AGU Graduate School of Engineering and Science Bioengineering Program

COURSE RECORD

Code	**BENG550**
Name	**Bioengineering; A Conceptual Approach**
Hour per week	3+0 (Theory Practice)
Credit	3
ECTS	7.5
Level/Year	Graduate
Semester	Fall
Type	Compulsory
Location	Classroom
Prerequisites	
Special Conditions	-
Coordinator(s)	Prof.Dr.Sevil Dinçer İşoğlu
Webpage	-
Content	This course reflects the critical principles and basic concepts in bioengineering which integrates the biological, physical, and chemical laws and principles enlightening bioengineering as an emerging, novel, complex approach with deep roots in the fundamental science.Topics covered in this course include cell architecture and physiology, genomics and proteomics, stem cells, drug delivery, system physiology, biomechanics, bioinstrumentation, biomaterials, nanotechnology and tissue engineering.
Objectives	- To introduce content and architecture of cell. - To provide the knowledge of genomics and proteomics and emphasizing of bioengineering aspect to genome and proteins. - To understand the role of nervous system and endocrine system in regulation of cell communication - To understand stem cells concept and learning role of stem cells in regenerative medicine. - To introduce drug delivery concept for learning development of nano-based drug delivery system and controlled drug delivery system. -To understand the systems in the human body and develop necessary bioengineering approach for these systems -To introduce engineering system to understand human body working principle which is an open system. -To give laws for understanding mechanical properties of materials. - To introduce biomedical instrumentation. - To introduce biomaterials and to emphasize their role in the field of health. - Providing the necessary background for understanding the fundamentals and applications of tissue engineering.

Learning Outcomes	LO1 Learning the bioengineering concept and its relationship with other disciplines. LO2 Learning the detailed cell construction: elements, molecules, forces and bonds between them, macromolecules and their functions in the cells as well as movable, working molecules that are maintaining cell energetic level, being capable of performing specific functions. LO3 Understanding structure, function, and evolution of genomes and proteins. LO4 Learning role of neural system in regulation of communication. LO5 Learning role of endocrine systems in regulation of cell communication. LO6 Learning about origin, classification, features of stem cells and fundaments of stem cell therapy as the segment of cellular–based therapy. LO7 Learning drug delivery concept. LO8 Learning of engineering essential concepts for understanding the human system under working or homeostasis situation. LO9 Learning of the systems and their working principle in the human body. L10 Learning principle of mechanics to explore biological systems. L11 Having knowledge of fundamental theory, design and operational principles of biomedical instrumentation and measurement systems applied to biomedical applications. L12 Learning of fundamental concepts and current knowledge of biomaterials and their biomedical application. L13 Learning of fundamental principles of nanotechnology and their application to bioengineering. L14 Learning of principles of tissue engineering.
Requirements	Pavlovic Mirjana "Bioengineering A Conceptual Approach", ISBN 978-3-319-10797-4.
Reading List	
Ethical Rules and Course Policy	

LEARNING ACTIVITIES

Activities	**Number**	**Weight (%)**
Lecture	14	70%
Group Works	-	-
Presentations	2	30%
Web search	-	-
	Total	100

ASSESSMENT

Evaluation Criteria	**Weight** (%)
Attendance & Studio Participation	-
Jury 1	-
Jury 2	-
Midterm	30%
Presentations	30%
Final Exam/Submission	40%
	100%

COURSE LOAD *Please, use this one as a reference for your course*

Activity	**Duration** (hour)	**Quantity**	**Work Load** (hour)
In class activities	3	12	36
Table Critics	3	12	36
Presentation	2	8	16
Research (web, library)	3	15	45
Required Readings	4	14	56
Pre-work for Presentation	6	6	36
		General Sum	**225**

ECTS: 7.5 (Work Load/25-30)

CONTRIBUTION TO PROGRAMME OUTCOMES*

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
LO1	5	2	2	5	5	5	5	5						
LO2	4	4	4	4	4	4	3	3						
LO3	4	4	4	4	4	4	3	3						
LO4	3	4	3	4	5	4	4	5						
LO5	3	4	4	4	4	4	3	3						
LO6	3	4	4	4	4	4	5	3						
LO7	3	4	3	4	4	4	3	3						
LO8	3	4	5	4	4	4	3	3						
LO9	3	4	5	4	4	4	3	3						
LO10	3	4	5	4	4	4	3	3						
LO11	3	4	5	4	4	4	3	3						
LO12	3	4	3	4	4	4	3	3						
LO13	3	4	3	4	4	4	3	3						
LO14	3	4	3	4	4	4	3	3						

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

Bu kısmı anlamadım hocam.

WEEKLY SCHEDULE

W	**Topic**	**Outcomes**
1	Introduction	LO1
	Activity: Lecture	
2	Cell Architecture and Physiology	LO2
	Activity: Lecture	
3	Genomics and Proteomics	LO3
	Activity: Lecture	
4	Communication 1	LO4
	Activity: Lecture	
5	Communication 2	LO5
	Activity: Lecture	
6	Stem Cells	LO6
	Activity: Lecture	
7	Drug Delivery Concept	LO7
	Activity: Lecture	
8	Engineering	LO8
	Activity: Lecture	
9	Systems Physiology	LO9
	Activity: Lecture	
10	Biomechanics	LO10
	Activity: Lecture	
11	Bioinstrumentation	LO11
	Activity: Lecture	

12	Biomaterials Activity: Lecture	LO12
13	Nanotechnology Activity: Lecture	LO13
14	Tissue Engineering Activity: Lecture	LO14

Prepared by: Prof Dr. Sevil Dinçer İşoğlu