Course Information

Course Name: Advanced Bioinformatics  
Course ID: CIS 555  
Semester: Summer 2024  
Lectures: Online on myCourses

Instructor Information

Name: Dr. Firas Khatib  
Email: fkhatib@umassd.edu  
Phone: (508) 999-8265

Course Description

This course covers advanced computational approaches used in bioinformatics. The course focuses on algorithmic challenges in analyzing molecular sequences, structures, and functions. It covers the following topics: Sequence comparison, assembly and annotation; Phylogenetic analysis; RNA secondary structure; Protein structure comparison, prediction, and docking; Microarrays, clustering, and classification; Genome, SNPs, and phenotypes. Proteomics and protein identification; Determining protein function and metabolic pathways.

Prerequisites: CIS 360 Algorithms and data structures, or CIS 455: Bioinformatics, or CIS 522: Algorithms and Complexity, or permission of instructor.

Course Credits: 3


Course Objectives

After successfully completing this course, students will be able to:

- Study advanced algorithms and methods in bioinformatics.
- Learn about the latest resources (algorithms, tools and datasets) in bioinformatics.
- Apply advanced computational techniques to biological problems.

Communication Plan

- MyCourses: https://mycourses.umassd.edu with course materials including syllabus, announcements, readings, homework and project materials.
If you have a question that another student in the course might have, please post the question in the appropriate Discussion Board Forum on myCourses. I will check the discussion forums daily and respond to any questions you may have. All course related material including announcements, lecture notes, assignments, grades, etc. can be found on the myCourses website.

Check your email and myCourses website often for important updates and information!

Methods of Instruction

There will be one midterm exam, one final exam, homework assignments, projects, and a presentation. Exam content will come from the material covered in class, the homeworks, the projects and/or the assigned readings. Complete all required work on time. In the event that required work cannot be completed on time, due to illness or other serious and unavoidable circumstance, notify the professor as far in advance as possible by phone or e-mail. Make-up exams will not be given for any reason.

Complete all required work on time. Late assignments will be penalized. In the event that required work cannot be completed on time—due to illness or other serious and unavoidable circumstances—notify the professor as far in advance as possible by e-mail.

Make-up exams will not be given for any reason.

The evaluation will be based on:

20% Midterm
40% Homework and Project
30% Final Exam
10% Participation

University Academic Policies

These policies are also available in the student handbook on the University website - umassd.edu

- Information on Incompletes
- Student Behavior
- Student Academic Integrity
- Definition of Credit Hour
- Course Withdrawal
- Grade Appeal
- Attendance Policy
- Academic Calendar
- Title IX and Sexual Assault/Harassment

Submitting all assignments on myCourses using SafeAssign

As a condition of continued enrollment in this course, you agree to submit all assignments to the SafeAssign services for plagiarism detection. All submissions will be included in the UMassD SafeAssign databases for the purpose of detecting possible plagiarism during the grading process and during this term and in the future.
Technical Help
- 24/7 email, live chat, and phone support for myCourses is available at the myCourses support portal. Do you need help with other UMass Dartmouth technologies (laptops, wifi USB sticks)? Please contact CITS.

Incomplete Policy
The incomplete policy for this course is that at least 70% of the course must be already completed with a passing grade and an exceptional circumstance (i.e. medical issue) must exist. If you feel you require an incomplete for an exceptional reason, you need to email me and state your reasons for the incomplete in writing. We will then decide on a course of action.

Syllabus Change Policy
Except for changes that substantially affect the evaluation (grading) of the course, this syllabus is a guide for the course and is subject to change. Please refer to the current online version for the most current information.

Course Schedule (subject to change with advance notice)

<table>
<thead>
<tr>
<th>Week Of</th>
<th>Topic(s)</th>
<th>Reading</th>
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<tbody>
<tr>
<td>1. May 28th</td>
<td><em>Where in the Genome Does DNA Replication Begin</em></td>
<td>Chapter 1</td>
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<tr>
<td>2. June 3rd</td>
<td><em>Which DNA Patterns Play the Role of Molecular Clocks?</em></td>
<td>Chapter 2</td>
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<td>3. June 10th</td>
<td>-Chap. 2 continued-</td>
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<tr>
<td>4. June 17th</td>
<td><em>How Do We Assemble Genomes?</em></td>
<td>Chapter 3</td>
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<td>5. June 24th</td>
<td>-Chap. 3 continued-</td>
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<tr>
<td>6. July 1st</td>
<td>Midterm Review and Exam</td>
<td>Midterm</td>
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<td>7. July 8th</td>
<td><em>How Do We Sequence Antibiotics?</em></td>
<td>Chapter 4</td>
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<td>8. July 15th</td>
<td><em>How Do We Compare Biological Sequences?</em></td>
<td>Chapter 5</td>
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<td>9. July 22nd</td>
<td>-Chap. 5 continued-</td>
<td></td>
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<tr>
<td>10. July 29th</td>
<td>-Chap. 5 continued-</td>
<td></td>
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<tr>
<td>11. August 5th</td>
<td><em>Are There Fragile Regions in the Human Genome?</em></td>
<td>Chapter 6</td>
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<tr>
<td>12. August 12th</td>
<td>Review and Final Exam</td>
<td>Final Project &amp; Final Exam</td>
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