

BIOLOGY 210 - INTRODUCTION TO RESEARCH

SYLLABUS

KNOX COLLEGE - SPRING 2018

Course Learning Goals:

- 1) Learn how knowledge within the natural sciences is accumulated; view science as questions that are constantly being reframed and investigated.
- 2) Acquire the skills required to do scientific research: inductive and deductive reasoning, hypothesis testing, experimental design, statistical analysis.
- 3) Hone communication skills for presenting research results, both orally and in writing.
- 4) Develop skills to work effectively as a member of a group.
- 5) Read scientific publications critically and carefully.
- 6) Follow ethical research practices in the collection, interpretation and publication of data.

Professor: Rose Keith; SMC, B113, ext. 7386, **E-mail:** rakeith@knox.edu

Office Hours: 4th period Monday, Tuesday, and Friday

Greenhouse Goddess: Miava Reem (mreem@knox.edu) **Office Hours:** 8:30am - 4:00pm

Classrooms: SMC A112, SMC B207

Class times: 5s,6 on Tuesdays and Thursdays.

Assigned Texts (please use the correct editions!):

Ambrose, W. H., Ambrose, K. P., and Emlen, D.J., Bright, K.L. 2007. A Handbook of Biological Investigation, 7th Edition. Hunter Textbooks, Winston-Salem, NC. (HBI on schedule).

Pechenik, J. A. 2013. A Short Guide to Writing About Biology., **8th or 9th Edition**. Addison Wesley Longman, New York. (WAB on schedule).

Organization:

1) Classroom

The classroom sessions will involve lectures, discussions, and group problem solving activities. You should pay close attention to the schedule (and the main Moodle course page) and come to class having read and thought about the assigned reading. Lectures, discussions, and group problem solving activities will provide an opportunity to clarify topics covered in the readings -- you will get the most out of class if you are prepared to ask questions. The group problem solving activities will involve small groups of students (2-4) working together to solve problems and answer questions. These problems are designed both to clarify what you have learned from the text and classroom discussion and to ask you to go beyond what you have learned by

applying your knowledge to new situations. The activities will vary in duration from a couple of minutes to an entire class period.

2) Laboratory

The laboratory experience will be built around three research projects - designed by YOU! These projects will give you an opportunity to apply what you have learned in the classroom, to learn from your mistakes and to explore a variety of biological questions. Over the course of the term, students will be asked to take an increasingly greater role in the reporting of their research projects. You will work in pairs for the laboratory.

Projects & Assignments

As mentioned earlier, you will be conducting your research in pairs. The research projects thus will be collaborative. You may come up with ideas together, and assist each other with your literature searches, sharing and discussing any useful sources that you find. However, most assignments related to these research projects (e.g. graphs, materials and methods sections, results, etc.) must be done on your OWN. The only assignments that may be completed and presented together are the final paper for Expt 2, and the final poster, oral presentation, and final paper for Expt 3. As explained below, exams, statistics exercises, and other homework assignments must be completed **on your own**.

The take-home assignments will be a series of problem sets, each covering one of our class session topics. The take-home assignments are to be completed individually; no collaboration is permitted. Details about these assignments and the due dates can be found in the course schedule.

EXAM:

There will be ONE open notes, open book, take home exam. It will test your understanding of the material and your ability to apply your understanding in solving novel problems, not how much you have memorized. While your exam is in progress you may not talk to anyone (except the instructor) about ANY aspect of the exam (including whether you are finding it easy or hard, long or short etc.).

Absence policy:

As participation is essential for the course, students are expected to attend all classes. Your participation grade will reflect unexplained absences in that the grade will be multiplied by the proportion of classes that you attended. All absences for which I don't receive an excused absence note (e.g. from a medical doctor or sports coach) are considered unexplained. It is your responsibility to see that I receive such a note if you miss a class. If other extraordinary circumstances (a family emergency, etc) cause you to miss class, please talk to me before you miss class. These rules will be applied to everyone, in order to be **fair** to everyone.

Late Submissions:

Unless stated otherwise, assignments are due at the beginning of class on the date indicated. Assignments submitted late will have 10% of their available marks subtracted for each day or part of a day that they are late.

Honor Code:

By joining the Knox College community, you have agreed to uphold its honor code. I feel strongly that maintaining the Honor Code is crucial to maintaining a learning community. Therefore I will fully prosecute any infractions of the code. The honor code can be found in the Knox College Student Handbook. Please read

the honor code and be sure you understand it. If you have any questions about the honor code or how to properly acknowledge the words and ideas of others, please ask me and I will be happy to discuss it with you.

Accommodations:

If you have documented accommodations, I'll be happy to work with you to support those. Please talk to me about it as soon as possible so that I can make sure we have a plan in place.

How to get help in the course:

If you're struggling with something specific or with general course expectations, please talk to me. Sooner is always better than later. I will always be in my office during office hours, and available to talk if you drop by. You can also email me to set up a meeting at another time. I generally respond to emails within 24 hours, although over the weekend may take a little bit longer; you're welcome to email me with questions, but please don't wait until the last minute. If you have questions about using the greenhouse, Miava is also an excellent resource. I want to make sure that you get the support you need to succeed in the course, so if things are coming up, please approach me about it.

Group work:

As always, successful group work requires that both partners be engaged and sharing the work. There is no formal process for evaluating the partner that you'll be working with, but if difficulties are coming up that are preventing you from getting work done in an equitable manner, let me know and we will work on a solution.

Laptops and devices in class:

Using laptops in class is allowed; however, there is a significant body of research that shows that most students don't learn as well when they take notes on laptops, and so I discourage you from doing so except when necessary. I do not want to see phones out during class unless there is a specific reason you need to be using it at that time for class activities (eg, as a calculator). If you are distracted and not engaged, you won't be learning, and it will be reflected in your participation grade.

Evaluation:

Your final grade in the course will be calculated as follows:

Notebooks - 10%

Homework - 10%

Paper 1 - 8%

Paper 2 - 15%

Paper 3 - 17%

Poster - 10%

Final Presentation - 10%

Participation* - 10%

Take Home Exam - 10%

TOTAL 100%

Course materials and details on each assignment will be posted on the Moodle site.

***Participation Grade:**

The discussions, group problem solving activities, and participation in research means that your contribution is vital to the success of the class. As a result, your participation will be graded. The participation grade will not assess how "clever" or "talkative" students are, but will instead assess how well each student has contributed to the class. In making this assessment I will ask myself the following questions:

- To what degree was the participant ready for each day's activity? Had the participant read the assigned readings critically and come to class prepared to discuss the material?
- Was the participant willing to ask questions about the material being discussed? Did the participant exhibit "academic honesty" - asking questions when things were unclear to them and admitting when they didn't understand something?
- Did the participant try to answer the questions of others in a helpful way?
- Was the participant willing to be wrong sometimes? Did the participant ask and answer questions and make observations that suggested that s/he was stretching him/herself and not overly afraid of saying something that might be wrong?
- Did the participation of this person enhance the understanding of the group?
- Was this person considerate in the way they participated in the group or did they dominate the conversation too much, making it difficult for others to speak?
- Did this person exhibit a positive attitude? Were they enthusiastic to learn and participate or did they do only what they had to?
- Was this person a valued member of the group, contributing to the best of her/his abilities?
- Did the participant put in her/his fair share of the work in completing the research and assignments?