

COE1112846 - CALCULUS I

2021 - 2022 FALL

Instructor	E-mail	Time/Place
Prof. Dr. Hüseyin Merdan	merdan [at] etu.edu.tr	Monday: 09:40-12:30 / 209 Wednesday: 09:40-12:30 / 209

Course description:

Equations and inequalities. Functions and their graphs. Limits and Continuity. Tangent lines and derivatives. Chain rule. Implicit differentiation. Derivative of trigonometric, exponential and logarithmic functions. Indeterminate forms and L Hospital's rules. Extreme values and optimization problems. Sketching graphs. Indefinite and definite integral. Fundamental Theorem of Calculus and Techniques of integration. Substitution. Partial fraction expansion. Integrals of Trigonometric Functions. Integration by Parts.

Course web page: <http://merdan.etu.edu.tr/AnkMedCalculus1.htm>

Text Books:

- Thomas' Calculus-Early Transcendentals (14th Ed.), Joel R. Hass, Maurice D. Weir, George B. Thomas; Pearson, 2019. ISBN: 978-0-13-443902-0
- CALCULUS--Early Transcendentals (6th Edition), James Stewart, Thomson-Brooks/Cole , ISBN 978 0-495-01166-8

Aim of the Course:

- To gain basic mathematical knowledge.
- Developing mathematical thinking and modeling techniques.
- To give information about limits, derivatives and integrals of functions and their applications.

Grading:

- 4-Quizes: **%5 each**
- Midterm: **% 30**
- Final Exam: **% 50**

Week	Syllabus
1	Preliminaries: <ul style="list-style-type: none"> • Set of Real Numbers and Their Properties • Equations and Inequalities
2	Functions and Graphs <ul style="list-style-type: none"> • Transformations. Linear and quadratic functions. Polynomials and rational functions • Exponential and Logarithmic Functions. Trigonometric and inverse trigonometric functions
3	Limits and Continuity
4	Limits and Continuity
5	Derivative and Differentiation Rules - I <ul style="list-style-type: none"> • Differentiation rules. Chain rule. Derivatives of trigonometric functions. Higher order derivatives
6	Derivative and Differentiation Rules - II <ul style="list-style-type: none"> • Implicit differentiation. Derivative of exponential and logarithmic functions. Indeterminate forms and L Hospital's rules
7	Applications of Differentiations- I <ul style="list-style-type: none"> • Extreme Values: Increasing/decreasing functions. Local maximum/minimum. Derivative tests
8	Applications of Differentiations- II <ul style="list-style-type: none"> • Sketching Graphs: Concavity and inflections
9	MIDTERM EXAM
	Extreme Values and Optimization Problems
10	Indefinite and Definite Integrals
11	Techniques of Integration. <ul style="list-style-type: none"> • The method of substitution, Partial fraction expansion. Integration by parts.
12	Techniques of Integration. <ul style="list-style-type: none"> • Integrals of trigonometric functions • Improper integrals
13	Application of Integration <ul style="list-style-type: none"> • Area, volume, arc length
14	Application of Integration <ul style="list-style-type: none"> • Area, volume, arc length