

Research Methods in Biology - BISC 300, Fall 2019
Meeting: MWF 11-11:50, Lamar 130
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Office: 332 Shoemaker
Office hrs: M and T: 3-5:00, or appt.

“Nature answers only when she is questioned.” Jacob Henle

Broad Objectives

- to learn basic research approaches used in the biological sciences and in medical research.
- to explore the various ways that scientific knowledge is obtained and defined, philosophical issues and methodological approaches related to model building, model validation, hypothesis formation, research design, making sense of data, the peer-review process, scientific responsibility and ethics, and the impact of culture on scientific investigation.
- to develop the mental tools and confidence to think scientifically.

Learning Objectives

After completing this course, a student should:

- understand the logic and general procedures and logic of scientific understanding
- understand basics of statistical inference and risk assessment
- understand basics of research design, as used in observation, experimentation, and modeling
- understand and be able to describe the structure of a scientific paper
- understand the peer-review process
- understand and be able to discuss ethical issues faced by scientists in conducting research

Lectures and Readings

1. There will be occasional required readings or other assignments. Some assignments may require a written submission. These assignments will be given in class.
2. Lectures on Powerpoint will be made available on the class BB site within 24 hrs AFTER the lecture.

Evaluation

- There will be 7 tests about every other Friday. The 1st test is on Sept. 6.
Test days are 9/6, 9/20, 10/4, 10/18, 11/1, 11/15, 12/9 (Final at noon)
All tests are weighted equally (= 14.30% of final grade per test)
- Grades on occasional written assignments will be included in test grades.

Course Grading

A	92.5-100%	C+	77.5-79.45
A-	89.5-92.45%	C	69.5-77.45
B+	87.5-89.45%	D	59.5-69.45%
B	82.5-87.45	F	<59.5%
B-	79.5-82.45		

Approximate Schedule of Topics – Fall 2019

week 1	Introduction, Basic, Applied, and Use-Inspired Basic Scientific Research The PEL Model applies to all scientific statements and explanations The P in PEL = Presuppositions are unavoidable but should be used with care.
2	Scientific Method utilizes an iterative approach to build models.
3	The L in PEL = the Logic of Hypothesis Building and Testing
4-5	Data, Pattern Recognition, and Pattern Representation
6-10	The E in PEL = Evidence as an explanation (vs. other explanations) for patterns
11	Model Building and Model Use
12	Peering into peer review- What makes it work or not?
13-14	Research Ethics and Responsibilities

Other Notes and Policies

1. *Challenges to Assigned Grades.* Challenges to assigned grades will be welcomed in writing. A written format provides you the opportunity to present an articulate and well-considered argument. Challenges must be submitted within one week of a graded assignment.
2. *Academic Integrity.* Any form of misconduct – cheating, plagiarism, fabrication – will not be tolerated and will subject violators to a failing grade in the course.
3. *Incompletes.* Incompletes will not be given except in extreme circumstances beyond a student's control.
4. Deadline for course withdrawals (no refund) – Oct. 7, 2019
5. **Disability Access and Inclusion:** The University of Mississippi is committed to the creation of inclusive learning environments for all students. If there are aspects of the instruction or design of this course that result in barriers to your full inclusion and participation, or to accurate assessment of your achievement, please contact the course instructor as soon as possible. Barriers may include, but are not necessarily limited to, timed exams and in-class assignments, difficulty with the acquisition of lecture content, inaccessible web content, and the use of non-captioned or non-transcribed video and audio files. If you are approved through SDS, you must log in to your Rebel Access portal at <https://sds.olemiss.edu> to request approved accommodations. If you are NOT approved through SDS, you must contact Student Disability Services at 662-915-7128 so the office can: 1. determine your eligibility for accommodations, 2. disseminate to your instructors a Faculty Notification Letter, 3. facilitate the removal of barriers, and 4. ensure you have equal access to the same opportunities for success that are available to all students.

This syllabus is subject to change at the discretion of the instructor to accommodate instructional and/or student needs.