

DEPARTMENT OF MOLECULAR BIOTECHNOLOGY
COURSE SYLLABUS

Course Details				
Code	Academic Year			Semester
MBT453	4			7
Title	T	A	L	ECTS
Biomathematics	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	Gaining the ability to use mathematical models to understand biological phenomena			
Content	Biological networks, differential equations, game theory, random walks			
Prerequisites	No			
Coordinator				
Lecturer(s)	Asist. Prof.Dr. Neşe Aral			
Assistant(s)				
Work Placement	No			
Recommended or Required Reading				
Books / Lecture Notes	Mathematical Biology, Roland W. Shonkwilder, James Herod			
Other Sources				
Additional Course Material				
Documents				
Assignments				
Exams				
Course Composition				
Mathematics und Basic Sciences	100			%
Engineering				%
Engineering Design				%
Social Sciences				%
Educational Sciences				%
Natural Sciences	100			%

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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	20	20
Final Exam	1	15	15
		Total Work Load	148
		ECTS Points (Total Work Load / Hour)	5
Learning Outcomes			
1	Having the ability to construct mathematical models for biological systems.		
Weekly Content			
1	Differential equations		
2	Population dynamics		
3	HIV infection model		
4	Biological networks		
5	Information theory and genomes		
6	Random walk		

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7	Lotka-Volterra systems, game theory, Nash equilibria and evolution						
Contribution of Learning Outcomes to Program Objectives (1-5)							
	P1	P2	P3	P4	P5	P6	P7
1	4	5	5	5	5	5	-
Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High						
<p>P01 Working with modern scientific sources.</p> <p>P02 Having modern scientific knowledge and scientific analysis abilities and being able to apply them to scientific problems.</p> <p>P03 Having theoretical and practical skills in the area of biotechnology.</p> <p>P04 Having foreign language skills to follow the worldwide advancements in the field of biotechnology and to be able to discuss them with foreign colleagues.</p> <p>P05 Having computational skills for research data analysis purposes.</p> <p>P06 Having appropriate skills for academic and industrial jobs, being ready to take responsibility in working life.</p> <p>P07 Having knowledge about work occupational work and safety.</p>							
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