

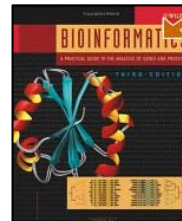
Essential Bioinformatics
Spring Semester 2008, 4 credit hours

BSC: 491/591 (Reg. code: 9541/9543) - Lab: BSC 491L/591L (Reg. code: 9542/9544)

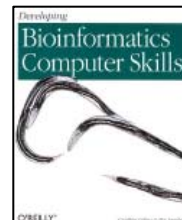
Undergraduate / Graduate

Course	Essential Bioinformatics
Course Homepage	TBA
Meeting Time & Location	Lecture: Tue & Thr (2:25-3:40) – Lab: Thr 5:10-7:10, TH
Instructor	Mehdi Pirooznia http://www.biology.usm.edu/faculty/Faculty_Profile_Mehdi_Pirooznia.htm
Contact Information	Email: mehdi.pirooznia@usm.edu Phone: (601) 266-4353

Textbooks Bioinformatics: A Practical Guide to the
Analysis of Genes and Proteins
Andreas D. Baxevanis, B. F. Francis
Ouellette
ISBN-10: 0471478784
2004



Developing Bioinformatics Computer
Skills
By Cynthia Gibas, Per Jambeck
Published 2001, O'Reilly
ISBN: 1565926641



Prerequisites There are no specific pre-requisites required for this course. Although a prior knowledge of molecular biology or cell biology would be helpful.

Course Description This course has been designed to introduce the topic, history, and current research issues in bioinformatics, as well as prepare students in the skills necessary to communicate with researchers across the disciplines of computer science and biology. The course is also designed for computer scientists who want an introduction to the molecular biology and to the significant

computational biology problems. This course will introduce basic biological databases, principles and methods for sequence and genome analysis such as alignment of pairs of sequences, multiple sequence alignment, motif and domain finding, searching similar sequences, RNA and protein structure prediction, phylogenetic analysis, micorrarray data analysis, genome annotation and comparative genomics.

Objectives

At the end of the course the students will be able to:

- Defend uses of bioinformatics resources, including software, database search engines, and other Internet tools.
- Defend uses of data mining and data visualization tools in informatics research.
- Implement computational procedures and algorithms to analyze structures and functions of biological systems
- Communicate with remote biological databases and perform data retrieval from them

Class Schedule

- Overview of Bioinformatics and Molecular Biology
- Pairwise Sequence Alignment
- Multiple Sequence Alignment
- Local Multiple Sequence Alignment
- Searching Sequence Databases
- Fundamentals of molecular modeling
- Biological Databases; Hidden Markov Models
- Protein Family Classification; Gene Prediction
- Phylogenetic Analysis
- Molecular database development
- Microarray Data Analysis
- Protein Folding Prediction
- Genome Analysis
- Biological Pathways

Grading

course grade consists three exams and an assignment (assignment is optional for undergraduate and compulsory for graduate student)

Course grading scale

- 90 to 100 A – Excellent work
- 80 to 89 B – Good work
- 70 to 79 C – Average work
- 60 to 69 D – Inferior work
- 0 to 59 F – Fail

Assignments

Assignment is mandatory for graduate students. The requirements and due dates are provided on the course homepage.

Attendance

Students are expected to attend all classes.

Academic Honesty

Students are expected to do their own work on all assignments, projects and tests except the assignments are indicated as team work. Assignments that appear to be substantial duplicates of other submitted student work will be treated as instances of academic misconduct. The following text is extracted from the USM Undergraduate Bulletin:

“When cheating is discovered, the faculty member may give the student an F on the work involved or in the course. If further disciplinary action is deemed appropriate, the student should be reported to the Dean of Students. In addition to being a violation of academic honesty, cheating violates the Code of Student Conduct and may be grounds for probation, suspension, and/or expulsion. Students on disciplinary suspension may not enroll in any courses offered by The University of Southern Mississippi.”

DAD Policy

If a student has a disability that qualifies under the **Americans with Disabilities Act (ADA)** and requires accommodations, he/she should contact the Office for Disability Accommodations (ODA) for information on appropriate policies and procedures. Disabilities covered by ADA may include learning, psychiatric, physical disabilities, or chronic health disorders. Students can contact ODA if they are not certain whether a medical condition/disability qualifies. Address: The University of Southern Mississippi, Office for Disability Accommodations, 118 College Dr. #8586, Hattiesburg, MS 39406-0001, Voice Telephone(601) 266-5024, Fax(601) 266-6035. Individuals with hearing impairments can contact ODA using the *Mississippi Relay Service* at 1-800-582-2233 (TTY) or email Suzy Hebert at suzanne.hebert@usm.edu