Syllabus: BIO 482: Genetics Capstone

Course Title: BIO 482: Genetics Capstone

Semester: Fall 2024

Instructor: Prof. Sarah Lee

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Office Hours: Fridays 2:00-4:30 PM OR by appointment

Class Time & Place: Wednesday or Friday 3:00-4:15 PM in SANCA 735

Course Description:

This capstone course focuses on the analysis of genetic variation in populations or species. Students will collect samples, extract DNA, analyze genetic data, and present their findings at the Innovation Showcase. The course includes the development of a project proposal, sample collection, genetic analysis, and a final report.

Course Objectives:

Analyze genetic variation in a specific population or species.

Collect samples, extract DNA, and conduct genetic analysis.

Test hypotheses about genetic variation and develop population genetics models.

Effectively present the research at the Innovation Showcase.

Learning Outcomes:

Gain expertise in genetics and population biology.

Develop practical skills in DNA extraction, genetic analysis, and bioinformatics.

Improve communication skills through written reports and presentations.

Enhance the ability to manage genetics research projects from conception to completion.

Group Project and Required Subtasks:

The group project for this course will involve the analysis of genetic variation in a specific population or species. The project will be broken down into the following subtasks:

1. **Project Proposal (Week 3):**
   - Create a proposal detailing the population or species being studied, the research objectives, and the anticipated outcomes. Include a timeline and assign roles to team members.

2. **Sample Collection and DNA Extraction (Weeks 4-6):**
   - Collect samples from the population or species being studied. Extract DNA from the samples and prepare them for analysis using techniques such as PCR and sequencing.

3. **Genetic Analysis and Data Interpretation (Weeks 7-10):**
   - Analyze the genetic data to identify patterns of variation. Use bioinformatics tools to interpret the data and compare it with known genetic markers.

4. **Hypothesis Testing and Population Genetics Modeling (Weeks 11-12):**
   - Test hypotheses about genetic variation and evolutionary forces in the population. Develop models of population genetics to explain the observed patterns.

5. **Final Report and Presentation (Weeks 13-15):**
   - Document the entire research process, including challenges, solutions, and outcomes in a final report.
   - Prepare a presentation for the Innovation Showcase that highlights the key aspects of the research.

Groups are expected to collaborate closely, meeting regularly to discuss progress and resolve any

issues. Instructor check-ins will be scheduled to provide guidance and feedback.

Evaluation:

Class meetings (5): 20 points

Individual meetings (3): 12 points

Project Proposal: 10 points

Sample Collection and DNA Extraction: 15 points

Genetic Analysis and Data Interpretation: 18 points

Hypothesis Testing and Population Genetics Modeling: 10 points

Final Report: 10 points

Presentation: 5 points

Poster: 10 points

Total: 100 points

Course Policies:

Attendance and Participation: Regular attendance and active participation are crucial for success in this course. Students are expected to attend all scheduled class meetings and individual sessions. If a student is unable to attend a class, they should inform the instructor in advance and arrange to complete any missed work.

Academic Integrity: All students must adhere to ASU's academic integrity policy. Any form of academic dishonesty, including plagiarism, will be reported and may result in severe penalties, including a failing grade for the course.

Accommodations: Students with disabilities or special needs should contact the ASU Disability Resource Center to arrange appropriate accommodations and notify the instructor as soon as possible.

Important Dates:

Class Week 1: Introductions & Project Brainstorming (Aug 26)

Individual Meeting #1: Discuss Ideas and Readings (Sep 4)

Class Week 2: Proposal Presentation & Group Feedback (Sep 18)

Individual Meeting #2: Proposal Feedback & Methods Discussion (Oct 2)

Class Week 3: Revised Proposal Presentation & CERTT Tour (Oct 23)

Individual Meeting #3: Data Analysis & Progress Review (Nov 13)

Class Week 4: Professional Development & Project Discussion (Nov 27)

Innovation Showcase: Final Presentations & Poster Display (Dec 6)