

## BIOL 3329-001 Genomics Spring 2025

**Meeting time:** Tues/Thurs 9:30 AM – 10:30 AM

**Meeting classroom:** Soules College Of Business 00227

**Instructor:** Matthew Greenwold, Ph.D., Assistant Professor of Biology

**Office:** HPR 117

**Office Hours:** Tues/Wed/Thurs 11:00 AM – 12:00 PM or by appointment.

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**Course Description:** Covers emerging fields of genomics. Discusses key technologies and their applications to the study of human and model organism genomes.

Prerequisites: BIOL 1306, BIOL 1106, BIOL 1307, BIOL 1107.

**Course Learning Objectives:** By the end of the course, students should be able to:

- Describe how genomics, transcriptomics and proteomics constitute the phenome
- Describe the general features of genomes
- Describe the steps in sequencing and annotating genomes
- Differentiate eukaryotic, prokaryotic, and organelle genomes
- Effectively discuss emerging topics in the field of genomics.

**Required Course Materials:** No required textbook.

**Grading:** Your grade will be based on three exams, class discussions, presentation, attendance, and a final exam. The grade distribution is:

|                     |            |
|---------------------|------------|
| Exam 1 =            | 15%        |
| Exam 2 =            | 15%        |
| Exam 3 =            | 15%        |
| Discussions (3) =   | 15%        |
| Presentation =      | 15%        |
| Final Exam =        | 15%        |
| <u>Attendance =</u> | <u>10%</u> |
| Total               | 100%       |

| Grading    |       |
|------------|-------|
| Percentage | Grade |
| 90-100%    | A     |
| 80-90%     | B     |
| 70-79%     | C     |
| 60-69%     | D     |
| < 59%      | F     |

**Exams:** There will be three semester exams that will take place **Tuesday Feb. 4<sup>th</sup>**, **Tuesday Mar. 4<sup>th</sup>**, and **Tuesday Apr. 8<sup>th</sup>**. You will have the entire class period to complete the exam. The questions will be mostly short answer/essay but may also include true/false and multiple-choice questions.

**Final Exam:** The final exam will be 50% new material (based on student presentations) and 50% old material and consist of essay/short answer, True/False, and multiple-choice questions. The final exam will take place at the date and time specified by the University for this course.

**Discussions:** The discussions will consist of an in class reading assignment followed by group discussion based on instructor provided questions.

**Presentation:** Each student will present on one genome article. The presentation should be a PowerPoint presentation with a length of 10 - 12 minutes. A rubric will be provided. I suggest that you pick an organism or group of organisms that you find interesting and then search for a genome article. Many journals specialize in genome studies such as *Genome Biology and Evolution*. The article should contain at least one novel genome and be a primary research article. You should submit your chosen article for approval by **March 11<sup>th</sup>**. The information presented by you and your fellow students will be on the final exam.

**Attendance:** Attendance is mandatory. You may miss **TWO** lectures without losing points. I am required to provide attendance data for Financial Aid, midterm, and final grades submissions; therefore, it is critical that you attend our class meetings. If you cannot attend for reasons of Illness or other acceptable situations, please contact me to determine the best course of action.

| Course Schedule                          |                                                         |
|------------------------------------------|---------------------------------------------------------|
| Week of                                  | Topic                                                   |
| Jan. 14 <sup>th</sup>                    | Introduction to the course and genomes                  |
| Jan. 21 <sup>st</sup>                    | Mapping Genomes (Discussion – Thursday)                 |
| Jan. 28 <sup>th</sup>                    | Sequencing Genomes                                      |
| Feb. 4 <sup>th</sup>                     | Sequencing Genomes cont. ( <b>Exam 1</b> – Tuesday)     |
| Feb. 11 <sup>th</sup>                    | Annotation / Databases                                  |
| Feb. 18 <sup>th</sup>                    | Prokaryotic Genomes - (Discussion – Thursday)           |
| Feb. 25 <sup>th</sup>                    | Virus Genomes                                           |
| Mar. 4 <sup>th</sup>                     | Virus Genomes cont. - ( <b>Exam 2</b> – Tuesday)        |
| Mar 11 <sup>th</sup>                     | Organelle Genomes – (Presentation Topic Due)            |
| Mar. 18 <sup>th</sup>                    | SPRING BREAK – No Classes                               |
| Mar. 25 <sup>th</sup>                    | Eukaryotic Genomes (Discussion – Thursday)              |
| Apr. 1 <sup>st</sup>                     | Avian Genomes                                           |
| Apr. 8 <sup>th</sup>                     | Transcriptomics / Proteomics ( <b>Exam 3</b> – Tuesday) |
| Apr. 15 <sup>th</sup>                    | Student Presentations                                   |
| Apr. 22 <sup>nd</sup>                    | Student Presentations                                   |
| Apr. 28 <sup>th</sup> - 30 <sup>th</sup> | Final Exams                                             |

Census Date: January 27<sup>th</sup>

**Late Work:** No late work will be accepted! Part of learning to be a scientist is learning time management. When you are in a job or working on grants - deadlines are final! If you miss the deadline, you cannot submit; therefore, this will be good practice for your future career. If for some reason you cannot attend class or turn in an assignment, please reach out to Dr. Greenwold to determine if a deadline extension can be granted.

**Make-Up Exams:** You must take the exams on the scheduled dates. Please mark your calendars now, so that you do not have conflicts. If an absence cannot be avoided, the professor must be notified in advance. If a student is unable to take an exam when scheduled, following appropriate documentation of the absence, the professor will arrange a make-up exam or provide an oral version depending on the nature of the absence. The make-up exam will NOT be the same format or questions as the original exam.

**Use of Artificial Intelligence in this course:** During some class assignments, we may leverage AI tools to support your learning, allow you to explore how AI tools can be used, and/or better understand their benefits and limitations. Learning how to use AI is an emerging skill, and we will work through the limitations of these evolving systems together. However, AI will be limited to assignments where AI is a critical component of the learning activity. I will always indicate when and where the use of AI tools for this course is appropriate.