

MATH 119 Calculus with Analytic Geometry

Course Number and Title: MATH 119 Calculus with Analytic Geometry
METU Credit & ECTS Credit: (4-2)5 & 7.5

Catalogue 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.

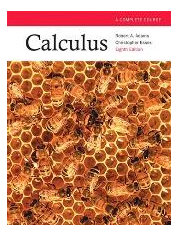
Course Coordinator: Dilber KOÇAK

Important Dates:

Midterm I (March 24, 2024)	30%
Midterm II (May 11, 2024)	30%
Final Exam (TBA)	40%

There may be pop quizzes at the recitation hours. (BONUS)
(there will be **no make-up** for missed quizzes)

Suggested textbook:



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

Reference Books: Calculus, James Stewart, Fifth or a Higher Edition

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

Contact: wwwma119@metu.edu.tr

Only the e-mails sent to wwwma119@metu.edu.tr will be answered. Mass e-mails will be ignored.

Week	Dates	Syllabus (Math 119) 2023-2	Suggested Problem List
1	February 19-23	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	
2	February 26-March 01	Ch 1: Limits and Continuity 1.2 Limits of Functions 1.3 Limits at Infinity and Infinite Limits	1.2: 2,3,4,5,6,11,13,18,2 2,24,32,56,58, 61,62,63,64 1.3: 3,6,10,14,20,25,29, 33,34,50,51
3	March 04-08	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: 4,6,8,10,12,16,20,27,30,31,37,38 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	March 11-15	2.3 Differentiation Rules 2.4 The Chain Rule 2.5 Derivatives of Trigonometric Functions 2.9 Implicit Differentiation 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 2.9 : 3, 7, 9, 11, 13, 17, 21, 27 2.6 : 1, 7, 11, 13, 21, 25, 26
5	March 18-22	2.8 The Mean-Value Theorem Ch 3: Transcendental Functions 3.1 Inverse Functions Midterm I (March 24, 2024)	2.8 : 1, 3, 5, 7, 9, 11, 15 3.1: 3, 9, 12, 17, 19, 23, 26, 29, 34
6	March 25-29	3.2 Exponential and Logarithmic Functions 3.3 The Natural Logarithm and Exponential 3.5 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	April 01-05	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 08-12	April 10 – 12 Religious holiday (Holiday eve Tuesday)	
9	April 15-19	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
10	April 22-26	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 April 23 National Sovereignty and Children's Day, Tuesday	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

11	April 29-May 03	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 May 1 – Labor and Solidarity Day, Wednesday	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
12	May 06-10	Ch 6: Techniques of Integration 6.1 Integration by Parts 6.2 Integrals of Rational Functions 6.3 Inverse Substitutions Midterm II (May 11, 2024)	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
13	May 13-17	6.5 Improper Integrals (including Limit Comparison Test and Absolute Convergence) May 19 - National Holiday (Commemoration of Atatürk & Youth and Sports Festival, Thursday)	6.5: 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 24, 25, 31, 33, 35, 37, 39, 41, 42
14	May 20-24	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
15	May 27-31	7.3 Arc Length and Surface Area 8.5 Polar Coordinates and Polar Curves Final Exam (TBA)	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 (2023-2)

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.

Class Attendance

You are **expected** to attend all lectures and recitations. However no attendance will be taken.

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 makeup 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.

Who gets NA grade?

(A) Before the final exam, students will be categorized in the following way:

1) $M1 + M2 \geq 20$ 2) $M1 + M2 < 20$, for which M1 is the Midterm 1 score out of 100, and M2 is the Midterm 2 score out of 100.

- Students in group 1 will be able to take the final exam.
- Students in group 2 will **NOT** be able to take the final exam. They will get an automatic NA grade.

Examples:

a) Student A attends to Midterm 1 and his score is 20. He/she does not take Midterm 2 being on leave for academic/medical reasons. Since $M1+M2 = 20 \geq 20$, He/she is eligible for the final exam. If he/she submits relevant documents, it is also possible to take make-up exam which is given after the final. *No problem at all.*

b) Student B does not attend to Midterm 1 because of their illness. He/she attends to Midterm 2 and get 18 points. Since $M1+M2 = 18 < 20$, he/she won't be able to take final exam and get NA grade. **It should be in mind that in this example, taking make-up for Midterm is not possible even if he/she has an appropriate official document (academic/medical report etc.).**

(B) According to the university's rules and regulations governing undergraduate studies (Article 24), "...*The grade NA is designated due to one of the conditions below. The grade NA is processed as FF in the calculation of the Grade Point Average.*

- 1) *Not fulfilling the attendance requirements for the theoretical and practical course hours as indicated in the course schedule.*
- 2) *Not qualifying to take the final exam due to failure in fulfilling the provisions regarding course practices.*
- 3) *Having taken none of the mid-term and final examinations.*

...”

Note that each instructor/the coordination of the course reserves the right to determine whether the attendance requirements indicated in the above policy (B-1) applies to the students of their section or not.

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."