

# 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 the 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 and engineering students.

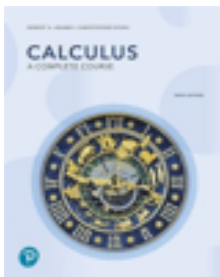
**Course Objectives:** The sequence Math 119-120 is the Standard complete introduction to the concepts and methods of calculus. It is taken by all engineering students. The emphasis is on concepts, solving problems, theory, and proofs. All sections are given a uniform midterm and a final exam. Students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

**Course Coordinator:** Dr. Kadri İlker Berktaş

- Midterm I (**October 24, 2026, Saturday at 11:00**) 25 pts
- Midterm II (**November 28, 2026, Saturday at 11:00**) 35 pts
- Final Exam (**January 7, 2027, Thursday at 09:30**) 40 pts
- Recitation Quizzes: 7 pts (There will be no make-up for missed quizzes)
- Pearson Tasks: 3 pts (to be accessible via ODTUClass/MATH119AllSections)

**Attendance Policy:** Lectures and recitations have a **mandatory attendance policy**. See below.

For more details about exams and grading, see the announcements on the Course Home page.



**Suggested textbook:** Robert A. Adams, Christopher Essex  
CALCULUS A Complete Course Calculus. 10th (or 9th) Edition. ISBN  
978 0-13-573258-8. **The e-book and all study tools will be  
accessible via ODTUClass.** No code or anything else is  
needed. See the ODTUClass announcement for details.

**Other reference book:** Calculus, James Stewart, Fifth Edition

**Current Semester Course Home Page(s)**

<http://www.ma119.math.metu.edu.tr/> AND [ODTUClass/MATH119AllSections](#)

**Contact:** [wwwma119@metu.edu.tr](mailto:wwwma119@metu.edu.tr)

**Only the e-mails sent to [wwwma119@metu.edu.tr](mailto:wwwma119@metu.edu.tr) will be answered. Mass e-mails or AI-generated duplicate e-mail bombardments will be ignored. Students must send individualized and authentic inquiries about their course matters.**

| Week                                                   | Dates                                                                                                                                                    | Syllabus(Math 119) 2026-1                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1                                                      | Sept. 28- Oct. 02                                                                                                                                        | <i>Reading assignment: Ch. 0: Preliminaries</i><br><b>Ch. 1: Limits and Continuity</b><br>1.2 Limits of Functions<br>1.3 Limits at Infinity and Infinite Limits                                                          | <b>SUGGESTED PROBLEMS FROM 10TH EDITION</b><br><b>1.2:</b> 2, 3, 4, 5, 6, 11, 13, 18, 22, 24, 32, 36, 56, 58, 61, 62, 63, 64, 67, 68, 75<br><b>1.3 :</b> 3, 6, 9, 10, 14, 20, 25, 29, 33, 34, 50, 51                                                                                                                                   |
| 2                                                      | <b>Oct. 05 - Oct. 09</b><br><i>Add-Drop and Advisor Approvals</i>                                                                                        | 1.4 Continuity<br>1.5* The Formal Definition of Limit<br><b>Ch 2: Differentiation</b><br>2.1 Tangent Lines and Their Slopes<br>2.2 The Derivative                                                                        | <b>1.4:</b> 1, 2, 3, 4, 5, 6, 9, 13, 16, 18, 22, 30, 32<br><b>1.5:</b> 4, 6, 8, 10, 12<br><b>2.1:</b> 3, 5, 9, 13, 15, 17, 19, 21, 23<br><b>2.2:</b> 1, 3, 11, 17, 23, 25, 27, 31, 35, 37, 41, 43, 45, 47, 49                                                                                                                          |
| 3                                                      | Oct. 12 - Oct. 16                                                                                                                                        | 2.3 Differentiation Rules<br>2.4 The Chain Rule<br>2.5 Derivatives of Trigonometric Functions<br>2.6 Higher-Order Derivatives                                                                                            | <b>2.3:</b> 7, 9, 11, 13, 15, 17, 23, 25, 29, 33, 37, 39, 43, 49, 51<br><b>2.4 :</b> 3, 5, 11, 13, 15, 19, 23, 25, 31, 37, 45<br><b>2.5 :</b> 3, 5, 11, 17, 21, 27, 29, 35, 37, 41, 43, 45, 49, 53, 55, 57, 62<br><b>2.6:</b> 1, 7, 11, 13, 21, 25                                                                                     |
| 4                                                      | Oct. 19 - Oct. 23                                                                                                                                        | 2.8 The Mean-Value Theorem<br>2.9 Implicit Differentiation<br><i>Midterm 1 (Oct. 24 Saturday at 11:00)</i>                                                                                                               | <b>2.8 :</b> 1, 3, 5, 7, 9, 11, 15, 33<br><b>2.9 :</b> 3, 7, 9, 11, 13, 17, 21, 27                                                                                                                                                                                                                                                     |
| 5                                                      | <b>Oct. 26 - Oct. 30</b><br><i>Oct. 29 Thurs: National Holiday (Republic Day)</i>                                                                        | <b>Ch 3: Transcendental Functions</b><br>3.1 Inverse Functions<br>3.3 The Natural Logarithm and Exponential<br>3.5 The Inverse Trigonometric Functions                                                                   | <b>3.1 :</b> 3, 9, 12, 17, 19, 23, 26, 29, 30, 34, 35, 36<br><b>3.2 :</b> 7, 17, 26, 31, 32<br><b>3.3 :</b> 5, 8, 13, 17, 33, 35, 41, 44, 48, 52, 57, 59, 63, 65<br><b>3.5 :</b> 7, 9, 11, 15, 24, 31, 35, 39, 47                                                                                                                      |
| 6                                                      | Nov. 02-06                                                                                                                                               | <b>Ch 4: More Applications of Differentiation</b><br>4.1 Related Rates<br>4.3 Indeterminate Forms                                                                                                                        | <b>4.1 :</b> 1, 2, 3, 4, 5, 6, 7, 13, 14, 20, 22, 26, 28, 35, 37<br><b>4.3 :</b> 1, 2, 3, 5, 7, 8, 9, 10, 13, 15, 17, 19, 24, 25, 26, 28, 29                                                                                                                                                                                           |
| 7                                                      | <b>Nov. 09-13</b><br><i>Nov 10: Commemoration of Atatürk (Tuesday)</i>                                                                                   | 4.4 Extreme Values<br>4.5 Concavity and Inflections<br>4.6 Sketching the Graph of a Function                                                                                                                             | <b>4.4 :</b> 1, 3, 5, 7, 8, 11, 13, 17, 19, 21, 24, 25, 26, 27, 29, 31, 34, 35, 38, 39, 49<br><b>4.5 :</b> 1, 3, 5, 7, 9, 11, 13, 14, 16, 17, 19, 25, 27, 29, 31, 33, 35, 36, 39<br><b>4.6 :</b> 1, 2, 3, 4, 5, 6, 15, 16, 17, 18, 24, 29, 31, 36, 38                                                                                  |
| 8                                                      | Nov. 16-20                                                                                                                                               | 4.8 Extreme-Value Problems<br>4.9 Linear Approximations<br><b>Ch 5: Integration</b><br>5.1 Sums and Sigma Notation<br>5.2 Areas as Limits of Sums<br>5.3 The Definite Integral                                           | <b>4.8 :</b> 1, 3, 7, 9, 11, 13, 17, 18, 21, 31, 32, 42<br><b>4.9 :</b> 1, 3, 5, 7, 9, 11, 15, 17, 21<br><b>5.1:</b> 3, 5, 11, 13, 17, 21, 31, 33<br><b>5.2:</b> 3, 7, 13, 17, 19<br><b>5.3:</b> 2, 3, 5, 7, 11, 13, 15, 17                                                                                                            |
| 9                                                      | Nov. 23-27                                                                                                                                               | 5.4 Properties of the Definite Integral<br>2.10 Antiderivatives and the Indefinite Integral<br>5.5 The Fundamental Theorem of Calculus<br>5.6 The Method of Substitution<br><i>Midterm 2 (Nov 28, Saturday at 11:00)</i> | <b>5.4:</b> 1, 2, 7, 9, 11, 13, 15, 17, 19, 21, 25, 29, 31, 35, 36, 37, 39<br><b>5.5:</b> 3, 7, 11, 13, 15, 17, 19, 23, 27, 29, 31, 33, 37, 39, 41, 43, 45, 46, 47, 49, 51, 52, 53, 54<br><b>5.6:</b> 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 |
| 10                                                     | Nov. 30-Dec. 04                                                                                                                                          | 5.7 Areas of Plane Regions<br><b>Ch 6: Techniques of Integration</b><br>6.1 Integration by Parts                                                                                                                         | <b>5.7:</b> 3, 5, 9, 11, 15, 17, 19, 21, 23, 29<br><b>6.1:</b> 5, 7, 10, 11, 13, 15, 17, 19, 21, 23, 25, 27, 28, 29, 33, 37                                                                                                                                                                                                            |
| 11                                                     | Dec. 07-11                                                                                                                                               | 6.2 Integrals of Rational Functions<br>6.3 Inverse Substitutions                                                                                                                                                         | <b>6.2:</b> 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31<br><b>6.3:</b> 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. 14-18                                                                                                                                               | 6.5 Improper Integrals                                                                                                                                                                                                   | <b>6.5:</b> 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 24, 25, 31, 33, 35, 37, 39, 41, 42                                                                                                                                                                                                                                              |
| 13                                                     | Dec. 21-25                                                                                                                                               | <b>Ch 7: Applications of Integration</b><br>7.1 Volumes by Slicing-Solids of Revolution<br>7.3 Arc Length and Surface Area                                                                                               | <b>7.1:</b> 1, 3, 7, 11, 13, 15, 19<br><b>7.3:</b> 3, 5, 7, 9, 11, 13, 14, 21, 24, 25, 27, 28, 29                                                                                                                                                                                                                                      |
| 14                                                     | <b>Dec. 28-31</b><br><i>Dec. 31 Thursday: Last Day of Undergraduate and Graduate Classes</i><br><i>Jan. 01 Friday: New Year's Day (Official Holiday)</i> | 8.5 Polar Coordinates and Polar Curves                                                                                                                                                                                   | <b>8.5:</b> 3, 4, 5, 7, 9, 11, 13, 16, 18, 22, 26                                                                                                                                                                                                                                                                                      |
| <b>Final Exam (January 7, 2027, Thursday at 09:30)</b> |                                                                                                                                                          |                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                        |

## MATH 119 Course Policy (2026-1)

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 posted on the official course website 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 to this policy depending on situations that are out of our control. Therefore, you are responsible for checking the course webpage announcements regularly.*

### Lectures and Recitations

Lectures and Recitations are delivered as announced in **the 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/ODTUCLASS when available.

### Class Attendance Policy

Lectures and recitations have a **mandatory attendance policy**.

**Effective from Week 3**, regular attendance will be taken **during both recitations and lectures**. You must fulfill all the attendance requirements below to prevent receiving an NA grade.

- Students are required to **attend at least 60% of the lectures**
- Students are required to **attend at least 60% of the recitations**

If a student **fails to satisfy one of these attendance requirements**, the **NA grade is automatically assigned**.

*For example:* If your lecture attendance rate is 70% but your recitation rate is 40%, you will get an NA grade. Similarly, 25% lecture attendance with 80% recitation attendance will result in an NA grade.

**Attendance Tracking:** Attendance will be monitored using a **double-check system**: Students are required to *check in digitally via ODTUClass* during the lecture; at any point during class, *randomly selected students* will also be asked to provide a physical signature or verbal confirmation. Both methods must match for your attendance to be valid.

**Misconduct and Penalties:** The first mismatch between the ODTUClass digital record and the physical signature sheet will **invalidate your attendance for that specific class**. Any **reoccurrence of such mismatches** will directly result in an automatic **NA grade for both the party committing the act and the party soliciting it**, regardless of prior attendance rates.

**Exceptions:** Students repeating the course who have previously achieved a grade of **DD or above** are exempt from mandatory attendance.

Other special situations may be evaluated individually on a case-by-case basis with the consent of the course coordination. You must contact the coordination about your inquiry preferably at the beginning of the semester or as soon as possible when your unprecedented situation occurs. Late requests will not be processed.

**Medical reports for attendance:** Report submissions **DO NOT** count toward the 60% attendance requirement.

### Make-up for Exams and Assignments

You can have **at most one make-up exam**. To take the make-up exam, you must provide a reasonable excuse (such as a medical report or academic leave).

- **How to apply for a make-up exam:** *After the final exam*, there will be a **form** on ODTUClass; use that form to apply for the make-up exam instead of a missed exam, and send your reasonable excuse to [wwwma119@metu.edu.tr](mailto:wwwma119@metu.edu.tr). *Any requests made without using the required form will be completely disregarded and will not be processed.*
- **No makeup** for any recitation quizzes, online assignments, or attendance.

### **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.

Remember also that if a student fails to satisfy the attendance requirements, the NA grade is automatically assigned.

### **Who gets an NA grade depending on midterm scores?**

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

1)  $M1 + M2 \geq 20$

2)  $M1 + M2 < 20$ ,

where 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.
  - Also, Students in group **2** will **NOT** be eligible to take the make-up exam even if some official document is presented. See Example b. below.

### **Examples:**

**a)** Student A attends 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 a make-up exam, which is given after the final. *No problem at all.*

**b)** Student B does not attend Midterm 1 because of their illness. He/she attends Midterm 2 and gets 18 points. Since  $M1+M2 = 18 < 20$ , he/she won't be able to take the final exam and will get an NA grade. **Please note that in this example, taking a make-up 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.*

*..."*

**Important Notice: The NA grade and Irregular Term Course Registration.** According to the Mathematics Department's new regulation, students who fail with an NA grade are **not** eligible to register for the same course offered in the subsequent irregular semester.

### **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 Honor Code is as follows: "Every member of the METU community adopts the following honor 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 honorable 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."