Syllabus

Code/Name	GBM 403 / BIOINFORMATICS
Type	Required
Credit/ECTS	7/7
Hour per Week	3 (3+0+0)
Level/Year	Undergraduate/4
Semester	Fall
Classroom	D306
Content	The aim of this course is to introduce bioinformatics science, its principles and several applications in industry, medical and plant biotechnology. Even though bioinformatics is algorithm-intensive science, it has a broad range of applications. The course will mostly focus on application of tools and algorithms to answer questions in biology. Within the scope of the course, the following topics will be covered: getting information from biological data, microarray experiments, information mining from databases, BLAST and its applications, Needleman-Wusch algorithm, analysis of Next-Generation Sequencing data and experimental design for proteomics.
Prerequisites	-
Textbooks	***Primary*** Discovering Genomics, Proteomics and Bioinformatics 2nd Edition by A. Malcolm Campbell, Laurie J. Heyer Introduction to Bioinformatics, Prentice-Hall,Inc., 1999 Bioinformatics For Dummies 2nd Edition by Jean-Michel Claverie, Cedric Notredame ***Secondary*** Recent articles Scientific videos
Objectives	• Acquire Knowledge of fundamentals of bioinformatics analysis of high throughput data from biological systems, sequencing and other gene reading techniques. • To educate attendees about varieties of biological data, their production methods, analytical processes, and storage with hands-on examples. • Use of programs to analyze DNA, RNA and protein sequence data
Course Outcomes	In this course you will be able to: CO1 Explain the importance and application areas of techniques related to the production of biological data CO2 Recognize analysis methods and important control principles in bioinformatics CO3 Memorize practical applications of data analytics and machine learning methods CO4 Apply bioinformatics science in bioengineering C05 Modify and use programs to analyze DNA, RNA and protein sequence data

Weekly Schedule of Topics

W	Topic
1	Introduction to bioinformatics science
2	Databases and data storage
3	Sequence Alignment
4	Similarity Searching

5	DNA sequencing and Next generation sequencing
6	Computational Gene Finding
7	Multiple Sequence Alignment and Profiles
8	Phylogeny
9	Gene Expression and Microarray
10	Protein Sequences and information
11	Substitution Matrices
12	Protein Secondary Structure
13	RNA Secondary Structure
14	Protein folding problem

Professional Contribution

Contribution to Program Outcomes*

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	5				5						3
CO2	5	4	5	4							3
CO3		4	5		5	5					3
C04		5			3	4					3
C05	5	5	5	5	5	5					5

* Contribution Level | 0: None | 1: Very Low | 2: Low | 3: Medium | 4: High | 5: Very High

Special Conditions	Students work in groups for the presentations.
Requirements	Basic knowledge of biology and Basic Computer Knowledge
Course Policy	• Be in the class on time. • English should always be used to communicate with one another. • At least 80% attendance is required, otherwise, a grade of **DZ** will be assigned. • You must be present in class for the presentations, otherwise you will not be graded.
Cheating & Plagiarism	• Copying or letting someone copy your work on exams, assignments, or reports is cheating. • Cutting and pasting text, figures, and tables from web sources or any other electronic source is plagiarism. • The consequence of academic dishonesty is to receive a grade of **FF** for the course.
Evaluation	Midterm 40% Final Exam 60% Total 100%

Instructor

Name/Surname	Özgür Öztürk	Email	ozgur.ozturk@alanya.edu.tr
Room	300	Office Hours	Tuesday 14:30-15:15 and Wednesday 10:30-11:15/15:30-16:15

Prepared by Özgür Öztürk on July 9th, 2024.