2018-2019 Spring **(last update: Feb 18)**

MATH 153, Calculus for Mathematics Students I

Catalog description: **Functions, limit and derivative of a function of a single variable. A thorough discussion of the basic theorems of differential calculus: Intermediate value, extreme value, and the Mean Value Theorem. Applications: Graph sketching and problems of extrema.**

At the end of the course students are expected to:

- **Compute limits and carry out some basic proofs about limits ,continuity, derivative,**
- **Compute derivates and use it in applications such as computing rates of change, finding extreme values,**
- **Sketch graphs of functions by finding intervals of increase /decrease, concavity and asymptotes,**
- **Use transcendental functions including logarithms, exponentials and inverse trigonometric functions effectively,**
- **State and use Intermediate value, extreme value, and the Mean Value Theorems.**

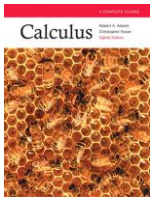
Course instructor: **Semra Öztürk**
Course teaching assistant: **Nisa Tuğrul**
Course Home Page:
https:/ma153.math.metu.edu.tr/ (**check for updates weekly**)

Grading:

- MidTerm1: 30 Points **(March 15, Friday at 17:40)**
- MidTerm2: 30 Points **(April 19, Friday at 17:40)**
- Final Exam: 40 Points **(TBA)**
- Bonus: 15 Points (attendance, quizzes, homeworks)

NA criterion: Attendance count below 70% and (M1+M2) < 30% will not be allowed to take the final exam, grade will be NA.

Suggested textbook:



Robert A. Adams, Christopher Essex
CALCULUS
A Complete Course Calculus. Eight Edition.
ISBN 978 0-321-78107-9
QA303.2.A33 2013

Reference Book: Calculus, Michael Spivak

Week	Dates	Tentative-Syllabus(Math 153) 2018-2019 SPRING (check for updates often)	
1	**Feb 11-15** **Add-Drop and Advisor Approvals on Feb 11,12** **Feb 12 first day of classes**	Selected topics from **Ch 0 :** real numbers, real line, absolute value as distance, interval notation, functions and their graphs, absolute value function, shiftings of graphs, trigonometric functions, line, circle , ellipse equations etc.. *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 18-22**	**Ch 1: Limits and Continuity** 1.1 Average and Instantaneous Velocity 1.2 Limits of Functions 1.3 Limits at Infinity and Infinite Limits	**Suggested exercises from the textbook** **1.1 :** 1,2,3,4,5,7 **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	**Feb 25 -Mar 1**	1.2 Limits at Infinity and Infinite Limits 1.5 The Formal Definition of Limit	**1.3 :** 3,6,10,14,20,25,29,33,34,50,51 **1.5 :** 4,6,8,10,12,16,20,27,30, 31,37,38
4	**Mar 4-8**	1.5 The Formal Definition of Limit	**1.5 :** 4,6,8,10,12,16,20,27,30, 31,37,38
5	**Mar 11-15** **March 15, Friday at 17:40**	1.4 Continuity, EVT, IVT **Ch 2: Differentiation** 2.1 Tangent Lines and Their Slope	**1.4:** 1,2,3,4,5,6,9,13,16,18, 22, 30,32 **2.1 :** 3, 5, 9, 13, 15, 17, 19, 21, 23
6	**Mar 18-22**	2.2 The Derivative 2.3 Differentiation Rules	**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
7	**Mar 25 -29**	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
8	**Apr 1-5**	2.8 The Mean-Value Theorem (MVT) 2.9 Implicit Differentiation	**2.8 :** 1, 3, 5, 7, 9, 11, 15 **2.9 :** 3, 7, 9, 11, 13, 17, 21, 27
9	**Apr 8-12**	**Ch 3: Transcendental Functions** 3.1 Inverse Functions 3.2 Exponential and Logarithmic Func.	**3.1 :** 3, 9, 12, 17, 19, 23, 26, 29, 34 **3.2 :** 7, 17, 26, 31, 32, 35
10	**Apr 15-20** **April 19, Friday at 17:40**	3.3 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
11	**Apr 22-26** **no classes on April 23, Tuesday, National Sovereignty and Children's Day**	**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
12	**Apr 29- May 3**	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
13	**May 6-10**	4.6 Sketching the Graph of a Function	**4.6 :** 1, 2, 3, 4, 5, 6, 15, 16, 17, 18, 29, 31
14	**May 13-17**	4.8 Extreme-Value Problems	**4.8 :** 1, 3, 7, 9, 11, 13, 17, 18, 21, 31, 32, 42
15	**May 20**	4.9 Linear Approximations	**4.9 :** 1, 3, 5, 7, 9, 11, 15, 17, 21