Syllabus for
BIO 311—Genetics Laboratory
1.0 Credit Hour
Spring 2009

I. COURSE DESCRIPTION

An opportunity to make crosses using *Drosophila* and other organisms, analyze data, and form conclusions. Other experiments demonstrate and complement the information being taught in the lecture portion.
Prerequisites: One year each of general chemistry and introductory biology, both with labs.
Corequisite: BIO 311 Lecture.
Lab Fee: $100.

II. COURSE GOALS

The purpose of this course is to provide the student with the opportunity to participate in and understand basic classical and molecular research as it enhances and supplements the learning in the genetics lecture. It will provide the student with a foundation for doing independent research with current genetic techniques and to build a career in science and related fields.

III. STUDENT LEARNING OUTCOMES FOR THIS COURSE

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

A. Manipulate *Drosophila melanogaster* (the fruit fly) as a genetic research organism.

B. Demonstrate classic Mendelian laws governing monohybrid and dihybrid inheritance.

C. Explain the use and role of fungi, bacteria, and viruses (bacteriophages) in genetic research.

D. Utilize the Hardy-Weinberg Equation for solving population genetic problems.

E. Collect, analyze, and interpret experimental data upon which to draw sound scientific conclusions in a scientifically written paper.

F. Demonstrate sound safety procedures within a molecular genetics laboratory.

G. Demonstrate molecular genetic techniques including PCR, gel electrophoresis, restriction enzyme digestion and mapping, DNA ligations, transformations, plasmid isolation, and DNA fingerprinting.

IV. TEXTBOOKS AND OTHER LEARNING RESOURCES

A. Required Text:
Desharnais, R. and Bell, J. Lab Manual for Biology Labs On-Line: FlyLab Edition. San Francisco: Benjamin Cummings. 2003.

B. Required Materials:
Student Lab Notebook with Spiral Binding: Life Science Edition. Plymouth: Hayden McNeil. 2001.

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, video, multimedia, or computer software. 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.
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 ePortfolio requirements. Students should consult the ePortfolio handbooks for requirements regarding general education and the students' majors.
    a. The penalty for not submitting electronically or for incorrectly submitting an ePortfolio 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
1. Evaluation Procedures
    a. All exercises require individualized effort in conducting the experiments, 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**.
    b. Lab Notebook: 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.
    c. Lab Reports: Students are evaluated on their ability to record data clearly and interpret/analyze the data as instructed by the instructor. Reports submitted past established due-date deadlines will be penalized 10% per day including weekend days regardless of evaluation.
    d. Quizzes: Students will be quizzed at the beginning of each new lab exercise to assess their preparation for that exercise and to review the material from the previous lab.
    e. Final: In order to differentiate between those students who really understand the principles studied from those who do not understand and those who had the right answers for lab manual grading, but not a good comprehension, a final lab practical will be given. This exam will be

constructed in such a way that the student who uses his or her own brain power to do his or her own work will be able to do better than someone who did less than his or her best.

f. Due to the hazards intrinsic to some types of molecular work, repeated violations of standard safety procedures will result in discipline. The first offense will result in a verbal reminder, the second offense will result in a note concerning the incidence going into the student's permanent folder, and the third incidence will result in dismissal from the lab and an earned "F" grade for the semester.

2. Grading

Notebook		100
Lab reports	2 x 20	40
Quizzes	8 x 20	160
Lab techniques/participation		60
Final		200
Total		560

3. ePortfolio Requirements
None.

VI. COURSE CALENDAR

WEEK	**TOPIC**
1	Introduction/Safety/Basic Lab Techniques
2	DNA Fingerprinting (Edvotek)
3	Transformation of *E. coli*
4	PV92 PCR/Informatics Kit (Bio-Rad)
5	PV92 PCR/Informatics Kit – Day 2
6	*Drosophila*/FlyLab/Mitosis Slides (Carolina/Wards)
7	Chromatography of Eye Pigment/Mitosis Slides (Wards)
8	Preparation of HeLa Spreads/Barr Body Slides (Edvotek)
9 - 13	Cloning a DNA Segment from Sheep (MBI)
14	FINAL EXAM

Course Inventory for ORU's Student Learning Outcomes

Genetics Laboratory – BIO 311
Spring 2009

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	