

# MATH 317: Elementary Number Theory

## Fall 2020

**Instructor:** Mohammad Sadek

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**Office:** 1099 FENS

**Class Hours:** Thursday 11:40 – 12:30; and Friday: 02:40 – 04:30

**Office Hours:** by appointment, on Zoom

**You are responsible for every announcement made in class or in SUCourse+. Not attending the class or not following SUCourse+ regularly is not an excuse, in case you miss something.**

**Textbook:** A Friendly Introduction to Number Theory, by Joseph H. Silverman, Fourth Edition - ISBN: 978-0-321-81619-1 2012 Pearson Education, Inc.

### Prerequisites:

MATH 102 and MATH 201

### Course Description:

This MATH 317 is an introductory course to number theory. Much emphasis is put on problem solving and writing rigorous mathematical proofs.

Throughout this course, you are expected to be able to:

- Read, understand and construct rigorous mathematical proofs, e.g., mathematical induction, direct and indirect proofs
- Present mathematical work, both in oral and written format, to various audiences (mathematicians, and non-mathematicians).

### The course covers the following topics:

- 1) Divisibility of integer numbers and the Euclidean algorithm
- 2) The Fundamental Theorem of Arithmetic
- 3) Multiplicative arithmetic functions and interesting numbers: perfect numbers, Fermat numbers and Mersenne numbers
- 4) Congruences and polynomial congruences
- 5) Chinese Remainder Theorem
- 6) Primitive roots
- 7) Quadratic residues, Jacobi symbols and Quadratic reciprocity
- 8) Pseudo primes
- 9) Pythagorean triangles

**Guideline for the syllabus:**

Lectures are given online, via Zoom. Attendance is checked (see below in Participation) using the log files of Zoom. You are required to register a Zoom account using the sabanci-univ.edu mail address provided by the university. Log data related to other mail addresses will be ignored.

- Create a Zoom account and a TopHat account, both using your sabanciuniv.edu address. Please add yourself to the course Elementary Number Theory, MATH 317, on TopHat.
- Follow the announcements on SUCourse+.
- Attend the lectures via Zoom, and answer the questions presented at the same time via TopHat.
- It is preferable that you keep your webcam on for better interaction.
- A list of suggested problems will be posted on SUCourse+. Solving these problems will help you get a good grasp of the material. Please do attempt all problems.
- Take advantage of the Office Hours to ask further questions.

**Grading:**

Your grade exclusively depends on the following listed items. There will be no other extra-credit opportunities.

- Attendance and Participation: 5%
- 6 – 8 Quizzes: 15%
- Two Midterms: 25% each
- Final Exam: 30%

**Important:**

- Every document submitted needs to be hand-written, to be converted to pdf, and to include name, surname, student ID, and signature in the top left corner of each page (note: if you write on the two sides of a piece of paper, write the information on both sides).

Any page missing any of the items above will be ignored.

- Submissions by mail are never considered, SUCourse+ is the only means accepted.

**NA Policy:**

Students missing two exams (out of three), will receive NA. If you will have serious issues preventing you from regularly following the course, you are required to contact your instructor.

**Midterms:**

The midterms and final exams are performed via SUCourse+. Questions can be presented in different ways, including the submission of hand-written answers. During their entire duration, students are proctored and recorded. More details are announced on SUCourse+.

Midterm 1, to be held on Saturday 14.11.2020, 02:00 pm – 03:30 pm

Midterm 2, to be held on Saturday 12.12.2020, 02:00 pm – 03:30 pm

**Participation Grades:**

Participation is measured in lectures. In each lecture, a certain number of pop-up questions will be presented to the students. Students attending their Zoom session will get 1 participation point if they also answer at least half of the questions.

There will be no make-up for missed questions.

**Quizzes:**

There will be short pop-up quizzes taking place during the last 10 minutes of the lecture. During the entire duration of each quiz, students are proctored and recorded. There will be no make-up for missed quizzes. At the end of the semester, the worst two quizzes will be dropped.

**Midterms and Final Make-up Policy:**

If you miss a Midterm/Final and wish to make it up, you must contact your instructor by mail, and explain your excuse as soon as possible. Only students that had contacted the instructor with a valid documented excuse will be contacted to arrange the terms of the exam. The make-up will be a recorded and proctored exam containing all topics and it will be scheduled during the final period.

**Academic Integrity:**

All university policies on academic integrity apply to our course, and they will be enforced. (more information on <http://www.sabanciuniv.edu/en/academic-integrity-statement>).

In general, to ensure Academic Integrity, *any student might be asked to validate any activity contributing to their grade in an interview via Zoom (recorded, with audio and video). A student failing to explain the submitted work, or refusing/missing the interview, will receive zero from that work.*

In particular, no form of cheating is welcome in the exams or quizzes, such as copying whole or part of each other's answers, using cheat-sheets etc. The action against such violations could range from getting a zero on the particular quiz/exam to explaining the case in front of the Disciplinary Committee.

**Classroom Discipline:**

It is our responsibility to provide students with excellent teaching and learning environments. We are therefore asking you to respect both our responsibility to teach and the right of other students to learn. Any action that disturbs your classmates or disrupts the online activities is unacceptable. Repeated violations of the above common sense rules may cause a student to be counted as absent for a lecture.