



**Course Name:** General Biology I

**Course Number:** BIO\* E121

**Credits:** 4

**Catalog description:** An introduction to the principles and processes of living organisms. The course is designed to serve as the basis for further study in biology: it explores the chemical basis of life, including molecular biology, respiration and photosynthesis; the structure and function of the cell; the genetic basis of inheritance; and the evolution of life. Similarities and differences among organisms are also discussed. 3 hours lecture and 3 hours Laboratory

**Prerequisite:** ENG 101

## General Education Competencies Satisfied:

**HCC General Education Requirement Designated Competency Attribute Code(s):**

SCKX      Scientific Knowledge & Understanding

**Additional CSCU General Education Requirements for CSCU Transfer Degree Programs:**

SCRX      Scientific Reasoning

**Embedded Competency(ies):**

ED      Appreciation of the Ethical Dimensions of Humankind (Outcomes  1  2  3  4)

**Discipline-Specific Attribute Code(s):**

SCI      Science elective

## Course objectives:

### General Education Goals and Outcomes:

**Scientific Knowledge & Understanding:** Students will gain a broad base of scientific knowledge and methodologies in the natural sciences. This will enable them to develop scientific literacy, the knowledge and understanding of scientific concepts and processes essential for personal decision making and understanding scientific issues.

**Scientific Reasoning (for CSCU Transfer Degree Programs):** Students will become familiar with science as a method of inquiry. Students will develop a habit of mind that uses quantitative skills to solve problems and make informed decisions.



**Embedded Appreciation of the Ethical Dimensions of Humankind:** Students will identify ethical principles that guide individual and collective actions and apply those principles to the analysis of contemporary social and political problems.

1.  Respond critically to ethical issues.
2.  Apply appropriate concepts and terminology in identifying ethical problems, proposing and defending solutions to them.
3.  Apply standards and practices of scholarship, research, and documentation to defend positions and beliefs, including reevaluating beliefs in light of unforeseen implications or new evidence.
4.  Recognize the value of creative, collaborative, and innovative approaches to problem-solving, including the ability to acknowledge differing points of view.

**Course Specific Objectives:**

1. Describe the chemical and cellular basis of life.
2. Describe the genetic basis of inheritance using specific examples.
3. Explain the theories of the origins and evolution of life and how they have changed over time.
4. Explain how evolution can account for the unity and diversity of life.
5. Construct a flow chart of the organization in and among living systems.
6. Describe the structure of DNA and explain the central dogma of molecular biology.
7. Interpret the findings of classical experiments in biology using the scientific method.
8. Analyze the results of a biological experiment for accuracy and reasonableness.
9. Recognize ethical issues involved with modern biotechnology.

**Laboratory Specific Objectives:**

1. Perform and interpret assays for biologically important molecules.
2. Demonstrate an ability to use the light microscope.
3. Describe and identify basic cell structures under a microscope.
4. Perform basic chromatography techniques such as paper and column chromatography.
5. Explain the elements of electrophoresis.
6. Recognize and apply basic principles of genetics.
7. Design an experiment, collect data, interpret and apply the data to describe the classic principles of genetics.
8. Interpret the findings of experiments using the scientific method.
9. Use the spectrophotometer to collect data on photosynthesis and properly graph and interpret the data.
10. Correct data for instrumental and personal error, both of which are inherent in the measurement of real quantities.



**Course Content:**

**LECTURE**

1. INTRODUCTION
  - a. Basic themes in the study of life
  - b. Properties of life
  - c. Levels of biological organization
  - d. Introduction to classification
2. CHEMISTRY OF LIFE
  - a. Atoms and molecules
  - b. Water
  - c. Carbohydrates
  - d. Proteins
  - e. Lipids
  - f. Nucleic Acids
3. THE CELL
  - a. Ultra-structure
  - b. Membrane structure
  - c. Respiration
  - d. Photosynthesis
  - e. Mitosis
4. GENETICS
  - a. MENDELIAN GENETICS
  - b. Chromosomal inheritance
  - c. DNA structure
  - d. Protein synthesis
5. EVOLUTION

**LABORATORY**

1. Biologically important molecules
2. Chromatography
3. Light microscopy
4. Cell structure and function
5. Cellular reproduction
6. Photosynthesis
7. Genetics
8. Genetics of Wisconsin Fast Plant
9. Elements of electrophoresis
10. DNA extraction
11. DNA analysis



### **HCC Safety Standard**

Instruction covering all safety rules and guidelines will be provided by the instructor during the first laboratory session. The safety features of the individual laboratory will also be highlighted by the instructor. Students are expected to read and understand the rules of the HCC Science Laboratory Student Safety Contract. The students will then sign this contract signifying that they have been instructed and understand the requirements for safety pertaining to their course. The student and instructor will each keep a copy of this contract. Students must come to the laboratory prepared for the laboratory activity. Students must abide by the safety rules and guidelines which may include wearing personal protection equipment. Failure to do so may result in removal from the laboratory by the instructor.

Date Course Created:

Date of Last Revision: 02/27/2017