DEPARTMENT OF ENERGY SCIENCE AND TECHNOLOGY
COURSE SYLLABUS

Course Details								
Code					**Academic Year**			**Semester**
MAT103					1			Fall
Title					**T**	**A**	**L**	**ECTS**
Analysis 1					3	2	0	6

Language	German					
Level	**Undergraduate**	**X**	**Graduate**		**Postgraduate**	
Department / Program	Energy Science and Technology					
Forms of Teaching and Learning	Face-to-face					
Course Type	**Compulsory**	**X**	**Elective**			
Objectives	The Analysis I course aims to equip students with the fundamental concepts and methods in mathematical analysis. The goal of this course is to teach students the concepts of limit, continuity, derivative, and integral of functions over the set of real numbers and demonstrate how these concepts are applied in analytical analysis and problem-solving processes. Additionally, the course aims to develop students' analytical thinking abilities, enabling them to formulate mathematical arguments and prove them. This course serves as a foundation for advanced mathematics courses in fields such as engineering, physics, and economics.					
Content	This course covers topics within the general framework of the concepts of functions, integrals, and differentials.					
Prerequisites	None					
Coordinator	Assist. Prof. Dr. Neşe Aral					
Lecturer(s)	Assist. Prof. Dr. Neşe Aral					
Assistant(s)	None					
Work Placement	None					

Recommended or Required Reading	
Books / Lecture Notes	Papula Lothar, Mathematik für Ingenieure und Naturwissenschaftler, Band 1+2
Other Sources	-

Additional Course Material	
Documents	Lecture notes
Assignments	-
Exams	1 Midterm, 1 Final Exam

Course Composition

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Mathematics und Basic Sciences	100	%
Engineering		%
Engineering Design		%
Social Sciences		%
Educational Sciences		%
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	3	42
Self-Study	13	7	91
Assignments			
Presentation / Seminar Preparation			
Midterm Exam	1	1	1
Recitations	16	2	32
Laboratory			
Projects			
Final Exam	1	2	2
		Total Work Load	**168**
		ECTS Points (Total Work Load / Hour)	**6**

Learning Outcomes

1	The student will gain the competency to work with single and multivariable functions.
2	The student will be able to use the concepts of derivative and integral.

Weekly Content

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1	Sets, Special Number Sets
2	Equalities, Binomial Theorem
3	Inequalities
4	Vector Operations, Linear Independence, Vector Representation of Lines and Planes
5	General Properties of Functions, Coordinate Systems, Coordinate Transformations
6	Limits and Continuity of Functions, Polynomials, and Trigonometric Functions
7	Conic Sections
8	Midterm Exam
9	Differentiability, Derivative Rules, Extremum Values, Mean Value Theorem
10	Derivative Applications
11	Graphing Functions
12	Definite and Indefinite Integrals, Fundamental Theorem of Calculus, Integral Calculation
13	Primitive Functions, Integration Methods
14	Multivariable Functions, Partial Derivatives
15	Vector Functions, Gradient, Divergence, Curl
16	Final Exam

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

	P1	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**
Ö1	5	5	5	4	5	4	5	5	5
Ö2	5	5	5	4	5	4	5	5	5

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