



AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title		Introduction to Bioinformatic							
Course Code		BYF537		Course Level		Second Cycle (Master's Degree)			
ECTS Credit	3	Workload	76 (Hours)	Theory	2	Practice	0	Laboratory	0
Objectives of the Course		This interdisciplinary course introduces the basic concepts and various aspects of bioinformatics such as accessing, analyzing, and interpreting biological data using NCBI databases and tools							
Course Content		This interdisciplinary course introduces the basic concepts and various aspects of bioinformatics such as accessing, analyzing, and interpreting biological data using NCBI databases and tools. Lectures cover sequence analysis, microarray expression analysis, Bayesian methods, control theory, scale-free networks, and biotechnology applications. The course will be useful for those non-biologists with computational and/or engineering background as well as biotechnologists							
Work Placement		N/A							
Planned Learning Activities and Teaching Methods				Explanation (Presentation), Discussion, Individual Study, Problem Solving					
Name of Lecturer(s)		Prof. Mehmet BİLGİN							

Assessment Methods and Criteria

Method	Quantity	Percentage (%)
Midterm Examination	1	40
Final Examination	1	60

Recommended or Required Reading

1	Introduction to Bioinformatics. Arthur M. Lesk
2	Fundamental Concepts of Bioinformatics. Dan E. Krane, Michael L. Raymer

Week	Weekly Detailed Course Contents	
1	Theoretical	Definition of Bioinformatics. Importance of Bioinformatics
2	Theoretical	Overview of Molecular Biology
3	Theoretical	Overview of Molecular Biology: Cells, Amino Acids, Proteins
4	Theoretical	Overview of Molecular Biology: Chromosomes, DNA, RNA, Genome, Transcriptome, Proteome
5	Theoretical	Database systems in Bioinformatics
6	Theoretical	Database systems in Bioinformatics
7	Theoretical	Web Technologies in Bioinformatics
8	Intermediate Exam	Midterm exam
9	Theoretical	Software Tools in Bioinformatics
10	Theoretical	Software Tools in Bioinformatics
11	Theoretical	Alignment methods (Visual, Brute Force, Dynamic Programming, Word-Based).
12	Theoretical	Dot plots, Global Alignment, Local Alignment
13	Theoretical	Scoring Matrices, Significance of Alignments
14	Theoretical	Multiple Sequence Alignment. Global Multiple Alignment, progressive global alignment, Iterative methods, Alignments based on locally conserved patterns
15	Theoretical	Database searches for specific genes

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	1	2	42
Assignment	2	4	1	10
Midterm Examination	1	10	2	12
Final Examination	1	10	2	12
Total Workload (Hours)				76
[Total Workload (Hours) / 25*] = ECTS				3

*25 hour workload is accepted as 1 ECTS



Learning Outcomes

1	To comprehend the definition, importance and usage areas of bioinformatics
2	To gain knowledge on the database systems and web technologies in bioinformatics
3	To gain knowledge on the usage of bioinformatic software tools
4	To gain knowledge on the alignment methods used in bioinformatic studies
5	Interdisciplinary students will be able to ask fundamental biological questions involving bioinformatics, able to perform database searches to reach the answer by applying appropriate computational tools and properly interpret the findings

Programme Outcomes (Biophysics Master)

1	To be able to acquire an up-to-date theoretical and practical background on biophysical and electrophysiological research
2	To be able to acquire a background needed for basic biophysical research and having the ability to use the theoretical and practical knowledge in the field
3	To be able to attain the ability to get access to the up-to-date knowledge, interpret and improve the information in the field of biophysics
4	To be able to attain the ability to perform experimental methods in the field, produce new approaches and ability to produce analytical solutions to the problems faced during application of new methods
5	To be able to reach a level to follow research in the field, to possess written and spoken communication skills and be able to join discussions
6	To be able to acquire knowledge and skill to apply scientific principles of ethics.
7	To be able to gain knowledge and skill about the basic issues of electric and magnetic fields, the interaction of light with matter, spectroscopy, radiation biophysics such as radiation, electromagnetic spectrum, ionizing radiation and radioactivity; learn about the physical properties of these issues and to be able to evaluate biological effects of radiation on tissues
8	To be able to construct knowledge and skill about the molecular structure and function in living systems, bioenergetic concepts, information theory and the processing of information in living systems
9	To be able to master about the basic principles of bioelectrical incidents that occur in cells, such as transport across membranes, electrical properties of membranes, resting membrane potential, and to be able to discuss the bioelectrical behaviour of excitable membranes
10	To be able to define the kinds, sources and biophysical properties of bioelectrical signals, to store knowledge in areas of biophysical concepts and characteristics such as nerve action potential and compound nerve action potential and to record to record these potential variants, analyze and evaluate the results
11	To be able to define basic biophysical principles of the visualization techniques used in medical field and the techniques used to determine biological signals, such as electromyography (EMG), electroencephalography (EEG), and electrocardiography (ECG), and attain the ability to apply these techniques
12	To be able to attain knowledge on molecular biophysics and its basic principles
13	To be able to attain the ability to plan and conduct projects in the field of biophysics, and attain the ability to write and publish scientific results
14	To be able to acknowledge the national and international laws and regulations about the concepts related to biophysics
15	To be able to attain the skills to organize activities together with non-governmental organizations or to conduct collaborative projects with other disciplines
16	To be able to acquire the ability of critical thinking, making judgements and solving problems in the field of biophysics
17	To be able to use statistical, computational and communicational tools, which can be applied in the field of biophysics
18	To be able to use basic knowledge and skills of the field; be able to evaluate data, identify problems and propose solutions

Contribution of Learning Outcomes to Programme Outcomes 1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High

	L1	L2	L3	L4	L5
P1	5	5	4	5	5
P2	5	5	5	5	5
P3	5	5	4	4	5
P4	5	5	5	5	5
P5	5	5	5	5	5
P6	2	2	2	2	3
P7	3	3	3	3	3
P8	3	3	3	3	3
P9	3	3	3	3	4
P10	5	4	4	4	5
P11	5	5	4	4	5
P12	4	4	4	4	4
P13	4	4	4	4	4
P14	4	4	4	4	4



P15	4	4	4	4	4
P16	3	4	3	3	4
P17	4	4	4	4	4
P18	4	4	4	4	4

