

Syllabus for
BIO 372—Introduction to Biological Research
1.0 Credit Hour
Fall 2006

I. COURSE DESCRIPTION

A course designed to introduce junior biology majors to scientific research. Introduces students to the nature of science and its methods and teaches the distinction between a “library” and “experimental” research project. Students then select a research topic, a research director, and an advisor for the senior research project.

Three other courses, BIO 370, BIO 499 and BIO 451, are designed and scheduled for successful completion of the undergraduate research experience.

II. COURSE GOALS

This course is a catalyst to direct and assist the students’ efforts in initiating, evaluating, and conducting valid scientific research. Much of the current scientific knowledge will be forgotten or superceded in the near future, but the need to critically analyze and conduct research will never be obsolete. Instead, it will become even more vital as we rush into the 21st century with new problems to understand and solve. This course will enable the student to develop the skills needed to understand and conduct both literary and experimental research, and learn to write scientifically.

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. Discuss the nature of science and its methods, including the characteristics of sound experimental design in biological research. Describe and explain experimental design and statistics relevant to biological research
- B. Select a research topic feasible for investigation; pose a relevant, scientifically testable question; and state a purpose or a hypothesis
- C. Select a Senior Research Advisor. For projects undertaken outside the Biology Department, a "Research Director" is also required.
- D. Distinguish between library research and field or laboratory research
- E. Conduct research in the scientific literature, distinguish between primary and secondary sources, and prepare reference cards, i.e., notecards of pertinent references.
- F. Evaluate the writing of other scientific writers using the evaluation criteria and forms that will be used to evaluate the student's senior paper.
- G. Search and apply for summer research internships at other universities and institutions.

- H. Maintain a research notebook according to the instruction and format prescribed by this syllabus.
- I. Write a research proposal in biology
- J. Complete a senior paper during the subsequent academic year

IV. TEXTBOOKS AND OTHER LEARNING RESOURCES

- A. Required Textbooks
Ambrose, HW and Ambrose, KP. 2002. A Handbook of biological Investigation.
Winston Salem, NC: Hunter Textbooks Inc. 194 p.

Kinsely, K. 2005. A Student handbook for writing in Biology. Sunderland, Mass:
Sinauer Associates, Inc. 237 p.
- B. Optional Textbooks:
Pechenik, JA. 2001. A short guide to writing about Biology. New York: Addison-Wesley
Educational Publishers. 318 p.
- C. Other Required Materials
Appendix
Research notebook as specified in syllabus.
BIO Style Manual.
BIO 499 syllabus.

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	<u>Points</u>
	Select Research Topic, complete Appendix D with signatures	10
	Secondary References: i.e. individual, different references (sources) (one point per reference with GOOD NOTES & PROPER CITATION) (See Appendix B)	10
	Primary References, i.e., individual, different sources (one point per reference with GOOD NOTES & PROPER CITATION)	20
	Research Proposal or Senior Paper Rough Draft Appendix A has grading criteria	20
	Scientific meeting Presentations: Attend Senior Seminar, OAS meeting, or TriBeta meeting	10
	Research Notebook Reading Assignments, Lecture Notes, Handouts from Class, library, etc., Research Log (Appendix D has grading criteria.)	10
	Evaluations: Research Director (Appendix F)	5
	Final Exam	10
	Class Attendance: 0-1 absences = 5 points 2 absences = 3 points 3 absences = 1 points >3 absences = 0 points	5
	TOTAL POINTS	100
Grade Determination: Late penalty = 10% per day late!		
2.	ePortfolio Requirements None	
3.	Other Policies and/or Procedures	
a.	Incompletes: Awarded very sparingly upon written petition to the instructor for emergency situations, which in the judgment of the instructor, were clearly unavoidable.	
b.	Unexcused Late Exams: May be assessed a late exam fee and a penalty up to 30% off.	
c.	Late work will be penalized 10% of maximum credit for each day that assignment is late, including weekend days.	

VI. COURSE CALENDAR

Week	Date	Topic	Assignment
1	—	<i>Introduction to Biological Research:</i> Course Overview Relation of BIO 372 to 370, 499, 451	Ambrose Ch.1,2; Knisley Ch. 1 Syllabus
2	—	<i>Research Opportunities:</i> BIO Faculty and Student Projects - Session 1	Handouts
3	—	<i>Research Opportunities:</i> BIO Faculty and Student Projects- Session 2	Handouts
4	—	<i>Research Opportunities:</i> Tulsa Area OSU-HSC and/or OU Tulsa tour	Handouts
5	—	<i>Research Opportunities:</i> Worldwide Summer Internships	Handouts
6	—	Final Week for Selecting Topic & Advisor	<i>Appendix D & F due</i>
7	—	Library Resources for Biologists*** Types of Scientific Literature	Library lecture & handouts Nagle 1994; Ambrose Ch.9,10; Knisley Ch. 2
8	—	Library Work Session I	Appendix B; <i>10 Secondary References due</i>
9	—	Analysis of an “Experimental Paper”	Knisley Ch. 3 <i>1st 10 References DUE</i>
10	—	Experimental Design and Statistics	Ambrose Ch. 3-8 <i>2nd 10 References DUE</i>
11	—	How to Write a Scientific Paper <i>OAS Meeting</i>	Ambrose Ch. 11-13, Knisely Ch. 3-5
12	—	Preparing a Research Proposal	Pechnenik Ch. 10
13	—	Preparing a Senior Paper Rough Draft	Ambrose and Knisely
14	—	Notebook, Research Proposal and Rough Draft due	
15	—	Exam	

***Meet in the library, 3rd floor.

Course Inventory for ORU's Student Learning Outcomes

Introduction to Biological Research II – BIO 372 Fall 2006

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		