BIO 270 Research Methods Lecture

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Office Hours
M&W 9-10:30 AM
M 2-3 PM
Th 9-10 AM

Lecture: MW 1-1:50, BH 105
Laboratory: T 2-4:50 PM, Boehm 207 (Rosch) or Th 2-4:50, Boehm 256 (Stone)

Required Texts:

McMillan, V.E. (2012). ***Writing Papers in the Biological Sciences*** **(5th edition).** Boston and New York: Bedford and St. Martin's.

Ambrose, H.W., Ambrose, K.P., Emlen, D.J., and Bright, K.L. (2007). ***A Handbook of Biological Investigation*** **(7th edition).** Knoxville, TN: Hunter Textbooks Inc.

Course Description:

This course provides students with the foundation to conduct biological research. The course covers grant and research proposal writing, conducting primary literature searches, critiques of journal articles, research design and execution, data analysis, oral and poster research presentations, and scientific writing skills.

Course Objectives:

Upon completion of this course, the successful student should be able to:

1. Conduct effective and comprehensive literature searches;
2. Read, understand and critique primary journal articles;
3. Identify a research project to work on;
4. Write a research project proposal;
5. Write a research grant proposal;
6. Develop an experimental design for the research project;
7. Conduct the experiments and/or collect the data for the research project;
8. Analyze data using statistical tests when appropriate;
9. Write a scientific paper;
10. Present results of a scientific study in the form of an oral presentation and a poster presentation;
11. Seek out research and internship opportunities within and outside the University;
12. Prepare a persuasive statement and resume to support an application for an internship or research opportunity

Grading for the course will be based on 650 points:

Lecture Quizzes (6 @ 10 pts each)	60 pts
Mid-term Exam	75 pts
Final Exam (= **Poster Presentation**)	75 pts
Homework Assignments:	115 pts
Lab safety and animal use training (6)	
Plagiarism/citation exercise (10)	
Journal Analysis & Annotation (20)	
Graphing exercise (10)	
Statistics exercises (2x12 pts = 24)	
Excel exercise (15)	
Synopses of research presentations (3x5 pts = 15)	
Resume (15)	
Lab Grade	325 pts
Total	650 pts

***Course Grade*:** Lecture constitutes 50% of your total course grade and Laboratory constitutes the other 50%. Your grade for this course will be determined based on the following scale:

93%+ = A	83-86% = B	70-76% = C
90-92% = A-	80-82% = B-	60-69% = D
87-89% = B+	77-79% = C+	≤ 59% = F

Lecture Policies:

Contacting Me.— See me during office hours or set up an appointment to discuss anything that is troubling you. You are invited to drop by my office for a friendly chat, to discuss academic difficulties, or to address any other items that may be affecting your performance in lab. I want to emphasize that if you are having problems see me ASAP; do not wait until the end of the semester to seek help!

Attendance.—Attendance in lecture every week is mandatory. I will make every reasonable effort to help you make up work for assignments/quizzes/exams missed for excused reasons; however, you are responsible for finding me to making all arrangements. Absences will be considered excused only if you can provide written documentation of the excuse. You must contact me within 24 hours of missing lecture with written documentation. If not, absences will be considered unexcused even if it was for an excused reason. Exemptions may be given due to extenuating circumstances at my discretion.

Academic Honesty.—I take academic honesty very seriously and will sanction violations to the fullest extent allowable under University policy. Academic dishonesty will blemish your record for life. Unless specifically authorized by me all work must be entirely your own work. If you are uncertain as to the amount of collaboration permitted, see me. **Never assume!** For a complete review of University academic honesty policy see page 56-65 of *The Key.*

Accommodations.—If you need, or think you may need, accommodations for any disability, I encourage you to contact me privately as soon as possible. The Disabilities Services Office should be contacted to coordinate accommodations for students with documented disabilities (215 Stratton Administration Building, 610-683-4108).

Etiquette.—I strive to maintain a professional and productive learning environment for you and your fellow classmates. Please refrain from talking with classmates while I am addressing the class. Such behaviors are distracting and disrespectful to me and your classmates. You are expected to arrive to class on time and should expect the same from me. Use of cell phones or personal electronic devices at any time is prohibited unless specifically authorized by me. **If I see you sending texts, receiving texts, or talking on your phone during class, I will reduce your overall class percentage**. Your final percentage will be lowered 1% for the first offense, 3% for the second offense, and 10% for each additional offense.

D2L.—You will need to regularly log into "Desire to Learn" (D2L) for this course. I will post copies of all handouts on D2L. Additionally, most assignments will be turned in via dropbox and lecture quizzes will be administered online. If you have never used D2L or have trouble logging on, please see me ASAP.

Late Assignments.—Assignments will be docked 10% each day they are late (including weekends) unless a documented excused absence prevents you from attending class the date the assignment is due.

Tentative Lecture Schedule (Spring 2014)

Date	Topic	Assigned Readings*
1/21	Introduction to Course/Scientific Method	**Am** Ch 1
1/23	Developing testable hypotheses/ethics in research I	**Am** Ch 2
1/28	Developing testable hypotheses/ethics in research II	
1/30	Proposal Development/Grant Writing	
2/4	Experimental Design/Peer Review of Proposals	**Am** Ch 6
2/6	Reading and Critiquing Primary Journal Articles	**Am** Ch 9-10; **Mc** Ch 1
2/11	Reading and Critiquing (cont)	**Mc** Ch 6
2/13	In Class: Literature Critique	
2/18	Data and Descriptive statistics	**Am** Ch 3-5
2/20	Statistical Analysis	**Am** Ch 7
2/25	Statistics: T tests	**Am** Ch 8
2/27	Statistics: T tests/ANOVA	
3/4	Statistics: ANOVA/KW & Tukey	
3/6	Statistics: Chi Square	
3/11	Statistics: Regression	
3/13	Statistics: Excel	
3*/18 & 20*	***Spring Break. No Class***	
3/25	Statistics: Excel (cont.)	
3/27	**Midterm Exam**	
4/1	Scientific Writing – Introduction/Methods	**Am** Ch 11, 13; **Mc** Ch 4
4/3	Scientific Writing – Results: Tables/Graphs	**Am** Ch12; **Mc** Ch 3
4/8	Scientific Writing – Results: Text	
4/10	Scientific Writing – Discussion and Literature Cited	
4/15	Scientific Writing – Abstract and Designing Presentations	**Am** Ch 14; **Mc** Ch 10
4/17	Delivering Presentations	
4/22	Planning for your future: Building a resume	
4/24	Planning for your future: Developing a Cover Letter	
4/29	Hiring Case Study	
5/1	Researching Opportunities : Careers in Science and Graduate School	
5/6	**Research Symposium/Poster Presentations 11 AM – 1PM**	

Note: Am=Ambrose, et al., Mc=McMillan