COURSE PROFILE

Course Name	Code	Semester	Term	Theory +PS+Lab. (hour/week)	Local Credits	ECTS
Calculus I	MATH 101	Fall	1	3+2+0	4	7

Prerequisites	None

Course Language	English
Course Type	Required
Course Lecturer	• Assoc.Prof. Banu Uzun
Course Assistant	• Filiz Uçgun
Course Objectives	This course aims to provide basic theory and applications of calculus and its extensions to mathematical analysis
Course Learning Outcomes	The students who succeeded in this course; • will be able to understand conceptual and visual representation of limits, continuity, differentiability, and tangent line approximations for functions at a point. • will be able to calculate the first and second implicit derivatives • will be able to use derivatives in practical applications, such as distance, velocity, acceleration and related rates. • will be able to evaluate the antiderivatives of basic functions. • will be able to understand conceptual and visual representation of areas, revolved areas, arc lengths.
Course Content	Functions, graphs, limits and continuity. Derivatives, derivative rules, chain rule, implicit differentiation. Applications of derivatives. Indefinite integrals, integration by substitution, definite integrals. Applications of integrals.

COURSE CONTENT

Week	Subjects	Related Preparation
1	Functions and Their Graphs; Combining Functions, Shifting and Scaling Graphs.	Chapter 1

2	Trigonometric Functions; Exponential Functions; Inverse Functions and Logarithms; Rates of Change and Tangent to Curves.	Chapter 1, Chapter 2
3	Limit of a Function and Limit Laws; The Precise Definition of a Limit; One-Sided Limits.	Chapter 2
4	Continuity; Limits Involving Infinity.	Chapter 2
5	Asymptotes of Graphs; Tangents and the Derivative at a Point.	Chapter 2, Chapter 3
6	The Derivative as a Function; Differentiation Rules; The Derivative as a Rate of Change.	Chapter 3
7	Derivatives of Trigonometric Functions; The Chain Rule; Implicit Differentiation; Derivatives of Inverse Functions and Logarithms.	Chapter 3
8	Inverse Trigonometric Functions; Linearization and Differentials; Extreme Values of Functions; The Mean Value Theorem.	Chapter 3, Chapter 4
9	Monotonic Functions and the First Derivative Test; Concavity and Curve Sketching.	Chapter 4
10	Indeterminate Forms and L'Hopital's Rule; Antiderivatives; Sigma Notation and Limits of Finite Sums.	Chapter 4, Chapter 5
11	The Definite Integral.	Chapter 5
12	The Fundamental Theorem of Calculus; Indefinite Integrals and the Substitution Method.	Chapter 5
13	Substitution and Area Between Curves; Volumes Using Cross-Sections.	Chapter 5, Chapter 6
14	Volumes Using Cylindrical Shells; Arc Length.	Chapter 6

Course Textbooks	Thomas' Calculus Early Transcendentals 11th Edition / Weir, Hass, Giordano, Addison - Wesley Publishing Company, 2006
Recommended References	Calculus with analytic geometry / C.H. Edwards, Jr., David E. Penney. Englewood Cliffs, N.J., Prentice Hall, c1994. 4th ed.

	Calculus with analytic geometry / Howard Anton; in collaboration with Albert Herr. New York, Wiley, c1995. 5th ed.

Semester Requirements	Number	Percentage of Grade
Attendance/Participation	1	5
Laboratory	-	-
Application	-	-
Special Course Internship (Work Placement)	-	-
Quizzes/Studio Critics	-	-
Homework Assignments	14	-
Presentation	-	-
Project	-	-
Seminar/Workshop	-	-
Midterms/Oral Exams	2	60
Final/Resit Exam	1	35
Total	17	100

PERCENTAGE OF SEMESTER WORK	16	65
PERCENTAGE OF FINAL WORK	1	35
Total	17	100

Course Category	Core Courses	X
	Major Area Courses	
	Supportive Courses	
	Media and Management Skills Courses	
	Transferable Skill Courses	

COURSE'S CONTRIBUTION TO PROGRAM

#	Program Qualifications / Outcomes	* Level of Contribution

		1	2	3	4	5
1	To have a grasp of basic mathematics, applied mathematics and theories and applications of statistics.					X
2	To be able to use theoretical and applied knowledge acquired in the advanced fields of mathematics and statistics,					X
3	To be able to define and analyze problems and to find solutions based on scientific methods,					X
4	To be able to apply mathematics and statistics in real life with interdisciplinary approach and to discover their potentials,					X
5	To be able to acquire necessary information and to make modeling in any field that mathematics is used and to improve herself/himself,					X
6	To be able to criticize and renew her/his own models and solutions,					X
7	To be able to tell theoretical and technical information easily to both experts in detail and nonexperts in basic and comprehensible way,				X	
8	To be able to use international resources in English and in a second foreign language from the European Language Portfolio (at the level of B1) effectively and to keep knowledge up-to-date, to communicate comfortably with colleagues from Turkey and other countries, to follow periodic literature,				X	
9	To be familiar with computer programs used in the fields of mathematics and statistics and to be able to use at least one of them effectively at the European Computer Driving Licence Advanced Level,			X		
10	To be able to behave in accordance with social, scientific and ethical values in each step of the projects involved and to be able to introduce and apply projects in terms of civic engagement,				X	
11	To be able to evaluate all processes effectively and to have enough awareness about quality management by being conscious and having intellectual background in the universal sense,				X	
12	By having a way of abstract thinking, to be able to connect concrete events and to transfer solutions, to be able to design experiments, collect data, and analyze results by scientific methods and to interfere,					X
13	To be able to continue lifelong learning by renewing the knowledge, the abilities and the compentencies which have been developed during the program, and being conscious about lifelong learning,					
14	To be able to adapt and transfer the knowledge gained in the areas of mathematics and				X	

	statistics to the level of secondary school,					
15	To be able to conduct a research either as an individual or as a team member, and to be effective in each related step of the project, to take role in the decision process, to plan and manage the project by using time effectively.					

*1 Lowest, 2 Low, 3 Average, 4 High, 5 Highest

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION

Activities	Number	Duration (Hours)	Total Workload
Course Hours (Including Exams)	14	3	48
Tutorials	14	2	28
Laboratory	-	-	-
Application	-	-	-
Special Course Internship (Work Placement)	-	-	-
Field Work	-	-	-
Study Hours Out of Class	14	2	28
Presentations / Seminar	-	-	-
Project	-	-	-
Preparatory reading	13	2	26
Homework Assignments	14	1	14
Quizzes	-	-	-
Midterm Exams	2	10	20
Final / Resit Exam	1	12	12
		Total Workload	**176**

COURSE CATEGORY

ISCED GENERAL AREA CODES	GENERAL AREAS	ISCED BASİC AREA CODES	BASIC EDUCATIONAL AREAS	
1	Education	14	Teacher Training and Educational Sciences	0
2	Humanities and Art	21	Art	0

2	Humanities and Art	22	Humanities	0
3	Social Sciences, Management and Law	31	Social and Behavioral Sciences	0
3	Social Sciences, Management and Law	32	Journalism and Informatics	0
3	Social Sciences, Management and Law	38	Law	0
4	Science	42	Life Sciences	0
4	Science	44	Natural Sciences	0
4	Science	46	Mathematics and Statistics	100
4	Science	48	Computer	0
5	Engineering, Manufacturing and Civil	52	Engineering	0
5	Engineering, Manufacturing and Civil	54	Manufacturing and Processing	0
5	Engineering, Manufacturing and Civil	58	Architecture and Structure	0
6	Agriculture	62	Agriculture, Forestry, Livestock, Fishery	0
6	Agriculture	64	Veterinary	0
7	Medicine and Welfare	72	Medical	0
7	Medicine and Welfare	76	Social Services	0
8	Service	81	Personal Services	0
8	Service	84	Transport Services	0
8	Service	85	Environment Protection	0
8	Service	86	Security Services	0