

## SCIENCE

For the 2019-2020 school year, the Stratford science department is implementing a new course sequence for all freshmen in order to meet the requirements of the Next Generation Science Standards. All courses in this sequence will follow a phenomena-driven, inquiry-based model and will focus on three-dimensional learning across the domains of disciplinary core ideas, crosscutting concepts and science/engineering practices.

<u>COURSE TITLE</u>	<u>CREDITS</u>	<u>GRADES OFFERED</u>
Earth & Energy Systems	.5	9
Human Biology	.5	9
<i>Chemistry A<sup>+</sup></i>	.5	10
<i>Environmental Biology<sup>+</sup></i>	.5	10
<i>Physics A<sup>++</sup></i>	.5	11
<i>Chemistry B<sup>++</sup></i>	.5	11
Environmental Science	.5	11 12
Forensic Science	.5	11 12
Biodiversity	.5	11 12
Human Anatomy and Physiology	1.2	11 12
AP/UConn ECE Biology*	1.6	11 12
AP/UConn ECE Chemistry*	1.6	11 12
AP/UConn ECE Physics 1*	1.6	11 12
AP/UConn ECE Physics 2*	1.6	11 12

+ These courses are currently under development for implementation during the 2020-2021 school year.

++These courses are currently under development for implementation during the 2021-2022 school year.

\*If a student is placed on Homebound Instruction during this course, laboratory credit may be lost depending on the amount of time spent out of school because lab components to the course would not be able to be completed.

### Earth & Energy Systems *(Pending Board of Education Approval)* **.5 Credit**

This semester course is organized around the Next Generation Science Standards with a primary focus in the domain of physical science and supporting work in the domain of earth science. Topics include: forces and interactions, energy transfer, and weather. Coursework will be supported by hands-on laboratory experiences. **College Prep or Honors level determined by a data-driven teacher recommendation process. Honors Level students must be concurrently enrolled in Geometry or Algebra 2.**

### Human Biology *(Pending Board of Education Approval)* **.5 Credit**

This semester course is organized around the Next Generation Science Standards with a primary focus in the domain of life science. Topics include: DNA, genetics, and body systems. Coursework will be supported by hands-on laboratory experiences. **College Prep or Honors level determined by a data-driven teacher recommendation process. Honors Level students must be concurrently enrolled in Geometry or Algebra 2.**

### Environmental Science **.5 Credit**

This course offers an in depth look at how ecological systems are interconnected and how an effect on one ecosystem can cause a far reaching effect on other systems. Factors affecting distribution of organisms, such as physical and biotic elements are investigated along with man's influence on different ecosystems. Scientific equipment will be used to investigate and formulate conclusions about a specific ecosystem under study. Risk-benefit relationships will be explored through this program. The offering of this course is contingent upon sufficient enrollment and funding. **Prerequisites: Successful Completion of Biology and participation in two years of Science. Open to juniors and seniors only.**

### Forensic Science **.5 Credit**

This course offers a look into the world of forensic science focusing on the techniques and materials used in analyzing physical evidence. Topics discussed include basic criminalistics, fingerprinting, DNA fingerprinting,

blood stain patterns, use of hair and fibers, and document analysis. The offering of this course is contingent upon sufficient enrollment and funding. **Prerequisites: Successful Completion of Biology and participation in two years of Science. Open to juniors and seniors only.**

### **Biodiversity**

**.5 Credit**

Biodiversity is an elective science course open to all students, with a focus on living organisms in the biosphere. The course is a one semester course designed to provide a hands on classroom lab and field study experience. The two main areas of study will include a Credit exploring the plant kingdom and a Credit exploring the animal kingdom with a focus on vertebrate biology. Students will perform a variety of inquiry based experiments including interdisciplinary school to career activities linked to fine art, technology education, and math. The course is aligned with components of the Connecticut Science Frameworks for enrichment in biology and covers all of the grade 9-10 content standards for scientific inquiry, literacy, and numeracy. The offering of this course is contingent upon sufficient enrollment and funding. **Prerequisites: Successful Completion of Biology and participation in two years of Science. Open to juniors and seniors only.**

### **Human Anatomy and Physiology**

**1.2 Credits**

This course offers the structure and function of all major body systems, nutrition, and personal health. This course is recommended for students interested in health related careers or as background for students interested in the structure and functioning of their own bodies. This course includes a dissection experience. **Prerequisites: Successful completion of a lab science class or Department Head approval. College Prep or Honors level determined by a data-driven teacher recommendation process.**

### **Advanced Placement (AP) Biology UConn/ECE BIOL 1107 / BIOL 1108**

**1.6 Credits**

This course is designed to be the equivalent of a two-semester college introductory biology course usually taken by biology majors during their first year. Students that enroll in this course have the opportunity to earn, through an Advanced Placement Exam, college credits while in high school. Students accepted into the UConn Early College Experience Program course earn four (4) college credits each for BIOL1107 and BIOL1108 from the University of Connecticut if they earn a UConn grade of C or better. The major areas covered by the course are molecular and cell biology, animal anatomy and physiology, ecology, and evolution, genetics, and plant biology. Major themes covered include science as a process, evolution, energy transfer, continuity and change, structure and function, regulation, interdependence in nature and science, technology, and society. The laboratory experience is an important component of the course. Appropriate labs will be assigned that will provide students with the opportunity to learn a variety of skills, facts, principles, and concepts of introductory level biology covered in lectures, reading, and discussions. **Note:** All students are expected to take the Advanced Placement Examination offered by the College Board. **College Prep or Honors level determined by a data-driven teacher recommendation process and Department Head approval.**

### **Advanced Placement (AP) Chemistry UConn/ECE CHEM 1127Q / CHEM 1128Q**

**1.6 Credits**

This course presents an in-depth study of chemistry comparable to that offered in a college inorganic chemistry course. Topics will include thermodynamics, various equilibria, electrochemistry, and precipitation reactions. Students should have a strong mathematical background to ensure successful preparation for the Advanced Placement Chemistry Exam. **Note:** All students are expected to take the AP Examination. **Placement determined by data-driven teacher recommendation and Department Head approval.**

### **Advanced Placement Physics 1/UConn PHYS 1201Q**

**1.6 Credits**

AP Physics 1 is the equivalent of a first-semester college course in algebra-based physics, designed to be taught over a full academic year. This course is part of the UConn Early College Experience program and will give enrolled students the opportunity to earn four (4) college credits for PHYS 1201Q from UConn if they earn a grade of C or better. The course covers kinematics; Newton's Laws of Motion (including gravitation); momentum; work, energy, and power; circular motion and rotation (including conservation of angular momentum); oscillations; mechanical waves; Coulomb's Law and basic DC circuits; and fluids and thermal physics. The objective of the course is to have students develop the skills and intuition to be able to solve college-level physics problems while applying their deep conceptual understanding of the content through inquiry labs. As the course progresses, multi-concept problems and labs are the norm. **Note:** All students are required to take an exit exam that is provided by the UConn Physics Department and are expected to take the AP examination offered by the College Board. **Prerequisites: Successful**

**Completion of Chemistry and Algebra 2. Co-requisite: Pre-Calculus. Placement determined by data-driven teacher recommendation and Department Head approval.**

**Advanced Placement Physics 2/UConn PHYS 1202Q**

**1.6 Credits**

AP Physics 2 is the equivalent of a second-semester college course in algebra/trigonometry-based physics, designed to be taught over a full academic year. This course is part of the UConn Early College Experience program and will give enrolled students the opportunity to earn four (4) college credits for PHYS 1202Q from UConn if they earn a grade of C or better. The course covers fluid mechanics; heat and temperature; kinetic theory and thermodynamics; electrostatics (including fields and potentials); conductors and capacitors; electric circuits (including RC circuits); magnetic fields and electromagnetism (including Faraday's Law and Lenz's Law); physical and geometric optics; atomic physics and quantum effects; and nuclear physics. The objective of the course is to have students develop the skills and intuition to be able to solve college-level physics problems while applying their deep conceptual understanding of the content through inquiry labs. As the course progresses, multi-concept problems and labs are the norm. All students are required to take an exit exam that is provided by the UConn Physics Department and are expected to take the AP examination offered by the College Board. **Prerequisites: Successful Completion of AP Physics 1/UConn PHYS 1201Q and Pre-Calculus. Note: Students who have not earned credit for UConn PHYS 1201Q cannot enroll in UConn PHYS 1202Q through the ECE program.**