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 Semih Alpsoy							
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	14	5	70
Self-Study	14	4	56
Assignments	-	-	-
Presentation / Seminar Preparation	-	-	-
Midterm Exam	1	2	2
Recitations			
Laboratory	-	-	-
Projects	-	-	-
Final Exam	1	2	2
		Total Work Load	**130**
		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, 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, exact differentials
14	Exact differentials

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:	
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