

Administrative Master Syllabus

Course Information

Course Title	General Biology 1
Course Prefix, Num. and Title	BIOL 1406
Division	Life Sciences
Department	Biology
Course Type	Academic WCJC Core Course
Course Catalog Description	Fundamental principles of living organisms will be studied, including physical and chemical properties of life, organization, function, evolutionary adaptation, and classification. Concepts of cytology, reproduction, genetics, and scientific reasoning are included. Laboratory activities will reinforce these concepts.
Pre-Requisites	TSI satisfied in Reading and Writing
Co-Requisites	Enter Co-Requisites Here.

Semester Credit Hours

Total Semester Credit Hours (SCH): Lecture Hours:	4:3:2
Lab/Other Hours	
Equated Pay Hours	4.2
Lab/Other Hours Breakdown: Lab Hours	2
Lab/Other Hours Breakdown: Clinical Hours	Enter Clinical Hours Here.
Lab/Other Hours Breakdown: Practicum Hours	Enter Practicum Hours Here.
Other Hours Breakdown	List Total Lab/Other Hours Here.

Approval Signatures

Title	Signature	Date
Prepared by:		
Department Head:		
Division Chair:		
Dean/VPI:		
Approved by CIR:		



Topical Outline: Each offering of this course must include the following topics (be sure to include information regarding lab, practicum, and clinical or other non-lecture instruction).

LECTURE TOPICAL OUTLINE

1. Introduction to Biology
 - A. Characteristics of life
 - B. Biological organization
 - C. Introduction to taxonomy
 - D. Evidence for evolution through natural selection
 - E. Scientific inquiry and the scientific method
2. Chemistry
 - A. Atoms and molecules
 - B. Chemical bonding
 - C. Importance of water
 - D. Properties of biological molecules (including structure, function, and examples): carbohydrates, lipids, proteins and nucleic acids
3. Viruses
 - A. Structure and characteristics
 - B. Reproduction
4. Cell theory
 - A. Cell theory
 - B. Prokaryotic vs. eukaryotic cells (structures, reproduction and characteristics)
 - C. Membrane structure and function
 - D. Types of membrane transport (including specific examples of each): passive transport, active transport and bulk transport
5. Energy Flow and Metabolism
 - A. Laws of thermodynamics
 - B. Metabolic pathways: catabolic vs. anabolic
 - C. Structure and hydrolysis of ATP
 - D. Structure, function and regulation of enzymes
6. Cellular Respiration
 - A. Cellular respiration as a redox reaction
 - B. Stages of cellular respiration: glycolysis, pyruvate oxidation, citric acid cycle and oxidative phosphorylation
 - C. Importance and types of fermentation: alcohol vs. lactate
7. Photosynthesis
 - A. Photosynthesis as a redox reaction
 - B. Stages of photosynthesis: light reactions and the Calvin cycle
8. The Cell Cycle
 - A. Importance (roles) of cell division
 - B. Mitotic cell cycle: interphase, mitotic phases and cytokinesis
 - C. Cell cycle regulation
9. Meiosis and Sexual Life Cycles
 - A. Importance (role) of meiosis in sexual life cycles
 - B. Meiotic stages: meiosis I vs. meiosis II
 - C. Contribution of genetic variation to evolution

10. Classical Genetics

- A. Mendel's laws of segregation and independent assortment
- B. Monohybrid and dihybrid crosses
- C. Mendelian patterns of inheritance in humans
- D. Extending Mendelian genetics: codominance, incomplete dominance, multiple alleles, pleiotropy, epistasis, polygenic inheritance and sex-linked genes

11. DNA Replication

- A. Discovering DNA structure: Watson, Crick and Franklin
- B. Semiconservative model of replication
- C. Proteins involved in DNA replication and repair
- D. Steps of replication process for leading and lagging strands

12. Protein Synthesis

- A. Flow of genetic information: DNA → RNA → protein
- B. Steps of transcription and translation
- C. Point mutations and their effect on protein structure and function

LAB TOPICAL OUTLINE

- 1. Orientation, laboratory safety and the microscope
- 2. Properties of water, electrolytes, acids & bases
- 3. Biological molecules
- 4. Cell structure and function
- 5. Movement of molecules
- 6. Enzymes
(Lab practical #1)
- 7. Cellular respiration and alcohol fermentation
- 8. Photosynthesis
- 9. The cell cycle
- 10. DNA structure, function and extraction
- 11. DNA fingerprinting I
- 12. DNA fingerprinting II and protein synthesis
(Lab practical #2)

Course Learning Outcomes:

Learning Outcomes – Upon successful completion of this course, students will:

- 1. Describe the characteristics of life.
- 2. Explain the methods of inquiry used by scientists.
- 3. Identify the basic requirements of life and the properties of the major molecules needed for life.
- 4. Compare and contrast the structures, reproduction, and characteristics of viruses, prokaryotic cells, and eukaryotic cells.
- 5. Describe the structure of cell membranes and the movement of molecules across a membrane.
- 6. Identify the substrates, products, and important chemical pathways in metabolism.
- 7. Identify the principles of inheritance and solve classical genetic problems.
- 8. Identify the chemical structures, synthesis, and regulation of nucleic acids and proteins.
- 9. Describe the unity and diversity of life and the evidence for evolution through natural selection.

10. Apply scientific reasoning to investigate questions and utilize scientific tools such as microscope and laboratory equipment to collect and analyze data.
11. Use critical thinking and scientific problem-solving to make informed decisions in the laboratory.
12. Communicate effectively the results of scientific investigations.

Methods of Assessment:

Exams, lab reports, essays, presentations, discussions (online or in- class), group activities, graph/table/chart presentations or post-tests

Required text(s), optional text(s) and/or materials to be supplied by the student:

Text: Reece, et al. *Campbell Biology*. Pearson. Current edition

Lab Manual: Crowder, Durant and Penrod. *Exploring the Unity of Organisms: Biology 1 Laboratory Manual*. Hayden-McNeil. Current edition

Suggested Course Maximum:

36 lecture; 24 lab

List any specific or physical requirements beyond a typical classroom required to teach the course.

Laboratory classroom required

Course Requirements/Grading System: Describe any course specific requirements such as research papers or reading assignments and the generalized grading format for the course.

Lecture Average:		55%
Exam average (3-4 exams)	30-55%	
Other (homework, quizzes, projects, etc.)	0-25%	
Laboratory Average *		25%
Final Exam (includes at least 50% comprehensive material)		<u>20%</u>
	TOTAL	100%

* Laboratory Average calculated as follows:

Quiz Average (best 6 of 9 weekly quizzes)	50%
Lab Practical #1 Exam	25%
Lab Practical #2 Exam	<u>25%</u>
	100%

A	100-90
B	89-80
C	79-70
D	69-60
F	Below 60

Curriculum Checklist:

- Administrative General Education Course** (from ACGM, but not in WCJC Core) – No additional documents needed.
- Administrative WCJC Core Course.** Attach the Core Curriculum Review Forms
 - Critical Thinking
 - Communication
 - Empirical & Quantitative Skills
 - Teamwork
 - Social Responsibility
 - Personal Responsibility
- WECM Course** -If needed, revise the Program SCANS Matrix and Competencies Checklist

Core Curriculum Review Form

Foundational Component Area: Core 030: Life & Physical Science

Course Prefix & Suffix: BIOL 1406

Core Objective:

Critical Thinking Skills—to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information

Student Learning Outcome Supporting Core Objective:

For each core objective, there must be at least two different methods of assessment.

SLO Status	Student Learning Outcome (SLO)	Learning Activity	Assessment
State Mandated	Communicate effectively the results of scientific investigations	Lab exercise in which students work in groups to consider the effects of solute concentration on osmotic rates; concepts to be reiterated in lecture	Group lab activity or post-test
Choose a SLO status.	Insert SLO (from Administrative Master Syllabi)	Provide a brief name and description of the sample learning activity.	Provide a brief name and description of the sample quiz, exam, rubric, assignment, etc. for assessing the objective.
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Core Curriculum Review Form

Foundational Component Area: Core 030: Life & Physical Science

Course Prefix & Suffix: BIOL 1406

Core Objective:

Communication Skills—to include effective development, interpretation and expression of ideas through written, oral and visual communication

Student Learning Outcome Supporting Core Objective:

For each core objective, there must be at least two different methods of assessment.

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State Mandated	Communicate effectively the results of scientific investigations	Communicate effectively the results of scientific investigations	Group lab activity or post-test
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Core Curriculum Review Form

Foundational Component Area: Core 030: Life & Physical Science

Course Prefix & Suffix: BIOL 1406

Core Objective:

Empirical and Quantitative Skills—to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions

Student Learning Outcome Supporting Core Objective:

For each core objective, there must be at least two different methods of assessment.

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Core Curriculum Review Form

Foundational Component Area: Core 030: Life & Physical Science

Course Prefix & Suffix: BIOL 1406

Core Objective:

Teamwork—to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal

Student Learning Outcome Supporting Core Objective:

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