TED University

Department of Mathematics

MATH 111 - Introduction to Calculus of One Variable

2019-2020 Spring Semester

Course Code & Name: Math 111 - Introduction to Calculus of One Variable

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:

- **Name:** Fuat Erdem (Sections 1, 2, 3)

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- **Name:** Levent Aybak (Sections 4, 5)

  Office: A420

  Office Hours: Tuesday 14:10-15:00, Thursday 14:10-15:00

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Course Assistant:

- **Name:** Şeyda Solmaz

  Office: B153

  Office Hours: Wednesday 15:00-17:00

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Textbook:

We will cover certain topics from the following textbook (please see the course outline below for more details). You can find a copy of the textbook at the University's Library. However, you are strongly advised, and it is more practical, to get a physical and original copy for yourself from TEDU Bookstore or elsewhere.

- Calculus, Metric Version, by James Stewart (8th Edition)

Supplementary Books:

The following textbooks are also useful as additional source material:

- Calculus, A Complete Course, by Adams & Essex (8th Edition)
- Calculus, by George B. Thomas (12th Edition)
- Calculus, Single and Multivariable, by B. E. Blank & S. G. Krantz (2nd 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.

Grading:

At the end of the semester, each student will get an overall score out of a total of 110 points (10 points of this is bonus) according to the grading scheme below.

Midterm Exam 1: 30 points

Midterm Exam 2: 30 points

Final Exam: 35 points

Active Learning Exercises (ALE): 5 points

Practice Hours (LAB): 5 points

Extra Credit Work (ECW): 5 points

Student Workload (175 hours):

Activities	Number	Duration (hour)	Total Work Load
Lectures	14	4	56
Practice Hours (LAB)	14	1	14
Course Readings	14	4	56
Active Learning Exercises (ALE) (Study duration)	7	2	14
Extra Credit Work (ECW) (Study duration)	3	3	9
Midterm Exams (Study duration)	2	8	16
Final Exam (Study duration)	1	10	10

Announcements:

- Announcements about the course (important notifications, course material, solution keys, exam dates, exam results etc) will be made on TEDU Moodle (https://moodle.tedu.edu.tr), via email or in class. Students will receive an automatic email when an announcement is made on TEDU Moodle.
- It is the student's responsibility to catch announcements by checking TEDU Moodle and their emails regularly and by attending lectures.

Attendance:

- Attendance is not mandatory for this course but it is **highly recommended** for the benefit of students.
- Students must attend the lectures and the lab hours of their enrolled section. Otherwise their grades will be **invalid**.
- Classes start on the hour. Please be respectful of your classmates by being in class on time. Mobile phones should be turned off and kept out of sight in lectures.

Exam Dates:

- **Midterm Exam 1:** March 30, 2020 (Monday), at 18:30
- **Midterm Exam 2:** April 27, 2020 (Monday), at 18:30
- **Final Exam:** To be announced later by the Registrar's Office

Active Learning Exercises (ALE):

- ALE's are an opportunity for students to learn the course material in an active and collaborative way.
- Students will be given 6 ALE's in class **without advance notice.** For each student, only the highest 5 ALE scores will be graded.

Practice Hours (LAB):

- Students are supposed to attend lab hours every week. In lab hours students will practice the topics covered in lectures by solving exercises online on TEDU WebWork (https://webwork.tedu.edu.tr/webwork2).
- Students are encouraged to be active learners by asking the lab assistant their questions

Extra Credit Work (ECW or Homework):

- ECW's provide students with a variety of exercises to expand their knowledge and improve their problem solving skills.
- Throughout the semester, students will be given 3 homework sets (ECW) on WeBWork (https://webwork.tedu.edu.tr/webwork2).

Make-up Policy:

- Only one make-up exam will be given at the end of the semester. The make-up exam will be given only for exams that were missed due to medical excuses documented by medical reports that are approved by the Student Health Center or other documented excuses approved by the University's executive branches.
- **No make-up will be given for LAB, ALE and ECW.**

Course Outline:

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

Course Outline (Tentative)		
Week 0&1	**Feb 13-21**	Appendix A: Numbers, Inequalities, and Absolute Values Appendix B: Coordinate Geometry and Lines
Week 2	**Feb 24 - 28**	1.1 Four Ways to Represent a Function 1.2 Mathematical Models: A Catalog of Essential Functions 1.3 New Functions from Old Functions
Week 3	**Mar 2 - 6**	Appendix D: Trigonometry 1.5 The Limit of a Function
Week 4	**Mar 9 - 13**	1.6 Calculating Limits using the Limit Laws 3.4 Limits at Infinity; Horizontal Asymptotes 1.8 Continuity
Week 5	**Mar 16 - 20**	2.1 Derivatives and Rates of Change 2.2 The Derivative as a Function 2.3 Differentiation Formulas
Week 6	**Mar 23 - 27**	2.4 Derivatives of Trigonometric Functions 2.5 The Chain Rule
Week 7	**Mar 30 - Apr 3**	2.8 Related Rates 6.1 Inverse Functions 6.2 Exponential Functions and Their Derivatives
Week 8	**Apr 6 - 10**	6.3 Logarithmic Functions 6.4 Derivatives of Logarithmic Functions 6.8 Indeterminate Forms and l'Hospital's Rule
Week 9	**Apr 13 - 17**	3.1 Maximum and Minimum Values 3.2 The Mean Value Theorem
Week 10	**Apr 20 - 24**	3.3 How Derivatives Affect the Shape of a Graph 3.5 Summary of Curve Sketching
Week 11	**Apr 27 - May 1**	3.7 Optimization problems 3.9 Antiderivatives
Week 12	**May 4 - 8**	4.1 Areas and Distances 4.2 The Definite Integral
Week 13	**May 11 - 15**	4.3 The Fundamental Theorem of Calculus 4.4 Indefinite Integrals and the Net Change Theorem
Week 14	**May 18 - 22**	4.5 The Substitution Rule 5.1 Areas Between Curves

Calculator Policy:

You may use a graphing calculator or software that does symbolic calculations. But you will not be allowed to use a calculator during ALE's and exams.

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 work, 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:

Each of the following situations is regarded as an act of 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.