Welcome to Genomics (undergrad Biol423/423L)

Note: This syllabus is for the undergraduate level course (423 and 423L)
The Basics
Course Numbers
Biol423/423L (undergraduate)

Meeting Times & Locations
Lecture: MWF @11-11:50am in RITA152
Genomics Lab: F @12-3pm in RITA145

Instructor: Jessica McCoy, PhD
mccoyja@cofc.edu
65 Coming Street, Room 102

Office Hours: Tuesday 9am-11am, or by appointment. Happy to meet in the office or through a virtual platform.

Pre-reqs:
Genetics (BIOL305), MolecularBiology (BIOL312) / CellBiology (BIOL313) or permission of the instructor.

Course Overview
This upper level undergraduate level course is designed to familiarize students with the field of genomics as well as current trends in this rapidly evolving discipline. We will explore several sub-disciplines and learn about a variety of techniques applicable to genomic analysis. Particular attention will be devoted to new advances in the area of biomedicine.
Required Materials

Text Book: None.
All materials will be provided on OAKS.

Other Required Materials

- Access to the G-word podcast for discussions: The G word Podcast
Course Objectives/Learning Outcomes

1) Recognize terminology used by genomicists and be able to explain the history, key principles and theories associated with this field.
2) Be able to describe genomic concepts and apply these concepts to new situations or to interpret data based on concepts learned in class.

3) Learn how to use Python and operate bioinformatics programs to detect/identify genes in a genome and better characterize gene products.

4) Discuss recent genomic research described in selected readings from the scientific literature and genomics based podcasts.

5) Complete phylogenetic analyses applicable to genomic studies.

6) Become familiar with all aspects of gene analysis including sample preparation, primer design, primer testing, controls, amplification reactions, and analysis of results.

7) Use polymerase chain reaction (PCR) on specific regions of a gene of interest from extracted DNA to create unique barcodes. Submit amplified sequences (amplicons) sequencing analyzed using DNA Subway and examine aspects of biodiversity.

7) Compare sequencing technologies, methods used to analyze gene expression, and proteomic technologies.

8) Discuss ethical issues relevant to genomics.

9) Review how to prepare a manuscript describing genome structure for publication in a professional journal.

Class Assignments

Assessments include weekly quizzes and worksheets

- Quizzes will consist of essay/short answer and multiple choice questions
- Worksheets are designed to help with concept comprehension.

You will lead 1 discussion.

- Introduce the class to their genomics topic and lead a discussion reviewing one episode of "The G Word" podcast, supplemented with at least one research article. Prior to their presentation, leaders will prepare:
  - detailed typed notes highlighting key points and listing discussion questions with written answers. Submit these notes to the instructor following the discussion session.
- an outline of 4-5 points they want to others to consider in that day’s discussion. Post the outline to OAKS prior to your discussion.

- Evaluation will assess whether the presenters...
  - carefully listened to the podcast/ read associated papers
  - answered questions raised during discussions
  - described the key points presented in the podcast/paper
  - outlined the implications of this work
  - contributed to classroom discussions

The job of non-presenters.

- You are expected to listen to the podcast and read any assigned papers before class and actively participate in class discussions

Grading

Lecture and Lab Combined

Quizzes and Worksheets: 60%
Participation in Discussion: 5%
Leading Discussion (x1): 15%
Weekly participation and completion of assignments (lab): 20%

**Grading Scale:**

- 92 and above: A
- 90-91.9: A-
- 87-89.9: B+
- 83-86.9: B
- 80-82.9: B-
- 77-79.9: C+
- 74-76.9: C
- 70-73.9: C-
- 67-69.9: D+
- 64-66.9: D
- 60-63.9: D-
- below 60: F

**Attendance Policy**

*Your attendance at our class meetings is required. If an emergency situation prevents your attendance, please reach out to me as soon as you can to receive instructions regarding missed work.*

**Honor Code and Academic Integrity**

*Lying, cheating, attempted cheating, and plagiarism are violations of our Honor Code that, when identified, are investigated. Each incident will be examined to determine the degree of deception involved. Incidents where the instructor determines the student’s actions are related more to a misunderstanding will handled by the instructor. A written intervention designed to help prevent the student from repeating the error will be given to the student. The intervention, submitted by form and*
signed both by the instructor and the student, will be forwarded to the Dean of Students and placed in the student’s file. Cases of suspected academic dishonesty will be reported directly by the instructor and/or others having knowledge of the incident to the Dean of Students. A student found responsible by the Honor Board for academic dishonesty will receive an XF in the course, indicating failure of the course due to academic dishonesty. This grade will appear on the student's transcript for two years after which the student may petition for the X to be expunged. The student may also be placed on disciplinary probation, suspended (temporary removal) or expelled (permanent removal) from the College by the Honor Board. Students should be aware that unauthorized collaboration—working together without permission—is a form of cheating. Unless the instructor specifies that students can work together on an assignment, quiz and/or test, no collaboration during the completion of the assignment is permitted.

Other forms of cheating include possessing or using an unauthorized study aid (which could include accessing information via a cell phone or computer), copying from others' exams, fabricating data, and giving unauthorized assistance. Research conducted and/or papers written for other classes cannot be used in whole or in part for any assignment in this class without obtaining prior permission from the instructor. Students can find the complete Honor Code and all related processes in the Student Handbook at: CofC Honor Code

Accommodations for Students with Disabilities

Any student eligible for and needing accommodations because of a disability is requested to speak with the professor during the first two weeks of class or as soon as the student has been approved for services so that reasonable accommodations can be arranged. Center for Disability Services/SNAP.

Recording of Classes (via ZOOM) Class sessions will be recorded via both voice and video recording. By attending and remaining in this class, the student consents to being recorded. Recorded class sessions are for instructional use only and may not be shared with anyone who is not enrolled in the class.

Laboratory Safety

SAFETY POLICY AND PROCEDURES

The School of Sciences and Mathematics of the College of Charleston understands that the safety of our students, staff and faculty is of paramount importance. Engendering a safety culture is an important part of our mission in teaching and doing science. Each department, course of instruction, or research lab may require higher standards or procedures. The policies and procedures set forth below are understood to be minimum requirements across our departments.
In this document, the term “laboratory” is meant for a work space/facility where chemicals, biological agents, or equipment is used for research and/or instruction.

No one (student, staff, faculty, or visitor) will be allowed in a laboratory (teaching or research) to perform experiments or where experiments may be in progress unless these regulations are followed.

Students dismissed from a teaching lab due to violations of the safety procedures will not be allowed to re-enter the laboratory until authorized to do so by their supervisor (instructor) and, in the case of research laboratories, by the department chair or designee. Any course work missed because of a violation of these guidelines cannot be made up at another time (or by an extension of the lab period) and will be treated as an unexcused absence.

1. You are responsible for knowing the biological, chemical, electrical, ergonomic, mechanical, and physical hazards associated with the equipment and materials that are being utilized in the laboratory. Listen to all instructions and ask questions about that which you do not understand.

2. Know the location of safety equipment: telephones, emergency shower, eyewash, fire extinguisher, fire alarm pull.

3. Know the appropriate emergency response procedures. If there is an injury or emergency, call 953-5611.

4. Do not work alone in the laboratory if you are working with hazardous materials or equipment.

5. Use hazardous chemicals, equipment, and biological agents only as directed and for their intended purpose.

6. Do not engage in horseplay, pranks or other acts of mischief while in lab.

7. Drinking, eating, and application of cosmetics is forbidden in laboratories where chemicals or biohazards are present. Smoking is forbidden in all College buildings.

8. Appropriate personal protective equipment shall be worn. The dress code for laboratory work when using chemicals, biological or physical hazards, or when instructed to do so by the laboratory supervisor is as follows:

   a) Wear safety glasses or goggles at all times. b) No exposed skin on arms, legs or torso.

   c) Wear lab coats or other approved protective garments.
d) Wear gloves or other personal protective equipment (PPE) as directed by the instructor or mandated by prudent practices based on the chemicals being handled. If in doubt, wear appropriate gloves. Latex is not permitted. Avoid cross-contamination.

e) Remove PPE (gloves and lab coat) when exiting the laboratory.