**BIOLOGY 350 LAB – SPRING 2022**

**Instructor: Dr. William J. Mackay Office Location: KESH 114**

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**Office Hours:** M 1-2; T 130-230; W 10-11; TH 130-230; F 10-12 (virtual, contact me for an appointment)

**Course Description:**

This laboratory course accompanies the Fundamentals of Genetics lecture. The purpose of the laboratory portion of this course is to provide students with an opportunity to learn how to apply theory learned during lecture to real scientific problems. Furthermore, students will learn additional theory of Genetics techniques and how to use these techniques to address a wide range of molecular problems.

**Credit Hours:**

1 credit hour

**Student Learning Outcomes:**

By the end of the course, students should have achieved the following learning outcomes:

* Laboratory techniques used in genetics
* Operation of genetics laboratory instruments (even if streaming at home)
* Experimental design
* Analysis of results
* Reporting of results
* Writing for science disciplines
* Presentation of research

**Methods of Instruction:**

A combination of bioinformatics and in-lab hands-on experiments will be used throughout the semester. Modality of instruction and labs may change based on circumstances such as Covid-19 and/ or hurricanes. Please review the University’s Operation Plan regularly for any changes.

**Academic Expectations:**

We at Coastal Carolina University would like to welcome you to our academic community. Achieving your maximum intellectual potential will require hard work, dedication, and diligence. The Coastal community has been designed to assist its students in many capacities, but the primary responsibility for learning is yours. These responsibilities include coming to class everyday (unless you have a documented university-approved excuse for missing class), arriving to class on time and prepared for class to begin, turning in all assignments by the deadline discussed in class and participating in class discussions and other activities in the classroom.

**Communication Policy**

For general course questions, see me in my office (with social distancing and wearing a mask), or by email. For specific questions related to your course work, email me at (wmackay@coastal.edu). I will respond within 24 hours in most instances during the week. On the weekends, I will try to respond within 24-48 hours as scheduling/travel permits. You may call my office phone, but that just gets sent to my email, and I can respond to an email faster than phone call.

**Course Requirements:**

**Attendance**

Students are expected to attend all class sessions as listed on the course calendar. Attendance at class meetings and participation in activities is essential for the success of the lab. Unexcused absences will result in an automatic zero for any assignments associated with that day’s lab. This includes two-week experiments. If you miss the first week for an unexcused absence, you will receive a zero for both weeks of the experiment, etc.

* Attendance is taken during each lab session. However, there are only a maximum of 24 students in each lab. So, it is easy for the instructor to determine who is missing. Absences due to your own illness, family illness and death, or other extenuating circumstances will need documentation. **If you test positive for COVID-19, you will need a doctor’s note *or* contact CCU Health Services to be placed on official quarantine.**

**Quarantine**

* If you are placed in quarantine due to a positive COVID-19 test, you will need to ZOOM with your lab partners (if you are capable) to keep up with lab. This is the best method I can come up with for anyone in quarantine to continue in the class without missing out on any class discussions or work. You also welcome to zoom directly to me or meet with me via Zoom separately to go over lab material.

**Lab requirements**

All students **must** strictly follow all lab rules including, wearing close-toe and heal shoes, no bare shoulders, no food or drink in the lab, pants, shorts, or skirts to the knees, and gloves worn at all times.

**Missed Assignments/Make-Ups/Extra Credit:**

Be sure to pay close attention to deadlines—there will be **no** makeup assignments or quizzes, or late work accepted without a serious and compelling UNIVERSITY approved reason, and instructor approval.

**Assignment Breakdown:**

# Assignment Points

# Notebook: You will be expected to maintain an appropriate research notebook. You need to have a composition notebook for this and it needs to be handwritten. You will not turn this notebook directly in for grading but upload pdf images of your recorded notebook entries in pdf format to me via email for grading. Upload only a single pdf file for each notebook entree (E.g. Module I notebook entree will include notebook pages from Jan. 26 and Feb. 9 as a single file.) For each day that you attend lab (including labs done at home) and/ or work on an experiment, you need to record:

# -Date

# -Title of the lab module

# -Purpose of the lab (e.g. We are using tobacco seeds to demonstrate segregation and

# inheritance of genetics. Further, we will be using chi-square to determine probabilities of inheritance of specific traits.)

# -Methods (in detail, this cannot be just cut and paste of the protocols we give you –

# they must be re-written in your own hand)

# -Results (including any photos or tables, e.g. your chi-square table with a written

# result stating ‘We determined a X2 value of …. and p-value of…. based on Table 1.’)

# -Conclusions (this should be a simple sentence, e.g. ‘We conclude from our results that our tobacco seeds were the result of a heterozygous cross and demonstrate the expected 1:2:1 inheritance pattern.’).

# If an experiment is not completed on the same day – write ‘to be continued.

# The day you continue the experiment write at the beginning of your notebook entry (Continued from … (date and page)).

-You will have four notebook ‘check’s during the semester for modules I through V. At the end of semester, I will allow you an extra credit option of submitting your entire notebook with **all** corrections for extra credit points (+10 pts. on your lowest notebook grade). Although a couple of your assignments ask to be submitted separate from the notebook, the same information should be recorded in your notebook. This includes **all** questions posed in each module. Any corrections for the final extra credit notebook check need to be highlight or marked in red. The requirements for each notebook entry is provided above. A rubric for grading of the notebook will be provided in Moodle.

Assignments: You will have some questions and assignments to complete during the semester.

Lab Report: You are required to write one lab report on your GM lab. This is to be done with assigned partner(s). Only one report per a pair/ group will be turned in.

Abstract on the GM bacteria lab: You will work as a group for the GM bacteria lab and turn in one abstract (no more than 400 words) that summarizes the objective, methods, results, and conclusions/ implications of findings of this lab module. No citations are required for the abstract.

Presentation: A final presentation by each team (with both team members contributing) will be given via Zoom at the end of the semester on one of your labs completed during the semester.

**Quizzes:** I plan to include periodic quizzes during class period. Quizzes can be substituted for other parts of your grade (to be discussed and determined during the course). I will give you sufficient notice before each quiz.

**Grading:**

Lab notebook Total of **50%** of your grade

Module I notebook check 10%

Module II notebook check 10%

Module III notebook check 10%

Module IV notebook check 20%

Assignments Total of **20%** of your grade

Primer design exercise 5%

Abstract eDNA lab 15%

GM lab report **20%** of your grade

Presentation **10%**  of your grade

**Total 100%**

Grade distribution: 90-100 A, 87-89 B+, 80-86 B, 77-79 C+, 70-76 C, 67-69 D+, 60-66 D, <60 F.

**Students with Disabilities:**

As an institution of higher education, Coastal Carolina University wants to see each student become successful and be given equal opportunity to achieve his or her fullest potential. Keeping this in mind, any student who needs further assistance due to a disability, whether it is physical, learning, or mental, will be provided with the means necessary to achieve his or her goals. For further information, please contact the Office of Accessibility and Disability Services at (843) 3492503 or visit their office in the Kearns Hall, Room 106.

A syllabus calendar will be provided for you today and will be periodically updated.

Coastal Carolina University is committed to equitable access and inclusion of individuals with disabilities in accordance with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act. Individuals seeking reasonable accommodations should contact Accessibility & Disability Services (843-349-2503 or [https://www.coastal.edu/disabilityservices)](https://www.coastal.edu/disabilityservices).

**Code of Conduct with Netiquette**

Online Code of Conduct Students are expected to treat one another with respect and basic common courtesies in our online classroom. All students should expect a safe environment learning environment. This is environment should be free of derogatory, offensive, harassing or inappropriate remarks or materials including but not limited to race, ethnicity, gender, sexual orientation, religion, and age.

**Academic Integrity**

Coastal Carolina University is an academic community that expects the highest standards of honesty, integrity and personal responsibility. Members of this community are accountable for their actions and are committed to creating an atmosphere of mutual respect and trust.

# A. Statement of Community Standards

Coastal Carolina University is an academic community that expects the highest standards of honesty, integrity and personal responsibility. Members of this community are accountable for their actions and are committed to creating an atmosphere of mutual respect and trust. Any class members who the instructor deems disruptive to the learning environment may be asked to leave class for the day.

# B. Expectations of Community Members

All members of our community – students, faculty, staff and administrators – share responsibility for promoting a culture of academic integrity. Each group plays a different role and, together, cultivates mutual respect and ethical behavior.

Students:

* Understand and abide by the Code of Student Conduct
* Take responsibility for personal behavior
* Actively oppose every instance of academic dishonesty

Writing Assignments

Please note that a portion of this lab involves writing. Points will be deducted for incorrect format of citation for all writing assignments. Examples of how to cite in-text and at the end of paper are shown below. Please follow these examples for your citation format. Make sure to **always** cite information used from any source. **Remember**, only peer-reviewed scientific literature (journal articles) are acceptable sources. Websites, Wikipedia, newspaper and or general magazines are not acceptable sources and will result in loss of points if used. **Lack of citation (either in-text or at the end of the paper is plagiarism and will result in a zero for the assignment as well as an academic integrity violation. This includes if you have some but not all citations – that is still plagiarism.**

In-text citation example: Genetic modification of plants has existed since the early times of civilization. Practices such as selective breeding of plants to improve taste, fruit production, and quality started in ancient Egypt (Smith et al., 2008).

If one author: (Smith, 2008); two authors (Smith and Hall 2008), more than two authors (Smith et al., 2008).

Full citation: **Smith EJ, Hall MC, Master TM, Lee HV** (2008). The earliest practices of genetic manipulation of plants. J Plant Breed **12**: 10-25.

**Course Schedule**

***Tentative Course Schedule:***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Week of** | **Lab** | **Do at home prior to coming into lab** | **Submit for grading: Assignment Name** | **Due Date (# indicates the number of days after your lab. Submit by 5 pm that day).** |
| Jan 19 | Syllabus, lab notebook vs lab report/ Pipette exercise |  |  |  |
| Jan 26 | **Module I: Mystery digest parts A-B (digest)** | **Complete part A** |  |  |
| Feb 2 | **Module I: Mystery digest part C-D (gel)** | **Complete part C** | **Notebook entries: Module I parts A-D** | +2 (So if you are in a Wednesday lab – you must submit by 5 pm the following Friday (2/4/22) |
| Feb 9 | **How to write 300+ papers/ Module III: tobacco seeds** |  |  |  |
| Feb 16 | **Module II: GM lab week 1 (A-B)** | **Decide what fruit to test and write your hypothesis down in your notebook** | **Primer exercise** | +2 |
| Feb 23 | **Module II: GM lab week 2 (A-B)** |  | **Notebook entries: Module II GM lab (weeks 1-2)** | +2 |
| Mar 2 | **Module III**  (Chi Square Analysis) |  | **Notebook entries: Module III: tobacco seeds lab** | +2 |
| Mar 9 | **Spring Break** |  |  |  |
| Mar 16 | **Module IV: Recombinant cloning Part 1: PCR** |  |  |  |
| Mar 23 | **Module IV: Recombinant cloning Part 2: gels** |  | **GM Paper** | +2 |
| Mar 30 | **Module IV: Recombinant cloning Part 3: Digestion and ligation** |  |  |  |
| April 6 | **Module IV: Recombinant cloning Part 5: Transformation** |  |  |  |
| April 13 | **Module IV: Recombinant cloning Part 6: Selection and screening**  **How to do a professional presentation** |  | **Notebook entries: Module IV: Recombinant cloning lab** | +2 |
| April 20 | **Presentations** |  | **Recombinant cloning Abstract/**  **Optional final notebook entrees with corrections** | +2 |