

DEPARTMENT OF CIVIL ENGINEERING
COURSE SYLLABUS

Course Details				
Code	Academic Year			Semester
MAT103	1			Fall
Title	T	A	L	ECTS
Calculus I	3	2	-	6
Language	German			
Level	Undergraduate	✓	Graduate	Postgraduate
Department / Program	Civil Engineering			
Forms of Teaching and Learning	Formal			
Course Type	Compulsory	✓	Elective	
Objectives	Analysis I			
Content	Real Numbers, Intervals, Equalities and Inequalities, Coordinate Systems, Lines, Slope, Functions of one Variable, Graphing Functions, Limit, Continuity, Differences, Rate of Change, Tangent Lines, Differentiation and Integration of Functions of one Variable Applications of Differentiation and Integration, Fundamental Theorem of Calculus, Infinite Series, Taylor-Series, Fourier-Series.			
Prerequisites	--			
Coordinator	--			
Lecturer(s)	Dr. İbrahim Kıvanç Ünlütürk			
Assistant(s)	Res. Assist. Mehmet Ali Taş			
Work Placement	--			
Recommended or Required Reading				
Books / Lecture Notes	Calculus: A Complete Course, Robert A. Adams, C Essex 7th Edition, Addison Wesley Longman Toronto 2010			
Other Sources	Thomas' Calculus, 12th Edition, G.B Thomas, M.D.Weir, J.Hass and F.R.Giordano, Addison-Wesley, 2012 Mathematik für Ingenieure und Naturwissenschaftler, Band 1, 14. Auflage, Lothar Papula, Springer 2014.			
Additional Course Material				
Documents				
Assignments				
Exams				
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 Point sand Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	3	42
Self-Study	16	5,75	92
Assignments			
Presentation / Seminar Preparation			
Midterm Exam	1	3	3
Recitations	14	2	28
Laboratory			
Projects			
Final Exam	1	3	3
Total Work Load			168
ECTS Points(Total Work Load / Hour)			6

Learning Outcomes

1	Use both the definition of derivative as a limit and the rules of differentiation to differentiate functions.
2	Sketch the graph of a function using asymptotes, critical points, and the derivative test for increasing/decreasing and concavity properties.
3	Use derivatives to solve real world problems (e.g. optimization, related rates).

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4	Apply integration to compute areas and volumes by slicing, volumes of revolution, arclength, and surface areas of revolution.
5	Evaluate integrals using techniques of integration, such as substitution, inverse substitution, partial fractions and integration by parts.
6	Determine convergence/divergence of improper integrals, and evaluate convergent improper integrals.
7	Determine convergence / divergence of infinite series
8	Find the Taylor series expansion of a function near a point, with emphasis on the first two or three terms.

Weekly Content

1	Functions
2	Limits and Continuity
3	Differentiation
4	Differentiation
5	Applications of Derivatives
6	Applications of Derivatives Transcendental Functions
7	Transcendental Functions
8	Integrals
9	Midterm exam
10	Integrals
11	Techniques of Integration
12	Applications of Definite Integrals Improper Integrals
13	Sequences and Series
14	Sequences and Series
15	Sequences and Series
16	Final Exam

Contribution of Learning Out comes to Program Objectives(1-5)

	P1	P2	P3	P4	P5	P6	P7
1	5	5	3	3	5	5	
2	5	5	3	3	5	5	
3	5	5	3	3	5	5	
4	5	5	3	3	5	5	
5	5	5	3	3	5	5	
6	5	5	3	3	5	5	
7	5	5	3	3	5	5	
8	5	5	3	3	5	5	

Contribution Level

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

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<https://obs.tau.edu.tr/oibs/bologna/progLearnOutcomes.aspx?lang=en&curSunit=5728>

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