

MATH 117 Calculus I (2021-2022 Spring)

METU Credit & ECTS Credit: (4-2)5 & 7.5

Catalog description: Functions. Limits and Continuity. Tangent lines and derivatives. Chain rule. Implicit differentiation. Inverse functions. Related rates. Linear approximations. Extreme values. Mean Value Theorem and its applications. Sketching graphs. Indeterminate forms and L Hospital s rules. Definite integral. Fundamental Theorem of Calculus. Substitution. Areas between curves. Formal definition of natural logarithm function. Techniques of integration.

Course instructor: Mustafa Korkmaz

Lectures: Tuesday and Thursday 08:40-10:30 (YP-A1),

Office hours: Tuesday 14:00-16:00

Course teaching assistant: MÜcahit Özalp

Recitations:

Section 11 Thursday 15:40-17:30 (U1)

Section 12 Friday 13:40-15:30 (U1)

Grading: There will be two midterms (30 pts each), quizzes (8pts) and a final exam (40 pts). There will be ONLY ONE make-up exam given after the final for a missed exam.

Suggested textbook: CALCULUS, A Complete Course Calculus. Eight Edition. Robert A. Adams, Christopher Essex,

Reference Books: Calculus, James Stewart.

Week	Dates	Syllabus(Math 117) 2021-2022 Spring	
1	Mar 7-11	Ch 0: Preliminaries	
		<i>0.1 Real Numbers and the Real Line</i>	<i>0.2 Cartesian Coordinates in the Plane</i>
		<i>0.3 Graphs of Quadratic Equations</i>	<i>0.4 Functions and Their Graphs</i>
		<i>0.5 Combining Functions to Make New Functions</i>	<i>0.6 Polynomials and Rational Functions</i>
		<i>0.7 The Trigonometric Functions</i>	
2	Mar 14-18	Ch 1: Limits and Continuity	Suggested exercises from the textbook
		1.2 Limits of Functions 1.3 Limits at Infinity and Infinite Limits	1.2 : 2,3,4,5,6,11,13,18,22,24,32,56,58, 61,62,63,64 1.3 : 3,6,10,14,20,25,29,33,34,50,51
3	Mar 21-25	1.4 Continuity 1.5 The Formal Definition of Limit (optional)	1.4 : 1,2,3,4,5,6,9,13,16,18, 22, 30,32, 1.5 : 3,7,11,12,19
		Ch 2: Differentiation	2.1 : 3, 5, 9, 13, 15, 17, 19, 21, 23 2.2 : 1, 3, 11, 17, 23, 25, 27, 31, 35, 37, 41, 43, 45, 47, 49 2.3 : 7, 9, 11, 13, 15, 17, 23, 25, 29, 33, 37, 39, 43, 49, 51, 53
4	Mar 28 – Apr 1	2.1 Tangent Lines and Their Slope 2.2 The Derivative 2.3 Differentiation Rules	2.4 : 3, 5, 11, 13, 15, 19, 23, 25, 31, 37, 45 2.5 : 3, 5, 11, 17, 21, 27, 29, 35, 37, 41, 43, 45, 49, 53, 55, 57, 62 2.6 : 1, 7, 11, 13, 21, 25, 26
		2.4 The Chain Rule 2.5 Derivatives of Trigonometric Functions 2.6 Higher-Order Derivatives	2.8 : 1, 3, 5, 7, 9, 11, 15 2.9 : 3, 7, 9, 11, 13, 17, 21, 27
5	Apr 4-8	2.8 The Mean-Value Theorem 2.9 Implicit Differentiation	
		Midterm 1 (April 16, 2022 Saturday at 13:30)	
6	Apr 11-15 Midterm 1		

7	Apr 18-22	Ch 3: Transcendental Functions 3.1 Inverse Functions 3.5 The Inverse Trigonometric Functions 3.2 Exponential and Logarithmic Functions	3.1 : 3, 9, 12, 17, 19, 23, 26, 29, 34 3.5 : 7, 9, 11, 15, 24, 31, 35, 39, 47 3.2 : 7, 17, 26, 31, 32, 35
8	Apr 25-30	3.2 Exponential and Logarithmic Functions 3.3 The Natural Logarithm and Exponential	3.2 : 7, 17, 26, 31, 32, 35 3.3 : 5, 8, 13, 17, 33, 35, 41, 44, 48, 52, 57, 59, 63, 65
9	May 2-6	Ch 4: More Applications of Differentiation 4.1 Related Rates	4.1 : 1, 2, 3, 4, 5, 6, 7, 13, 14, 22, 26
10	May 9-13	4.3 Indeterminate Forms 4.4 Extreme Values	4.3 : 1, 3, 5, 7, 9, 13, 15, 17, 19, 24, 26, 28 4.4 : 1, 3, 5, 7, 8, 11, 13, 17, 19, 21, 25, 29, 31, 35, 39
11	May 16-20	4.4 Extreme Values 4.5 Concavity and Inflections 4.6 Sketching the Graph of a Function	4.4 : 1, 3, 5, 7, 8, 11, 13, 17, 19, 21, 25, 29, 31, 35, 39 4.5 : 1, 3, 5, 7, 9, 11, 13, 14, 16, 17, 19, 25, 27, 29, 31, 35, 39 4.6 : 1, 2, 3, 4, 5, 6, 15, 16, 17, 18, 29, 31
12	May 23-27	4.8 Extreme-Value Problems 4.9 Linear Approximations Ch 5: Integration 5.1 Sums and Sigma Notation	4.8 : 1, 3, 7, 9, 11, 13, 17, 18, 21, 31, 32, 42 4.9 : 1, 3, 5, 7, 9, 11, 15, 17, 21 5.1 : 3, 5, 11, 13, 17, 21, 31, 33
13	May 30 – Jun 3 Midterm 2	5.2 Areas as Limits of Sums 5.3 The Definite Integral Midterm 2 (June 4, 2022 Saturday at 13:30)	5.2 : 3, 7, 13, 17, 19 5.3 : 2, 3, 5, 7, 11, 13, 15, 17
14	Jun 6-10	5.4 Properties of the Definite Integral 5.5 The Fundamental Theorem of Calculus	5.4 : 1, 2, 7, 9, 11, 13, 15, 17, 19, 21, 25, 29, 31, 35, 36, 37, 39 5.5 : 3, 7, 11, 13, 15, 17, 19, 23, 27, 29, 31, 33, 37, 39, 41, 43, 45, 46, 47, 49, 51, 52, 53, 54
15	Jun 13-17	5.5 The Fundamental Theorem of Calculus 5.6 The Method of Substitution 5.7 Areas of Plane Regions	5.6 : 1, 3, 5, 7, 8, 9, 10, 11, 12, 13, 15, 17, 18, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 40, 41, 43, 44, 45, 47, 48, 49, 50, 51 5.7 : 3, 5, 9, 11, 15, 17, 19, 21, 23, 29

Final Exam: Ju* ?, 2022 * at 13:30??.