TED University

Department of Mathematics

MATH 111 - Introduction to Calculus of One Variable

2021-2022 Spring Semester

Credit Hours: (3+2+0) 4 TEDU Credits, 7 ECTS Credits

Pre-requisites: None

Course Description:

Functions and Their Graphs. Combining Functions. Trigonometry. Concept of Limit. Continuity. Exponential and Logarithmic Functions. Derivative. Rules for Differentiation. Chain Rule. Related Rates. The Mean Value Theorem. Maxima and Minima of Functions. Graphing Functions. L'Hopital's Rule. Integration. Rules for Integration. The Fundamental Theorem of Calculus. Integration by Substitution. Calculation of Area.

Instructors:

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Teaching Assistants:

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Textbook:

All the topics of the course will be covered from the following textbook (please see the course outline below for more details). You may find a copy of the textbook at the University's Library or you may get one for yourself from TEDU Bookstore or elsewhere.

- Calculus, Metric Version, by James Stewart (7^{th} or 8^{th} Edition)

Supplementary Books:

You may also make use of the following textbooks as additional source materials.

- Calculus, A Complete Course, by Adams and Essex (7^{th} Edition)
- Calculus, by George B. Thomas (12^{th} Edition)

Learning Outcomes:

Upon successful completion of this course, a student will be able to:

1. Recall fundamental definitions, notations, conventions and basic principles of mathematical writing.
2. Recognize elementary and transcendental functions and their properties.
3. Explain the concepts of limit, continuity and continuity implications such as the Intermediate and Extreme Value Theorems.
4. Calculate limits, derivatives and definite integrals algebraically, graphically and numerically.
5. Use the Mean Value Theorem (MVT) and implications of the MVT on limits, monotonicity, concavity and extrema.
6. Solve problems concerning related rates, optimization, and approximation.
7. Relate indefinite integral and definite integral via the Fundamental Theorem of Calculus.

Exam Dates:

Midterm Exam 1: March 23, Wednesday, at 06:30 pm

Midterm Exam 2: April 20, Wednesday, at 06:30 pm

Final Exam: To be announced by the Registrar's Office

Remark:

- **In accordance with the regulations of the University Administration, midterm exams and the final exam will be held face-to-face in classrooms. The contents of midterm exams and the final exam will be revealed within the week before their dates.**
- **In case of severe pandemic conditions, all the details including the dates, durations and implementation types of the exams may be modified in accordance with the regulations of the University Administration. Any possible change will be announced to you whenever it occurs.**

ALE Dates:

ALE 1 for Sections 1&3: March 2, Wednesday

ALE 1 for Sections 2&4: March 3, Thursday

ALE 2 for Sections 1&3: April 6, Wednesday

ALE 2 for Sections 2&4: April 7, Thursday

ALE 3 for Sections 1&3: May 11, Wednesday

ALE 3 for Sections 2&4: May 12, Thursday

ALE 4 for Sections 1&3: May 25, Wednesday

ALE 4 for Sections 2&4: May 26, Thursday

Remark: All ALEs will be held face-to-face in classrooms. There is no make-up for active learning exercises.

Grading (A Total of 110 points):

Midterm Exam 1: 28 Points

Midterm Exam 2: 28 Points

Final Exam: 29 Points

Active Participation in Lectures: 10 Points

Active Learning Exercises (ALE): 10 Points

Active Participation in Practice Hours (LAB): 5 Points

Remark: Letter grades are assigned in accordance with the official catalog of TEDU below. However, as a result of the ultimate consideration of overall averages of the exams by the instructor, letter grading may be modified for the benefit of the students.

The Catalog of Letter Grades

AA	Excellent (90-100)
BA	Good-Excellent (85-89)
BB	Good (80-84)
CB	Satisfactory-Good (75-79)
CC	Satisfactory (70-74)
DC	Weak- Satisfactory (60-69)
DD	Satisfactory (50-59)
F(Failure)	Failure (0-49)
FX (Failure)	Letter grade "FX" is assigned to students who have failed to attend classes or failed to participate in the midterm exam, final exam, term project or in similar major course assessment activities

Student Workload (162 hours):

Activities	Number	Duration (hour)	Total Work Load
Lectures	14	4	56
Practice (Lab) Hours	14	1	14
Course Readings	14	3	42
Active Learning Exercises (Study duration)	5	4	20
Homework on WeBWorK (Study duration)	3	5	15
Assignments/Exams (Study duration)	3	5	15

Course Outline:

The course outline is given below. This outline is tentative and it will be adapted to the pace of the class in agreement with students. Any changes will be announced either in the classroom or via email.

Week 1 Feb 14-18	Appendix A Numbers, Inequalities and Absolute Values Appendix B Coordinate Geometry and Lines
Week 2 Feb 21-25	1.2 Mathematical Models: A Catalog of Essential Functions 1.3 New Functions from Old Functions
Week 3 Feb 28-March 4	Appendix D Trigonometry 1.5 The Limit of a Function 1.6 Calculating Limits using the Limit Laws **ALE 1 for Sections 1&3 on March 2, Wednesday, in classroom** **ALE 1 for Sections 2&4 on March 3, Thursday, in classroom**
Week 4 March 7-11	3.4 Limits at Infinity; Horizontal Asymptotes 1.8 Continuity 2.1 Derivatives and Rates of Change
Week 5 March 14-18	2.2 The Derivative as a Function 2.3 Differentiation Formulas 2.4 Derivatives of Trigonometric Functions

Week 6 **March 21-25**	2.5 The Chain Rule 3.2 The Mean Value Theorem **Midterm Exam 1 on March 23, Wednesday, at 06:30 pm**
Week 7 **March 28-April 1**	3.3 Increasing/Decreasing Test 6.1 Inverse Functions
Week 8 **April 4-8**	6.2 Exponential Functions and Their Derivatives 6.3 Logarithmic Functions 6.4 Derivatives of Logarithmic Functions **ALE 2 for Sections 1&3 on April 6, Wednesday, in classroom** **ALE 2 for Sections 2&4 on April 7, Thursday, in classroom**
Week 9 **April 11-15**	2.8 Related Rates 6.8 Indeterminate Forms and L'Hospital's Rule
Week 10 **April 18-22**	3.1 Maximum and Minimum Values 3.3 How Derivatives Affect the Shape of a Graph **Midterm Exam 2 on April 20, Wednesday, at 06:30 pm**
Week 11 **April 25-29**	3.5 Summary of Curve Sketching 3.7 Optimization problems
Week 12 **May 2-6**	*Official Holiday between May 2-4, Monday-Wednesday*
Week 13 **May 9-13**	3.9 Antiderivatives 4.2 The Definite Integral **ALE 3 for Sections 1&3 on May 11, Wednesday, in classroom** **ALE 3 for Sections 2&4 on May 12, Thursday, in classroom**
Week 14 **May 16-20**	4.3 The Fundamental Theorem of Calculus 4.4 Indefinite Integrals and the Net Change Theorem *Official Holiday on May 19, Thursday*
Week 15 **May 23-27**	4.5 The Substitution Rule 5.1 Areas Between Curves **ALE 4 for Sections 1&3 on May 25, Wednesday, in classroom** **ALE 4 for Sections 2&4 on May 26, Thursday, in classroom**
	The date of the Final Exam will be announced by the Registrar's Office

Remark: You are responsible for checking your TEDU e-mails frequently to be informed about possible announcements.

Active Participation in Lectures (10 points):

Attendance to lectures is not mandatory but your active participation in lectures is **graded** in this course, so you are **strongly** recommended to actively participate in all lectures. **Missing even one lecture may cause the loss of many hours of study to learn the material of the course you have missed. You must stay available in the classroom during lectures unless you have an emergency to leave.** You must attend your lectures and practice (lab) hours in your own section's room.

An **active participant** in lectures is the student who

- **stays available physically and mentally in the classroom during lectures without an emergency to leave**
- **tries to answer possible questions of the instructor during lectures**
- **tries to show his/her interest to lectures by interacting with the instructor and participating in tutorial discussions carried out by the instructor.**

Remark: Active participation in lectures does not mean being available in the classroom only! You may not get the full credit (10 points) from your attendance to lectures if you do not satisfy all the requirements above. Your exact credit will be determined by the instructor with respect to your performance of active participation in lectures.

Active Participation in Practice (Lab) Hours (5 points):

Attendance to practice (lab) hours is not mandatory but your active participation in practice (lab) hours is **graded** in this course, so you are **strongly** recommended to actively participate in all practice (lab) hours. **You must stay available in the classroom during practice (lab) hours unless you have an emergency to leave.** You must attend your practice (lab) hours in your own section's room.

An **active participant** in practice (lab) hours is the student who

- **stays available physically and mentally in the classroom during** practice (lab) hours **without an emergency to leave**
- **submits correct answers of half of the problems weekly assigned on WeBWorK**
- **tries to show his/her interest to practice (lab) hours by interacting with the teaching assistant.**

Remark: Active participation in practice (lab) hours not mean being available in the classroom only! You may not get the full credit (5 points) from your attendance to practice (lab) hours if you do not satisfy all the requirements above. Your exact credit will be determined by the teaching assistant with respect to your performance of active participation in practice (lab) hours.

Active Learning Exercises (ALE) (10 points):

Throughout the entire semester, **four** active learning exercises will be given. Each ALE will be of the form of a quiz and will be held in the classroom. ALEs will help you learn the course material in an active and collaborative manner.

Homework on WeBWorK:

You will be given at least two homework sets each of which may contain various number of questions from WeBWorK (https://webwork.tedu.edu.tr/webwork2). **Homework sets assigned on WeBWorK are not graded.**

Make-up Policy:

Only one make-up exam will be given at the end of the semester. The make-up exam will be given for those who miss one of the assignments due to medical excuses documented by medical reports that are approved by official health institutes or due to other official excuses approved by the university's executive branches. **The content of the make-up exam covers all the subjects in the syllabus. There is no make-up for attendance to lectures, practice hours and active learning exercises**.

Calculator Policy: You are NOT allowed to use any calculator during active learning exercises and exams.

Classroom Policy: All students are expected to comply with the following rules in the classroom.

1. **You must take all the precautions such as wearing a mask, keeping your hands clean, coughing into a bent elbow or tissue, etc. in accordance with the "Commitment Form on the Principles to Observe during COVID-19 Pandemic", which you may read clicking on the URL: https://www.tedu.edu.tr/sites/default/files/content_files/kys-pd-01-ek14-eng-commitmentformontheprinciplestoobserveduringcovid-19pandemic.pdf .**

2. **Behaviors disturbing the other students or the instructor and disrupting the process of the lecture are not tolerated. You are not allowed to engage in any of such behaviors during the lecture.**

3. **You must respect to your classmates and your instructor by being in class before the lecture starts. Students who are late due to reasonable excuses in the first 15 minutes of the lecture may be allowed to come in the classroom by the approval of the instructor. However, you are not allowed to come in the classroom after the first 15 minutes of the lecture.**

4. **You must stay in the class during the lecture unless you have an emergency to leave. Walking in the classroom after the lecture starts is not appropriate for the peace of all members in the classroom and for the efficiency of the lecture.**

5. **You must turn off all your electronic devices –especially your mobile phones- before the lecture starts. Using any of these devices is not allowed during the lecture.**

How to be Successful at this Course?

Here are the basic suggestions to succeed in this course:

1. **You should attend all the lectures and practice (lab) hours. You shouldn't miss any of the lectures/lab hours.**
2. **You should give your entire attention to the lecture while you are listening to your instructor.**
3. **You should satisfy all the requirements of active participation mentioned before.**
4. **You should regularly review all the materials you learned in lectures. Moreover, you should not only solve all the problems assigned to you on WeBWorK, but you should also try to solve exercises at the end of related subjects in your textbook.**
5. **You should study by writing as your instructor does in lectures. You shouldn't study by just reading passages in your notes/textbook.**
6. **You should take notes of what you have difficulty on your study or solutions and ask for help from the instructor and from the assistant of the course.**

Cheating:

Cheating has a very broad description which can be summarized as "acting dishonestly". Some of the things that can be considered as cheating are the following: copying answers on exams, homework and lab works, using prohibited material on exams, lying to gain any type of advantage in class, providing false, modified or forged data in a report, plagiarizing, modifying graded material to be re-graded, causing harm to colleagues by distributing false information about an exam, homework or lab. Cheating is a very serious offense and will be penalized accordingly by the university disciplinary committee.

Plagiarism:

All of the following are considered plagiarism:

- Turning in someone else's work as your own
- Copying words or ideas from someone else without giving credit
- Failing to put a quotation in quotation marks
- Giving incorrect information about the source of a quotation
- Changing words but copying the sentence structure of a source without giving credit
- Copying so many words or ideas from a source that it makes up the majority of your work, whether you give credit or not

Plagiarism is a very serious offense and will be penalized accordingly by the university disciplinary committee. The best way to avoid accidentally plagiarizing is to work on your own before you ask for the help of other resources.

For more detailed information, please visit the web page of TEDU Principles of Academic Integrity (https://student.tedu.edu.tr/en/student/principles-of-academic-integrity).