

DEPARTMENT OF MOLECULAR BIOTECHNOLOGY
COURSE SYLLABUS

Course Details				
Code	Academic Year			Semester
MBT455	4			7
Title	T	A	L	ECTS
Biophysics	2	2	0	6
Language	German			
Level	Undergraduate	X	Graduate	Postgraduate
Department / Program	Molecular Biotechnology			
Forms of Teaching and Learning	Face-to-Face			
Course Type	Compulsory		Elective	X
Objectives	Having an understanding of the role of concepts and methods in physical sciences in explaining working principles of biological systems.			
Content	Molecular structures and forces, cell structure, cell mechanics, transport through membranes diffusion, energy and thermodynamics in biological systems, fluids in biological systems: life at low Reynolds numbers, blood circulation Electromagnetic concepts: neurobiophysics, radiation Structural analyses: Microscopy, electron microscopy, NMR, X-Ray imaging			
Prerequisites	No			
Coordinator	Asist. Prof.Dr. Neşe Aral			
Lecturer(s)	Asist. Prof.Dr. Neşe Aral			
Assistant(s)				
Work Placement	No			
Recommended or Required Reading				
Books / Lecture Notes	Biophysik, Werner Mäntele Angewandte Biophysik, Helmut Pfützner Lehrbuch der Biophysik, Erich Sackmann, Rudolf Merkel			
Other Sources				
Additional Course Material				
Documents				
Assignments				
Exams				
Course Composition				
Mathematics und Basic Sciences				%
Engineering				%

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Engineering Design			%
Social Sciences			%
Educational Sciences			%
Natural Sciences	100		%
Health Sciences			%
Expert Knowledge			%
Assessment			
Activity	Count		Percentage (%)
Midterm Exam	1		40
Quiz	0		0
Assignments	0		0
Attendance	0		0
Recitations	0		0
Projects	1		20
Final Exam	1		40
		Total	100
ECTS Points and Work Load			
Activity	Count	Duration	Work Load (Hours)
Lectures	14	2	28
Self-Study	14	3	42
Assignments	0	0	0
Presentation / Seminar Preparation	0	0	0
Midterm Exam	1	15	15
Recitations	14	2	28
Laboratory	0	0	0
Projects	1	30	30
Final Exam	1	15	15
		Total Work Load	158
		ECTS Points (Total Work Load / Hour)	5
Learning Outcomes			
1	To be able to benefit from the science of physics to explain biological systems		
2	To be able to make mathematical modeling for biological systems		
Weekly Content			
1	Molecular structure and forces. Protein structure and folding		
2	Cell structure and cell mechanics		

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3	Membranes, permeability, diffusion
4	Energy and thermodynamic processes in biological systems
5	Fluids in biological systems, life at low Reynolds numbers
6	Blood circulation
7	Electromagnetic concepts: Neurobiophysics
8	Radiation and its effects on living systems
9	Photosynthesis
10	Self organization in the cell
11	Biomechanics
12	Structural analyses: Microscopy, electron microscopy
13	NMR and X-ray imaging
14	What is Life, Erwin Schrödinger

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7
1	5	5	5	5	3	4	-
2	5	5	5	5	3	4	-

Contribution Level 1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High

<https://obs.tau.edu.tr/oibs/bologna/progLearnOutcomes.aspx?lang=en&curSunit=5707>

Compiled by: Res. Ass. Melis Işık Toksoy

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