ideas, enduring understandings, and science practices emphasizing data analysis, modeling, and evidence-based reasoning. Students develop an appreciation for environmental systems while applying scientific principles to real-world environmental challenges. In contrast to a traditional high school science course, AP Environmental Science entails heightened rigor and expectations and emphasizes analytical thinking and college-level academic skills. Students are required to take the College Board AP Environmental Science examination in the spring semester.

COMPUTER SCIENCE AND ELECTRICAL ENGINEERING

CSEE113 INTRODUCTION TO ROBOTIC ENGINEERING

(Half Year, College preparatory, UC-D, 10 high school units)

This course serves as an introduction to robotics and artificial intelligence. The course presents several basic concepts of engineering (research, planning, prototyping, and testing) via the construction and programming of modern robotic kits. In this course, students will apply the programming and electronics skills that they previously learned in the "Introduction to Computer Science and Electrical Engineering" (CSEE100) course. This course utilizes the C++ programming language and the Arduino microcontroller.

CSEE221 A/B AP COMPUTER SCIENCE PRINCIPLES

(Full Year, College preparatory, UC-D, UC Honors course, 5 high school units per semester)

This yearlong course is roughly the equivalent of a one semester, college-level course in introductory computer science. The major areas of the course are organized around five main 'Ideas':

- Creative Development (CRD)
- Data (DAT)
- Algorithms and Programming (AAP)
- Computing Systems and Networks (CSN)
- Impact of Computing (IOC)

The course content is consistent with preparation for the AP Computer Science Principles examination. Students enrolled in this course are required to take this examination in May. As such, the course also includes strategies for success on the examination. This course utilizes the Python programming language.

CSEE223 DIGITAL SYSTEMS

(Half Year, College preparatory, UC-G, 5 high school units)

This course is an introduction to digital electronics from a "black box" perspective, using standard TTL integrated circuit devices. The course begins with a presentation of binary mathematics, truth tables, AND/OR logic gates, and inverters. Students will be introduced to techniques for digital circuit simplification using Boolean algebra, and Karnaugh mapping. Students will study an important logic configuration, known as a "half-adder", that is key to providing arithmetic functionality in computers and calculators. Finally, they will explore the applications of various "flip-flop" memory devices, multiplexors, encoders, and decoders.

CSEE321 AC CIRCUIT ANALYSIS

(Half Year, College preparatory, UC-G, 5 high school units)

This course expands the basic concepts of circuit analysis to include time-dependent components such as inductors and capacitors. Students will learn the concepts of time constants and resonance, and they will be able to analyze and design basic R-C, L-C, and R-L-C circuits in both series and parallel configurations. In support of the lecture material, students will be given a number of laboratory assignments where they will learn how to use function generators and oscilloscopes to observe and measure AC circuit behavior. This course is intended to prepare students for future courses in analog and digital circuit design.

CSEE325 A/B AP CYBERSECURITY

(Full Year, College preparatory, UC-D, UC Honors course, 5 high school units per semester)

This yearlong course is roughly the equivalent of a one semester, college-level course in introductory cybersecurity. The major areas of the course are organized around five units:

- Introduction to Security (Unit 1)
- Securing Spaces (Unit 2)
- Securing Networks (Unit 3)
- Securing Devices (Unit 4)
- Securing Applications and Data (Unit 5)

The course content is consistent with preparation for the AP Cybersecurity examination. Students enrolled in this course are required to take this examination in May. As such, the course also includes strategies for success on the examination. This course utilizes the Bash command-line tool.

CSEE411 SEMICONDUCTOR AND ANALOG CIRCUIT DESIGN

(Half Year, College preparatory, UC-G, 5 high school units)

This course is a comprehensive introduction to analog electronics that deals primarily with TTL circuit technology. The basic physics concepts of semiconductor devices such as diodes and transistors are presented. Along with circuit construction and troubleshooting, the student will use basic DC and AC analysis of circuits that contain semiconductor components. Major applications in the course are DC power supplies and transistor amplifier, oscillator, and switching circuits. Laboratory experiments support the theory presented. The

course is intended for students that are planning further college or university studies in the fields related to engineering, physics, electronics or computer science and provide exposure to semiconductor physics. The electronic theory and laboratory work will reflect topics covered at the college level and emphasize general study, mathematical and communications skills. Laboratory work will include circuit calculations, observations and measurements.

CSEE421 LINEAR OPERATIONAL CIRCUITS

(Half Year, College preparatory, UC-G, 5 high school units)

This course introduces the student to linear integrated circuits. He will gain the skills to research their capabilities, set up their recommended test circuits, and describe their behavior. Emphasis will be placed on operational amplifiers. Other devices explored will include power transistors to assist an operational amplifier, class B linear amplifiers, analog to digital converters, digital to analog converters, analog differentiators and integrators.

CSEE423 RF & MICROWAVE COMMUNICATIONS

(Half Year, College preparatory, UC-G, 5 high school units)

Radio frequency and microwave circuits present special difficulties due to the extremely high frequencies that are involved, many times beyond the reach of traditional laboratory instruments like meters and oscilloscopes. This course introduces students to measurements in the VHF, and UHF regions (30 MHz – 30 GHz), and leads him to build and test useful building blocks for radio communication. Some work will be done in the AM and FM radio band, where traditional instrumentation is still useful.

INTEGRATED DESIGN ENGINEERING AND ART

IDEA114 ENGINEERING FOUNDATIONS *(new)*

(Half Year, College preparatory, UC-D, 10 high school units)

Engineering Foundations is the first full course in the IDEA pathway, where students build engineering and scientific reasoning through hands-on design, fabrication, and measurement. The course opens during the season of the FIRST Robotics Competition, an international high school robotics competition. Students help build the school team's competition robot and keep a daily engineering notebook on the design decisions they observe. They then learn technical drawing by hand, followed by 3D modeling in SolidWorks, and present and defend their models to classmates. A manufacturing unit introduces every machine in the IDEA shop and how screws, bolts, and other hardware are specified. Students then plan and machine a set of precision steel parts. In the lab, students compare the weight and density their computer models predict against what they measure, and they check finished parts against their drawings. The course ends with each student designing, manufacturing, and testing a spinning top built to a written specification. Students compete the tops in a tournament and write an engineering analysis of the results.

IDEA209H ENGINEERING I HONORS *(new)*

(Half Year, College preparatory, UC-D, UC Honors course, 10 high school units)

In this course, every design decision is backed by calculation, every result is measured, and every conclusion is written up as a formal engineering report. Students learn to make things before they design them. They identify unknown metals and plastics by testing density and hardness, and they calculate the loads that gears, shafts, bearings, and fasteners must carry before selecting them. They then earn safety certification and make parts on five processes: a CNC router, a fiber laser, a manual mill, a manual lathe, and 3D printing. Next, students design original parts in SolidWorks and produce complete technical drawings that specify every dimension and its allowable variation. Each student then designs and manufactures a working solution to a real problem in the IDEA building, which must include a part made on a CNC or manual machine. The course ends with teams each building one mechanism of a radio-controlled robot, then testing the assembled robot against set performance

goals. A comprehensive written final exam covers the laboratory concepts and skills from every unit.

IDEA208 INTRODUCTION TO MECHANICAL DESIGN ENGINEERING

(Half Year, College preparatory, UC-D, 5 high school units)

This intermediate course provides an introduction to robot mechanisms, dynamics, and intelligent controls. Topics include planar and spatial kinematics, and motion planning; mechanism design for manipulators and mobile robots, multi-rigid-body dynamics; control design, actuators, and sensors; wireless networking, task modeling and product design documentation to industry standards, Weekly laboratories provide experience with material science, mechanical principles, and machine design. Through scaffolded projects students will design and build working components of robotic systems that are then integrated in a robotic device for the group term project.

Introduction Mechanical Engr Design is a rigorous and engaging CTE Engineering course with an overarching focus on robotics, transportation, and green energy. Utilizing a combination of traditional and project-based instructional methods, students engage in the extensive iterative engineering design process that begins to prepare them for careers in technology, transportation, engineering or renewable energy research. In this course, students experience a spiraling curriculum that provides multiple entry points to develop a deep understanding of Engineering Design concepts and skills including the iterative design cycle, technical drawing and 3-D modeling, use of CAD, prototyping, safe use of hand and power tools, material selection, production processes, and career exploration. Last, by encapsulating learning opportunities within the context of green energy, efficiency analysis and transportation, students will be exposed to careers within renewable energy and engineering technology -- a significantly growing industry sector.

IDEA210H ENGINEERING APPLICATIONS HONORS *(new)*

(Quarter Year, College preparatory, UC-D, UC Honors course, 5 high school units)

Engineering Applications Honors is the school's FIRST Robotics Competition build season, taught as a one-quarter honors course. Prerequisite: IDEA209H. Small student groups each take full ownership of one system on the school team's competition robot, working alongside the other IDEA classes as a single engineering team. Each group measures the game's playing pieces to set numerical requirements for its system, then builds and tests competing prototypes to choose a design. Groups model the final design in SolidWorks, produce the drawings and machine programs needed to make it, and fabricate and inspect every part. Each system is tested against its requirements before it is installed on the robot. After competition, each student writes an individual engineering analysis connecting the team's design decisions to how the robot actually performed. A comprehensive written final exam assesses each student independently of the team.

IDEA403 SENIOR PROJECT

(Half Year, College preparatory, UC-G, 10 high school units)

The capstone project for Integrated Design Engineering and Art (IDEA) curriculum. Students will design, build, test, and present a project as if it were a commercial project or design. In this course students have the opportunity to embark in the aspect of design that inspires them the most. Whether that is Character Design, Product Design or Architectural Design, students will produce a proposal for their senior project that must be approved by the Department Chair as well as Technology Instructor. The objective of this course is for students to draw upon previous coursework to provide a solution for a real world problem.

Students will focus on design, project planning, prototyping fabrication, assembly and testing. Students will also be required to write formal reports and formal oral presentations. This project can either be completed individually or as a team. Examples of past outstanding projects include fabricating an air intake for their car, generating and testing a map for a popular video game, a frisbee launcher subsystem for FIRST robotics competition, developing a control system for the IDEA Tech tank, and a COD Zombies themed vending machine.

MATERIALS SCIENCE, ENGINEERING AND TECHNOLOGY

MSET103 INTRODUCTION TO MATERIALS PROCESSING

(Half Year, College preparatory, UC-D, 10 high school units)

This course is designed as an introduction to materials science and materials processing. Topics of interest will include the following: manufacturing and processing of materials; atomic structure and bonding; periodic table fundamentals and how they relate to material properties. This course provides insight on metals, polymers, ceramics, and composites. Labs focus on Materials Processing techniques including primary shaping (casting and forming), joining (welding and braising), and surface treatment (sand blasting, coating and polishing).

MSET243 MECHANICAL TESTING

(Half Year, College preparatory, pre-engineering, 10 high school units)

This course is an introduction to the basic principles and practices of materials evaluation using the fundamentals of Mechanical Testing. Areas covered will include the following testing methods: tensile, fatigue, hardness, impact, creep, on metallics and non-metallic materials. In addition to basic theory concepts, students will obtain practical knowledge and "hands-on" experiences in generating, collecting, and interpreting data in laboratory situations.

MSET208 MATERIALS FOR DESIGN ENGINEERS

(Quarter Year, College preparatory, pre-engineering, 5 high school units)

This introductory course will familiarize the design engineering student to the basic classes of materials, the properties of materials, and to the production, processing, fabrication and compatibility of metals and materials. In addition, the various techniques used to characterize materials properties will be demonstrated. A hands-on session addressing welding and joining techniques will be provided. The lectures will be complemented with laboratory sessions and demonstrations. *(This one semester-equivalent course is paired with IDEA208 for IDEA students.)*

MSET244 NON-DESTRUCTIVE TESTING

(Quarter Year, College preparatory, UC-D, 5 high school units)

This course is designed as an introduction to the basic principles and practices of materials evaluation using the fundamentals of non-destructive testing (NDT). Specific areas covered include visual, liquid penetrant, magnetic particle, radiographic, ultrasonic, and eddy current testing. Students obtain practical knowledge through experience in laboratory situations in addition to basic theory. Experiments are performed to enhance and reinforce topics covered in lectures. The laboratory sessions require that the student develop a working knowledge of magnetism, electricity, capillary action, physics (buoyancy, displacement, the Compton effect), and assessment of flaws. The course also provides an introduction to data and formula management using Microsoft Excel, a common software tool used widely in the engineering field. Areas of interest include cell usage, equations, and tips to increase productivity and efficiency. *(This one semester-equivalent course is paired with IDEA208 for MSET students.)*

MSET332 METALLOGRAPHY

(Half Year, College preparatory, UC-D, 10 high school units)

This course is an introduction to the fundamentals of Metallography and for the visual and light microscopy of metals and engineered materials. Preparation techniques necessary to accurately assess the structure, properties and composition of materials will be applied. In addition, the metallurgy of common alloy systems will be discussed and advanced optical measuring techniques, quantitative metallographic and micro-hardness techniques will be utilized in data evaluation and report preparation.

MSET333 INTRODUCTION TO POLYMERS

(Half Year, College preparatory, UC-D, 10 high school units)

Introduction to Polymers is an introduction to organic compounds and their characteristics. Classification of plastics, overview of common plastics and polymers, elementary molecular structures and related mechanical, chemical and physical properties, typical applications and products, major production methods and testing of polymers to ASTM standards are the major topics covered.

MSET431 FAILURE ANALYSIS

(Full Year, College preparatory, UC-D, 10 high school units per semester)

This course will introduce the fundamentals of failure analysis by applying the theories and procedures learned in previous MSET core courses to the analysis of real world metals/materials failures. The course will introduce current failure analysis and problem solving techniques including data assimilation, fracture handling & analysis, micro/macro-optics, Scanning Electron Microscopy, Fracture mode/mechanism identification and characterization and data interpretation, presentation and reporting. Case histories of actual service failures will be reviewed and discussed. In addition, the interpretation and use of specifications and blueprints as valuable tools in the analytical process will be provided. The moral and legal issues associated with failure investigations will also be discussed.

MSET441 CHEMICAL ANALYSIS

(Full Year, College preparatory, UC-D, 10 high school units per semester)

A survey of commonly used laboratory testing methods for both metallic and nonmetallic material systems. These will include theory and application of gravimetric analysis, volumetric analysis, and potentiometric titrations. The fundamentals of Fourier Transfer Infrared spectroscopy, atomic emission, ultraviolet-visible spectroscopy, and x-ray fluorescence will be introduced.

MEDIA ARTS AND TECHNOLOGY

MAT103 DIGITAL MEDIA FUNDAMENTALS

(Half Year, College preparatory, UC-F, 10 high school units)

Graphic and Digital Design will allow students to explore the world of design with a focus on concept development and professional application of digital media. The course consists of developing knowledge of the graphic design field, digital manipulation and creation using Adobe's Creative Suite (Photoshop, Illustrator, After Effects, Premiere or InDesign). Students follow the design process to complete their own practical work, consisting of visual research, sketches, photographs and digital resolutions. Students will use their problem solving skills to produce innovative, professional and unique digital designs. Assignments will become more complex and technically challenging with an emphasis on expanding critical thinking as a valuable tool for visual problem solving and applying those skills in projects that meet professional industry standards.

Students will work independently and collaboratively, will engage in regularly scheduled critique sessions and will share and receive critical feedback in a professional manner. Students will engage in oral presentations, critiques and write reflections that identify each stage of the design thinking process from ideation, concept development, to completion. Students will research and discuss historical design and aesthetics, how technology, politics, social media, economics and cultural beliefs influence design work.

MAT201 DIGITAL PHOTOGRAPHY & COMPOSITION

(Half Year, College preparatory, UC-F, 10 high school units)

The purpose of this course is to incorporate Advanced Adobe Lightroom & Photoshop techniques. By the end of the course, the student will be able to:

- Work with layers and masks
- Develop a workflow that incorporates a smooth synergy between Lightroom and Photoshop
- Perform basic and advanced Portrait touch-ups and processing
- Use advanced tools like: Brushes, Filters, Liquify and Distort
- Combine multiple images into digital Composites that create a new hyper-realistic image

- Use the Clone and Heal Tools to clean up and manipulate images
- Use the basics of Color Profiling to produce clean Physical Prints

MAT214 VIDEO PRODUCTION AND EDITING

(Half Year, College preparatory, UC-F, 10 high school units)

This course focuses on the genre of film and on introducing students to the tools of media production. Filmmaking will prepare students for the critiquing, planning, production, and post-production of quality short films and broadcast journalism. Structuring the course to allow students to tell a story promotes using digital media platforms and tools and provides them with 21 Century skills necessary for many careers today.

During this yearlong course, students will analyze, critique, compare and discuss an array of different still photography (and other visual and performing arts genres) and film types and genres (Short films, mini-documentaries, full-length documentaries, public service announcements) by professional and student filmmakers using jargon and language specific to the industry. Students will learn about the history of filmmaking and how it has developed over time and across cultures. Each unit of study will involve exploring different aspects of film and broadcast journalism, as well as learning industry-level filmmaking skills leading to the production of one short video per quarter.

Students complete every phase of filmmaking: brainstorming and pitching ideas, writing, storyboarding, directing, shooting and editing using Adobe Premier Pro software and other Adobe media tools.

MAT311 3D ANIMATION

(Half Year, College preparatory, UC-F, 10 high school units)

In this course, students will acquire an initial understand and appreciation of the evolution of animation from its early, obscure beginnings to its modern ubiquity across diverse range of cultures and countries. Students will gain skills and competencies so that they are able to produce several animated short films that showcase their understanding of how the medium works, including a broad range of specific information including things like color theory, staging, digital tools, et al. As a guiding framework, they will benefit from a hands-on education in the 12 principles of animation and extend their practical work to digital technologies including programs like Adobe After Effects and Adobe Premiere. They will also work with a variety of mediums including hand-drawn 2D images, digital animation, and stop-motion animation, using models of the past in order to realize their personal expression and creativity..

MAT313 AUDIO ENGINEERING

(Half Year, College preparatory, UC-F, 10 high school units)

The Multimedia Sound Production course is built on the notion that one's ability to absorb and adapt to ever-changing technology is dependent not only on the capacity to think critically, but also on a foundational understanding of digital and analog audio systems from an acoustical, electrical, and signal flow perspective, balancing new state-of-the-art techniques with an understanding of historical context. Each unit sequentially leads to a summative, end-of-year, capstone project.

Further, reinforcing this knowledge with substantial hands-on project time, using professional equipment, is the only way to attain the technical facility necessary for a real career involving music technology. We emphasize hands-on production projects in a professional recording environment.

MAT411 MEDIA CAMPAIGN DEVELOPMENT

(Half Year, College preparatory, UC-G, 10 high school units)

Introduction to Digital Marketing is a semester long course that focuses on digital marketing foundational knowledge and building a digital marketing presence with Digital Marketing Strategies, Website Management, Paid Search, Digital Advertising, Search Engine Optimization, Social Media and marketing Automation. Students

will learn digital marketing through comprehensive lesson plans, videos, “digital builds” or hands-on assignments and more. The curriculum is also designed to use current technology, integrate real-world scenarios, and spark the entrepreneurial spirit. Digital Marketing consists of 6 modules with quizzes that expound upon a student’s digital marketing and critical thinking skills.

MAT413 DIGITAL MARKETING/ SENIOR CAPSTONE

This course trains students in competencies necessary for entry-level employment and career opportunities within the marketing industry. Students will learn the fundamental concepts of marketing and business principles. Training requires hands-on experiences conducting research and developing marketing strategies, promoting and advertising products and services related to the business sector. Students will also learn about necessary marketing topics such as utilities, pricing strategies, marketing functions, and financing concepts. Students will develop leadership, technology, and communication skills to assist them in being responsible young adults in their community and in the workforce.