

BIO 101

BIOLOGICAL SCIENCE FOR SCIENCE MAJORS I

4 cr. (3-2)

**COURSE DESCRIPTION:**

This course is designed for science majors. It is a lecture-lab course which includes the following: an introduction to biochemistry, molecular genetics, cell structure, function, and processes. The scientific method is presented in lab.

**PREREQUISITES:** None**COURSE OBJECTIVES:**

Students will:

1. Describe and discuss the organization of living systems at the molecular, cellular, and organismal levels.
2. Compare and contrast the structure and function of organisms belonging to each of the six living kingdoms.
3. Describe principles of chemistry and thermodynamics that are important to the organization and function of living systems.
4. Identify and describe the components of eukaryotic and prokaryotic cells. Discuss the importance of membranes in regulating, organizing and facilitating cellular biological processes.
5. Compare and contrast chemical pathways for acquiring and transforming energy and matter at the cellular level. Clearly distinguish between the mechanisms and purposes of photosynthesis, respiration, and fermentation.
6. Describe prokaryotic and eukaryotic cell growth and division. Differentiate between the characteristics and outcomes of asexual versus sexual nuclear division in eukaryotes.
7. Demonstrate both a theoretical and practical understanding of the principles of inheritance in plants and animals, including humans. Both predict and analyze the outcomes of simple Mendelian matings.
8. Describe the structure and behavior of genes at the molecular, chromosomal, cellular, and organismal levels. Relate their behavior to Mendel's laws of inheritance.
9. Describe the techniques, products and applications of molecular biotechnology in basic science, medicine, agriculture, and/or industry.
10. Identify or describe some potential effects of biotechnology on humanity, including some ethical difficulties created by growing knowledge and technology in the field of biology.

**Lab Objectives:**

1. Demonstrate an understanding of scientific principles by the collection, qualitative and quantitative analysis, interpretation, and presentation of experimental data. Demonstrate an ability to communicate scientific information orally and in written assignments.
2. Show a theoretical and practical understanding of common biological techniques such as light microscopy, enzyme activity assays, restriction mapping of DNA or PCR analysis, computer modeling, and analysis of Mendelian traits in animals or plants.

**COURSE OUTLINE:**

Exam dates may be revised in response to unforeseen circumstances.

Lecture Topics	Dates	Chapters
I. The Organization of Life (Chapters 1-4)	Week 1 August 14-15	Introduction Syllabus
	Week 2 August 18-22	Chapter 1
	Week 3 August 25-29	Chapter 2 CD ROM - Biochemistry
	Week 4 September 1-5	Chapter 3 <b>Synopsis 1 due</b>
	<b>No School Monday September 1 – Labor Day</b>	
	Week 5 September 8-12	Chapter 4 <b>Exam 1 - Chapters 1 -3</b>
II. Energy Transfer and Living Systems (Chapters 5-8)	Week 6 September 15-19	Chapter 5 CD ROM – The Plasma Membrane
	Week 7 September 22-26	Chapter 6 CD ROM – Enzymes <b>Synopsis 2 due</b>
	Week 8 September 29- October 3	Chapter 7 CD ROM – Cellular Respiration <b>Exam 2 Chapters 4 - 6</b>
	Week 9 October 6-10	Chapter 8 CD ROM - Photosynthesis
III. Cell Growth and Inheritance (Chapters 9, 10, 15)	Week 10 October 13-17	Chapter 9 CD ROM Mitosis CD ROM Meiosis <b>Exam 3 Chapters 7-8</b>
	Week 11 October 20-24	Chapter 10 CD ROM Mendel's Principles
	Week 12 October 27-31	Chapter 15

Lecture Topics	Dates	Chapters
IV. Molecular Genetics and Biotechnology (Chapters 11-14)	Week 13 November 3-7	Chapter 11 CD ROM DNA: The Molecule of Life <b>Exam 4 Chapters 9, 10, 15</b>
	Week 14 November 10-14	Chapter 12 CD ROM From DNA to Protein
	<b>No School November 11-Veteran's Day</b>	
	Week 15 November 17-21	Chapter 13 Genetics Paper is Due
	<b>November 24-29 Thanksgiving Break</b>	
	Week 16 December 1-5	Chapter 14 Plant <b>Exam 5 Chapters 11-14</b>
	December 6-11	<b>Final Exams</b>

### Lab Schedule

Date	Lab Topics
Week 1 August 14-15	Lab Safety Handout
Week 2 August 18-22	Microscope I Ex. 1.1-1.3 Pages 5-13
Week 3 August 25-29	Microscope II Ex. 1.5 Pages 15-24
Week 4 September 1-5	Scientific Investigation I Ex. 2.1-2.2 Pages 27-35
Week 5 September 8-12	*Scientific Investigation II Ex. 2.3 Pages 35-39
Week 6 September 15-19	*Diffusion and Osmosis Ex. 3.1-3.2 Pages 59-71
Week 7 September 22-26	Enzyme I Ex. 1-2 Pages 88-93
Week 8 September 29-October 3	*Enzyme II Ex. 3 Pages 94-105
Week 9 October 6-10	*Photosynthesis Ex. 5.1-5.3 Pages 113-123
Week 10 October 13-17	*Carbohydrate Metabolism Handout
Week 11 October 20-24	Mitosis Ex. 6.1-6.3 Pages 135-146

Date	Lab Topics
Week 12 October 27-31	Meiosis Ex. 6.4 and Handout Pages 146-152
Week 13 November 3-7	Mendelian Genetics Handout
Week 14 November 10-14	PCR I Handout
Week 15 November 17-21	Genetics Paper is due *PCR II Handout
Week 16 December 1-5	Lab Clean Up and Discussion

### **COURSE REQUIREMENTS:**

1. You are required to attend lecture and lab. If you are late to class, you should give the instructor a **note** at the **end** of class so that you are counted tardy rather than absent. (PLEASE don't skip classes—nothing is more disastrous for your grade). You miss 10 points per lab absence plus assignments and quiz points for absences from lecture.
2. You must turn in assignments on time. Should an emergency arise, you should contact your instructor **as soon as possible** to inform him or her of the problem.
3. Exams. There will be five lecture exams and one cumulative final exam. If your instructor chooses, he or she may make a homework assignment one component of one or more of the regular exams. The four best lecture exams will count. There will **not** be any makeup exams after the class has taken the exam. If you must miss a lecture exam for any reason, you can arrange to take the exam early.
4. There will be at least ten (10) unannounced lecture quizzes or in-class assignments throughout the semester. Your top ten scores will be used in computing your final grade. These quizzes **may not be made up**. Most of the quizzes will be given at the beginning of the class. If you are tardy, then you will not be allowed to take them.
5. Your final grade will reflect your performance in **both** lecture and lab. You receive one overall grade for both parts of the class.
6. Big Paper. You will write a research paper based on the data gathered in one lab experiment (Genetics). The due date is listed in the Lecture Outline. The paper must be written and cited in the style of *Infection and Immunity*. (Examples are available on reserve in the LRC). These papers must be typewritten, in the appropriate format, and turned in on time. You will receive additional information about this assignment.

7. Little Papers. Two **brief** synopses (summaries) of articles on cells, physiology, tissue culture, genetics, or molecular biology. **No other topics are acceptable!** Each synopsis should be 5-10 sentences long and should be in a clear, formal written English. There should be **no direct quotations**—not even a part of a sentence.

**You must clearly identify the article by title, authors, journal name, date, volume number, and page numbers.** You may choose a 2-3 page article from any scientific journal dated 2003 or later in the LRC. These are worth 10 points each if well done.

8. Lab Reports. You will turn in five lab reports over the starred exercises. Each should be neatly written and submitted within one week of the completion of each lab. There will be one report each for exercises 1, 2, 4, 6, PCR, and Respiration Lab. The format for laboratory reports is described throughout the manual and is summarized in Appendix A of the manual. **You may turn in reports only over exercises which you actually performed!** Late reports will be returned within two weeks of when you turned it in.
9. Lab. The laboratory component of your grade will be determined by attendance, participation, lab reports, video question assignments, and performance on quizzes and/or skill demonstrations. Your instructor will give you more details about laboratory grading.

Classroom Behavior. Disruptive behavior in the classroom or laboratory is unacceptable. You will be asked to leave if you behave in a way that makes either teaching or learning difficult. “Disruptive behavior” includes, but is not limited to, conversing during lectures or exams, profanity, abusive language, or rude/abusive behavior directed towards **anyone** in the classroom. Students and teachers alike are expected to treat others with respect and civility. Please be familiar with your rights and responsibilities as outlined in the John A. Logan College Handbook of Student Rights and Responsibilities.

Incompletes are only given to those who are passing at the time of the request and who are missing no more than one major assignment. Because lab space is limited, it is not usually possible to take an incomplete when significant lab work must be made up.

Anyone caught cheating on an exam or other assignment will be asked to withdraw from the class or will receive a failing grade. Formal disciplinary action may be taken at the instructor’s discretion.

Student Success Center. Tutors may be obtained through the Student Success Center. Contact the staff in C219 if this service is desired. John A. Logan College will make reasonable accommodations for students with documented disabilities under Section 504 of the Rehabilitation Act of 1973, and the Americans with Disabilities Act of 1990. Any student with a disability that may have some impact on work in this class, who feels

she/he needs an accommodation, should make an appointment with the Coordinator of Services for Students with Disabilities on campus, Jennifer Frost, Room C219B, Ext. 8516. Before services can be provided, this advisor must determine eligibility and arrange appropriate academic adjustments. ***It is the student's responsibility to register in advance of a school term with this office and to turn in a schedule each term to ensure that there is every opportunity for success in this class.***

English Writing Center/Tutoring. For assistance with writing assignments in any college course, students are encouraged to visit "The Write Place" in Room E109. English instructors are available for one-on-one tutoring each semester during hours posted at the center.

Financial Aid. Students who receive financial assistance and completely withdraw from classes prior to 60% of the semester being completed (approximately 2-3 weeks after midterm) could be responsible to return a portion of their Federal Pell Grant award. Prior to withdrawing from courses, students should contact the Financial Aid Office.

Course Withdrawal Information. It is expected that you will attend this class regularly. If you stop attending for any reason, you should contact your advisor and withdraw officially to avoid the posting of a failing grade (an E) to your transcript. It is also advisable to discuss the situation with your instructor before dropping.

### **METHOD OF EVALUATION:**

Tests/Homework – 4 at 100 points .....	400
Final Exam .....	150
Lecture Quizzes (Includes film worksheets & assignments).....	100
Two Synopses.....	20
Genetics Paper .....	80
Lab Questions, Quizzes and Skills.....	100
Lab Reports – 5 at 30 points .....	<u>150</u>
Total Points .....	1000

### **Minimum Grading Scale:**

A 900+.....	(90%+)
B 800-899.....	(80-89%)
C 700-799.....	(70-79%)
D 600-699.....	(60-69%)

This is a minimum scale (i.e., if you get 800 points, you are guaranteed at least a B). The scale may be adjusted upwards in response to unforeseen events.

Your textbook publisher has a website: [www.thomsonedu.com/biology/solomon](http://www.thomsonedu.com/biology/solomon) . There are flashcards, quizzes and other materials for each chapter in the text. Your textbook also has a website called "Thomson Now." There are questions for you to answer (and the correct answer) in the form of pre- and post-tests.

### **METHOD OF PRESENTATION:**

Lecture, discussion, readings, assigned worksheets and problem sets, written papers and lab reports, supervised laboratory work, videos

### **TEXTS:**

Biology, 8<sup>th</sup> edition. Solomon, Berg, Martin and Villee. Saunders College Publishing.  
Symbiosis. (Lab Manual). Morgan/Carter. Benjamin Cummings, Publishers.  
 Study Guide (recommended but not required). A copy is on reserve in LRC.  
Chemistry for Biology (recommended but not required).

**INSTRUCTOR:** Dr. Sue Trammell  
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 Ext: 8324  
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**DATE:** Fall, 2008

### **John A. Logan College Telephone Numbers**

Cartersville and Williamson County .....	985-3741 (operator)
	985-2828 (direct extension access)
Carbondale and Jackson County .....	549-7335 (operator)
	457-7676 (direct extension access)
Du Quoin .....	542-8612
West Frankfort.....	937-3438
Crab Orchard, Gorham, & Trico areas .....	1-800-851-4720
TTY (hearing-impaired access) .....	985-2752

*John A. Logan College does not discriminate on the basis of race, religion, color, national origin, disability, age, sexual orientation, or gender orientation.*

**BIO 101 Syllabus Addendum**  
**Dr. Sue Trammell**

**Students: Please keep this information and refer to it during the semester.**

Unless otherwise stated here, information and policies on your regular course syllabus will be followed. Please read the following information that applies to courses I teach.

Cell Phones:

Please turn cell phones and pagers off before class *begins*. If your phone becomes a disruption in class, you will be asked to leave class that day with no points for work.

Pencils:

You will be required to complete ALL work (quizzes, tests, homework) in biology in pencil. Or, in the case of written assignments such as article summaries, you may type/word process your assignments in black ink. Please buy at least 2 pencils with good erasers and have them with you every day in both lecture and laboratory. After the second week of class, I will not accept any work done in pen and marker (0 for grade).

Textbooks:

You are expected to buy necessary textbooks for your biology class. You are to bring them with you *every day* to class because you will need them for both lab and lecture.

For most of my courses, I recommend students buy the “student study guide” book for their particular textbook. Now some “study guides” are on a CD that comes with the textbook or they can be found on your textbook’s website (url usually printed on the inside cover or the first few pages of the textbook). *Note:* Many of my exam questions come directly from these sources. Please spend some time studying this information. A copy of the study guide book is on reserve in the LRC and can be used there.

Late Assignments:

Due dates for assignments are given to you at the beginning of the semester. Any assignment turned in after the due date will have points deducted from the score – *no matter what the excuse*. Please check your test schedule and assignment due dates frequently. If I do not remind you in class, it is still YOUR responsibility to remember.

Makeup Work:

In Biology 101, five lecture exams are given. At the end of the semester, your lowest exam grade will be dropped before calculating your final grade. As a result, there are **NO makeup exams in this course**. If you miss an exam (no matter what the reason), you will receive a zero grade. That zero grade can then be the exam score that will be dropped.

In laboratory, we will have 12 weekly lab quizzes. Two of your lowest quiz scores will be dropped before calculating your final grade (10 quizzes x 10 points = 100 points on syllabus). If you are absent, no matter what the reason, you will receive a zero score for that quiz. That can then be one of the quiz scores that will be dropped.

On your syllabus, regular lecture quizzes account for 100 points of your total points. You will be given 12 lecture quizzes on textbook material, and two of your lowest quiz scores will be dropped before calculating your final grade. **The lecture quizzes will be taken ONLINE on a weekly basis.** I will be giving you a schedule of textbook reading assignments and availability of the online lecture quizzes. You will have to register using the college's Blackboard system.

#### Classroom Behavior:

Disruptive or rude behavior in the classroom or in the lab is unacceptable. You will be asked to leave if you behave in such a way that makes either teaching or learning difficult. You will also receive no points for that day's activities. "Disruptive behavior" includes, but is not limited to, conversing during lectures or exams, sleeping/putting your head on the desk during class time, profanity, abusive language or rude/abusive behavior directed at anyone in the classroom. Students and teachers alike are expected to behave like adults and treat others with respect. If you feel there is a problem of any kind, please see me in private to discuss the matter and hopefully resolve it quickly. Please read the information in JALC's Handbook of Student Rights and Responsibilities.

#### Cheating:

Cheating on exams, quizzes and written assignments will not be tolerated. If there is evidence of a student cheating, he will receive a zero grade for that work. If the student is caught cheating a second time, he will be removed from the class with a failing grade. Please read the information in JALC's Handbook of Student Rights and Responsibilities.

#### Tardiness/Leaving Early:

When you register for a course, you are expected to attend during your section's hours. Failure to do so can jeopardize your grade. Most quizzes are given at the beginning of a class period. If you are late for class and the quiz for that day is completed, you will *not* be able to make it up. Similarly, if a quiz or activity is done in the latter part of a class period and you leave class early that day, you will *not* be able to make the work up later. Recall that in most of my courses, one or two of your lowest quiz scores are dropped so that if you are sick one day or if you are late because of car trouble, your grade will not be adversely affected.

#### Tests:

When taking a scheduled exam, I try to return the graded exams to you within one week. We will go over the tests in class to answer any questions about the test, or you may come to my office during office hours if you need additional time. *I keep your exams* for my records after we go over them in class. Do not forget to return them to me then!!

### Lab Work:

You are expected to participate in all lab activities as directed. If you know that you will be absent for a lab, you MAY be able to make up that lab with another section, providing you ask the instructor. Failure to clean up your work area/equipment or to use the microscopes incorrectly may result in loss of points from *all students'* work that day.

### Instructor Office Hours:

Office hours are posted on my office door, C256. If I am not around during scheduled office hours because of a meeting, etc., please leave me a note, a voice mail at Ext. 8324, or e-mail me at: [suetrammell@jalc.edu](mailto:suetrammell@jalc.edu) and I will get back to you as soon as possible.

### Online Quizzes:

You will be required to take regular lecture quizzes on the college's BlackBoard (BB) system. If you have never used BB here at John A. Logan, then you must get an account to access your course materials as soon as possible. Go to the college's home page: [www.jalc.edu](http://www.jalc.edu). Look on the left side of the page where you will see "Blackboard," then click on "Orientation." This will guide you through the steps needed to get a BB account. **DO NOT GET ANOTHER BB ACCOUNT IF YOU ALREADY HAVE ONE AT JALC.** Once you have an account and have chosen your password, you must find your course, BIO 100, in a list of other online classes. Click on the course name. Your quizzes will be under "Assignments" on the left side of home page. There will also *be important announcements* posted on your course's home page.

Most every week you will be asked to complete a ten-question quiz on course lecture material. You will take approximately 12 quizzes throughout the semester. I will drop at least two of your lowest scores (or zeroes if you fail to take the quiz) before calculating your total of 100 possible points (10 quizzes x 10 points = 100 points). The quizzes are timed – **10 minutes only**. If you go over the time limit, you will receive a ZERO GRADE for a score. The quizzes will be **available on BB for only a few days period of time**. A schedule will be given to you so that you know exactly when you are to take a particular quiz. If you forget to take the quiz or you are out of town with no computer access, there is **NO MAKE UP quiz**, no matter what the excuse. This zero grade may count as one of your lowest scores to be dropped at the end of the semester. The only excuse I will accept is if the college's whole BB system is down for more than a few hours. If that ever happens, I will make adjustments as necessary.