



HASAN KALYONCU UNIVERSITY
Faculty of Engineering
Course Description Form

COURSE: Biology					
CODE: BIO202		SEMESTER: SPRING			
LANGUAGE: ENGLISH		TYPE: COMPULSORY			
PRE-REQUISITES: - CO-REQUISITES: -		THEORY	PRACTICAL	CREDIT	ECTS
WEEKLY HOURS:		3	0	3	4

CONTENT OF THE COURSE:

Introduction to the basic concepts of biology. Topics range from molecules to organisms. This course includes other topics such as genetics, genetic engineering, DNA technology and genomic structures. It also covers topics such as bioinformatics, synthetic biology and nanobiotechnology, where engineering is applied to biology.

OBJECTIVE OF THE COURSE:

Upon successful completion of the course, the students will be able to: understand the basic concepts of biology and how to use computers in biological studies. Critically think, analyze and evaluate scientific data and information. Understand the relationship between biology and computer. Learn bioinformatics terminology and important methods and tools used in bioinformatics. Having a general idea about synthetic biology and nanotechnology, which are important science fields for the future, can understand their applications.

WEEKLY SCHEDULE

Week	Topics
1	Introduction: Life on Earth: What is Life? What is science?
2	Cell Life: Atoms, Molecules and Biological Molecules.
3	Cell Structure, Cell Membrane Structure and Function
4	Cellular Respiration and Photosynthesis
5	Genetics: Cellular Reproduction, Inheritance
6	Structure and Function of DNA, Gene Expression and Regulation
7	Midterm
8	Biotechnology: Genetic Engineering, DNA Technology and Genomics
9	Biotechnology: Genetic Engineering, DNA Technology and Genomics
10	Bioinformatics and Biological Databases
11	Synthetic Biology: Application of Engineering to Biology
12	Nanobiotechnology
13	Biology and Computers: Present and Future - Presentations
14	Biology and Computers: Present and Future - Presentations

TEXTBOOK: Eric J. Simon, Jean L. Dickey, Jane B. Reece, Kelly A. Hogan, Campbell Essential Biology with Physiology. Pearson, 2016. Jane B. Reece, Martha R. Taylor, Eric J. Simon, Jean L. Dickey, Kelly Hogan, Campbell Biology Concepts and Connections. Pearson, 2015.

REFERENCE BOOKS:

Dan Gusfield, Algorithms on Strings, Trees and Sequences: Computer Science and Computational Biology. Cambridge University Press, 1997. David W. Mount, Bioinformatics: Sequence and Genome Analysis. Cold Spring Harbor Laboratory Press, 2004.

EVALUATION SYSTEM:

IN-TERM STUDIES	QUANTITY	PERCENTAGE (%)
Midterm Exam	1	35
Homework	1	20
Laboratory works		
Quiz		
Final Exam	1	45
TOTAL	3	100
CONTRIBUTION OF INTERM STUDIES TO OVERALL GRADE	2	55
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE	1	45
TOTAL	3	100

COURSE CATEGORY:

	PERCENTAGE (%)
Mathematics and Basic Sciences	
Engineering	
Engineering Design	
Social Sciences	100

TABLE OF ECTS / WORKLOAD:

Activities	QUANTITY	Duration (Hour)	Total Workload
Course Duration	13	3	39
Hours for off-the-classroom study (Pre-study, practice)	14	5	70
Laboratory works			
Mid-term	1	2	2
Final examination	1	2	2
Homework	1	2	2
Quiz			
Total Work Load			115
Total Work Load / 30			3,8
ECTS Credit of the Course			4

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
LO1	3	0	0	0	0	0	0	2	0	0	0
LO2	2	0	0	0	2	0	0	1	0	0	0
LO3	2	0	0	0	0	0	0	2	0	0	0
LO4	2	0	0	0	0	0	0	1	0	0	0
LO5	1	0	0	0	0	0	0	3	0	0	0
PO: Program Outcomes LO: Learning Outcomes Values: 0: None 1: Low 2: Medium 3: High											

INSTRUCTOR(S):	Asst. Prof. Dr. Ulaş GÜLEÇ
FORM PREPARATION DATE:	22/05/2019

LEARNING OUTCOMES OF THE COURSE:	PROGRAM OUTCOMES:
<p>LO1: To understand the basic concepts in biology and how to use computers in biological studies.</p> <p>LO2: To be able to critically analyze, analyze and evaluate scientific data and information.</p> <p>LO3: To understand the relationship between biology and computer.</p> <p>LO4: To learn bioinformatics terminology and important methods and tools used in bioinformatics.</p> <p>LO5: To have a general idea about synthetic biology and nanotechnology which are important science fields for the future and to understand its applications.</p>	<p>PO1: Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline; ability to use theoretical and applied knowledge in these areas in complex engineering problems.</p> <p>PO2: Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.</p> <p>PO3: Ability to design a complex system, process, device or product under realistic constraints and conditions, in such a way as to meet the desired result; ability to apply modern design methods for this purpose.</p> <p>PO4: Ability to devise, select, and use modern techniques and tools needed for analyzing and solving complex problems encountered in engineering practice; ability to employ information technologies effectively.</p> <p>PO5: Ability to design and conduct experiments, gather data, analyze and interpret results for investigating complex engineering problems or discipline specific research questions.</p> <p>PO6: Ability to work efficiently in intra-disciplinary and multi-disciplinary teams; ability to work individually.</p> <p>PO7: Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of one foreign language; ability to write effective reports and comprehend written reports, prepare design and production reports, make effective presentations, and give and receive clear and intelligible instructions.</p> <p>PO8: Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself.</p> <p>PO9: Consciousness to behave according to ethical principles and professional and ethical responsibility; knowledge on standards used in engineering practice.</p> <p>PO10: Knowledge about business life practices such</p>

	<p>as project management, risk management, and change management; awareness in entrepreneurship, innovation; knowledge about sustainable development.</p> <p>PO11: Knowledge about the global and social effects of engineering practices on health, environment, and safety, and contemporary issues of the century reflected into the field of engineering; awareness of the legal consequences of engineering solutions.</p>
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