	Course name: MATH 101 Calculus I		**Department:** Computer, **Electrical and Electronics,** Mechanical, Metallurgical and Materials, Energy Systems, Industrial, Civil, Aerospace Engineering				Semester: 1
	Methods of Education						Credit (ECTS)
	Lecture	Study Time	Quiz	Project	Exam (incl. Prep.)	Total	6
	56	74	0	0	50	180	
Language	English						
Compulsory/Elective	Compulsory						
Prerequisites	None						
Course Contents	Preliminaries. Limits and Continuity. Tangent Lines and Their Slopes. Differentiation Rules. Higher Order Derivatives. Inverse Functions. Exponential and Logarithmic Functions. Related Rates Problems and more Applications of Derivative. Integration. Definite and Indefinite Integrals. Integration Techniques. Improper Integrals.						
Course Objective	This course aims • To provide the concepts of functions, limits, continuity, differentiation and integration • To provide the knowledge of applications of differentiation and integration • To give an ability to apply knowledge of mathematics on engineering problems						
Learning Outcomes and Competences	Student, who passed the course satisfactorily will be able to **1.** compute the limit of various functions, use the concepts of the continuity, use 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.** solve max/min problems and use differentiation to solve them **4.** evaluate integrals by using the Fundamental Theorem of Calculus **5.** apply integration to compute areas and volumes, volumes of revolution and arc lengths **6.** learn transcendental functions and evaluate integrals using techniques of integration						
Textbook and /or References	**Main Textbook** Calculus, A Complete Course, Eight Edition, Robert A. Adams, Christopher Essex, Publisher: Pearson, 2013. **References:** 1. Thomas' Calculus 13th Edition by George B. Thomas Jr., Maurice D. Weir and Joel R. Hass, Publisher: Pearson; (2014). 2. Calculus 8th Ed. by James Stewart (Author) Publisher: Cengage Learning.						
Assessment Criteria			If any, mark as (X)		Percentage (%)		
	Midterm Exams		X		40		
	Quizzes						
	Homework						
	Projects						
	Laboratory work						
	Other						
	Final Exam		X		60		
Instructors	Prof. Dr. Fatih Koyuncu, Prof. Dr. Gülnihal MERAL, Prof. Dr. Niyazi ŞAHİN, Asst. Prof. Dr. Wesam TALAB, Asst. Prof. Dr. Selim BAHADIR, Asst. Prof. Dr. Nuray ÖKTEM, Asst. Prof. Dr. Ahmet Yücel						

Weekly Schedule	
Week	**Subject**
1	**Preliminaries**
2	**1 Limits and Continuity** • 1.2 Limits of functions • 1.3 Limits at Infinity and Infinite Limits • 1.4 Continuity
3	**2 Differentiation** • 2.1 Tangent Lines and Their Slopes • 2.2 The Derivative • 2.3 Differentiation Rules
4	• 2.4 The Chain Rule • 2.5 Derivatives of Trigonometric Functions • 2.6 Higher-Order Derivatives
5	• 2.7 Using Differentials and Derivatives • 2.8 The Mean-Value Theorem • 2.9 Implicit Differentiation
6	**3 Transcendental Functions** • 3.1 Inverse Functions • 3.2 Exponential and Logarithmic Functions • 3.3 The Natural Logarithm and Exponential
7	• 3.4 Growth and Decay • 3.5 The Inverse Trigonometric Functions • 3.6 Hyperbolic Functions
8	**4 More Applications of Differentiation** • 4.1 Related Rates • 4.3 Indeterminate Forms • 4.4 Extreme Values
9	**Mid-term Exam**
10	• 4.5 Concavity and Inflections • 4.6 Sketching the Graph of a Function • 4.8 Extreme-Value Problems
11	**5 Integration** • 5.1 Sums and Sigma Notation • 5.2 Areas as Limits of Sums • 5.3 The definite Integral
12	• 5.4 Properties of the Definite Integral • 5.5 The Fundamental Theorem of Calculus • 5.6 The Method of Substitution
13	• 5.7 Areas of Plane Regions 6 **Techniques of Integration** • 6.1 Integration by Parts
14	• 6.2 Integrals of Rational Functions • 6.3 Inverse Substitutions
15	• 6.5 Improper Integrals