MATH 119
Calculus with Analytic Geometry

Frequency: Fall/Spring Terms

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

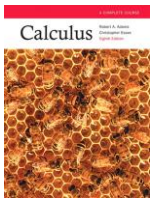
Catalog description: Functions. Limits and Continuity. Tangent lines and derivatives. Chain rule. Implicit differentiation. Inverse functions. Related rates. Linear approximations. Extreme values. Mean Value Theorem and its applications. Sketching graphs. Indeterminate forms and L'Hospital's rules. Definite 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.

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: Prof. Dr. Songül Kaya Merdan

Midterm I (ONLINE) (April 15, 2023 at 13:30) 15%
Midterm II (ONLINE) (June 8, 2023 at 19:30) 15%
Final Exam (IN-CLASS) (June 15, 2023 at 13:30) 70%+ 15%
Make-up Exam (IN-CLASS): After Final Exam

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: wwwma119@metu.edu.tr

Week	Dates	MATH 119 Syllabus 2022-2023 Spring (2022-2)	
1	March 06-10	Ch 0: Preliminaries *0.1 Real Numbers and the Real Line* *0.2 Cartesian Coordinates in the Plane* *0.3 Graphs of Quadratic Equations* *0.4 Functions and Their Graphs* *0.5 Combining Functions to Make New functions* *0.6 Polynomials and Rational Functions* *0.7 The Trigonometric Functions* Ch 1: Limits and Continuity 1.3 Limits at Infinity and Infinite Limits 1.2 Limits of Functions	
2	March 13-17	1.4 Continuity 1.5 The Formal Definition of Limit	**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 **1.5 :** 4,6,8,10,12,16,20,27330,31,37,38
3	March 20-24	Ch 2: Differentiation 2.1 Tangent Lines and Their Slope 2.2 The Derivative	**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	March 27-31	2.3 Differentiation Rules 2.4 The Chain Rule 2.5 Derivatives of Trigonometric Functions 2.6 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	April 03-07	2.8 The Mean-Value Theorem 2.9 Implicit Differentiation Ch 3: Transcendental Functions 3.1 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	April 10-14	3.2 Exponential and Logarithmic Functions 3.3 The Natural Logarithm and Exponential 3.5 The Inverse Trigonometric Functions **Midterm-I April 15th 2023 at 13:30**	**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	April 17-21	Ch 4: More Applications of Differentiation 4.1 Related Rates 4.3 Indeterminate Forms	**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	April 24-28	4.4 Extreme Values 4.5 Concavity and Inflections 4.6 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	May 01-05	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	May 08-12	5.4 Properties of the Definite Integral 2.10 Antiderivatives and the Indefinite Integral 5.5 The Fundamental Theorem of Calculus 5.6 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	May 15-19	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	May 22-26	6.5 Improper Integrals **(including Limit Comparison Test and Absolute Convergence)**	**6.5:** 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 24, 25, 31, 33, 35, 37, 39, 41, 42
13	May 29-June 02	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	June 05-09	7.3 Arc Length and Surface Area ~~8.5 Polar Coordinates and Polar Curves~~ **Midterm-II June 8 th 2023 at 19:30** **Final Exam June 15th 2023 at 13:30**	**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 (2022-2)

IMPORTANT: **The rules and regulations given here are subject to change in the case the university or YÖK changes their decisions about Spring 2022-2023 (2022-2) Semester. So, it is your responsibility to follow the announcements in the ODTU Class page regularly and check your METU email regularly.**

Class Attendance

Attendance during lectures and recitations will not be taken. However, you are strongly suggested to attend the lectures and recitations. No lecture and recitation notes will be shared.

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) when requested.

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: http://engelsiz.metu.edu.tr/en/advisor-students-disabilities) as soon as possible. For detailed information, please visit the website of Disability Support Office: https://engelsiz.metu.edu.tr/en/

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."