

MATH 119

Calculus with Analytic Geometry

Frequency: Fall/Spring Terms

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. Improper integrals. Arc length. Volumes and surface areas of solids of revolution. Parametric plane curves. Polar coordinates. Arc length in polar coordinates.

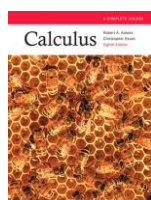
Justification for the Course Proposal: This is a fundamental course designed for all science – Engineering Students.

Course Objectives: The sequence Math 119-120 is the Standard complete introduction to the concepts and methods of calculus. It is taken by all engineering students. The emphasis is on concepts, solving problems, theory and proofs. All sections are given a uniform midterm and a final exam. Students will develop their reading, writing and questioning skills in Mathematics.

Course Coordinator: Dr. Muhiddin Uğuz

MidTerm1: 30 Points (Nov.17 2018 Saturday at 09:30)
MidTerm2: 30 Points (Dec.22 2018 Saturday at 09:30)
Final Exam: 40 Points (Jan.10 2019 Thursday at 09:30)
Quiz/Attendance: 7 Points

Suggested textbook:



Robert A. Adams, Christopher Essex
CALCULUS
A Complete Course Calculus. Eight Edition.
ISBN 978 0-321-78107-9
QA303.2.A33 2013

Reference Books: Calculus
James Stewart, Fifth Edition

Current Semester Course Home Page: <http://www.ma119.math.metu.edu.tr/>

Week	Dates	Syllabus(Math 119) 2018-1	
1	Oct 01-05 Oct. 01: University Opening Ceremony (Between 8:40 and 12:30 classes will not be held)	Ch 0: Preliminaries 0.1 Real Numbers and the Real Line 0.3 Graphs of Quadratic Equations 0.5 Combining Functions to Make New functions 0.7 The Trigonometric Functions	0.2 Cartesian Coordinates in the Plane 0.4 Functions and Their Graphs 0.6 Polynomials and Rational Functions
2	Oct 08-12 Add-Drop and Advisor Approvals	Ch 1: Limits and Continuity 1.2 Limits of Functions 1.3 Limits at Infinity and Infinite Limits 1.4 Continuity	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 1.4 : 1,2,3,4,5,6,9,13,16,18,22,30,32
3	Oct 15-19	1.5 The Formal Definition of Limit Ch 2: Differentiation 2.1 Tangent Lines and Their Slope 2.2 The Derivative 2.3 Differentiation Rules	1.5 : 4,6,8,10,12,16,20,27,33,31,37,38 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	Oct 22-26	2.4 The Chain Rule 2.5 Derivatives of Trigonometric Functions 2.6 Higher-Order Derivatives	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
5	Oct 30- Nov 02 Oct.29 th Monday: National Holiday (Republic Day)	2.8 The Mean-Value Theorem 2.9 Implicit Differentiation Ch 3: Transcendental Functions 3.1 Inverse Functions 3.2 Exponential and Logarithmic Functions 3.3 The Natural Logarithm and Exponential	2.8 : 1, 3, 5, 7, 9, 11, 15 2.9 : 3, 7, 9, 11, 13, 17, 21, 27 3.1 : 3, 9, 12, 17, 19, 23, 26, 29, 34 3.2 : 7, 17, 26, 31, 32, 35 3.3 : 5, 8, 13, 17, 33, 35, 41, 44, 48, 52, 57, 59, 63, 65
6	Nov 05-09	3.3 The Natural Logarithm and Exponential 3.5 The Inverse Trigonometric Functions 3.6 Hyperbolic Functions Ch 4: More Applications of Differentiation 4.1 Related Rates	3.5 : 7, 9, 11, 15, 24, 31, 35, 39, 47 3.6 : 1, 5, 7, 9 4.1 : 1, 2, 3, 4, 5, 6, 7, 13, 14, 22, 26
7	Nov 12-16	4.3 Indeterminate Forms Midterm 1 (Nov 17 2018 Saturday at 09:30)	4.3 : 1, 3, 5, 7, 9, 13, 15, 17, 19, 24, 26, 28
8	Nov 19-23	4.4 Extreme Values 4.5 Concavity and Inflections 4.6 Sketching the Graph of a Function 4.8 Extreme-Value Problems	4.4 : p238: 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 4.8 : 1, 3, 7, 9, 11, 13, 17, 18, 21, 31, 32, 42
9	Nov 26-30	4.9 Linear Approximations Ch 5: Integration 5.1 Sums and Sigma Notation 5.2 Areas as Limits of Sums 5.3 The Definite Integral 5.4 Properties of the Definite Integral	4.9 : 1, 3, 5, 7, 9, 11, 15, 17, 21 5.1 : 3, 5, 11, 13, 17, 21, 31, 33 5.2 : 3, 7, 13, 17, 19 5.3 : 2, 3, 5, 7, 11, 13, 15, 17 5.4 : 1, 2, 7, 9, 11, 13, 15, 17, 19, 21, 25, 29, 31, 35, 36, 37, 39
10	Dec 03-07	5.5 The Fundamental Theorem of Calculus 5.6 The Method of Substitution Ch 6: Techniques of Integration 6.1 Integration by Parts	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 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 6.1 : 5, 7, 10, 11, 13, 15, 17, 19, 21, 23, 25, 27, 28, 29, 33, 37
11	Dec 10-14	6.2 Integrals of Rational Functions 6.3 Inverse Substitutions	6.2 : 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31 6.3 : 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 44, 45, 47, 49, 51
12	Dec 17-21	6.5 Improper Integrals Midterm 2 (Dec 22 2018 Saturday at 09:30)	6.5 : 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 24, 25, 31, 33, 35, 37, 39, 41, 42
13	Dec 24-28	Ch 7: Applications of Integration 5.7 Areas of Plane Regions 7.1 Volumes by Slicing-Solids of Revolution 7.3 Arc Length and Surface Area	5.7 : 3, 5, 9, 11, 15, 17, 19, 21, 23, 29 7.1 : 1, 3, 7, 11, 13, 15, 19 7.3 : 3, 5, 7, 9, 11, 13, 14, 21, 24, 25, 27, 28, 29
14	Dec 31- Jan 04 New Year's Day (Tuesday)	8.5 Polar Coordinates and Polar Curves	8.5 : 3, 4, 5, 7, 9, 11, 13, 16, 18, 22, 26
Final Exam (Jan 10 2019 Thursday at 09:30)			