



## MASTER COURSE OUTLINE

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## COURSE TITLE

Survey of Biology

## GENERAL COURSE INFORMATION

Dept.: BIOL&

Course Num: 100

(Formerly: BIO 101)

CIP Code: 26.0101

Intent Code: 11

Program Code: N/A

Credits: 5

Total Contact Hrs Per Qtr.: 66

Lecture Hrs: 44

Lab Hrs: 22

Other Hrs: 0

Distribution Designation: Lab Science LS

## COURSE DESCRIPTION (as it will appear in the catalog)

A study of basic biological principles common to living organisms, this course is intended for non-majors who desire a lab science requirement. Topics of study include: scientific thinking, basic chemistry, cell structure and membrane transport, energy and cell pathways, DNA and gene expression, chromosomes and cell division, genes and inheritance, and evolution and natural selection. Related investigations take place in a required two-hour lab period each week. There will be no required dissections in the laboratory.

## PREREQUISITES

None

## TEXTBOOK GUIDELINES

A recent edition of an introductory, non-majors biology text such as *Concepts of Biology* (Open resource edited by Biology Faculty), the text used must have departmental approval.

Lab Manual: BIOL 100 Lab Handouts (required); online courses may use other approved materials.

## COURSE LEARNING OUTCOMES

*Upon successful completion of the course, students should be able to demonstrate the following knowledge or skills:*

1. Define science and describe how a person can use scientific thinking in everyday life by applying the scientific method to hypothetical biological problems as well as explaining experimental design.
2. Use knowledge of atomic structure and chemical bonding to discuss the properties of water, and describe the structure and functions of carbohydrates, lipids, proteins, and nucleic acids, including the enzyme structure and function.
3. Demonstrate knowledge of cells and their function by defining what a cell is and describing cell structure and membrane structure.
4. Name and explain the processes that move substances across membranes, and identify and describe the structure and functions of structures found within eukaryotic cells.
5. Describe energy use in cells by defining and explaining how energy is used, transported, and produced within cells; describing the detailed events that occur within photosynthesis and within cellular respiration.

6. Demonstrate knowledge of DNA and its function by describing the structure of DNA in detail and describing the events of replication, transcription, and translation.
7. Demonstrate understanding of cell division and its purposes by listing events of each phase of the cell cycle and meiosis; comparing and contrasting the purposes, events, and outcomes of mitosis and meiosis, and describing the eukaryotic cell cycle.
8. Demonstrate knowledge in genetics by stating and giving examples of Mendel's law of segregation and law of independent assortment.
9. Demonstrate knowledge in genetics by explaining simple dominance, incomplete dominance, codominance, multiple alleles, sex-linked traits, polygenic traits, and environmental factors.
10. Solve simple genetic problems involving up to two genetic traits at once by using a Punnett square.
11. Demonstrate knowledge of evolution and natural selection by defining each including what makes them different, and using an appropriate example to illustrate these concepts
12. Demonstrate knowledge of evolution by discussing fitness, adaptation, and the patterns of natural selection, and describing the evidence for evolution.
13. Demonstrate the knowledge of the scientific method with experimental design by applying the scientific method to hypothetical biological problems and designing valid experiments.
14. Apply knowledge of scientific method/experimental design, microscopes, macromolecules, cells/transport, metabolism, replication/protein synthesis, mitosis/cell cycle, meiosis/gametes, genetics, evolution, and ecology within laboratory exercises.

### **INSTITUTIONAL OUTCOMES**

IO3 Human Relations/Workplace Skills: Students will be able to demonstrate teamwork, ethics, appropriate safety awareness and/or workplace specific skills.

### **COURSE CONTENT OUTLINE**

1. Introduction to Biology – Themes and Concepts of Biology, The Process of Science
2. Chemistry of Life – The Building Blocks of Molecules, Water, Biological Molecules
3. Cell Structure and Function – Cell Theory and the Two Types of Cells, The Plasma Membrane, Structures Found Within Eukaryotic Cells, Passive Transport, Active Transport
4. How Cells Obtain Energy – Energy and Metabolism, ATP and the ATP/ADP Cycle, Cellular Respiration
5. Photosynthesis – Overview of Photosynthesis, The Light-Dependent Reactions of Photosynthesis, The Calvin Cycle of Photosynthesis
6. Reproduction at the Cellular Level – The Genome, Interphase and the Cell Cycle, The Mitotic Phase, Cancer and the Cell Cycle
7. The Cellular Basis of Inheritance – Sexual Reproduction, Meiosis, Errors in Meiosis
8. Patterns of Inheritance – Mendel's Experiments, Laws of Inheritance, Extensions of the Laws of Inheritance
9. Molecular Biology – Structure of DNA, DNA Replication, Transcription, Translation
10. Evolution and Its Processes – Discovering How Populations Change, Mechanisms of Evolution, Evidence of Evolution, and Common Misconceptions about Evolution

Upon completion of the above core material, additional areas of biology may be explored as time permits, including one or more of the following topics:

Biotechnology	The Immune System and Disease
Population and Community Ecology	Ecosystems and the Biosphere

Additional topics outside of this list are also permitted with departmental approval.

### **DEPARTMENTAL GUIDELINES** *(optional)*

- The overall course percentage will be based on the following weighted categories:
  - Lecture exams (including 2-4 tests plus a comprehensive final exam) collectively worth 60-65%,

- Laboratory work collectively worth 20-25%, and
- Class assignments/quizzes collectively worth 15-20% of the overall score
- A standard grade scale will be used for this course with a 2.0 grade point corresponding to 70-72%.
- All exams are proctored. When possible, exams are held on campus. Online and hybrid courses may have exams online, they may or may not be proctored.
- Lab is an essential part of this class and is required for credit. Students missing more than two labs will not be given credit for this course.
- PO5 should be assessed: Students will be able to solve problems by gathering, interpreting, combining and/or applying information from multiple sources.

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**DIVISION CHAIR APPROVAL**

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**DATE**