

**3543 Biology**

Credit: 1

Prerequisite: None

Students will use critical thinking and scientific problem solving to make informed decisions in field and laboratory investigations. Study will include structures and functions of cells and viruses; growth and development of organisms; cells, tissues, and organs; nucleic acids and genetics; biological evolution; taxonomy; metabolism and energy transfers in living organisms; living systems, homeostasis; ecosystems; and plants and the environment.

**3573 Biology – PAP**

Credit: 1

Prerequisite: None

Biology PAP will increase students' understanding of biological concepts, extend students' knowledge of science as a process, and enhance test-taking strategies. Students will use critical thinking and scientific problem solving to make informed decisions in field and laboratory investigations. Study will include structures and functions of cells and viruses; growth and development of organisms; cells, tissues, and organs; nucleic acids and genetics; biological evolution; taxonomy; metabolism and energy transfers in living organisms; living systems, homeostasis; ecosystems; and plants and the environment. PAP courses prepare students who intend to continue their studies in the AP. This PAP course will require students to dedicate themselves to study required by rigorous college-level standards.

**3593 Biology II – AP**

Credit: 1

Prerequisite: Chemistry or concurrent enrollment

AP Biology is an introductory college-level biology course. Students cultivate their understanding of biology through inquiry-based investigations as they explore the following topics: evolution, cellular processes — energy and communication, genetics, information transfer, ecology, and interactions. Students taking this course will be prepared and are expected to take the AP test upon completion.

**Biology – Dual****3583 AD Fall****3583 BD Spring****3583WD (Fall) for Cohort 2022****3583XD (Spring) for Cohort 2022**

(Lone Star College BIOL 1406/1407)

Credit: 1

Prerequisite: Chemistry or current enrollment

A contemporary course including applications of the scientific method, cellular and molecular biology, biochemistry, classical and human genetics, virology and mechanisms of evolution. The second semester is a continuation of introductory Biology \* for majors. It includes a detailed survey of the major phylogenetic lineages. This includes a comparison of the systems of different organisms, Ecological roles and relationships, as well as behavior of organisms, will be integrated throughout. Semester exam exemption will not be available for this course \*Not all Dual Credit courses are offered at all campuses. This course is not eligible for semester exam exemptions.

**3943 Aquatic Science**

Credit: 1

Prerequisite: Biology

Students will use critical thinking and scientific problem solving to make informed decisions in field and laboratory investigations. Students will study components of an aquatic ecosystem; relationships among aquatic habitats and ecosystems; roles of cycles within an aquatic environment; adaptation of aquatic organisms; changes within aquatic environments; geological phenomena and fluid dynamic effects; and origin and use of water in a watershed.

**3843 Environmental Systems**

Credit: 1

Prerequisite: Biology and a physical science

Students will use critical thinking and scientific problem solving to make informed decisions in field and laboratory investigations. Students will study biotic and abiotic factors in habitats; ecosystems and biomes; interrelationships among resources and an environmental system; sources and flow of energy through an environmental system; relationship between carrying capacity and changes in populations and ecosystems; and changes in environments.

**3643 Chemistry**

Credit: 1

Prerequisite: Biology and Algebra I

Students will use critical thinking and scientific problem solving to make informed decisions in field and laboratory investigations. Students will study characteristics of matter; energy transformations during physical and chemical changes; atomic structure; periodic table of elements; behavior of gases; bonding; nuclear fission; oxidation-reduction reactions; chemical equations; solutes; properties of solutions; acids and bases; and chemical reactions.

**3673 Chemistry – PAP**

Credit: 1

Prerequisite: Biology and Algebra I

Chemistry PAP will increase students' understanding of chemistry concepts, extend students' knowledge of science as a process, and enhance test-taking strategies. Students will use critical thinking and scientific problem solving to make informed decisions in field and laboratory investigations. Students will study characteristics of matter; energy transformations during physical and chemical changes; atomic structure; periodic table of elements; behavior of gases; bonding; nuclear fission; oxidation-reduction reactions; chemical equations; solutes; properties of solutions; acids and bases; and chemical reactions. PAP courses prepare students who intend to continue their studies in the AP program. This PAP course will require students to dedicate themselves to study required by rigorous college-level standards.

**3693 Chemistry II – AP**

Credit: 1

Prerequisite: Chemistry and Algebra II or concurrent enrollment in Algebra II

The AP Chemistry course provides students with a foundation to support future advanced course work in chemistry. Through inquiry-based learning, students develop critical thinking and reasoning skills. Students cultivate their understanding of chemistry and science practices as they explore topics such as: atomic structure, intermolecular forces and bonding, chemical reactions, kinetics, thermodynamics, and equilibrium. Students taking this course will be prepared and are expected to take the AP test upon completion.

### **Chemistry I – Dual**

**3683AD Fall**

**3683BD Spring**

**3683WD (Fall) for Cohort 2022**

**3683XD (Spring) for Cohort 2022**

(Lone Star College CHEM 1411)

Credit: 1

Prerequisite: Chemistry and Algebra II or Concurrent enrollment in Algebra II, College/University requirements

Topics include a mathematical introduction (metric system, significant figures and scientific notation), discussion of atoms, molecules and ions, stoichiometry, electronic structure, periodic relationship, bonding, molecular geometries and properties of gases, liquids, solids and solutions. Appropriate lab experiments are included.

Semester exam exemption will not be available for this course. \*Not all Dual Credit courses are offered at all campuses. This course is not eligible for semester exam exemptions.

### **7640C Anatomy and Physiology**

Credit: 1

Prerequisite: Biology; a second science credit

Study the energy needs of the human body, how it maintains homeostasis, and its transport systems, electrical conduction processes, environmental factors affecting the body, and the process of reproduction, growth and development. Special projects, research studies, and creative assignments that reflect independent thinking are required. This course is a Career and Technical Education funded course and requires 40% laboratory and fieldwork requirements. This course can earn college credit based on Articulation agreements, which are subject to change.

### **3893 Environmental Science – AP**

Credit: 1

Prerequisite: Algebra I, Physics or Chemistry

The goal of this course is to provide students with the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world, to identify and analyze environmental problems both natural and human-made, to evaluate the relative risks associated with these problems, and to examine alternative solutions for resolving or preventing them. Students taking this course will be prepared and are expected to take the AP test upon completion.

### **Environmental Science- Dual**

**3873AD Fall**

**3873BD Spring**

(Lone Star College ENVR 1401/1402)

Credit: 1

Prerequisite: Algebra I, Physics or Chemistry, college/University requirements

An interdisciplinary study of both natural (biology, chemistry, geology) and social (Economics, politics, ethics) sciences as they apply to the environment. Focus is on the role of science in addressing global environmental concerns. Concepts include ethics, policy, matter, energy, species biodiversity, ecology, human populations, food and agriculture. Practical laboratory experience emphasizes the application of fundamental principles of biology and chemistry as well as critical thinking and analysis. Second semester Focus is on energy issues, global warming, ozone loss, land use, conservation and management of resources, deforestation, biodiversity, waste, and sustainable practices. Semester exam exemption will not be available for this course. \*Not all Dual Credit courses are offered at all campuses. This course is not eligible for semester exam exemptions.

### **7650C Medical Microbiology**

Credit: 1

Prerequisite: Biology and Chemistry

Study the role of microbes in infectious diseases and the relationship between microbes and health maintenance. This course requires a greater degree of student skill in math and laboratory proficiency. Field studies and research projects are required in this course. This course is a Career and Technical Education funded course, and requires 40% laboratory and fieldwork requirements. This course can earn college credit based on Articulation agreements, which are subject to change.

### **3743 Physics**

Credit: 1

Prerequisite: Biology and Algebra I

Students will use critical thinking and scientific problem solving to make informed decisions in field and laboratory investigations. Students will study laws of motion; changes within physical systems and conservation of energy and momentum; force; thermodynamics; characteristics and behavior of waves; and quantum physics.

### **8360C Principles of Technology (Physics credit, student cannot earn credit for both Physics and Principles of Technology)**

Credit: 1

Prerequisite: Biology and Algebra II or concurrent enrollment in Algebra II.

If you are interested in the Dual Credit programs at TSTC or WCJC, then this is the course for you. This course is an extensive hands-on course designed to provide a study in force, work, rate, resistance, energy, power and force transformers as applied to mechanical, fluid, thermal, and electrical energy that comprise simple technological devices and equipment. The course can be taken for physics graduation credit, is a Career and Technical Education funded course, and requires 40% laboratory and fieldwork requirements. This course can earn college credit based on Articulation agreements, which are subject to change.

### **3773 Physics – PAP**

Credit: 1

Prerequisite: Biology and Algebra I

Physics PAP will increase students' understanding of physics concepts, extend students' knowledge of science as a process and enhance test-taking strategies. Students will use critical thinking and scientific problem solving to make informed decisions in field and laboratory investigations. Students will study laws of motion; changes within physical systems and conservation of energy and momentum; force; thermodynamics; characteristics and behavior of waves; and quantum physics PAP courses prepare students who intend to continue their studies in the AP program. This PAP course will require students to dedicate themselves to study required by rigorous college-level standards.

### **3794 Physics C: Mechanics - AP**

Credit: 1

Prerequisite: Physics and Calculus or concurrent enrollment

This AP course will require students to dedicate themselves to study required by rigorous college-level standards. Topics covered include Kinematics; Newton's Laws of Motion; Work, Energy, and Power; Systems of Particles and Linear Momentum; Circular Motion and Rotation; and Oscillations and Gravitation. Students taking this course will be prepared and are expected to take the AP test upon completion.

### **Physics I/II Dual**

#### **3785AD Fall**

#### **3785BD Spring**

(Lone Star College PHYS 1401/1402)

Credit: 1

Prerequisite: Calculus or concurrent enrollment, College/University requirements

Fundamental principles of physics, using algebra and trigonometry, the principles and applications of classical mechanics and thermodynamics, including harmonic motion, mechanical waves and sound physical systems, Newton's Laws of Motion, and gravitation and other fundamental forces, with emphasis on problem solving. The second semester includes the principles and applications of electricity and magnetism, including circuits, electrostatics, electromagnetism, waves, sound, light, optics, and modern physics topics, with emphasis on problem solving. Laboratory activities will reinforce fundamental principles of physics. This course is not for physical science and engineering majors but can serve as the physics requirement for the pre-professional medical programs. Semester exam exemption will not be available for this course. \*Not all Dual Credit courses are offered at all campuses. This course is not eligible for semester exam exemptions.

### **8370 Scientific Research and Design**

Credit: 1

Prerequisite: Biology and Chemistry, IPC or Physics

Students conduct laboratory investigations and fieldwork, use critical thinking and scientific problem solving to make informed decisions, formulate hypotheses to guide experimentation and data collection, analyze published research, develop and implement investigative designs, collect, organize and evaluate qualitative and quantitative data obtained through experimentation, synthesize valid conclusions from qualitative and quantitative data, and communicate results. This course is a Career and Technical Education funded course, and requires 40% laboratory and fieldwork requirements.

### **ONRAMPS Physics: Mechanics, Heat, and Sound**

#### **3784 Fall**

Credit: .5-1

Prerequisite: Algebra I, Algebra II, Geometry, Trigonometry or Pre-Calculus recommended, College/University requirements

#### **ONRAMPS Physics – Dual**

#### **3784BD (Spring)**

#### **3784XD (Spring) for Cohort 2022**

Credit: .5

Prerequisite: Algebra I, Geometry, Algebra II, Trigonometry or Pre-Calculus recommended, students must meet the College/University requirements for the Dual credit option 2nd semester.

This is an algebra-based (non-calculus) course in mechanics, heat and sound. Students will practice problem-solving and analyzing physical situations involving motion, force, energy, rotations, heat, oscillations, waves, and sound. They will explore concepts in small groups, develop ideas, and explain them. The course lays the groundwork for college majors including engineering, physics, chemistry, or mathematics. Students will experience high-quality curriculum designed by the faculty at UT Austin. Students can earn three hours of UT credit with feedback and assessment provided by UT course staff. The second semester of this course is not eligible for semester exam exemptions.

#### **3933 Earth and Space Science**

Credit: 1

Prerequisite: Three credits of math and science; one of which may be taken concurrently.

Earth and Space Science (ESS) is a capstone course designed to build on students' prior scientific and academic knowledge and skills to develop understanding of Earth's system in space and time.

#### **3963 Astronomy**

Credit: 1

Prerequisite: Two science credits

Students conduct field and laboratory investigations, use scientific methods during investigations, and make informed decisions using critical thinking and scientific problem solving. Students study the following topics: information about the universe; scientific theories of the evolution of the universe; characteristics and the life cycle of stars; exploration of the universe; role of the Sun in our solar system; planets; and the orientation and placement of the Earth.

### **7130W Advanced Animal Science**

Credit: 1

Prerequisite: Biology, Chemistry or IPC, Geometry; and Small Animal Management or Livestock Production or Equine Science. Recommended: Veterinary Medical Applications

Take a deeper look into the animal industry by studying various livestock anatomy and physiology. Sample topics include diseases, reproduction, genetics and heredity. Hands-on activities and labs are an essential part of this course. This course is a Career and Technical Education funded course and requires 40% laboratory and fieldwork requirements.

#### **7740 Food Science**

Credit: 1

Prerequisite: Biology and Chemistry and a third science. How do we know if our food is safe? This course will use scientific methods to analyze the role of acids and bases in food science, apply the principles of food safety, study the chemical properties of food, and learn the reasons for additives and leavening agents in food. Also understand how food provides energy and how digestion and metabolism affect our bodies. This course is a Career and Technical Education funded course, and requires 40% laboratory and fieldwork requirements.

#### **8140C Forensic Science**

Credit: 1

Prerequisite: Biology and Chemistry  
Forensics is a structured and scientific approach to the investigation of crimes of assault, abuse and neglect, domestic violence, accidental death, homicide, and the psychology of the criminally insane. Learn basic terminology and investigative procedures related to crime scene, question building, interviewing, criminal behavior characteristics, and scientific procedures used to solve crimes. You will have the opportunity to collect and analyze evidence through case studies and mock crime scenes. Lab activities will be based on crime scene scenarios and analyzing fingerprints, ballistics, and blood spatter. Learn about the history, legal aspects of forensics, and career options available in the forensic field. This course is a Career and Technical Education funded course, and requires 40% laboratory and fieldwork requirements. This course can earn college credit based on Articulation agreements, which are subject to change.

**8329C Engineering Science - PLTW**

Credit: 1

Prerequisite: A PLTW Engineering Specialization course

This survey course of engineering exposes students to major concepts they'll encounter in a post-secondary engineering course of study. Students employ engineering and scientific concepts in the solution of engineering design problems. They develop problem-solving skills and apply their knowledge of research and design to create solutions to various challenges, documenting their work and communicating solutions to peers and members of the professional engineering community. This course can earn college credit based on Articulation agreements with the Rochester Institute of Technology, which are subject to change.

**8325C Engineering Design and Problem Solving - PLTW**

Credit: 1

Prerequisite: Three PLTW credits, Algebra II, Chemistry & Physics.

This engineering research course allows students to work in teams to research, design, and construct a solution to an open-ended engineering problem. Students apply principles developed in previous PLTW courses, present progress reports, submit a final written report and defend their solutions to reviewers. This course can earn college credit based on Articulation agreements, which are subject to change.

**3973W Advanced Plant and Soil Science**

Credit: 1

Prerequisite: Horticultural Science; Recommended Biology; IPC, Chemistry or Physics.

Complete your pathway by digging deeper into the Plant and Soil Sciences Industry through laboratory and field investigations in the areas of habitats and ecosystems, soil formation/genesis as well as environmental systems and conservation. Additional areas of study include hydroponics, watersheds, crop production, plant form and function, and genetics. Industry certification testing will be available for Wastewater Collections and Water Operators to all students meeting testing criteria; see teacher for these details. This course is a Career and Technical Education funded course, and requires 40% laboratory and fieldwork requirements.