

Syllabus for
BIO 411L—Molecular Cell Biology Laboratory
1.0 Credit Hour
Fall 2016

I. COURSE DESCRIPTION

Introduction to modern techniques frequently used in the study of molecular biology. Lab techniques studied include native gel electrophoresis, protein fingerprinting, peptide mapping, SDS-PAGE, Western blotting, restriction digestion of plasmid DNA, cell fractionation and subcellular organelle isolation, DNA extraction, and DNA gel electrophoresis.

Corequisite: BIO 411 Lecture.

Lab fee: \$100.

II. COURSE GOALS

Molecular Cell Biology Laboratory is a corequisite to Molecular Cell Biology (BIO 411) and therefore, supports the goal of the latter in integrating biochemistry, organic chemistry, genetics, physiology and molecular biology into a meaningful whole. A biology or chemistry major graduating from ORU must be prepared to demonstrate expertise not only in theoretical concepts, but also in laboratory situations. Therefore, a major goal of BIO 411 is to contribute to the excellent preparation of a young scientist who will be able to make meaningful contributions to a world in need—whether through pursuing a career in the health professions or through continuing his or her science career in graduate or professional school.

III. STUDENT LEARNING OUTCOMES FOR THIS COURSE

As a result of successfully completing this course, the student will be able to do the following:

1. Analyze structures and functions of nuclear material by use of biochemical techniques.
2. Separate proteins electrophoretically by charge.
3. Determine molecular weights of proteins by use of electrophoresis.
4. Discuss and perform common molecular laboratory techniques such as PCR, gel electrophoresis, DNA cloning, restriction enzyme digests, etc.

IV. TEXTBOOK AND OTHER LEARNING RESOURCES

Required Materials:

Composition notebook.

V. POLICIES AND PROCEDURES

A. University Policies and Procedures

1. Attendance at each class or laboratory is mandatory at Oral Roberts University. Excessive absences can reduce a student's grade or deny credit for the course.
2. Students taking a late exam because of an unauthorized absence are charged a late exam fee.
3. Students and faculty at Oral Roberts University must adhere to all laws addressing the ethical use of others' materials, whether it is in the form of print, electronic, video, multimedia, or computer software. Plagiarism and other forms of cheating involve both lying and stealing and are violations of ORU's Honor Code: "I will

not cheat or plagiarize; I will do my own academic work and will not inappropriately collaborate with other students on assignments.” Plagiarism is usually defined as copying someone else’s ideas, words, or sentence structure and submitting them as one’s own. Other forms of academic dishonesty include (but are not limited to) the following:

- a. Submitting another’s work as one’s own or colluding with someone else and submitting that work as though it were his or hers;
- b. Failing to meet group assignment or project requirements while claiming to have done so;
- c. Failing to cite sources used in a paper;
- d. Creating results for experiments, observations, interviews, or projects that were not done;
- e. Receiving or giving unauthorized help on assignments.

By submitting an assignment in any form, the student gives permission for the assignment to be checked for plagiarism, either by submitting the work for electronic verification or by other means. Penalties for any of the above infractions may result in disciplinary action including failing the assignment or failing the course or expulsion from the University, as determined by department and University guidelines.

- 4. Final exams cannot be given before their scheduled times. Students need to check the final exam schedule before planning return flights or other events at the end of the semester.
- 5. Students are to be in compliance with University, school, and departmental policies regarding the Whole Person Assessment requirements. Students should consult the Whole Person Assessment handbooks for requirements regarding general education and the students’ majors.
 - a. The penalty for not submitting electronically or for incorrectly submitting an artifact is a zero for that assignment.
 - b. By submitting an assignment, the student gives permission for the assignment to be assessed electronically.

B. Course Policies and Procedures
Evaluation Procedures

- 1. The course score is determined as follows:

Notebook	200
Quizzes	10x 10 = 100
<u>Final Exam</u>	<u>200</u>
Total	500

Grades will be assigned as follows:

90 -100%	=	A
80 – 89.99%	=	B
70 – 79.99%	=	C
60 – 69.99%	=	D
59.99% and below	=	F

- 2. It is expected that all work be handed in on time. **Late work will be penalized 10% per day for each day late, including weekends.**
- 3. Whole Person Assessment Requirements
None.

4. Laboratory Conduct and Procedures
- a. The cell biology laboratory involves the manipulation and use of multiple types of equipment and supplies. Part of the laboratory learning experience is in setting up the equipment and returning it in its original condition so it will be in satisfactory condition for the next class. Lab etiquette is essential.
 - b. All exercises require individualized effort in conducting the experiments and analyzing and interpreting the data. Plagiarism and falsifying data are two temptations to be avoided concerning these exercises. **Any evidence of plagiarism or cheating on lab work will automatically earn an F grade for the semester.**
 - c. Students will be required to maintain a lab notebook on a weekly basis in which they record the work from each experiment according to class guidelines.
 - d. Students will be quizzed at beginning of every lab period during the lab course to assess their preparation for that day's exercise and to review the material from the previous labs.
 - e. There will be a written Final at the end of the semester (100 points)
 - g. It is the responsibility of each student or student team to:
 1. Clean and return all glassware to its designated storage area.
 2. Return all equipment to its storage.
 3. Restore all large equipment, e.g., electrophoresis apparatus and centrifuges to the original condition.
 4. Dispose of all waste products in the designated area.
 5. Use all equipment carefully and treat it with respect.
 6. Leave the laboratory clean and neat.
 7. No one is excused from the lab session until these responsibilities are completed. **Anyone leaving prior to completion of lab cleanup will be penalized on his/her final grade.**
 - h. **Students are required to attend class. Lab work and quizzes missed due to unexcused absences cannot be made-up. Missing more than 3 labs results in an automatic F for the class.**

VI. COURSE CALENDAR

Date	Topic
Week 1	Course Introduction
Week 2	Dimorphic Intronic Repeat Recognition - PV92 Chromosome 16 (Part 1)
Week 3	Dimorphic Intronic Repeat Recognition - PV92 Chromosome 16 (Part 2)
Week 4	pGLO Bacterial Transformation
Week 5	UV/Comassie Polyacrylamide GFP Analysis
Week 6	Forensic DNA Analysis with Real-Time PCR (Part 1)
Week 7	Forensic DNA Analysis with Real-Time PCR (Part 2)
Week 8	Protein Expression and Purification Series (PEaPS) (Chapters 1 and 2)
	FALL BREAK
Week 9	PEaPS Growth and Expression (Chapter 4)
Week 10	PEaPS Growth and Expression (Chapter 4)
Week 11	PEaPS Lysis of Induced Samples (Chapter 4)
Week 12	PEaPS Separation of Induced Samples (Chapter 4)
Week 13	PEaPS Purification of Induced Samples (Chapter 4)
Week 14	PEaPS SDS-PAGE and Enzymatic Analysis (Chapters 4 and 8)
Week 15	FINAL EXAM

Course Inventory for ORU Student Learning Outcomes

Molecular Cell Biology Laboratory – BIO 411L Fall 2016

This course contributes to the ORU student learning outcomes as indicated below:

Significant Contribution – Addresses the outcome directly and includes targeted assessment.

Moderate Contribution – Addresses the outcome directly or indirectly and includes some assessment.

Minimal Contribution – Addresses the outcome indirectly and includes little or no assessment.

No Contribution – Does not address the outcome.

The Student Learning Glossary at <http://ir.oru.edu/doc/glossary.pdf> defines each outcome and each of the proficiencies/capacities.

OUTCOMES & Proficiencies/Capacities		Significant Contribution	Moderate Contribution	Minimal Contribution	No Contribution
1	Outcome #1 – Spiritually Alive Proficiencies/Capacities				
1A	Biblical knowledge				X
1B	Sensitivity to the Holy Spirit				X
1C	Evangelistic capability				X
1D	Ethical behavior			X	
2	Outcome #2 – Intellectually Alert Proficiencies/Capacities				
2A	Critical thinking	X			
2B	Information literacy		X		
2C	Global & historical perspectives			X	
2D	Aesthetic appreciation				X
2E	Intellectual creativity			X	
3	Outcome #3 – Physically Disciplined Proficiencies/Capacities				
3A	Healthy lifestyle				X
3B	Physically disciplined lifestyle				X
4	Outcome #4 – Socially Adept Proficiencies/Capacities				
4A	Communication skills	X			
4B	Interpersonal skills		X		
4C	Appreciation of cultural & linguistic differences				X
4D	Responsible citizenship			X	
4E	Leadership capacity			X	