

DEPARTMENT OF MOLECULAR BIOTECHNOLOGY
COURSE SYLLABUS

Course Details				
Code	Academic Year			Semester
MAT201	2			3
Title	T	A	L	ECTS
Differential Equations	2	2	1	6
Language	German			
Level	Undergraduate	X	Graduate	Postgraduate
Department / Program	Molecular Biotechnology			
Forms of Teaching and Learning	Face-to-face			
Course Type	Compulsory	X	Elective	
Objectives	Students learn the basics of differential equations and they can model simple systems with first and second order ordinary differential equations, interpret their solutions and carry out numerical methods on the computer.			
Content	Linear Differential Equations of first, second and higher orders. Methods for analytical and numerical solutions. Applications in physics, chemistry and biology.			
Prerequisites	-			
Coordinator	-			
Lecturer(s)	Assist. Prof. Dr. Neşe Aral Sözener			
Assistant(s)	RA Elvan Burcu Koşma			
Work Placement	-			
Recommended or Required Reading				
Books / Lecture Notes	Boyce / DiPrima, Gewöhnliche Differentialgleichungen			
Other Sources	-			
Additional Course Material				
Documents	-			
Assignments	-			
Exams	-			
Course Composition				
Mathematics und Basic Sciences	100			%
Engineering				%
Engineering Design				%
Social Sciences				%
Educational Sciences				%

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Natural Sciences			%
Health Sciences			%
Expert Knowledge			%
Assessment			
Activity	Count		Percentage (%)
Midterm Exam	1		40
Quiz	-		-
Assignments	-		-
Attendance	-		-
Recitations	-		-
Projects	-		-
Final Exam	1		60
	Total		100
ECTS Points and Work Load			
Activity	Count	Duration	Work Load (Hours)
Lectures	13	5	65
Self-Study	13	2	26
Assignments	-	-	-
Presentation / Seminar Preparation	-	-	-
Midterm Exam	1	2	2
Recitations	13	3	39
Laboratory	-	-	-
Projects	-	-	-
Final Exam	1	2	2
	Total Work Load		134
	ECTS Points (Total Work Load / Hours)		6
Learning Outcomes			
1	Being able to model simple systems with differential equations		
2	Being able to identify basic differential equation types		
3	Being able to interpret solutions of differential equations		
4	Being able to use numerical methods on computer		
Weekly Content			
1	Definitions, classification of differential equations, first order linear differential equations, direction fields		
2	Separable equations, homogeneous differential equations, Bernoulli equation		
3	Second order differential equations with constant coefficients, characteristic equation		

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4	Reduction of order, behavior of solutions, method of d'Alembert
5	Nonhomogeneous equations of second order, method of undetermined coefficients
6	Forced oscillations, beats and resonance
7	Higher order differential equations
8	Variation of parameters for nonhomogeneous equations, Cauchy-Euler Equation
9	Numerical methods
10	Systems of first order linear differential equations
11	Applications of differential equations
12	Nonlinear differential equations, stability
13	Introduction to partial differential equations

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

	P1	P2	P3	P4	P5	P6	P7	P8
1	4	5	4	5	4	4	1	-
2	4	5	4	5	4	4	1	-
3	4	5	4	5	4	4	1	-
4	4	5	4	5	5	4	1	-

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

OBS LINK:

Compiled by: Assist. Prof. Dr. Neşe Aral

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