MATH 119 Calculus with Analytic Geometry

Frequency: Fall/Spring Terms

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

<u>Catalog description</u>: 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.

<u>Course Objectives:</u> 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 % (November 19 th 2022 at 09:30)
MidTerm2:	30 % (December 24 th 2022 at 09:30)
Final Exam:	40 % (January 12 th 2023 at 09:30)
Quiz:	5 % (during Recitations)

Suggested textbook:



Robert A. Adams, Christopher Essex CALCULUS A Complete Course Calculus. Eight Edition. (or higher editions) 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/

Contact: www.ma119@metu.edu.tr

Week	Dates	MATH 119 Syllabus 2022-2023 Fall (2022-1)		
1	Oct.03-07	Ch 0: Preliminaries0.1 Real Numbers and the Real Line0.2 Cartesian Coordinates in the Plane0.3 Graphs of Quadratic Equations0.4 Functions and Their Graphs0.5 Combining Functions to Make New functions0.6 Polynomials and Rational Functions0.7 The Trigonometric Functions		
2	Oct.10-14 Add-Drop and Advisor Approvals	Ch 1: Limits and Continuity 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	Oct.17-21	 1.4 Continuity 1.5 The Formal Definition of Limit Ch 2: Differentiation 2.1 Tangent Lines and Their Slope 2.2 The Derivative 	1.4 : 1,2,3,4,5,6,9,13,16,18,22,30,32 1.5 : 4,6,8,10,12,16,20,27330,31,37,38 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	
4	Oct.24-28 October 29, Republic Day (October 28, Friday, half-day holiday)	2.3 Differentiation Rules2.4 The Chain Rule2.5 Derivatives of Trigonometric Functions2.6 Higher-Order Derivatives	2.3 : 7, 9, 11, 13, 15, 17, 23, 25, 29, 33, 37, 39, 43, 49, 51, 53 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.31- Nov.04	2.8 The Mean-Value Theorem2.9 Implicit DifferentiationCh 3: Transcendental Functions3.1 Inverse Functions	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	
6	Nov.07-11 November 10, Commemoration of Atatürk	3.2 Exponential and Logarithmic Functions3.3 The Natural Logarithm and Exponential3.5 The Inverse Trigonometric Functions	3.2 : 7, 17, 26, 31, 32, 35 3.3 : 5, 8, 13, 17, 33, 35, 41, 44, 48, 52, 57, 59, 63, 65 3.5 : 7, 9, 11, 15, 24, 31, 35, 39, 47	
7	Nov.14-18	Ch 4: More Applications of Differentiation 4.1 Related Rates 4.3 Indeterminate Forms Midterm-I November 19 th 2022 at 09:30	4.1 : 1, 2, 3, 4, 5, 6, 7, 13, 14, 22, 26 4.3 : 1, 3, 5, 7, 9, 13, 15, 17, 19, 24, 26, 28	
8	Nov.21-25	4.4 Extreme Values4.5 Concavity and Inflections4.6 Sketching the Graph of a Function	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	
9	Nov.28- Dec.02	 4.8 Extreme-Value Problems 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 	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 5.2 : 3, 7, 13, 17, 19 5.3 : 2, 3, 5, 7, 11, 13, 15, 17	
10	Dec.05-09	5.4 Properties of the Definite Integral2.10 Antiderivatives and the Indefinite Integral5.5 The Fundamental Theorem of Calculus5.6 The Method of Substitution	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 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	
11	Dec.12-16	Ch 6: Techniques of Integration 6.1 Integration by Parts 6.2 Integrals of Rational Functions 6.3 Inverse Substitutions	 6.1: 5, 7, 10, 11, 13, 15, 17, 19, 21, 23, 25, 27, 28, 29, 33, 37 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.19-23	6.5 Improper Integrals Midterm-II December 24 th 2022 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.26-30	Ch 7: Applications of Integration 5.7 Areas of Plane Regions 7.1 Volumes by Slicing-Solids of Revolution	5.7: 3, 5, 9, 11, 15, 17, 19, 21, 23, 29 7.1: 1, 3, 7, 11, 13, 15, 19	
14	Jan.02-06	7.3 Arc Length and Surface Area8.5 Polar Coordinates and Polar CurvesReview	7.3: 3, 5, 7, 9, 11, 13, 14, 21, 24, 25, 27, 28, 29 8.5: 3, 4,5, 7, 9, 11, 13, 16,18,22,26	

MATH 119 Course Policy (2022-1)

This document/announcement contains all the necessary information that you need to know about the structure of the *MATH 119: Calculus with Analytic Geometry course*. More information will be announced on the official website of the course and the ODTUCLASS page. All students enrolled in this course are supposed to follow these websites regularly.

MATH119 Coordination reserves the right to make necessary changes in this policy depending on the situations which are out of our control. So it is your responsibility to follow the announcements in the webpage of the course regularly.

Lectures and Recitations

Lectures and Recitations are delivered as announced in **Schedule of Lectures** on the official website of the course. Keep in mind that this course is 6 (=4+2) hours per week.

The first 2+2=4 hours are for **lectures** and the last 2 hours are for **recitations**. See "the schedule of lectures"- tab on the MATH119 web page when available.

For details about sections and subsections, see the page: What is a section/subsection?

Class Attendance

You are **expected** to attend all lectures and recitations. However no attendance will be taken. Also there will be frequent pop quizzes in recitation hours.

Make up for Exams and Assignments

You can have at most one make-up exam. In order to be able to take the make-up exam, you must present a reasonable excuse (such as a medical report or an academic leave). After the final exam, there will be a form on ODTÜClass and via that form, you will apply the make-up exam instead of one missed exam and will send your reasonable excuse to wwwma119@metu.edu.tr.

Eligibility to take the Final Exam and NA Grade

If your two midterm scores (each one out of 100 points) add up to less than 20 points (out of 200 points in total), then you cannot take the Final Exam and will receive an NA grade from the course. If you did not attend the Final Exam and if you do not have the right to take make-up exam for Final, you will receive an NA grade.

Information for Students with Disabilities

Students who experience difficulties due to their disabilities and wish to obtain academic adjustments and/or auxiliary aids must contact ODTU Disability Support Office and/or course instructor and the advisor of students with disabilities at academic departments (for the list: <u>http://engelsiz.metu.edu.tr/en/advisor-students-disabilities</u>) as soon as possible. For detailed information, please visit the website of Disability Support Office: <u>https://engelsiz.metu.edu.tr/en/</u>

Academic Honesty

The METU Honour Code is as follows: "Every member of METU community adopts the following honour code as one of the core principles of academic life and strives to develop an academic environment where continuous adherence to this code is promoted. The members of the METU community are reliable, responsible and honourable people who embrace only the success and recognition they deserve, and act with integrity in their use, evaluation and presentation of facts, data and documents."