FLORIDA INTERNATIONAL UNIVERSITY

Syllabus

Bioinformatics for Biologists

1171-FIU01-BSC-4434-SECRVC-33061

GENERAL INFORMATION | IMPORTANT INFORMATION | COURSE DETAIL | COURSE CALENDAR

GENERAL INFORMATION

Professor Information

Instructor: Dr. Tim Collins
Phone: (305) 348-1730
Office: AHC1, Rm. 319C (MMC)
Office Hours: Mondays 11:00 AM to 3:00 PM or by appointment
E-mail: CollinsT@fiu.edu

Course Description And Purpose

This course is a survey of the rapidly growing and changing field of bioinformatics. A limited but concise definition of bioinformatics is that it is the field concerned with computer-assisted analysis of the massive amount of nucleotide, protein, and whole genome biological sequence data currently being generated. Bioinformatics is a key element of some of the most exciting developments in modern biology. These include entire genome sequencing projects, such as the Human Genome Project, as well as the growing comparative databases aimed at mapping genomes and determining the structure and function of genes.

Course Objectives

The goals of this course are twofold. The first goal is to introduce students to bioinformatics resources available in various databases, and to enable students to efficiently search and retrieve data from these databases. The course will be based on freeware and shareware, providing students with a set of tools for future work. The course will be entirely online. The second goal is to introduce students to the theory and methods of analysis of biosequences. This includes multiple sequence alignment, prediction of secondary and tertiary protein structure from sequence data, phylogenetic analysis, and protein identification. This course is not about programming, but rather an introduction to bioinformatics and bioinformatics resources.

IMPORTANT INFORMATION

Policies

Please review the FIU's Policies webpage. The policies webpage contains essential information regarding guidelines relevant to all courses at FIU, as well as additional information about acceptable netiquette for online courses.

As a member of the FIU community you are expected to be knowledgeable about the behavioral expectations set forth in the FIU Student Code of Conduct.

Technical Requirements & Skills

One of the greatest barriers to taking an online course is a lack of basic computer literacy. By computer literacy we mean being able to manage and organize computer files efficiently, and learning to use your computer's operating system and software quickly and easily. Keep in mind that this is not a computer literacy course; but students enrolled in online courses are expected to have moderate proficiency using a computer. Please go to the "What's Required" webpage to find out more information on this subject.

Please visit our Technical Requirements webpage for additional information.

Accessibility And Accommodation

The Disability Resource Center collaborates with students, faculty, staff, and community members to create diverse learning environments that are usable, equitable, inclusive and sustainable. The DRC provides FIU students with disabilities the necessary support to successfully complete their education and participate in activities available to all students. If you have a diagnosed disability and plan to utilize academic accommodations, please contact the Center at 305-348-3532 or visit them at the Graham Center GC 190.

Please visit our ADA Compliance webpage for information about accessibility involving the tools used in this course.

Please visit Blackboard's Commitment Accessibility webpage for more information.

For additional assistance please contact FIU's Disability Resource Center.

Academic Misconduct Statement

Florida International University is a community dedicated to generating and imparting knowledge through excellent teaching and research, the rigorous and respectful exchange of ideas and community service. All students should respect the right of others to have an equitable opportunity to learn and honestly to demonstrate the quality of their learning. Therefore, all students are expected to adhere to a standard of academic conduct, which demonstrates respect for themselves, their fellow students, and the educational mission of the University. All students are deemed by the University to understand that if they are found responsible for academic misconduct, they will be subject to the Academic Misconduct procedures and sanctions, as outlined in the Student Handbook.

Academic Misconduct includes: **Cheating** – The unauthorized use of books, notes, aids, electronic sources; or assistance from another person with respect to examinations, course assignments, field service reports, class recitations; or the unauthorized possession of examination papers or course materials, whether originally authorized or not. **Plagiarism** – The use and appropriation of another's work without any indication of the source and the representation of such work as the student's own. Any student who fails to give credit for ideas, expressions or materials taken from another source, including internet sources, is responsible for plagiarism.

Learn more about the academic integrity policies and procedures as well as student resources that can help you prepare for a successful semester.

Course Prerequisites

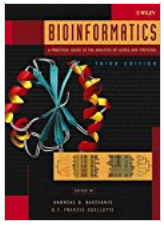
The course assumes a basic knowledge of biology and genetics, equivalent to Introductory Biology 1 and 2 (BSC 1010 & 1011), and Genetics (PCB 3063), completed with a satisfactory grade (C or better). In addition, basic familiarity with desktop computers is assumed. For example, in this course you will be required to download and operate bioinformatics-related freeware and shareware programs.

Review the Course Catalog webpage for prerequisites information.

Proctored Exam Policy

This online section does not require an on-campus visit or exam.

Textbook



Bioinformatics: A Practical Guide to the Analysis of Genes and Proteins

Andreas D. Baxevanis and B.F. Francis Ouellette

Wiley-Interscience; 3rd Edition; 2004

ISBN-10: 0471478784

ISBN-13: 978-0471478782

You may purchase your textbook online at the FIU Bookstore.

Expectations Of This Course

This is an online course, which means most (if not all) of the course work will be conducted online. Expectations for performance in an online course are the same for a traditional course. In fact, online courses require a degree of self-motivation, self-discipline, and technology skills which can make these courses more demanding for some students.

COURSE DETAIL

Course Communication

Communication in this course will take place via **Email.**

The Email feature is an external communication tool that allows users to send emails to users enrolled within the course. Emails are sent to the students' FIU email on record. The Email tool is located on the Course Menu, on the left side of the course webpage.

Office Hours: Mondays 11AM-3PM AHC1, Room 319C (MMC). I will be available for questions and help outside of office hours. However, if you need to meet outside office hours PLEASE SEND AN EMAIL IN ADVANCE TO SCHEDULE AN APPOINTMENT (I may be reached by phone or email. Please identify yourself by name as your e-mail name may not clearly identify who you are (I will not know who "#1Dolfan" is). Please include the following in the email subject: "Bioinformatics, (add your LAST NAME, FIRST NAME)". Important announcements regarding the progress and organization of the course will be posted in Blackboard. These notifications will be sent to YOUR FIU EMAIL ACCOUNT associated with Blackboard. Please check regularly for important messages (in case you don't check your FIU email account that often, YOU MUST MAKE SURE that you have it linked to your main email account). Please note that questions about exam content will NOT be answered during the exam period. Issues regarding the course will be DISCUSSED between the Professor and the student; third parties (such as relatives, spouses, friends, class-mates) CANNOT be involved in any discussions concerning any particular issue that the student may have during this course. These issues include but are not limited to grades, class performance, etc.

Discussion Forums

Keep in mind that your discussion forum postings will likely be seen by other members of the course. Care should be taken when determining what to post.

Assessments

In order to mitigate any issues with your computer and online assessments, it is very important that you take the "Practice Quiz" from each computer you will be using to take your graded quizzes and exams. It is your responsibility to make sure your computer meets the minimum hardware requirements.

Assessments in this course are not compatible with mobile devices and should not be taken through a mobile phone or a tablet. If you need further assistance please contact FIU Online Support Services.

There will be **THREE** exams (two midterm exams and a final exam). The exams will consist of multiple choice and short answer test questions. The exams will require you to carry out some of the types of analyses used in the course, and then report the results on your exam. The weeks for the three exams are in the course schedule below. Exams will be available all day Thursday and Friday of the exam week, so, from midnight Wednesday to midnight Friday for the two full days of Thursday and Friday of the week they are scheduled. Students will have 3 hours to complete each exam, although it should only take an hour if you are up-to-speed in the class. Of course, if you start the exam less than three hours before the end of the exam period, you will not have the full 3 hours. **Many of the weekly lessons will include questions or problems that you must answer. The answers will be either e-mailed to me, or answered in a quiz, depending on the problem. This will be spelled out in each lesson. These answers are due by 11:59pm Saturday for that week's lesson.**

Grading

Exams will be graded on the basis of the number of correct answers. The FINAL GRADE will be the sum of the grades obtained in the MIDTERMS and the FINAL exams, and the answers to questions at the end of some weekly lessons. The exams will count as 90% of the grade, and the answers to weekly questions as 10%. **Answers to weekly questions are due by 11:59pm on Saturday for that week's lesson.**

Grades will be posted on Blackboard. Students can check their exams. All students must check their grades as soon as they are posted. Students will be allowed to check their exams during a two-week period after the grades of each exam are posted. Students will have a second opportunity to check their exams after the final grade of the course is officially posted.

Course Requirements	Total Points Available	Weight
Exams (3 at 90 pts each)	180	90%
Weekly Questions	30	10%
Total	**300**	**100%**

Letter	Points	Letter	Points	Letter	Points
A	300 - 286	B	260 - 251	C	231 - 210
A-	285 - 271	B-	250 - 241	D	209 - 180
B+	270 - 261	C+	240 - 231	F	< 180

COURSE CALENDAR

Weekly Schedule

Tentative Course Schedule

Date	Topics/Tasks	Chapters
Week 1 Jan. 9 - Jan. 15	Course Organization/Introduction	*None*
Week 2 Jan. 16 - Jan. 22	Sequence Databases	1
Week 3 Jan. 23 - Jan. 29	Mapping Databases and Genomic Databases	2, 4
Week 4 Jan. 30 - Feb. 5	Information Retrieval from Biological Databases	3
Week 5 Feb. 6 - Feb. 12	Homology and Pairwise Similarity	11 & 14: p. 366-373
Week 6 Feb. 13 - Feb. 19	**EXAM 1** (Available Thursday morning at 12:00 AM - Friday night at 11:59 PM)	
Week 7 Feb. 20 - Feb. 26	Multiple Alignment of Biosequences	12
Week 8 Feb. 27 - Mar. 5	Sequence Assembly and Finishing Methods	13
Week 9 Mar. 6 - Mar. 12	Phylogenetic Methods with Biosequences	14
Week 10 Mar. 13 - Mar. 19	*Spring Break - No New Material*	*None*
Week 11 Mar. 20 - Mar. 26	Predictive Methods using DNA Sequences	5
Week 12 Mar. 27 - Apr. 2	**EXAM 2** (Available Thursday morning at 12:00 AM - Friday night at 11:59 PM)	
Week 13 Apr. 3 - Apr. 9	Predictive Methods using RNA sequences	6
Week 14 Apr. 10 - Apr. 16	Predictive Methods using Protein Sequences	8
Week 15 Apr. 17 - Apr. 23	Protein Structure Prediction and Analysis	9
Week 16 Apr. 24 - Apr. 28	**FINAL EXAM** (Available Thursday morning at 12:00 AM - Friday night at 11:59 PM)	