Oregon State University
Ecampus

Course Name: Applied Bioinformatics
Course Number: BB 485
Credits: 3 Credits

Course Description
The fundamentals of bioinformatics are presented, which will enable an understanding of the software and methods used in answering questions in bioinformatics. The student will gain a working knowledge of the bioinformatics analysis of contemporary techniques such as databases, gene and genome annotations, functional annotations, sequence alignment, motif finding, secondary structure prediction, phylogenetic tree construction, high-throughput sequence data, ChIP-Seq peak identification, transcriptome profiling by RNA-Seq, microRNA discovery and target prediction.

Enforced Prereqs: BI 314 [C-] or BI 314H [C-]
Other Prereqs: /or equivalent or by instructor approval.

Communication
Please post all course-related questions in the General Discussion Forum so that the whole class may benefit from our conversation. Please email your instructor for matters of a personal nature. The instructor will reply to course-related questions and email within 24-48 hours. I will strive to return your assignments and grades for course activities to you within five days of the due date.

Course Credits
This course is 3 credits. Every third video lecture (roughly) after week 1 involves a more hands-on laboratory project. These lectures will involve a set of questions and a basic write up.

Technical Assistance
If you experience computer difficulties, need help downloading a browser or plug-in, assistance logging into the course, or if you experience any errors or problems while in your online course, contact the OSU Help Desk for assistance. You can call (541) 737-3474, email osuhelpdesk@oregonstate.edu or visit the OSU Computer Helpdesk online.

Learning Resources

The text for this class will be "Applied Bioinformatics of Nucleic Acid Sequences", by David Hendrix. This text will be updated throughout the term at the following URL and on canvas: http://hendrixlab.cgrb.oregonstate.edu/teaching/ab/AB.pdf

Canvas

This course will be delivered via Canvas where you will interact with your classmates and with your instructor. Within the course Canvas site you will access the learning materials, such as the syllabus, class discussions, assignments, projects, and quizzes. To preview how an online course works, visit the Ecampus Course Demo. For technical assistance, please visit Ecampus Technical Help.

Measurable Student Learning Outcomes

• Correctly utilize the specialized language of bioinformatics and computational biology.
• Analyze data using bioinformatics to understand eukaryotic gene regulation.
• Choose appropriate methods and research questions for bioinformatics investigations.
• Appropriately run/execute command-line software in a unix environment to answer specific bioinformatics questions.
• Appropriately select and employ modules and methods from Biopython to answer specific bioinformatics questions.
• Apply modern methods of bioinformatics to medicine and biology.

Evaluation of Student Performance

- Homework, 5 problem sets (50%: 5 sets 10% each for weeks 2,4,6,8,10)
- Project write-ups (10%)
- Mid Term Exam 50pts (20%)
- Final Exam 100pts (20%)

Extra Credit Opportunities

Students are encouraged to attain extra credit points by:

- Significant contributions to Discussions on canvas
- Identifying any significant error in the class text "Applied Bioinformatics of Nucleic Acid Sequences"

Course Content

Week	Topic	Reading Assignments	Learning Activities
1	Introduction	Chapter 1 "Introduction to Biological Sequences", Appendices A and B.	Online discussion
2	Sequence Motifs	Chapter 2 "Sequence Motifs"	Online discussion, Quiz 1, Project write-up: L8 - Finding motifs

Week	Topic	Reading Assignments	Learning Activities
3	Sequence Alignments	Chapter 3 "Sequence Alignments"	Online discussion, Project write-up: L11 – BLAST command line
4	Molecular Evolution and Phylogenetics	Chapter 4 "Molecular Evolution and Phylogenetics"	Online discussion, Quiz 2, Project write-up: L15 – Building Phylogenetic Trees
5	Genomics	Chapter 5 "Genomics"	Online discussion Midterm Exam, Project write-up: L17 – Genomics and Python
6	Transcriptomics	Chapter 6 "Transriptomics"	Online discussion Quiz 3, Project write-up: L20 – Transcriptomics with Tuxedo suite
7	Noncoding RNAs	Chapter 7 "Noncoding RNAs"	Online discussion, Project write-up: L23 – RNA Structure
8	Proteins	Chapter 8 "Proteins"	Online discussion Quiz 4, Project write-up: L25 – Proteins and Domains
9	Gene Regulation	Chapter 9 "Gene Regulation"	Online discussion, Project write-up: L28 – ChIP-seq peaks
10	Catch-up and Review		Online discussion Quiz 5
Finals			Final Exam

Course Policies

Discussion Participation
Students are expected to participate in all graded discussions. While there is great flexibility in online courses, this is not a self-paced course. You will need to participate in our discussions on at least two different days each week, with your first post due no later than Wednesday evening, and your second and third posts due by the end of each week.

Makeup Exams
Makeup exams will be given only for missed exams excused in advance by the instructor. Excused absences will not be given for airline reservations, routine illness (colds, flu, stomach aches), or other common ailments. Excused absences will generally not be given after the absence has occurred, except under very unusual circumstances.

Exam Time Limits
Exams will be administered through Canvas with a fixed time limit. After the time limit, the exams will be automatically submitted.

Incompletes
Incomplete (I) grades will be granted only in emergency cases (usually only for a death in the family, major illness or injury, or birth of your child), and if the student has turned in 80% of the points possible (in other words, usually everything but the final paper). If you are having any difficulty that might prevent you completing the coursework, please don't wait until the end of the term; let me know right away.

Guidelines for a Productive and Effective Online Classroom

Students are expected to conduct themselves in the course (e.g., on discussion boards, email) in compliance with the university's regulations regarding civility.

Civility is an essential ingredient for academic discourse. All communications for this course should be conducted constructively, civilly, and respectfully. Differences in beliefs, opinions, and approaches are to be expected. In all you say and do for this course, be professional. Please bring any communications you believe to be in violation of this class policy to the attention of your instructor.

Active interaction with peers and your instructor is essential to success in this online course, paying particular attention to the following:

- Unless indicated otherwise, please complete the readings and view other instructional materials for each week before participating in the discussion board.
- Read your posts carefully before submitting them.
- Be respectful of others and their opinions, valuing diversity in backgrounds, abilities, and experiences.
- Challenging the ideas held by others is an integral aspect of critical thinking and the academic process. Please word your responses carefully, and recognize that others are expected to challenge your ideas. A positive atmosphere of healthy debate is encouraged.

Statement Regarding Students with Disabilities

Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at http://ds.oregonstate.edu. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.

Accessibility of Course Materials

All materials used in this course are accessible. If you require accommodations please contact Disability Access Services (DAS).

Additionally, Canvas, the learning management system through which this course is offered, provides a vendor statement certifying how the platform is accessible to students with disabilities.

Expectations for Student Conduct

Student conduct is governed by the university's policies, as explained in the Student Conduct Code.

Academic Integrity

Students are expected to comply with all regulations pertaining to academic honesty. For further information, visit Student Conduct and Community Standards, or contact the office of Student Conduct and Mediation at 541-737-3656.

OAR 576-015-0020 (2) Academic or Scholarly Dishonesty:

a) Academic or Scholarly Dishonesty is defined as an act of deception in which a Student seeks to claim credit for the work or effort of another person, or uses unauthorized materials or fabricated information in any academic work or research, either through the Student's own efforts or the efforts of another.

b) It includes:
   i) CHEATING - use or attempted use of unauthorized materials, information or study aids, or an act of deceit by which a Student attempts to misrepresent mastery of academic effort or information.

This includes but is not limited to unauthorized copying or collaboration on a test or assignment, using prohibited materials and texts, any misuse of an electronic device, or using any deceptive means to gain academic credit.

ii) FABRICATION - falsification or invention of any information including but not limited to falsifying research, inventing or exaggerating data, or listing incorrect or fictitious references.

iii) ASSISTING - helping another commit an act of academic dishonesty. This includes but is not limited to paying or bribing someone to acquire a test or assignment, changing someone's grades or academic records, taking a test/doing an assignment for someone else by any means, including misuse of an electronic device. It is a violation of Oregon state law to create and offer to sell part or all of an educational assignment to another person (ORS 165.114).

iv) TAMPERING - altering or interfering with evaluation instruments or documents.

v) PLAGIARISM - representing the words or ideas of another person or presenting someone else's words, ideas, artistry or data as one's own, or using one's own previously submitted work. Plagiarism includes but is not limited to copying another person's work (including unpublished material) without appropriate referencing, presenting someone else's opinions and theories as one's own, or working jointly on a project and then submitting it as one's own.

c) Academic Dishonesty cases are handled initially by the academic units, following the process outlined in the University's Academic Dishonesty Report Form, and will also be referred to SCCS for action under these rules.

Conduct in this Online Classroom
Students are expected to conduct themselves in the course (e.g., on discussion boards, email postings) in compliance with the university's regulations regarding civility.

Tutoring
NetTutor is a leading provider of online tutoring and learner support services fully staffed by experienced, trained and monitored tutors. Students connect to live tutors from any computer that has Internet access. NetTutor provides a virtual whiteboard that allows tutors and students to work on problems in a real time environment. They also have an online writing lab where tutors critique and return essays within 24 to 48 hours. Access NetTutor from within your Canvas class by clicking on the Tools button in your course menu.

OSU Student Evaluation of Teaching
Course evaluation results are extremely important and are used to help me improve this course and the learning experience of future students. Results from the 19 multiple choice questions are tabulated anonymously and go directly to instructors and department heads. Student comments on the open-ended questions are compiled and confidentially forwarded to each instructor, per OSU procedures. The online Student Evaluation of Teaching form will be available toward the end of each term, and you will be sent instructions via ONID by the Office of Academic Programs, Assessment, and Accreditation. You will log in to "Student Online Services" to respond to the online questionnaire. The results on the form are anonymous and are not tabulated until after grades are posted.