**MATH 111**

**2021-2022 FALL SEMESTER**

**Instructors:**

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**Coordinator:** Ebru Solak

**Course description:**

The main goal of this course is to enable the student to comprehend and construct mathematical arguments, as well as to develop the student’s mathematical maturity by providing basic definitions, facts and necessary tools. It is to your advantage to learn how to write mathematics as early as possible. If you do well in this course, then it is very likely that you will have no trouble in the rest of your education in the mathematics courses.

**Classes:** Tuesday 15:40-17:30

Thursday : 12:40-13:30

**Recitation:** Friday 10:40-11:30

This schedule is common **FOR ALL SECTIONS** of Math 111.

The lectures will be given online via Zoom. Before each class, a Zoom link will be posted in Odtüclass and sent to your METU email address. Attendance is **not mandatory** for online classes.

These lectures are intended only for Math 111 students and sharing the link with third parties is strictly forbidden. The video recording and the lecture notes of each lecture will be posted in Odtüclass, so that you will have a chance to watch them again. Sharing the links to the videos with third parties is also strictly forbidden.

**Office Hours:** See the office hours section of the web page of your instructors and also see Odtü class. Note that the schedule of office hours may change. The office hours will be done online over Zoom.

**Textbook:** Proofs and Fundamentals: A First Course in Abstract Mathematics, Second Edition, by Ethan D. Bloch

It can be officially downloaded from Springer’s website https://link.springer.com/book/10.1007/978-1- 4419-7127-2 if you are connected to the internet through the university. (You can you use the METU VPN service https://faq.cc.metu.edu.tr/groups/vpn-service to connect via the university.)

**Grading**

It will be announced later.

**Tentative course outline:**

**Week 1**: Chapter 1.1 Introduction, 1.2 Statements, 1.3 Relations between Statements

**Week 2**: Chapter 1.4 Valid Arguments, 1.5 Quantifiers

**Week 3**: Chapter 1.5 Quantifiers, 2.2 Direct Proofs

**Week 4**: Chapter 2.3 Proofs by Contrapositive and Contradiction

**Week 5**: Chapter 2.4 Cases, and «If and only if», 2.5 Quantifiers in theorems

**Week 6**: Chapter 3.1 Introduction to Sets, 3.2 Basic definitions, 3.3 Set operations

**Week 7**: Chapter 3.3 Set operations, 4.1 Functions, 4.2 Image and Inverse Image

**Week 8**: Chapter 4.2 Image and Inverse Image, 4.3 Composition and Inverse functions

**Week 9**: Chapter 4.3 Composition and Inverse functions, 4.4 Injectivity, Surjectivity, Bijectivity

**Week 10**: Chapter 5.1 Relations, 5.2 Congruence, 5.3 Equivalence relations

**Week 11**: Chapter 7.4 Order Relations

**Week 12**: Chapter 6.3 Mathematical Induction

**Week 13**: Chapter 6.5 Cardinality of Sets, 6.6 Finite and Countable Sets

**Week 14**:Chapter 6.7 Cardinality of Number systems