

MATH 153
CALCULUS FOR MATHEMATICS STUDENTS I, Fall 2020

Classes:

The classes will be online through Zoom or Webex. The Zoom/Webex link will be sent to your METU email address before each class. The video recording and lecture notes of each lecture will be posted on Odtuclass for convenience. These lectures, videos and notes are intended only for Math 153 students and sharing the related links, videos and lecture notes with third parties is strictly forbidden. The common live lecture and recitation hours for all sections:

Mondays: 13:40-15:30
Thursdays: 13:40-15:30
Recitation: Fridays 13:40-15:30

Office Hours: To be announced

Course Objectives:

At the end of this course, the student will learn the concepts limit, continuity, derivative of a function of one variable and some of their applications to real life problems.

Exams and Grading: The grading will be based on 2 Midterms, 1 Final exam and weekly homeworks and quizzes, all to be conducted online. You will need a camera (smartphone's camera or webcam) and reliable internet connection for midterms and the final exam.

Midterm I: 35 Points (**Nov 20, 2020 at 13:30**), (Written exam over Zoom with camera)

Midterm II: 35 Points (**Dec 25, 2020 at 13:30**), (Written exam over Zoom with camera)

Final Exam: 30 Points (Written / Oral exam over Zoom with camera. Students who collect at least 25 points over 70 points from 2 midterms are eligible to take the final exam)

Quiz-Homework: 10 Points (Bonus)

Make-up: After the final exam, 1 make up exam will be given to the students who miss 1 exam with an acceptable excuse.

NA Policy: Students who miss 2 exams or collect less than 25 points over 70 points from 2 midterms will get NA.

Attendance Policy: Students are expected to attend to the lectures and recitations regularly. Zoom/Webex links will be sent before the semester starts.

Reference Books:

1. Michael Spivak, Calculus
2. Robert A. Adams, Christopher Essex, CALCULUS A Complete Course Calculus.

Weekly Course Plan:

Week 1: Preliminaries: Real numbers and their properties, solving (in)equalities, Cartesian coordinates,

Week 2: Preliminaries: Functions and their basic types, graphs, shifting and scaling

Week 3: Limits of functions, properties of limit

Week 4: Limit types, Sandwich Theorem, Continuity

Week 5: Properties of continuity, Extreme Value and Intermediate Value Theorems and applications

Week 6: Derivative of a function, differentiability, tangent line,

Week 7: Chain Rule, implicit differentiation, higher order derivatives

Week 8: Tangent line (linear) approximation, Mean Value Theorem and its applications

Week 9: Inverse functions, natural logarithmic and exponential functions, Logarithmic differentiation, general logarithmic and exponential functions

Week 10: Indeterminate forms, L'Hospital Rule, exponential growth and decay

Week 11: Hyperbolic and inverse trigonometric functions and their derivatives, critical, singular and end points

Week 12: 1st and 2nd Derivative Tests, concavity, asymptotes, sketching the graphs of functions

Week 13: Extreme value problems

Week 14: Related rates