

NIKOLA TESLA STEM HIGH SCHOOL

INSPIRE, EDUCATE, INNOVATE



COURSE CATALOG 2020-2021

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<http://tesla.lwsd.org/>

Table of Contents

Typical Student Schedule and Offerings (By Grade Level).....	3
District Information Regarding Seven Period Schedule.....	4
Graduation & University Requirements.....	5
Course Descriptions.....	6-19
English.....	6-7
Fine Arts.....	7
Social Studies.....	8
World Language.....	9
Math.....	9-10
Engineering.....	11
Computer Science.....	12
Business.....	13
Science.....	14-15
STEM Junior Labs.....	16-17
STEM Senior Labs.....	18-19
Other Electives.....	19

Typical Tesla STEM Student Schedule (2020-21)

9th Grade

1. **Honors English 9**
2. **Math:** Algebra 1 | Geometry | Algebra 2 | Math Analysis
3. **Science:** Honors Physics
4. **Fine Art:** Graphic Production
5. **World Language:** Spanish 1, 2, or 3
6. **Elective:** AP Computer Science Principles
7. **Elective:** Entrepreneurship

10th Grade

1. **Honors English 10**
2. **Math:** Geometry | Alg.2 | Math Analysis | AP Calculus AB
3. **Biology:** AP OR Honors
4. **Biology Lab**
5. **AP Environmental Science**
6. **World Language:** Spanish 1, 2, or 3
OR Elective _____
(if 2-year language requirement already met)
7. **Elective:** _____
(Choose from list below)

11th Grade

1. **English 11:** AP OR Honors
2. **Math:** Alg.2 | Math Analysis | AP Calculus AB | AP Calc BC
3. **Honors U.S. History & International Relations**
[1.5 credits total]
4. **Honors Chemistry**
OR Elective (if Chemistry already completed) _____

Choose ONE Lab Option (A or B)

Option A: AP Psych & Forensics (2 credits)

5. **Signature Lab:** AP Psychology
6. **Signature Lab:** Forensics
7. **Elective:** _____
(Research or Business Foundations recommended)

OR

Option B: Environmental Engineering & Sustainable Design (1 credit)

5. **Signature Lab:** Environ. Engineering & Sus. Design
6. **Elective:** _____
(Research or Business Foundations recommended)
7. **Elective:** _____
(Choose from list below)

12th Grade

1. **English 12 – World Lit/ACR Masterpieces**
2. **Math:** Alg.2 | MA | AP Calc AB | AP Calc BC | AP Stats
3. **Honors Contemporary World Problems**
4. **LWSD Civics** (.5 credit grad requirement) **AND**
LWSD Health (.5 credit grad requirement)
OR
Elective:(if Health and/or Civics already completed) _____

Choose ONE Lab Option (A or B)

Option A: Advanced Physics Lab (2 credits)

5. **Signature Lab:** AP Physics C: Mechanics
6. **Signature Lab:** AP Physics C: Electricity/Magnetism
7. **Elective:** _____
(Business Classes recommended)

OR

Option B: Advanced Biomedical Lab + Anatomy & Physiology (2 credits)

5. **Signature Lab:** Advanced Biomedical Engineering Lab
6. **Signature Lab:** Honors Anatomy & Physiology
7. **Elective:** _____
(Business Classes recommended)

Elective Options:

Business & Marketing Found. (11th/12th)
Digital Marketing & Social Media (12th)
Independent Research (11th grade)
Peer Tutoring (+ 2x/week before school)
AP Statistics

Engineering I
Engineering II
Engineering III
AP CS Principles
Data Structures
AP Comp. Sci. A

Honors Chem
AP Chemistry
Honors Spanish 3
Advanced Projects in Java

Optional before/after school

Orchestra (2x/wk after school)
Choir (2x/wk after school)
Leadership (2x/wk before school)

District Information Regarding Our Seven Period Schedule

As part of their four-year program of study, all students are expected to register for and take seven credit bearing courses each semester. A senior who is on track to satisfy all credit requirements for graduation may complete an application for Early Dismissal or Late Arrival. Requests for a class schedule with less than seven credit bearing courses will be reviewed with extenuating considerations in mind, which may include but are not limited to the following:

- Employment
- Medical need with documentation
- Educational opportunities outside the school/district consistent with the student's High School & Beyond Plan

A class schedule with less than seven credit bearing courses will only allow for a late arrival or early dismissal. It is necessary to gain approval from the student's counselor and parents for late arrival or early dismissal and have a copy of the approval on file in the counseling office.

Minimum Graduation & University Requirements

SUBJECT	STATE MINIMUM GRAD REQUIREMENTS	TESLA STEM COURSE OFFERINGS	UNIVERSITY REQUIREMENTS
ENGLISH	4 Credits	Hn English 9, Hn English 10, Hn or AP English 11, English 12 - World Lit/ACR	All Universities: 4
SOCIAL STUDIES	3 Credits	Hn U.S. History, Hn Contemporary World Problems, Civics, International Relations, (AP Psychology can count as SS elective)	Minimum: 3 Competitive Universities: 3-4
WORLD LANGUAGE	2 Credits <i>Must take two years of the same language</i>	Hn Spanish 1-3	Minimum: 2 Competitive Universities: 3-4
MATH	3 Credits	Algebra 1, Geometry, Hn Algebra 2, Math Analysis, AP Statistics, AP Calculus AB, AP Calc BC	Minimum: 3 Competitive Universities: 3-4 (<i>many Universities mandate Senior year Math</i>)
SCIENCE	3 Credits	Hn Physics, Hn or AP Biology, AP Environmental Science, Hn or AP Chemistry, Forensics, AP Comp Sci Principles, AP Comp Sci A, Environmental Engineering & Sustainable Design, AP Physics C, Hn Anatomy/BioMed	Minimum: 2 Competitive Universities: 3-4
FINE ARTS	2 Credits <i>1st cr mandatory, 2nd cr optional based on HSB Plan</i>	Graphic Arts, Orchestra, Choir	Minimum: .5 -1 Competitive Art Universities: 2-3
OCCUPATIONAL	1 Credit	Environmental Engineering & Sustainable Design, Engineering 1-3, Forensics, AP Psychology, all Comp Sci classes, all Business classes	
P.E.		Pass PE Proficiency Written Test in 11 th /12 th grade	
HEALTH	0.5 Credit	LWSD Online Health course or another approved online provider	
ELECTIVES	Varies	Advanced Science classes, Advanced Math, Computer Sciences, Music, Engineering, Business, all other additional classes	
TOTAL CREDITS	24 credits		<i>*Check individual colleges for additional course requirements and testing requirements (ACT, SAT, SAT Subject Test requirements, etc.)</i>
STATE TESTING GRAD REQUIREMENTS		Math Smarter Balanced Assessment English Smarter Balanced Assessment Science State Science Assessment (required for CO 2021+ only)	
HIGH SCHOOL & BEYOND PLAN REQU.		Completed in Senior Year	

Math and World Language are the ONLY middle school classes that may receive high school credits

LWSD graduation requirements can also be accessed at <https://www.lwsd.org/schools/high-school/high-school-guide>

English Language Arts

English 9 - 1 Credit (Honors)

Prerequisite: Current Freshman

This course introduces students to a variety of literatures, including key works, William Shakespeare's Romeo and Juliet; Homer's The Odyssey, Maya Angelou's I Know Why the Caged Bird Sings and William Kamkwamba's The Boy Who Harnessed the Wind. Critical thinking and self-expression are emphasized in the study of the fundamental elements of the expository (analytical) essay and narrative writing. Literature and writing will focus on themes of knowledge, responsibility, the power of individual choice and the connection of humanities within the STEM model, specifically "The Grand Challenges for Engineering." Public speaking units, including Lincoln-Douglas debate, original oratory and presentation, will be intensive in preparing students for the rigor of upper grades. By the end of the year, students will have received skills important to work in literary and STEM study, such as:

- Careful and analytic reading of academic prose
- Ability to situate oneself in a critical conversation and debate
- Ability to create a logically coherent claim
- Ability to develop a coherent and sustained argument using evidence
- Ability to speak and present ideas, research and work products to a variety of audiences

English 10 - 1 Credit (Honors)

Prerequisite: Current Sophomore

From the Romantic poets and Mary Shelley's Frankenstein to dystopian literature such as Aldous Huxley's Brave New World and Ray Bradbury's Fahrenheit 451, along with assorted short stories and dramatic tragedy like William Shakespeare's Macbeth, we will investigate and question what it means to be human and our relationship with nature, the natural order, and STEM issues. Students will write clear, organized, vivid prose with specific textual references for evidence. Analytical essays will be written with sophistication in sentence, paragraph, and essay form. By the end of the year, students will have received skills important to use in literary and STEM study, such as:

- Careful reading of primary textual evidence
- Ability to summarize the main claims of an academic essay
- Ability to formulate a distinct critical perspective
- Ability to present well organized arguments
- Careful adherence to research skills

English 11 – English Language - 1 Credit (Honors or AP)

Prerequisite: Current Junior

Students will read and carefully analyze a broad selection of informational texts featuring a variety of authors and historical contexts. Students will develop sophistication and stylistic maturity in their own writing while building their skills in comprehension, interpretation, evaluation, argumentation, rhetorical analysis, and vocabulary acquisition. In addition, literature selections will focus on American literature. A summer reading assignment is also required.

Students who elect to take the course for AP credit will complete additional work, including one extra paper, more vocabulary, a more extensive first semester final, and will prepare to sit for the AP Language & Composition exam in May. AP Language final exams and tests are designed to more closely mimic the AP exam. AP Language is considered to be a college-level course, so students may potentially receive credit and/or advanced placement from the university they plan to attend depending on the score they earn on the AP Exam.

English 12 - World Lit/ACR Masterpieces -1 Credit (Accelerated)

Prerequisite: Current Senior

Students will study works from a variety of time periods and genres with an emphasis on fine literature and university level informational text. Students will reflect on a range of advanced abstract concepts and complex issues through papers, research, and projects. By building on rhetorical techniques, students will gain confidence with language and be college ready. STEM 12th grade English classes will integrate and delve into a wide range of themes and research that supports the 12th grade STEM Labs.

Fine Arts

Graphic Art/Production - 1 Credit

Prerequisite: All Freshmen are required to take this yearlong class

Graphic Production is a course that prepares individuals to apply artistic and technical skills to the fields of commercial and advertising art. Includes instruction in computer-assisted art and design, photography, concept development, technical drawing, color theory, imaging, studio technique, communication skills and commercial art business operations. Students will develop an understanding of materials that will be useful to any area of study where visual enhancement may apply. This includes Environmental Science, Biology, Mathematics, Computer Science, Game Design, Engineering, Scientific Illustration and 3-D imaging. Sketchbook and journal work will be a daily activity.

Optional Tech Prep College Credit

Bellevue College Course Equivalency – DMA 103: Graphic Design Fundamentals (5 credits)

Orchestra - 0.5 Credit (8th Period Course)

Prerequisite: Previous instrumental (strings, winds, brass, and percussion) experience

Orchestra introduces the instrumental music student to the demands and schedule of performance at the high school level. Students will continue to develop individual musicianship and technical skills through the study and performance of a variety of music. This class allows musical expression, self-discipline, and dedication to group efforts. Students are instructed in the fundamentals of musical performance (tone, rhythm, scales, theory, string technique), with an emphasis on high level group performance. Students must practice regularly, perform assigned music accurately and attend performances throughout the year. By the end of this course students will be able to sight read grade three music, perform grade four music, evaluate individual performance to aid improvement and understand preparation and performance skills used by professional musicians.

Choir - 0.5 Credit (8th Period Course)

Prerequisite: Previous choir experience preferred but not required

Choir introduces the vocal music student to the demands and schedule of performance at the high school level. Students will continue to develop individual musicianship and technical skills through the study and performance of a variety of music. This class allows musical expression, self-discipline, and dedication to group efforts. Students are instructed in the fundamentals of musical performance (tone, rhythm, scales, theory, vocal technique), with an emphasis on high level group performance. Students must practice regularly, perform assigned music accurately and attend performances throughout the year. Through the process of learning music theory, history, developing sight-reading skills, evaluating individual and group performance, and practicing good ensemble skills, the students will learn to make music that goes beyond the written page and creates a moving experience for performers and listeners.

Social Studies

US History - 1 Credit (Honors)

Prerequisite: Current Junior

Students will examine the history of the United States from pre-colonial times to the present through several units of study. The course follows a timeline covering such topics as the Colonial Period, Constitutional Period, Pre-Civil War, Post-Civil War, Expansion and Industrialization, and Early, Middle and late 20th Century. Students will develop and practice historical reasoning skills such as compare and contrast, cause and effect and will apply those skills in tests, writing assignments and classroom projects. By the end of this course, students will be able to read and interpret difficult primary sources, write complex essays on historical topics, and present their understanding of complex historical topics in a variety of formats.

International Relations - 0.5 Credit

Prerequisite: Current Junior

The class will examine the development and consequences of U.S. foreign policy on various stakeholders and how U.S. policy-imposed costs and/or provided benefits to other nations. At the end of the class, students will examine a specific current US foreign policy by developing a cohesive essay or presentation, and by discussing how the topics and themes are explored in motion pictures. In addition to different strategies to write about the intersection of foreign policy and movies, students will also be exposed to key readings by social scientists on some of the political issues raised by the films shown in class.

NOTE: This course is cross-credited with the junior year History and STEM Lab Concentrations and is not a separate class.

Contemporary World Problems - 1 Credit (Honors)

Prerequisite: Current Senior

This is a thematic and conceptual course that examines the history of the world with a focus on the social, economic, and political impacts on societies. Topics include the formation of civilizations and development of shared beliefs, exploration and colonization, scientific and industrial revolutions, the development of national and regional identities, and global expansion and international conflicts. By the end of this course, students will be able to explain continuities and changes over time, and how historical events have and will continue to affect the future.

Civics - 0.5 Credit

Prerequisite: Current Senior

This course is designed to prepare students to fulfill their role as citizens in a democratic society. This self-paced course consists of a series of assignments over the semester that examine the foundations of America's democratic traditions. By the end of this course students will have an understanding of the structure and function of the U.S. government as well as the rights and responsibilities of U.S. citizenship.

World Language

Spanish I - 1 Credit (Honors)

Prerequisite: None

This course introduces students to the study of the Spanish language. Students will acquire basic oral and written communication skills by using authentic materials (i.e. literature, newspapers, television, etc.) Grammar will be integrated into the curriculum by studying a variety of themes. The present tense will be introduced. Instruction will be mostly in Spanish.

Spanish II - 1 Credit (Honors)

Prerequisite: Spanish I/Instructor Approval

The goal of this course is to continue to build on the language structure learned in Spanish 1. The preterit and imperfect tenses will be introduced. Grammar and new vocabulary will be taught in context through reading and listening to authentic sources. Instruction will be mostly in Spanish.

Spanish III - 1 Credit (Honors)

Prerequisite: Spanish II/Instructor Approval

The goal of this course is to continue to build on the language structure learned in Spanish 1 and 2. Commands and the subjunctive tenses will be introduced. Grammar and new vocabulary will be taught in context through reading and listening to authentic sources. Instruction will be mostly in Spanish.

Math

The math courses are designed as a sequential pathway, laying the foundation for further mathematical study. Each course has a strong emphasis on applied problems and integrates engineering curriculum throughout the content.

Algebra I - 1 Credit

Prerequisite: None

The fundamental purpose of this course is to formalize and extend the mathematics that students learned in the middle grades. The course focuses on five critical areas: (1) develop fluency writing, interpreting, and translating between various forms of linear equations and inequalities and simple exponential functions, and using them to solve problems; (2) compare and contrast linear and exponential functions, translate between different representations, use function notation, and interpret arithmetic sequences as linear functions and geometric sequences as exponential functions; (3) using regression techniques to describe linear relationships quantitatively and make judgments about the appropriateness of linear models; (4) extend the laws of exponents to rational exponents, see structure in and create quadratic and exponential expressions, and solve equations, inequalities and systems of equations involving quadratic expressions; and (5) compare quadratic, linear, and exponential functions to model phenomenon. They also identify the real solutions of quadratic equations as the zeroes of a related quadratic function and expand their experience to more specialized functions – absolute value, step, and those that are piecewise-defined.

Geometry - 1 Credit

Prerequisite: Algebra 1

Geometry is study of shapes and angles that describe the physical space in which we live. The course is primarily focused on logical and spatial reasoning. Students will use both inductive and deductive reasoning to communicate their thinking and written proofs as well as geometric constructions to validate their conclusions. The course will have an additional emphasis on applications to the world around us. During this yearlong course, students will study the properties and applications of angles; parallel and perpendicular lines; triangles; similarity and congruence; right angle trigonometry; quadrilaterals; circles; coordinate geometry; three dimensional solids; the measures of length, area and volume; and geometric probability.

Algebra II - 1 Credit (Honors)

Prerequisite: Successful completion of Algebra I & Geometry

Advanced Algebra is the study of things that vary with relation to one another and can be described with mathematical statements. The course is primarily focused on analyzing mathematical relations graphically, numerically, symbolically, and verbally. Students will analyze and identify the relationship among mathematical expression and justify their conclusions through graphs, tables, and symbolic manipulation. During this yearlong course, students will study linear equations, systems of equations, inequalities, quadratic and polynomial equations, the expansion of the number system to include complex numbers, exponential functions, logarithmic equations, series, and statistical analysis of data. Students will need a graphing calculator for this class (TI-83 or above).

Math Analysis - 1 Credit (Accelerated)

Prerequisite: Successful completion of Algebra II

Math Analysis is a deeper examination of the topics of Algebra II and Trigonometry. This course is designed to prepare students for further rigorous study of mathematics and is the recommended course for students intending to take Calculus at the high school or University Level and pursue degrees in Mathematics, Computer Science or Engineering. During this yearlong course, students will study: trigonometric functions and identities; polynomial, rational, absolute value, piece-wise, exponential, logarithmic, parametric and polar functions; vectors; conic sections and an introduction to limits. Students will need a graphing calculator for this class (TI-84 or above).

AP Statistics - 1 Credit (AP)

Prerequisite: Successful completion of Algebra II

This course is designed to cover topics needed to successfully complete the Advanced Placement exam. It is an introduction to the major concepts and tools for collection, analyzing, and drawing conclusions from data. Students are exposed to four broad conceptual themes: exploring data, sampling and experimentation, anticipating patterns, and statistical inference. Some major assignments include designing and implementing sample surveys, observational studies, and experiments, critical statistical analysis of real-life data. By the end of this course students will have a working knowledge of the ideas and tools of practical statistics and will be able to make informed decisions based on data. A graphing calculator is required for this class (TI-84 or above).

AP Calculus AB - 1 Credit (AP)

Prerequisite: Successful completion of Math Analysis

The focus of the course is to provide students with a solid conceptual understanding of Calculus topics and provide them with a framework for further studies in mathematics. Students are also encouraged to take the AP Exam in the spring for the purpose of earning college credit or accelerated placement. This course covers the subjects of limits as well as differential and integral calculus comparable to the first 2 quarters of Calculus at most Universities. Students entering AP Calculus AB should have finished 4 years of preparatory work in mathematics through Pre-Calculus or Math Analysis and have a solid foundation in the analysis of the following classes of functions: Linear, quadratic, polynomial, rational, power, exponential, logarithmic, absolute value, piece-wise, step, and trigonometric. A graphing calculator is required for this class (TI-83 or above).

AP Calculus BC - 1 Credit (AP)

Prerequisite: Successful completion of AP Calculus AB

This course is designed to cover topics needed to successfully complete the Advanced Placement exam. Topics include infinite series, polar coordinates, parametric equations, conic sections with calculus, matrices and vectors.

Engineering

Engineering I - 1 Credit

Prerequisite: None

Engineer Your World is a one-year high school engineering curriculum developed by the Cockrell School of Engineering at University of Texas at Austin in collaboration with the National Science Foundation and NASA. This hands-on, project-based course emphasizes the historic achievements and contemporary challenges of engineers, the engineering design process, and the skills and habits of mind that engineers find most essential in their work. Our first unit focuses on establishing norms for all of our group interactions and for effective documentation of our projects in our engineering notebooks. The next five units all involve designing, building, and testing devices or systems of devices to accomplish specific tasks in response to customer needs. Each unit also emphasizes several specific aspects of the work of professional engineers. The remaining units are: Pinhole Cameras (Discovering Design), Earthquake Simulator (Data Acquisition and Analysis), Piggy Flashlights (Reverse Engineering and Redesign), and Aerial Imaging (Systems).

Optional University of Texas - Austin Credit

UT-Austin Equivalent Course - ES 301 – Engineering Design and Problem Solving (4.5 Quarter credits)

Cost- \$300 (subject to change)

Course Description: This Course uses a unique, multi-level engineering design process, highlighting engineering's potential to impact human lives.

Website: www.engineeryourworld.org

Optional Tech Prep College Credit

Shoreline Course Equivalency – ENGR&114: Engineering Graphics (5 credits)

Engineering II - 1 Credit (Accelerated)

Prerequisite: Engineering I

Picking up where *Engineering I* left off, this course is designed to build on the knowledge and skills acquired in the first year of engineering and to challenge students with more complex projects and more independent decision making. Hands-on and project-based, this course emphasizes the historic achievements and contemporary challenges of engineers, the engineering design process, and the skills and habits of mind that engineers find most essential in their work. Students will work in cooperative groups to address challenges ranging from automotive and mechanical engineering to electrical and energy system engineering. The course will culminate in an original design challenge, where students will have an opportunity to apply everything that they have learned in a project of their choice. Students will create formal presentations of their projects, appropriate for community sharing events and for science and engineering competitions.

Engineering III/STEM Startups - 1 Credit (Accelerated)

Prerequisite: Engineering I, 11th and 12th grade only

Students make their ideas real and create startups in STEM Startups (Engineering 3), an interdisciplinary design, business, and engineering class. First, students complete fast-paced challenges to develop skills and knowledge in design thinking, user research, technical development, business modeling, and networking. Then, students create their startups following these steps: generating ideas and forming teams, validating with customers, creating a business plan, building a minimum viable product, iterating with potential customers, building a prototype, and designing a pitch, and presenting the pitch to an external panel of entrepreneurs, innovators, and investors.

Through the iterative process of building a startup to serve specific customers, students are empowered with an entrepreneurial mindset, connected to a network of industry professionals, and exposed to frameworks and tools that help them design better products and businesses.

Computer Science

AP Comp Science Principles- 1 Credit (AP)

Prerequisite: None

Per College Board, this course provides introductions to programming and to the fundamentals of computing, including problem solving, working with data, understanding the Internet, cybersecurity and privacy. This course is also the initial programming course students take at Tesla STEM. Suggested units will include abstraction, algorithms, computational thinking and global impact. Students will demonstrate project-based learning and teamwork in many of the assignments. Programming topics are designed to build the foundational knowledge necessary for the next-level AP Comp Sci A (Java) course. This course will prepare students to take the AP Computer Science Principles exam in the Spring. Students electing to take the AP exam will also be expected to submit portfolio assignments to the AP College Board as part of the exam.

Optional Tech Prep College Credit

Bellevue Course Equivalency – PROG 110: Intro to Programming (5 credits)

AP Computer Science A with Java - 1 Credit (AP)

Prerequisite: Algebra II & 10th grade and above.

This course is generally equivalent to the first course in an undergraduate computer science program. The emphasis in the course is on procedural and data abstraction, object-oriented programming and design methodology, algorithms, and data structures. The course centers on understanding programming concepts and projects that explore a broad range of fields that leverage programming. It is important that students understand that computer science builds upon a foundation of mathematical reasoning and written communication, and students are expected to have acquired these skills before attempting this course. Successful completion of this course and its projects will prepare students for the AP Comp Sci A exam.

Data Structures - 1 Credit (Accelerated)

Prerequisite: AP Computer Science A w/ Java, Current Junior or Senior only

This course is a post-AP Computer Science A course and is generally equivalent to the second course in an undergraduate computer science program. It extends the concepts introduced in AP Computer Science, including object-oriented programming with Java. Students will explore the mathematical and theoretical bases of modern computer science, including analysis of fundamental algorithms and their relative efficiencies, computational complexity, and the specific coupling of data structure to computational task. Data structures explored include Linked Lists, Stacks, Queues, Sets, Heaps, Hash Tables, Trees, and Graphs.

Advanced Projects in Java - 1 Credit (Accelerated)

Prerequisite: Data Structures

This course will allow students who have had success in both AP Computer Science and Data Structures to further explore a potential career in software development. Students taking this class will demonstrate successful time management, strong problem solving and programming skills, an ability to work in teams, and strong presentation skills. First semester will focus on several pair programming projects exploring different areas of software development. Second semester will comprise of a larger group capstone project modeling a full software development lifecycle.

Business

Entrepreneurship - 1 Credit

Prerequisite: Current Freshman

This course focuses on design theory as implemented by the Stanford Design School. Utilizing 21st Century skills, students will design products and/or businesses that meet customer needs and/or address unmet needs in the commercial, social and global economy. Through experimental learning, case studies, business writing assignments and creative thinking exercises, students will develop a disciplined thought process for starting and running their own enterprise and begin the development of a business plan. In addition, students will be involved in leadership activities, such as attending professional conferences and community service events.

Optional Tech Prep College Credit

Bellevue College Course Equivalency – BUS& 101 Intro to Business (5 credits)

Business and Marketing Foundations – 1 Credit

Prerequisite: Current Junior/Senior

This yearlong course focuses on an intro to business structure, the fundamentals of marketing, including market research, product development, pricing and promotion of goods and services, and an introduction to finance and operations. This course will connect economic theory in today's global business climate with entrepreneurial endeavors in the above business management functions. Business ethics, workplace skills, and professional behaviors will be identified and practiced throughout the course. Students will develop essential skills for success in the 21st century, such as speaking, presenting and critical thinking skills. This course will also offer an intro to digital marketing, incorporating the concept of innovation in today's business climate. This class is recommended as a baseline class for further marketing and business classes.

Optional Tech Prep College Credit

Bellevue College Course Equivalency – BUS& 101 Intro to Business (5 credits)

Digital Marketing and Social Media – 1 Credit

Prerequisite: Completion of Business and Marketing Foundations

This course is designed to teach advanced marketing concepts and skills with an application to digital and social media. Topics include integrating different digital and social media strategies into the promotional mix of a product, creating social media marketing campaigns across channels, and applying appropriate social media tools. Upon completion, students should be able to assess the effectiveness of the digital and social media strategies for a small business and suggest ways to create and improve marketing efforts. Ethics, marketing careers, workplace skills and professional behaviors will be identified and practiced throughout the course. Search engine optimization (SEO), Search engine marketing (SEM), content marketing, email marketing, affiliate marketing, native advertising, online public relations (PR), and inbound marketing will also be discussed. In addition, students will reflect on their own use of social media as it applies to their digital reputation and how to be more responsible digital citizens.

Science

Inquiry Physics - 1 Credit (Honors)

Prerequisite: Current Freshman

Inquiry Physics is designed to keep the innate curiosity of 9th grade thinkers alive using an inquiry approach to inspire deeper questioning about the way things work in the physical world around us. Inquiry Physics will provide maximum opportunity to sharpen the analytical and mathematical skills of talented, motivated students through the study of measurement, motion, forces, energy, optics, gravitation and electricity. Daily activities include discussions, labs, small group problem solving and working in students' Physics Journals. This course will help build the foundational problem-solving skills and attitudes required for continued STEM work.

Biology - 1 Credit (Honors)

Prerequisite: 9th grade Physics (or other 9th grade science)

Biology Honors is a college-preparatory course intended to provide students with the content-knowledge and skills necessary for performing Biology-related research. This year-long course will provide an opportunity for the student to develop an in-depth knowledge of biochemistry, cells, genetics, DNA, evolution, and ecology. The course curriculum is dictated by the state and national standards for Biology. The Biology Honors course will be team taught with AP Environmental Science due to the overlap in content area.

Optional Bellevue College Credit

Bellevue College Course Equivalency - Biol 160, General Biology (5 Quarter credits)

AP Biology - 1 Credit (AP)

Prerequisite: Expected successful completion of Summer AP Biology coursework

Advanced Placement Biology is a rigorous, college-paced course intended to provide students with the content knowledge and skills necessary for performing Biology-related research. By the completion of the year-long AP Biology course, students will have an in-depth understanding of the following "big ideas": Evolution, Cellular Processes: Energy and Communication, Genetics and Information Transfer, and Interactions. In addition, students will be conducting student-directed, inquiry-based lab experiments that will further prepare them for innovative STEM research in their junior and senior years. The AP Biology curriculum is dictated by the College Board's AP Biology Curriculum Framework. Students in this course will take the Advanced Placement Biology exam in May for an opportunity to earn college credit for the course. The AP Biology course will be team taught with AP Environmental Science due to the overlap in content area. This course requires a substantial amount of work/study outside of the classroom.

Biology – Independent Lab Studies - 1 Credit

Prerequisite: Concurrent enrollment in Honors Biology or AP Biology

In this course students explore scientific topics of interest, using advanced methods of scientific inquiry and experimentation. Problem based learning (PBL) projects will be conducted so that students can develop their research, experimental or engineering design, and data analysis skills. Wet lab and computational projects will also be conducted with heavy emphasis on integrating computer science, mathematical algorithms and technology. Major focus is on preparation for academically styled laboratory research and scientific practices. This course is offered in conjunction with Honors and/or AP Biology.

Chemistry - 1 Credit (Honors)

Prerequisite: None

Chemistry is a pre-college course that explores the world of elements, molecules and chemical reactions. This course is an algebra-based lab science course that takes real-world data and applies mathematical concepts to discover patterns within the physical world. This course explores the concepts of nomenclature, the mole, stoichiometry, thermochemistry, atomic theory, bonding, gas laws, phases of matter at an atomic level, solubility, acids and bases, equilibrium and introduction to organic chemistry. Major assignments in this course include: major lab activities in every unit, end of unit tests, college prep lab notebook, end of term summative final. By the end of this course, students will be able to demonstrate an understanding of major chemical properties and processes, plan and conduct algebra based scientific investigation, and communicate scientific results via lab reports.

AP Chemistry - 1 Credit (AP)

Prerequisite: Successful completion of Chemistry Honors & recommended grade of B or higher in Algebra 2

The AP Chemistry course covers material typically presented in a college general chemistry course. The AP Chemistry course is designed to be taken only after a successful completion of a first course in high school chemistry. Students will be prepared to take the AP examination in May. The AP course differs qualitatively from the usual first year secondary school course in chemistry with respect to the textbook used, the topics covered, the emphasis on chemical calculations and the mathematical formulation of principles, and the kind of laboratory work done by the student. The AP course offers the laboratory experience equivalent to that of a typical college course. Students in this course should attain a depth of understanding of fundamentals and a reasonable competence in dealing with chemical problems. The course should contribute to the development of the students' ability to think clearly and to express their ideas, orally and in writing, with clarity and logic. This course is an algebra-based lab science. Students may potentially receive credit and/or advanced placement from the university they plan to attend.

AP Environmental Science - 1 Credit (AP)

Prerequisite: Current Sophomore

This class is designed to explore environmental issues as well as prepare students for the AP Environmental Science test. Concepts studied include ecosystem measurements, human populations, energy use, climate change, water and air pollution, soils, food, toxics, waste management and environmental job skills. Students will also have the opportunity to complete the first portion of the 5 credit University of Washington Atmospheric Science 111 course.

STEM Labs Offered in Junior Year

STEM Labs are thematic, interdisciplinary instructional blocks organized around career clusters and pathways. These courses combine rigorous academics and “real world” application of learning. Initial programs will focus on Science, Technology, Engineering and Math (STEM) career pathways to prepare students for postsecondary work in the STEM fields. The 11th Grade English class integrates and delves into a wide range of themes and research that supports the 11th grade STEM Labs.

Environmental Engineering and Sustainable Design (EESD) - 1 Credit

Prerequisite: Current Junior

The cause, effect, and science of global climate change, along with a strong emphasis on engineering and sustainability solutions, are the central themes of this course. Students will explore green jobs and solutions to a number of environmental issues through design, efficiency, and engineering projects. Topics covered include architectural design, green construction, alternative energy, water and waste management, transportation system design, public land use, ecosystem services, and urban design and community planning. This class utilizes specific tech skills; such as drafting, energy auditing, 2D and 3D design, model building, landscape design, engineering testing, and systems thinking. Student groups will be encouraged to enter their projects in several national and regional contests. Course content will examine the nature of the global climate system and the main processes controlling climate. Topics covered will include the global energy balance, atmospheric circulation, the role of oceans and ice in climate, the carbon cycle, and atmospheric composition. In addition, several of the Grand Challenges for Engineering will be addressed, including:

- Make Solar Energy Economical
- Provide Energy from Fusion
- Develop Carbon Sequestration Methods
- Manage the Nitrogen Cycle
- Provide Access to Clean Water
- Engineer the Tools of Scientific Discovery

Optional UW Credit

UW Course Equivalency- ATM 111: Global Warming (5 Credits)

Cost (2017) - \$325, plus a \$45 UW course registration fee

UW ATM 111 Course Description: The nature of the global climate system. Factors influencing climate including interactions among the atmosphere, oceans, solid earth, and biosphere. Stability and sensitivity of climate system. Global warming, ozone depletion, and other human influences. Intended for non-majors.

Website: <https://www.uwhs.uw.edu/courses/science/>

Optional Tech Prep College Credit

Cascadia Course Equivalency – ETSP101: Environmental Tech & Design (5 credits)

Forensics & AP Psychology - 2 Credits Total

Prerequisite: Current Junior

Forensic Science/Psychology is a junior level course that integrates AP Psychology and Forensic Science and offers multiple opportunities for students to engage in problem-based learning activities such as working crime scenes, investigating a decomposing pig outside to determine the time of death of the deceased victim in the 2nd semester lab final. All students enrolled in both courses will learn extensively about drugs and how they affect the brain during the Toxicology unit as part of the Bio 100: Brain and Addiction course through the University of Washington. All students in AP Psychology will compete in the Central Sound Regional Science and Engineering Fair (CSRSEF) held at Bellevue College in March. It is recommended that during the summer between Sophomore and Junior year, students secure summer research with a mentor scientist if they wish to maintain a competitive advantage and qualify for the International Science and Engineering Fair (ISEF) in May as well. Additionally, students will also tackle aspects of the Grand Challenges in Engineering. Because this integrated lab has a heavy

focus on neuroscience, students will seek to understand how the brain works and apply that knowledge to computing and problem-solving. Students may be able to investigate **Reverse Engineering the Brain** or **Personalized Learning** if they are selected to be a part of the Neuroscience internship during their junior year. In **Engineering the Tools for Scientific Discovery**, students will grapple with new mathematical and computing methods that are incorporated into many of the problem-based learning activities in this STEM signature lab. In addition, solutions to any three of these grand challenges can be obtained through authentic research with CSRSEF.

Forensic Science -1 Credit

Forensic Science offers students multiple opportunities to engage in problem-based learning, apply forensic science knowledge to engineer solutions to areas of Forensic Science that can be strengthened, and provides students with innovative thinking and 21st Century skills to be successful in STEM occupations. Students will study units in fingerprinting, medical examiner/autopsy analysis, trace evidence, toxicology, blood, anthropology and entomology, and crime scenes. When coupled with psychology, students may participate in potential job shadows or internships at places such as the Washington State Crime Lab or the King County Latent Finger Printing Lab.

Optional UW Credit

UW Course Equivalency- Biology 100: Intro. Biology: Addiction & the Brain (5 Credits)

Cost-\$325, plus a \$45 UWV course registration fee (subject to change)

UW Course Description: Explore the effects of a range of mood-altering drugs to learn about brain structures, brain chemicals and genetic differences in people's response to drugs.

Website: <https://www.uwhs.uw.edu/courses/science/>

Optional Tech Prep College Credit

Bellevue College Course Equivalency – CJ 202: Principles of Criminal Investigation (5 credits)

Psychology-1 Credit (AP)

Students will apply understanding of the brain and psychology to solve problems and analyze criminal behavior and crime trends. Students will cover the entire AP curriculum, with special focus on brain research and neuroscience, FBI profiling, abnormal psychology and psychological disorders, social psychology, jury selection, personality profiling, and sensation/perception. Additional learning in the areas of History and Approaches, Statistics and Research Methods will be crucial in creating the experimental design for competing at the Central Sound Science and Engineering Fair. Other AP units of student interest include States of Consciousness, Learning, Cognition, Motivation and Emotion, and Development.

Independent Research - 1 Credit

Prerequisite: Current Junior. Concurrent enrollment in either Forensics, EESD, Computer Science, or Engineering

Students will perform unique research and compete in the Central Sound Regional Science and Engineering Fair (CSRSEF) and Washington State Science and Engineering Fair (WSSEF) after successful completion of this course. This is a junior level course designed to help support and provide credit for students who will already be doing unique research in the AP Psychology & Forensic Science STEM lab OR who will be taking Environmental Engineering and Sustainable Design (EESD), Engineering or Computer Science and are interested in competing at CSRSEF and WSSEF. Students will receive instruction and have time to work in class on their research, which includes finding a mentor, finding and reading scientific articles, completing literature reviews, writing their research plan, completing their fair paperwork, conducting their experiment, statistically analyzing their data, working on their photoshop document for their trifold poster board, writing their research paper and plotter printing. After the CSRSEF and WSSEF competitions in March, students will be working on developing partnerships with the school and greater Puget Sound STEM community.

STEM Labs Offered in Senior Year

STEM Labs are thematic, interdisciplinary instructional blocks organized around career clusters and pathways. These courses combine rigorous academics and “real world” application of learning. Initial programs will focus on Science, Technology, Engineering and Math (STEM) career pathways to prepare students for postsecondary work in the STEM fields. The 12th Grade English class integrates and delves into a wide range of themes and research that supports the 12th grade STEM Labs.

Advanced Physics Lab - 2 Credits Total (AP)

Prerequisite: Current Senior, Concurrent Enrollment in/or completion of AP Calculus AB, and completion of Honors Physics

The senior level Advanced Physics Lab integrates AP Physics C Mechanics, AP Physics C Electromagnetism, and English Language Arts 12. This course is an in-depth investigation into the physical universe. It will include extensive mathematical modeling of physical phenomena and calculus-based problem solving. Mind expanding theoretical material will be balanced with hands-on lab investigations and projects. Projects will form the bridge to allow students to creatively integrate their physics understanding, lab skills and language arts studies. A major project will be to design and build an Arduino powered model space station with appropriate artificial gravity and power management. This class is designed to prepare students for future university level science and engineering studies. In particular, it will lay the analytical foundation for mechanical and electrical engineering.

Advanced Physics C: Mechanics - 1 Credit (AP)

The first semester will focus on classical mechanics: motion, forces, momentum, energy, simple harmonic motion and Newtonian Gravity. Special emphasis will be placed on rotational physics. The development of advanced mathematical problem-solving ability (including calculus) will be the key goal of this course. Advanced physics labs will look closely at torque, angular momentum, universal gravitation and the fundamental conservation laws. Students will be prepared to take the AP Physics C: Mechanics exam in May.

Advanced Physics C: Electromagnetism - 1 Credit (AP)

The second semester will focus on Maxwell's Equations of Electromagnetism. Calculus based problem solving beginning with Gauss' Law, and continuing with the other three laws of electromagnetism will be at the heart of students' work. Students will be challenged to use mental models and abstract reasoning as they grapple with the flux of electric and magnetic fields. Advanced physics labs will include examining electric and magnetic interactions in detail, and measuring the charge to mass ratio for the electron. Students will also get plenty of hands-on lab time to become familiar with AC and DC circuits and the tools of electronics including digital multi-meters, function generators and oscilloscopes. Students will be prepared to take the AP Physics C Electromagnetism exam in May.

Biomedical Engineering - 2 Credits Total

Prerequisite: Current Senior; AP Biology or B or higher in Honors Biology

The STEM Lab Concentration in Biomedical Engineering is a course that integrates Human Anatomy and Physiology Honors, Advanced Biomedical Engineering, and offers opportunities for students to engage in systems biology problem solving. This course will address two of the Grand Challenges of Engineering: Advancing Health Informatics and Engineering Better Medicines. In Advancing Health Informatics, students will use the knowledge gained in Human Anatomy and Physiology and Biology to research and communicate medical information to improve the quality and efficiency of healthcare. For Engineering Better Medicines, students will work to improve biomedical technologies and medicines for healthcare patients. As a part of this STEM lab concentration, students will be encouraged to enter projects in national competitions.

Human Anatomy and Physiology -1 Credit (Honors)

This course is an in-depth study of human anatomy and physiology, focusing on the eleven human body systems: integumentary/tissues, skeletal, muscular, digestive, urinary, cardiovascular, respiratory, nervous, reproductive, endocrine, and lymphatic. Primary study within this course includes terminology associated with the human body and the relationships between the structure and function of organ systems. Lab exercises in this course include animal dissections and physiological tests with Vernier probeware. This course will be taken in conjunction with the Biomedical Engineering course program to provide students with the knowledge needed to design and develop medical advances.

Optional UW Credit

UW Course Equivalency- Biology 118: Survey of Physiology (5 Credits)

Cost-\$325, plus a \$45 UW course registration fee (subject to change)

UW Course Description: This course is a survey of human physiology.

Website: <https://www.uwhs.uw.edu/courses/science/>

Advanced Biomedical Engineering Lab -1 Credit (Accelerated)

This course is an extension of the Human Anatomy and Physiology Honors course. Students will critically evaluate current medical practices, engage in communication concerning ethics associated with health, and research and develop improvements in medical technology. This course will focus on the areas of Bioethics, Genetic Engineering, Cancer, Tissue Engineering, Biomechanics and Prosthetics, Infectious Disease, Cardiovascular and Respiratory Physiology, and Digestive Health. Biomedical Engineering will incorporate partnerships with local organizations and businesses and will require students to work collaboratively in problem-based learning activities.

Other Electives

Leadership - .5 Credit (0 Period Course)

Prerequisite: Elected ASB Officers and 11th/12th graders in Link Crew

This course is open to all elected officers and juniors and seniors in Link Crew. Leadership students are involved in the planning of events, assemblies, Spirit Week, freshman orientation, and other school activities. This class provides students with strategies, skills and experience needed to further the development of their leadership strengths. Lessons will include, but not be limited to, communication skills, group process, self-awareness, and human relations. Class meets twice a week during 0 period and students are required to take this class the full year. This course qualifies for Career & Tech Education credit.

Please note: two days/week of 0 period required

Peer Tutoring – 1.5 credits for whole year/0.75 for a single semester

Prerequisite: Current Junior or Senior or Teacher/Staff Approval

This elective is suitable for students who are looking to enhance learning for other students at Tesla. Students approved to be a peer tutor will be matched with an instructor in a subject the student is knowledgeable in and will be in the instructor's classroom on a daily basis to support students needing extra academic assistance. Students are required to meet outside of class for instructional leadership training throughout the year. This elective is suitable for students who have met graduation and their personal college application course requirements and who work well with others. Students interested in becoming a peer tutor will need to talk to their counselor to secure approval for this elective credit. Preference is for a full-year commitment, but a Fall/Spring semester commitment is considered as well for students completing Health at STEM during one semester and looking for a meaningful experience for the remaining semester.