

Research Methods in Biology - BISC 300, Fall 2020
Meeting time: MWF 11-11:50, REMOTE
office phone: 915-7562
[email: byochs@olemiss.edu](mailto:byochs@olemiss.edu)

Dr. Clifford A. Ochs
Office: 332 Shoemaker
Office hrs: TU & WED 9-11, or appt.

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

BISC 300 class Format for Fall 2020

- BISC 300 will be taught by Zoom this semester. The class will be entirely remote. I will provide lectures live on Zoom at regular class times, MWF from 11-11:50. I encourage you to be present at those times for class, so that we can interact directly. All lectures will be recorded for you to listen to, or re-listen to, at your convenience. Class presentations (Powerpoints) will also be made available for you on Blackboard.

To meet with me

- I will be available for remote office hours, via email or Zoom every Tuesday and Wednesday from 9-11 am. If you ever want to talk with me confidentially, outside of a class zoom, please let me know and we will make arrangements.

Attendance policy

- The University requires instructors to verify the attendance/participation of students in **ALL** courses within the first two weeks of the semesters. Therefore, For the first two weeks of class I will check the participant list on zoom for attendance. Otherwise, I will not take attendance.

Student Support Services

- Students are encouraged to visit the University’s Keep Learning site (<https://olemiss.edu/keeplearning/>) to access information and resources related to COVID-19 support. The site provides links to University student services to facilitate and support learning.
- Students with diagnosed health concerns that may affect their compliance with COVID-19 health requirements should contact UM’s Student Disability Services (SDS) Office (<https://sds.olemiss.edu>) to see if they are eligible for an SDS accommodation as soon as possible.

Updated Contact Information

- The University must have accurate contact information, including cell phone numbers, to facilitate student communications and contact tracing. Students should check and update their University contact information (<https://olemiss.edu/mystudentprofile>).

Broad Objectives of BISC 300

- 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 inference
- know 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 research paper
- understand the peer-review process
- understand and be able to discuss issues and procedures of ethics of biological research

Readings – There is no text. Readings and written homework pertinent to the class topic will be assigned on an occasional basis. There will be 4-5 of these written assignments.

Evaluation

- There will be four tests during the semester (about every 3 weeks), in addition to a comprehensive final exam. All tests will be given on Blackboard during class time. Test dates are included in the syllabus. Except for the final, I will drop the lowest test score. If you miss a test for any reason, that is the test score that will be dropped. The final will not be dropped.
- Written homework assignments are to be turned in on Blackboard. These will count towards 20% of the final grade. All written assignments are required.

Course Grading

A	89.5-100%
B	79.5-89.49%
C	69.5-79.49%
D	59.5-69.49%
F	<59.5%

Approximate Schedule of Topics – Fall 2020

Week/Day	TOPIC
1/M (8/24)	Introduction to class
1/W (8/26)	Basic, Applied, and Use-Inspired Basic Scientific Research
1/F (8/28)	Ways of Knowing
2/M (8/31)	Scientific Method – generic model (part 1)
2/W (9/2)	Scientific Method – generic model (part 2) reading – Space, climate change, and the real meaning of theory
2/F (9/4)	How to read a scientific paper
3/M (9/7)	Labor Day, no class
3/W (9/9)	The PEL Model – Presuppositions and Inference
3/F (9/11)	Test 1
4/M (9/14)	The PEL Model – Logic and Inference (part 1)
4/W (9/16)	The PEL Model – Logic and Inference (part 2)
4/F (9/18)	Hypotheses as tools
5/M (9/21)	Confirmation bias and the role of peer review reading - Chamberlin (1890) Method of multiple working hypotheses
5/W (9/23)	The PEL Model – Evidence and Inference
5/F (9/25)	Sampling and Sample Designs
6/M (9/28)	Principles of Statistical Inference (part 1)
6/W (9/30)	Principles of Statistical Inference (part 2)
6/F (10/2)	Test 2
7/M (10/5)	Inference by null hypothesis significance testing (NHST) (part 1)
7/W (10/7)	Inference by null hypothesis significance testing (NHST) (part 2)
7/F (10/9)	Inference using a Bayesian approach
8/M-F (10/12-16)	Introduction to Observational Studies
9/M (10/19)	Explanation of Patterns - Chance, Cause and Confounding (part 1)
9/W (10/21)	Explanation of Patterns - Chance, Cause and Confounding (part 2)
9/F (10/23)	Test 3
10/M-F (10/26-30)	Experimental Design
11/M-F (11/2-6)	Models and Modeling
11/M (11/9)	Research Ethics and Responsibilities (part 1)
11/W (11/11)	Test 4
11/F (11/13)	Research Ethics and Responsibilities (part 2)
11/M (11/16)	Perspective

Other Notes and Policies

1. *Appeals to Assigned Grades.* Reasonable appeals to assigned grades are 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) – October 5, 2020

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.

ZOOM INVITE for CLASS - MWF (10:50 - 11:50 am)

Join Zoom Meeting:

<https://olemiss.zoom.us/j/95783988133?pwd=WEpmUXZjckN4RzVWVE1rV2oxbFFwdz09>

Meeting ID: 957 8398 8133 **Passcode: bisc300**

ZOOM INVITE for OFFICE HOURS - TU and W (9-11 am) or by appt

<https://olemiss.zoom.us/j/91698408911?pwd=RWlBcUFsOHhHYy96L1BqYWJGWXRZz09>

Meeting ID: 916 9840 8911 **Passcode: office**