MATH 117 (Calculus I)

Spring 2025 (2024-2)

Frequency: Fall/Spring Terms

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

Catalog Description: Functions and their graphs. Limits and continuity. Tangent lines and derivative. Chain rule. Implicit differentiation. Inverse functions. Related rates. Linear approximation. Extreme values. Mean Value Theorem and its applications. Sketching graphs of functions. Indeterminate forms and L'Hospitals rules. Exponential growth and decay. Formal definition of natural logarithm function. Definite integral. Fundamental Theorem Calculus. Substitution and areas between curves.

Course Grading:

- Midterm 1: 30 % (April 5, 2025, Saturday at 13:30)
- Midterm 2: 30 % (May 10, 2025, Saturday at 13:30)
- Final: 40 % (June 14, 2025, Saturday at 13:30)

Course Coordinator: **Nazmi Oyar** (wwwma117@metu.edu.tr)

Instructor: **Semra Öztürk**

Lectures, recitations and exams will be face to face.

Lecture Hours and Places:

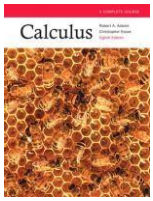
Monday: 15:40-17:30, YP-A2
Wednesday: 15:40-17:30, YP-A2

Recitation Hours and Places:

Thursday: 13:40-15:30, U2
Friday: 13:40-15:30, YP-A2

Course Assistants: **Nazmi Oyar and Melike Çakmak**

Course Textbook:



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, Eighth Edition

Course Home Page: https://ma117.math.metu.edu.tr/ (Should be checked regularly for announcements)

Contact: wwwma117@metu.edu.tr (Only the e-mails sent to wwwma117@metu.edu.tr will be answered.)

Week	Dates	MATH 117 (Tentative) Syllabus (2024-2)	
1	Feb. 17--21	Ch 0: Preliminaries (selected topics from the following) *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	Feb. 24--28 **(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	March 3--7	1.3 Limits at Infinity and Infinite Limits 1.4 Continuity 1.5 The Formal Definition of Limit	**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
4	March 10--14	Ch 2: Differentiation 2.1 Tangent Lines and Their Slope 2.2 The Derivative 2.3 Differentiation Rules	**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
5	March 17-- 21	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
6	March 24--28	2.8 The Mean-Value Theorem 2.9 Implicit Differentiation	**2.8:** 1, 3, 5, 7, 9, 11, 15 **2.9:** 3, 7, 9, 11, 13, 17, 21, 27
7	**(March 29--April 1 Ramadan Feast, Monday and Tuesday)** April 2--4 **Midterm 1: April 5, 2025 13:30**	Ch 3: Transcendental Functions 3.1 Inverse Functions 3.3 The Natural Logarithm and Exponential	**3.1:** 3, 9, 12, 17, 19, 23, 26, 29, 34 **3.3:** 5, 8, 13, 17, 33, 35, 41, 44, 48, 52, 57, 59, 63, 65
8	April 7--11	3.3 The Natural Logarithm and Exponential 3.5 The Inverse Trigonometric Functions	**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
9	April 14--18	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
10	April 21—25 **(April 23`rd Wednesday, National Sovereignty and Children`s Day Holiday)**	4.4 Extreme Values	**4.4:** 1, 3, 5, 7, 8, 11, 13, 17, 19, 21, 25, 29, 31, 35, 39
11	April 28—May 2 **(May 1`st Thursday, Labor and SolidarityDay Holiday)**	4.4 Extreme Values 4.5 Concavity and Inflections	**4.4:** 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
12	May 5—9 **Midterm 2: May 10, 2025 13:30**	4.6 Sketching the Graph of a Function 4.8 Extreme-Value Problems	**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
13	May 12--16	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	**4.9:** 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
14	May 20--23	5.4 Properties of the Definite Integral 5.5 The Fundamental Theorem of Calculus	**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
15	May 26-30	5.6 The Method of Substitution 5.7 Areas of Plane Regions	**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 **5.7:** 3, 5, 9, 11, 15, 17, 19, 21, 23, 29
Final Exam: June 14, Saturday 13:30			

MATH 117 Course Policies (2024-2)

This document contains all the information you need to know about the structure of the **MATH 117 (Calculus I)** course. More information will be announced on the course home page https://ma117.math.metu.edu.tr/ and the ODTUClass page. All students enrolled in this course are supposed to check these websites regularly for possible announcements.

The MATH 117 coordination reserves the right to make necessary changes depending on situations which are out of our control. So it is students' responsibility to follow the announcements.

Lectures and Recitations

Keep in mind that this course is **6 (4** (Lectures**) +2** (Recitations**)) hours per week**.
Later, in the first week a recitation section will be assigned to you, you can learn yours from the web page of the course. However, you can attend to one which is suitable for you.

There will be no quizzes

Class Attendance

You are expected to attend all lectures and recitations. Attendance during lectures and recitations will not be taken.

Make-Up for Exams

You must present a reasonable excuse (such as a medical report or an academic leave) to take a make-up exam. However, you can take only one make-up exam, that is if you miss more than one exam you will fail the course.

After the final exam, there will be a form on ODTÜClass and via that form, you will apply to take the make-up exam instead of the missed exam and you will send your reasonable excuse to **wwwma117@metu.edu.tr**.

Eligibility to take the Final Exam and NA Grade (Items A and B below)

If you did not attend the Final Exam and if you already missed a midterm exam, you will receive NA grade.

If your two midterm scores (each one out of 100 points) add up to less than 10 points (out of 200 points in total), then you cannot take the Final Exam and will receive an NA grade from the course. That means,

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

(1) M1 + M2 **>=** 10

(2) M1 + M2 **<** 10,

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 X attends to Midterm 1 and his score is 10 and does not take Midterm 2 being on leave for academic/medical reasons. Since M1+M2 = 10 **>=** 10, Student X is eligible for the final exam provided that relevant documents are submitted.

b) Student Y does not attend to Midterm 1 because of their illness and attends to Midterm 2 and get 8 points. Since M1+M2 = 8 **<** 10, Student Y 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.).**

Also, according to the university's rules and regulations governing undergraduate studies (Article 24), that is

(B) *"…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 the 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, see 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 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."