

BIOL 200-004: Quantitative Biology

Instructor: Dr. D Jennings (Dr. J)

Contact Information: dbjennings@vcu.edu

I am available by email, although it may take up to 24hrs to receive a response depending on the day and time that you send an email (evenings/weekends/holidays). If you do not receive a response within 24hrs please be sure to resend the email.

Student Hours:

You are also welcome to make an appointment to meet. To do so please send an email that includes several times that you are available.

Building Our Community

It may seem a bit odd to talk about the course environment in an online class, however, I feel that it is a valuable discussion. My goal is to work with you as you learn more about experimental design and quantitative skills related to biological studies and hopefully your life. As each of us comes from a different background and thus each of us has a different experience, I want to incorporate that into our learning environment. I would appreciate your input as we move through the learning process. If there is something that you think will add to our knowledge or assist in making the topic more relevant to you, I hope that you will feel comfortable sharing it. At various points you will be asked to share something about your experiences, please be aware that you need only share what you want to.

The other key aspect to our course environment is how we interact with each other. I am planning on providing multiple different means of connecting with each other. It is my hope that as we interact we are all aware of our impact upon others and that we each strive to help each other in a positive way. A supportive environment benefits us all. Above all, I want you to be able to choose the means by which you interact with each other and me, so that you feel most comfortable in your learning environment.

What is BIOL 200 all about?

Our purpose this semester is to introduce the application of the scientific method, experimental design and quantitative aspects in biological studies. In particular this course focuses on quantitative skills that are relevant to the biological sciences by introducing basic scientific reasoning, quantitative skills and data analysis

During this semester you will develop biological hypotheses and design aspects of experiments to test them, use probabilities to predict possible outcomes, create and interpret graphs based on biological data, implement different types of logical reasoning to create and evaluate experiments as well as interpret data. As a means of analyzing data and results you will learn to calculate basic statistic measures (means, ranges) as well as become familiar with some types of statistical testing related to hypotheses.

Don't Panic: We will work to build the skills needed to do all of these things. You will not be asked to memorize formulas, and are encouraged to use calculators for some of the math. This is NOT a statistics course, it is a course about biology and experiments. While there is some math, the focus here is to build an understanding of the use of numbers and math in biological studies.

Course Overview

Course Description:

Semester course; 3 lecture hours (delivered online or hybrid). 3 credits. Prerequisites: [BIOL 151](#) and [BIOZ 151](#) with minimum grades of C; and [MATH 151](#), [MATH 200](#), [MATH 201](#), [STAT 210](#) or satisfactory score on the VCU Mathematics Placement Test within a one-year period immediately preceding the beginning of the course. Enrollment is restricted to biology majors and biology minors. An introduction to the application of the scientific method, experimental design and quantitative aspects of biology.

Books/Readings:

All materials will be provided to you on Canvas directly and with a link or a PDF/DOCX file. You may want access to a printer if you want a printed copy of these.

Required Materials:

Access to a computer or device and a reliable internet connection, that can play videos, access Canvas and has a webcam. (Please contact the professor if any of these is an issue for you)

General Course Goals:

By the end of the semester, you should be able to:

- Create and evaluate basic experimental designs
- Create and interpret graphs of biological data
- Use Quantitative Skills to Test Scientific Hypotheses
- Use quantitative applications across varied subdisciplines within biology including mathematical models
- Demonstrate the use of quantitative skills in biological research

Course Policies and Expectations

What you can expect in this course:

This section of BIOL 200 is an asynchronous course, however that does not mean that you can complete assignments at any time during the course. To help assist in keeping everyone moving forward and learning the core concepts needed to meet the course goals, this course has a specific structure. Because of the nature of this course, in which each skill is built upon previously introduced skills, there are deadlines for assignments. In fact, there are a series of assignments due throughout each week of the course. Please do not panic about this. First, you can work ahead if you need/want to. Second, reminders will be sent out on the due date (and sometimes before) to ensure that you do not miss completing the assignment. For all assignments, while there is no late penalty, completing the assignment will be necessary to move on to the next ones.

In addition to individual assignments, you will also have a series of posts that you will be contributing to a class or group discussion. Specific instructions are posted in the modules for each discussion and a rubric that will be used for grading is provided. Participation in the discussions are a required part of this course so be sure to contribute fully. Our discussions will focus on the design, implementation and analysis of a research question(s).

For most individuals it will take a minimum of 10-15 hours per week to complete the assignments associated with this course. Depending upon your background and skills some weeks you may spend less and others you may even need spend more than 20hrs. Help for assignments is available. So, if there is a section that you find yourself struggling with please reach out for assistance rather than spend hours struggling on your own.

Class Policies

It is your responsibility to check the course Canvas site for any assignments and to make sure that assignments are completed before due dates. Modules are set up so there are two for each week M-F. Reminders will be sent when possible however you really should be completing something each day.

Most assignments will be available ahead of time and can be completed at any time after they become available, with the exception of discussion assignments, where you may need to wait for others to post before you can reply.

NOTE: You will need to complete the items in each module in order before the next module becomes available. As there are two modules each week in every week of the course, and each is labeled with the date, there should be no unexpected surprises. If you finish a module and cannot see the next one, first check your grades to be sure that you submitted the assignments, and then if needed contact me so that we can see what is going on.

ATTENDANCE POLICY : In order to ensure your success in this course I will be closely watching your access and progress. This is to help you stay on track and move through the course in a manner that will allow you to complete it successfully. It is important that you check your email daily and respond to any emails sent to you specifically. If you know in advance that you will be completing assignments predominately on specific days, it helps to let me know, so I don't keep emailing you reminders.

Software/Hardware Compatibility:

Please be sure to use a browser that is compatible with Canvas when completing course assignments. Both Internet Explorer and Mozilla Firefox are compatible with the Canvas assignments. Google chrome will also work with most of the assignments. Assignments completed on smart phones, ipads and tablets are known to have issues so if you use these devices when completing assignments please double check that the assignment submits properly before leaving the page.

Note: When technical issues arise you need to contact the VCU HelpDesk immediately and then copy your ticket and send it to me.

How things will "work"

There are five main sections in this course based on the course goals: Introduction to experimental design, building methods based quantitative skills, working with data and results, applying statistics to data, and testing scientific hypotheses. Our ultimate goal in this course is to integrate numbers into our understanding how science, in our case biology, is done. This is your hint that the concepts we will study are linked together (remember we are building a bigger picture).

During each week there will be assigned readings, videos, question sets, discussions and assignments. Some you will complete on your own at your own pace (with deadlines) and others will be part of collaborative assignments.

Integrated into the course materials there will be assessments of your understanding that focus on synthesizing concepts (don't panic, we will practice this before you will be expected to do it). These will be opportunities for us (you and I) to measure your understanding of the concepts we are studying.

Along the way there will be multiple opportunities receive assistance, ask questions and work with peers as we strive to develop a deeper understanding of how quantitative skills are used in the study of biological systems.

Grading Information

Your course grade will be made up of two categories; assignments and assessments. Within each of these your grade will be based on the total number of points that you earn throughout the course compared to the total number of possible points.

- For most assignments there are either numerous attempts possible, or additional items that you can complete to help you earn the total number of points. Please see each assignment for specific details.
- For most assignments there is no late penalty, however many assignments will have an end date by which any and all attempts must be made. Please see each assignment for specific details.
- For many assessments you will be provided with an opportunity to revise your work based on feedback and resubmit it for re-evaluation.

Because multiple attempts at assignments and most assessments are provided there will be no extra credit in this course. Thus, it is up to you to make the most of the assignments/opportunities that are provided.

The Final Grading Scale:

based on % of total pts possible that you earn

Letter Grade	% Scale	
A	90-100%	Exceeds Course Learning Goals
B	80-89.99%	Meets Course Learning Goals
C	70-79.99%	Approaching Course Learning Goals
D	60-69.99%	Does not yet approach Course Learning Goals
F	<60%	In sufficient evidence of progress towards learning goals

Course Schedule: [Link to schedule document](#)

VCU Academic Support and Policies

VCU Course Policies

For a list of academic policies and procedures, please follow this link to [the Provost's statement on course policies \(Links to an external site.\)](#) (also included in the course syllabus).

VCU Academic Calendar

Check out this link to the [VCU academic calendar \(Links to an external site.\)](#) for an overview of important dates.

Student Success Resources

This link to the [VCU Student Success page \(Links to an external site.\)](#) collects resources for academic advising as well as a number of support services including the Writing Center, the Campus Learning Center, and more.

Accessibility

[The Student Accessibility and Educational Opportunity \(Links to an external site.\)](#) is the designated office on VCU's Monroe Park Campus charged with fostering an environment where all students have equal access to the University's programs, services, and activities. Contact SAEO for questions or concerns about accessibility and accommodations.

Library

[VCU Libraries \(Links to an external site.\)](#) offers research support, academic support, workshops, equipment, and many other students services. Visit their website for more information.