

Angelina College  
Science and Mathematics Division  
BIOL 1406: Biology for Science Majors I  
General Syllabus

I. **Basic Course Information**

A. **Course 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.

B. **Intended Audience:** This course is intended for science and mathematics majors

C. **Instructor:**

Instructor: Dr. Andrea Barrett  
Office: S121  
Office Hours: As posted or by appointment  
Phone: (936) 633-5262  
e-mail: [abarrett@angelina.edu](mailto:abarrett@angelina.edu)

II. **Intended Student Outcomes**

A. **Core Competencies (Basic Intellectual Competencies)**

1. **Critical Thinking:** To include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information.
2. **Communication:** To include effective development, interpretation and expression of ideas through written, oral and visual communication.
3. **Empirical and Quantitative Skills:** To include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions.
4. **Teamwork:** To include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal.

B. **Course Learning Outcomes for all Sections.**

**Upon successful completion of lecture portion of the 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.

**Upon successful completion of laboratory portion of the course, students will:**

1. Apply scientific reasoning to investigate questions and utilize scientific tools such as microscopes and laboratory equipment to collect and analyze data.
2. Use critical thinking and scientific problem-solving to make informed decisions in the laboratory.
3. Communicate effectively the results of scientific investigations.
4. Describe the characteristics of life.
5. Explain the methods of inquiry used by scientist.
6. Identify the basic properties of substances needed for life.
7. Compare and contrast the structures, reproduction, and characteristics of viruses, prokaryotic cells, and eukaryotic cells.
8. Describe the structure of cell membranes and the movement of molecules across a membrane.
9. Identify the substrates, products, and important chemical pathways in metabolism.
10. Identify the principles of inheritance and solve classical genetic problems.
11. Identify the chemical structures, synthesis, and regulation of nucleic acids and proteins.
12. Describe the unity and diversity of life and the evidence for evolution through natural selection.

III. **Assessment Measures of Student Learning Outcomes**

A. **Assessments for the Core Objectives**

1. **Critical thinking:** Students will analyze, compare, and contrast an assigned scientific topic. Evidence of critical analysis will be assessed using a standardized AC rubric.
2. **Communication:** Oral and visual communication will be assessed during a 10 to 15 minute classroom presentation. Written communication will be assessed based on an accompanying research paper to the

presentation where students will present the bulk of their data or analysis. Communication skills and abilities will be assessed using a standardized AC rubric.

3. **Empirical and quantitative Skills:** In researching the assigned scientific topic, students will compare and analyze the data presented in scientific articles. Students will also design an experiment to test underlying scientific theory where applicable. Their findings will be presented orally and in written format. Empirical and quantitative skills will be evaluated using a standardized AC rubric.
4. **Teamwork:** Students will be assigned to teams. Each team will be assigned specific set of scientific topics and use the scientific literature available to analyze. Team members will work together to define the roles of each member, will collaborate to share information and generate a meaningful synopsis of the compared works. Team members will evaluate the performance of one another using standardized AC rubric.

#### **B. Assessments for the Course Learning Outcomes for all Sections**

Assessment for the Course Learning Objectives will use embedded test questions on quizzes, three major exams, and a final exam.

#### **IV. Instructional Procedures**

This course will be taught using a combination of lectures and laboratory exercises that complement and supplement lecture material. Audio-visual materials, models, and laboratory experiments will be employed to enhance lecture and laboratory presentations.

#### **V. Course Requirements and Policies**

##### **A. Required Textbooks, Materials, and Equipment**

1. Biology: How Life Works, Morris, Hartl, Knoll, Lue. Macmillian publishing, 2<sup>nd</sup> edition.
2. Investigations in Biology, Barrett, A. Rhaeadr Publishing, 1<sup>st</sup> edition.
3. Access to Launchpad
  - a. <http://www.macmillanhighered.com/launchpad/morris2e/10060389>
4. Access to Blackboard
5. Scantrons (882-E) for each exam.

**B. Academic Assistance** – If you have a disability (as cited in Section 504 of the Rehabilitation Act of 1973 or Title II of the Americans with Disabilities Act of 1990) that may affect your participation in this class, you may fill out the Educational Accommodations application within your AC Portal, under the “Student Services” tab. A Student Success team member will contact you once the application is received. At a post-secondary institution, you must self-identify as a person with a disability in order to receive services; for questions regarding the application process you can visit the Office of Student Success and Inclusion in the Student Center (205A); text 936.463.8078; or email [access@angelina.edu](mailto:access@angelina.edu). To report any complaints of discrimination related to a disability, you should contact Mr. Steve Hudman, Dean of Student Affairs, in Room 101 of the Student Center. You may also contact Dean Hudman by calling (936) 633-5292 or by emailing [hudman@angelina.edu](mailto:hudman@angelina.edu).

**C. Attendance** – All students are expected to attend all scheduled classes and examinations and to be on time. Students who know they will be absent in advance should contact the instructor as soon as possible by e-mail (preferred) or telephone. The instructor will determine whether or not an absence is excused. **IT IS THE STUDENT’S RESPONSIBILITY TO DROP THE COURSE** to avoid a potentially failing grade, however any student with 3 consecutive, or 4 cumulative absences may be dropped by the instructor regardless of the potential end of semester grade. **The last day to drop the course with a “W” is (April 1, 2019).**

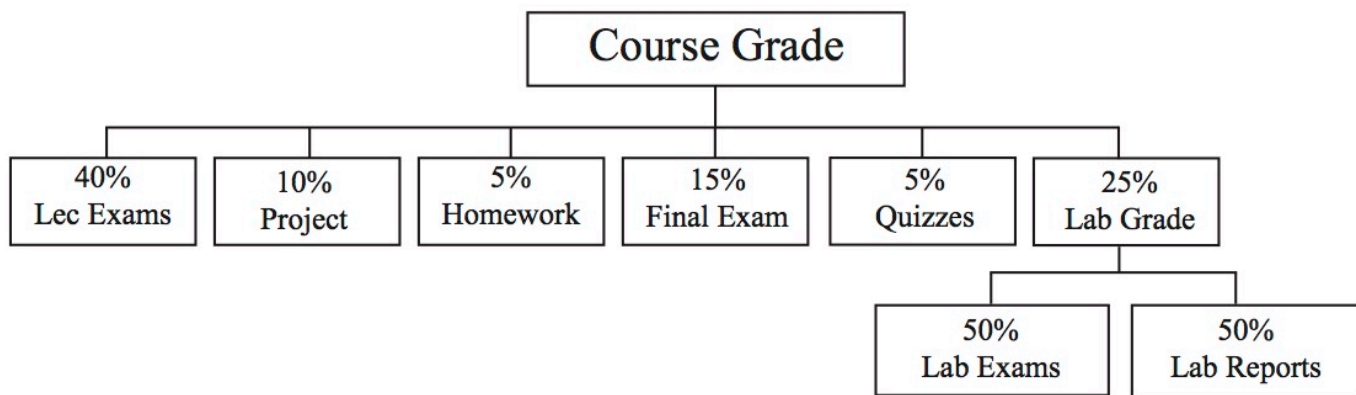
##### **D. Course Conduct**

1. Absolutely no cell phone use is allowed during labs or class.
2. No Food, drinks, or tobacco in class.
3. Courteous and respectful behavior will be expected in class at all times.

**VI. Evaluation and Grading**

- A. Lecture Exams:** There will be four regular non-comprehensive lecture exams that will be given as shown on the class schedule. Collectively, they are worth 40% of the lecture grade.
- B. Missed Exams:** There will be NO make-up exams. The final exam grade may replace the single lowest test grade or the grade for a missed exam.
- C. Quizzes:** Several quizzes will be given throughout the semester over chapters specified by your instructor. They will be collectively worth 5% of the lecture grade.
- D. Homework:** All homework assignments given on Launchpad will be worth a collective 5% of the lecture grade.
- E. Projects:** There will be a total of four different projects given throughout the semester. Collectively they are worth 10% of the lecture grade.
- F. Final Exam:** The final exam is comprehensive and will be given during the scheduled final examination period. The score of the final exam may replace the lowest regular exam grade. The final exam is worth 15% of the lecture grade.
- G. Lab Exams:** There will be two lab exams that are comprehensive over the laboratory experiments given on the lab schedule. Collectively, they are worth a total of 50% of the lab grade.
- H. Lab reports:** All lab reports (observations and results) at the end of each laboratory experiment will be graded. Collectively, they are worth a total of 50% of the lab grade.

Total Percentage	Final Grade
90+%	A
80-89%	B
70-79%	C
60-69%	D
Below 60%	F



## VII. Course Outline

Description of the course activities including: due dates, schedules, and deadlines.

Class	Day	Date	Chapter	Description
1	M	14-Jan	1	Course Introduction and Life
2	W	16-Jan	2	Molecules of Life
	M	21-Jan		<b>MLK Holiday</b>
3	W	23-Jan	5	Organizing Principle
4	M	28-Jan	3	Nucleic Acids and Transcription
5	W	30-Jan	4	Translation and Protein Structure
6	M	4-Feb	3, 4	Transcription and Translation Review
7	W	6-Feb		<b>Exam 1</b>
8	M	11-Feb	6	Making Life Work
9	W	13-Feb	7	Cellular Respiration
10	M	18-Feb	8	Photosynthesis
11	W	20-Feb	7, 8	Energy Review
12	M	25-Feb	9	Cell Signaling
13	W	27-Feb		<b>Exam 2</b>
14	M	4-Mar	10	Cell and Tissue Architecture
15	W	6-Mar	11	Cell Division
	M	11-Mar		<b>Spring Break</b>
	W	13-Mar		<b>Spring Break</b>
16	M	18-Mar	11	Cell Division cont.
17	W	20-Mar	12	DNA Replication and Manipulation
18	M	25-Mar	13	Genomes
19	W	27-Mar	14	Mutation and DNA repair
20	M	1-Apr		<b>Exam 3</b>
21	W	3-Apr	15	Genetic Variation
22	M	8-Apr	16	Mendelian Inheritance
23	W	10-Apr	16	Mendelian Inheritance cont.
24	M	15-Apr	17	Inheritance of Sex Chromosomes, Linked Genes, and Organelles
25	W	17-Apr	18	The Genetic and Environmental Basis of Complex Traits
26	M	22-Apr	19	Genetic and Epigenetic Regulation
27	W	24-Apr	20	Genes and Development
28	M	29-Apr		<b>Exam 4</b>
29	W	1-May		Semester review
30	W	8-May		<b>Comprehensive Final Exam</b>

**VIII. Laboratory Outline**

Description of the course activities including: due dates, schedules, and deadlines.

<b>Class</b>	<b>Day</b>	<b>Date</b>	<b>Exp</b>	<b>Description</b>
1	F	18-Jan	1	The Scientific Method and Data Analysis
2	F	25-Jan	2	The Microscope and The Cell
3	F	1-Feb	3	Movement Across the Membrane
4	F	8-Feb	Handout	Enzyme Activity
5	F	15-Feb	5	Cellular Respiration and Photosynthesis
6	F	22-Feb	6	Cell Reproduction
7	F	1-Mar		<b>Lab Exam 1</b>
8	F	8-Mar	8	Identification of GMOs: DNA Extraction
	F	15-Mar		<b>Spring Break</b>
9	F	22-Mar	9	Identification of GMOs: PCR
10	F	29-Mar	10	Identification of GMOs: Gel Electrophoresis
11	F	5-Apr	7	Heredity
12	F	12-Apr	11	Transformation
13	F	19-Apr	12	Protein Purification and Analysis
14	F	26-Apr		<b>Lab Exam 2</b>

**SYLLABUS MODIFICATION:** The instructor may modify the provisions of the syllabus to meet individual class needs by informing the class in advance as to the changes being made.