

SCIENCE CURRICULUM

Course Offerings

The science requirement for graduation is 1.00 credit each in Biology, Physics/Physical Science and Chemistry/Environmental Science. Electives are to be taken in addition to the required courses and cannot replace them.

FULL YEAR COURSES (1 credit each)

Biology (Gr. 9-10)	Physical Science (Gr. 10-12)	Chemistry (Gr. 11-12)
Honors Biology (Gr. 9-10)	Honors Physics (Gr. 10-12)	Honors Chemistry (Gr. 10-12)
AP Biology (Gr. 11-12)	AP Physics I & II (Gr. 11-12)	AP Chemistry (Gr. 11-12)
AP Environmental Science (Gr. 10-12)	Environmental Science (Gr. 11-12)	CCP Chemistry I & II (Gr. 11-12)

STEM SEMESTER ELECTIVES (0.5 credit each)

Forensics (Gr. 12)	Astronomy (Gr. 11-12)
Anatomy and Physiology (Gr. 12)	Digital Fabrication (Gr. 9-12)
Honors Biotechnology (Gr. 11-12)	Digital Fabrication II (Gr. 9-12)
Honors Biotechnology II (Gr. 11-12)	Innovation Lab Technician (Gr. 11-12)
	Remotely Piloted Aerial Vehicles (Gr. 9-12)

SUGGESTED COURSE SEQUENCE

GRADE	Honors / STEM	CP
9	Honors Biology / Biology	Biology
10	Honors Physics AP Environmental w/ Recommendation	Physical Science
11	Honors Chemistry AP Environmental Science, AP Physics, Electives	Environmental Science / Chemistry *Must choose one of these for your 3rd science credit AP Environmental Science, Electives
12	AP Chemistry, CCP Chemistry, AP Physics, AP Biology, AP Environmental Science, Electives	AP Environmental Science, Electives

Biology

Course Number: 3100

Credit: 1

Length: year

Prerequisites: Teacher recommendation

Grades: 9 – 10

This is a survey course that investigates cellular structure and functions as well as how interactions lead to heredity through genetics. It also covers how adaptations and diversity of organisms leads to evolution through relationships between species and their environment. Students will be involved in individual and group learning, projects, lab experimentation and simulated lab analysis.

Physical Science

Course Number: 3200

Credit: 1

Length: year

Prerequisites: 1 science credit and Teacher recommendation

Grades: 10 – 12

This lab based course covers basic chemistry topics such as atoms, the periodic table, bonding, chemical & nuclear reactions, and states of matter. Physics topics include Newton's three laws of motion, forces, momentum, energy conservation, light, electricity and magnetism. Astronomy topics include the history of the universe, formation of galaxies and stars.

Environmental Science

Number: 3300

Credit: 1

Length: year

Prerequisite: 2 science credits and Teacher recommendation

Grades: 11 – 12

Environmental science focuses on the interconnected spheres of the earth and how they relate to one another. It includes information about the Earth's resources, how they are used, and policies that have been developed. This course will also address the global environmental problems that face our Earth today and in the future.

Honors Biology

Course Number: 3110

Credit: 1

Length: year

Prerequisite: Teacher recommendation

Grades: 9 – 12

This course is a rigorous study of biochemistry, cellular structure and processes, DNA structure and function, biotechnology, genetics, evolutionary biology, and the interdependence of life. The learning process will involve application of concepts in a laboratory group setting.

Honors Physics

Course Number: 3210

Credit: 1

Length: year

Prerequisite: Teacher recommendation, 1 science credit, B or higher in Algebra I

Grades: 10 – 12

Honors Physics is a blend of mathematical application and hands-on exploration into the fundamental principles of the physical world. Throughout the year, we integrate algebraic applications, revealing the meaning behind the numbers we employ in scientific inquiry. Our primary objective is to foster a comprehensive understanding by combining conceptual insights with mathematical proficiency and hands-on experiences. Covering diverse units including: Waves & Sound, Geometric Optics, Electricity & Magnetism, Newtonian Mechanics and more, students will not only develop a solid foundation in physics but also gain a heightened appreciation for its relevance in their daily life. This course sets the stage for future scientific endeavors, and is designed to facilitate a seamless transition into advanced studies. This course is very strongly recommended for any students pursuing a STEM career. Strong mathematical skills are required.

Chemistry

Course number: 3305

Credit: 1

Length: year

Prerequisite: Teacher recommendation, 2 science credits, completed/ currently taking Algebra II

Grades: 11-12

Chemistry students develop critical thinking skills, problem-solving abilities, and a practical understanding of how chemistry applies to real-world situations. Labs and demonstrations are an integral part of the curriculum, providing students with the opportunity to apply theoretical knowledge in a hands-on environment. An emphasis is placed on mathematical calculations and communication of scientific data. The course aims to prepare students for more advanced studies in chemistry or related fields and to promote scientific literacy.

Honors Chemistry

Course Number: 3310

Credit: 1

Length: year

Prerequisite: Teacher recommendation, 2 science credits, completed/concurrently taking Algebra II

Grades: 11 – 12

Chemical principles are introduced from a mathematical and conceptual perspective, with emphasis on the development of extensive experimentation and laboratory skills. Concepts covered include Quantitative Measurement, Atomic Theory and Structure, Chemical Nomenclature, Chemical Reactions, Stoichiometry, Energy Transformations, Chemical Bonding, and Acid Base Chemistry. Strong emphasis is placed on mathematical calculations, communication of scientific data, as well as problem solving.

Astronomy

Course Number: 3115

Credit: .5

Length: semester

Prerequisites: Teacher recommendation and 2 credits in science

Grades: 11 – 12

This is a survey course that covers the following topics: Human Exploration of Space (past, present and future), Comparative Planetology – the Solar System in Detail, Properties of Stars and Stellar Life Cycle, Cosmology – The Large Scale Structure of the Universe. The successful student will engage in classroom discussions and complete outside of class textbook readings. This is an elective course and may not replace the courses required for graduation.

Forensics

Course Number: 3326

Credit: .5

Length: semester

Prerequisites: Teacher recommendation and 3 science credits

Grade: 12

This is an interdisciplinary forensics course which ties together principles of chemistry, physics, biology and mathematics. Topics include crime scene investigation skills and evidence analysis of hair, fur, fibers, latent fingerprints, blood composition, blood splatter, DNA electrophoresis, and more! Students learn and practice analysis techniques through individual and group work including a final crime scene project. This course contains extensive lab work and frequent absences may hinder progress.

Honors Biotechnology

Course number : 3502

Length: semester

Prerequisites: Completed/concurrently taking Honors Chemistry and Teacher Recommendation

Grade: 11-12

Biotechnology is the study and manipulation of living organisms and/or their components to be used as tools to solve a problem or create a product. Skills assessed in this course include DNA extraction, restriction enzyme digest, PCR, gel electrophoresis, ELISA, genetic transformation, and CRISPR. This course contains extensive lab work and frequent absences may hinder progress.

Honors Biotechnology II

Course number : 3503

Length: semester

Prerequisites: Completion of Honors Biotechnology and Teacher Recommendation

Grade: 11-12

Honors Biotechnology II is an Independent Study course which expands student skills and knowledge obtained in Honors Biotechnology to develop their own research projects utilizing DNA, protein, and cell technologies. Students work with the instructor to research and develop an independent project timeline and budget, then develop and implement Standard Operating Procedures (SOP) for their project. This course contains extensive lab work and frequent absences may hinder progress. Time management, initiative, organization, and self-motivation are critical to the success of this course.

Human Anatomy and Physiology

Course Number: 3341

Credit: .5

Length: semester

Prerequisites: Teacher recommendation, 2 science credits, Completed/Concurrently taking Chemistry

Grade: 11-12

This is a course designed for those students who are planning on a career in the health professions, emergency responders, sports training or have an interest in human anatomy and physiology. It provides the study of the structure and function of the human body and the mechanisms for maintaining homeostasis within it. The course will be covering multiple human systems including the integument, skeletal, muscular, nervous, cardiovascular, respiratory, digestive, urinary, and reproductive. Students will do readings and investigations that will prepare them to operate very effectively in freshman level college courses in this area.

Digital Fabrication

Course Number: 3500

Credit: .5

Length: semester

Prerequisites: none

Grade: 9-12

Digital fabrication is a hands-on exploration in the art and process of digital fabrication. Students will be given the opportunity to design and create products utilizing equipment in the Innovation & Design Lab which include but are not limited to laser cutting and engraving, 3D printers, CNC machine, and vinyl printer and cutter.

Digital Fabrication II

Course Number: 3104

Credit: .5

Length: semester

Prerequisites: Digital Fabrication and Teacher Recommendation

Grade: 10-12

Students will enhance their proficiency in advanced digital fabrication tools like 3D printers, CNC machines, laser cutters, and more, focusing on precision and efficiency. By the course's end, students will be well-prepared to tackle complex digital fabrication challenges and excel in fields like product design, engineering, art, or related areas. They'll possess the skills necessary to produce high-quality projects using cutting-edge technologies.

Innovation Lab Technician

Course Number: 3105

Credit: .5

Length: semester

Prerequisites: Application Approval by Instructor

Grade: 11-12

In this course, students will assist in designing and producing various projects for the high school as well as the district. Students will also be trained on all the equipment and software in the Innovation & Design Lab. Students will then assist in training staff and students on the equipment in the Lab. Students will be asked to submit an application and provide teacher recommendations before they are able to sign up for this course.

Remotely Piloted Aerial Vehicles (RPAV)

Course Number: 3501

Credit: .5

Length: semester

Prerequisites: none

Grade: 9-12

Students will start by learning how remotely piloted aerial vehicles - specifically drones- are used for a wide variety of purposes. They will learn the basic parts of a drone as well as the mechanics and engineering. Students will learn to fly a drone as well as be prepared to take the Part 107 FAA certification test at the conclusion of the course.

AP Physics

Course Number: 3220

Credit: 1

Length: year

Prerequisite: Teacher recommendation, B+/higher in Honors Physics, Completed/Concurrently taking Honors Algebra 2

Grades: 11 – 12

The AP Physics 1 & 2 course has been designed by the College Board as a course equivalent to a full year algebra-based college level physics class. Topics taught include Kinematics, Dynamics, Energy, Rotational Motion, Momentum, Oscillations, Fluids, Thermodynamics, Electric fields, Electric Circuits, Electromagnetism, Waves, Sound, Geometric Optics & Modern Physics. At the end of the course students are required to take both the AP Physics 1 Exam and AP Physics 2 Exam, which will test their knowledge of both the concepts taught in the classroom and their use of proper mathematical reasoning. Successful students will have strong mathematical/conceptual reasoning skills and be able to apply their knowledge in a wide variety of applications. Students will also be expected to complete labs in the classroom that complement the topics covered in class. This course is very strongly recommended for students considering an engineering or STEM career.

AP Biology

Course Number: 3320

Credit: 1

Length: year

Prerequisites: Teacher recommendation, Honors Chemistry with an A/B average

Grade: 12

AP Biology is a college-level general biology course. Students cultivate their understanding of biology through inquiry-based lab investigations as they explore the topics of biochemistry, cellular processes, cellular energetics, cellular communication, genetics, gene expression, gene regulation, ecology, and evolution. Students are required to take the Advanced Placement Biology Test in May. The course is highly recommended for students pursuing a science related college major.

AP Environmental Science

Course Number: 3340

Credit: 1

Length: year

Prerequisites: A/B Bio/Honors Bio; A/B Algebra; Teacher Recommendation

Grade: 10-12

AP Environmental Science course is designed to engage students with the scientific principles, concepts, and methodologies required to understand the interrelationships within the natural world. The course requires that students identify and analyze natural and human-made environmental problems, evaluate the relative risks associated with these problems, and examine alternative solutions for resolving or preventing them. Environmental science is interdisciplinary, embracing topics from geology, biology, environmental studies, environmental science, chemistry, and geography.

AP Chemistry

Course Number: 3320

Credit: 1

Length: year

Prerequisites: Teacher recommendation, Honors Chemistry with an A/B average

Grade: 12

AP Chemistry is an introductory college-level chemistry course. Students cultivate their understanding of chemistry through inquiry-based lab investigations as they explore the four Big Ideas: scale, proportion, and quantity; structure and properties of substances; transformations; and energy. Students are required to take the Advanced Placement Chemistry Test in May. The course is highly recommended for students pursuing a science related college major.

CCP: General Chemistry I

Course Number: 3325

Credit: 1

Length: semester

Prerequisites: Honors Chemistry, Completion of Algebra II, Students meet the admission criteria and be accepted as a College Credit Plus student at the university or college offering the credits.

Grade: 12

Study of fundamental principles of chemistry emphasizing atomic theory and structure, chemical bonding, periodic trends, thermochemistry, nuclear chemistry, aqueous solutions, stoichiometry, and the gaseous state of matter. Basic laboratory experiments which correlate with chemical concepts, principles and processes of General Chemistry I. Emphasis on techniques and procedures. (5 semester credit hours) Students are encouraged to take the AP Chemistry Exam in May.

This course follows the rules and regulations of the State of Ohio College Credit Plus Program.

CCP: General Chemistry II

Course Number: 3330

Credit: 1

Length: semester

Prerequisites: Honors Chemistry, Completion of Algebra II, Students meet the admission criteria and be accepted as a College Credit Plus student at the university or college offering the credits.

Grade: 12

Emphasis on kinetics, equilibrium concepts, electrochemistry, thermodynamics, liquids and solids and phase transitions, solutions, and descriptive chemistry, including periodic patterns of chemical properties and reactivities. Basic laboratory experiments which correlate with chemical concepts, principles and processes of General Chemistry II. Emphasis on technique and procedures. (5 semester credit hours) Students are encouraged to take the AP Chemistry Exam in May.

This course follows the rules and regulations of the State of Ohio College Credit Plus Program.