Course Description: High School Biology (NGSS-Aligned, A–G Certified*)

This comprehensive High School Biology course is designed to fulfill one of the two required science credits for graduation and is aligned with the California Next Generation Science Standards (NGSS) for high school life sciences. The course provides a rigorous, engaging exploration of biological systems, from cellular processes to ecosystems, with a strong emphasis on laboratory investigation, data analysis, and scientific reasoning.

Instruction is delivered through weekly 2.5-hour live instructional sessions that combine interactive lectures, guided discussions, and hands-on laboratory activities. Core content includes:

Cellular biology and biomolecules

Enzymes, photosynthesis, and cellular respiration (HS-LS1-5, HS-LS1-6)

Genetics and inheritance, protein synthesis, mitosis, and meiosis (HS-LS1-1, HS-LS3-1, HS-LS3-2)

Evolution and natural selection (HS-LS4-2, HS-LS4-3, HS-LS4-4, HS-LS4-5)

Ecology and ecosystem dynamics, including human impacts (HS-LS2-1, HS-LS2-2, HS-LS2-6, HS-LS2-7)

Students examine real-world biological phenomena and develop an understanding of how living systems interact and maintain stability.

Students build proficiency in scientific inquiry and laboratory skills, including experimental design, data collection, analysis, interpretation, and scientific communication. In-class practicum sessions reinforce proper lab techniques, safety procedures, and NGSS Science and Engineering Practices, such as:

Developing and using models

Planning and carrying out investigations

Analyzing and interpreting data

Constructing evidence-based explanations

Engaging in argument from evidence

All required lab supplies are provided for in-person learners.

This course is A–G certified (pending approval by the enrolling charter school or PSP) and meets college-preparatory expectations for high school science.

Office hours will be by appointment only via Zoom.

An Honors option is available. Students who enroll in Honors Biology complete additional readings, assignments, and assessments at an accelerated depth and pace. Honors coursework is designed to prepare motivated students for the CLEP Biology examination for potential college credit. Honors students are strongly encouraged to make appointments for advanced support.

Standards Alignment: California NGSS – High School Biology

This course addresses the following NGSS Performance Expectations, including but not limited to:

From Molecules to Organisms: Structure and Function

HS-LS1-1: Construct explanations for how the structure of DNA determines the structure of proteins

HS-LS1-2: Develop and use models to illustrate hierarchical organization of interacting systems within multicellular organisms

HS-LS1-5: Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy

HS-LS1-6: Construct explanations for how carbon, hydrogen, and oxygen cycle through photosynthesis and cellular respiration

Heredity: Inheritance and Variation of Traits

HS-LS3-1: Ask questions to clarify relationships about the role of DNA and chromosomes in inheritance

HS-LS3-2: Make and defend claims about how variation in traits arises through meiosis and mutations

Biological Evolution: Unity and Diversity

HS-LS4-2: Construct explanations that biological diversity results from evolution

HS-LS4-3: Apply statistics and probability to support explanations that traits increase survival and reproduction

HS-LS4-4: Construct explanations for how natural selection leads to adaptation

HS-LS4-5: Evaluate evidence supporting claims that environmental changes can lead to increases, decreases, or extinction of species

Ecosystems: Interactions, Energy, and Dynamics

HS-LS2-1: Use mathematical representations to support explanations of energy flow and matter cycling in ecosystems

HS-LS2-2: Use models to illustrate the role of photosynthesis and respiration in the carbon cycle

HS-LS2-6: Evaluate claims about the role of group behavior in species survival

HS-LS2-7: Design and evaluate solutions for reducing human impacts on ecosystems and biodiversity

Instruction integrates NGSS Disciplinary Core Ideas (LS1, LS2, LS3, LS4), Science and Engineering Practices, and Crosscutting Concepts, including cause and effect, structure and function, energy and matter, systems and system models, and stability and change.

Constructing explanations & engaging in argument from evidence

Using mathematics and computational thinking

Crosscutting Concepts

Cause & effect

Systems & system models

Energy & matter

Stability & change

Structure & function

Additional Resources:

A–G Course List Verification: UCHS Articulation