Syllabus   Math 189H – The Joy of Numbers

Instructor: Dr. Alexandra Seceleanu

> **Office hours:** MTW 11 am -12 pm in 338 Avery Hall or by appointment
> **Email:** aseceleanu@unl.edu   (this is the best way to reach me)

Class Times and Location: TR 9:30 am - 10:45 am, Avery Hall – Room 112.

Course Description: In this class we will investigate properties of the integers. The part of mathematics that deals with these investigations is called number theory and it is the source of many beautiful problems. Once considered a pure branch of Mathematics, number theory has, nowadays, many applications in modern life: from cryptology and coding theory to computer science.

> The goal of the class is to gain experience on how mathematical investigation is done. By looking at many examples, we will come up with possible properties that the integers have (*conjectures*), then we will have to prove whether those properties hold true (*theorems*) or we will need to find counterexamples. Along the semester you will learn how to appreciate the investigation in the mathematical science.

ACE Outcome 3: This course satisfies ACE Outcome 3: "Use mathematical, computational, statistical, or formal reasoning (including reasoning based on principles of logic) to solve problems, draw inferences, and determine reasonableness." The tests will be the primary means of assessing your achievement of ACE Outcome 3.

Text: At the beginning of each class I will distribute notes summarizing the discussion of the previous class. These notes will be posted on Blackboard, usually within the same day of class. You also will need to keep good notes about the class discussions.

Course grades: Your grade will be based on 3 components: class participation, project, six take-home tests. The points you will receive for each component are the following:

Class participation	=	200 points
Tests (6 × 100 points)	=	600 points
Project	=	200 points
Total	=	1000 points

Homework: Daily homework problems will be assigned and you will be expected to have prepared them for the next class. I will not collect homework, but you are expected to present your solution in class when called upon. Collaboration is both allowed and strongly encouraged on the daily homework problems: the best way to learn mathematics is to explain what you are trying to do to someone else.

Class participation: Class participation will influence your final grade as described above. Each day I will ask for volunteers or randomly call upon several of you to present to the class your attempts at solutions to homework problems. You are expected to contribute to class discussions and to work with your colleagues. There are no dumb questions:

if you dont understand something I, or somebody else in the class, said, then stop us and ask for explanations. All questions can lead to interesting observations.

Tests: There are six take home tests. Three of them will be collaborative, in the sense that collaboration is both allowed and encouraged. You will need to write down your own solutions and you will have to reference the people you talked to. The remaining tests will be solo. In this type of tests you are supposed to work alone and no collaboration of any kind is allowed. The only person you can talk to about the solo tests is me. I will assume you adhere to the UNL Policy on Academic Honesty.

The following is a tentative schedule for the take-home tests:

Given out	Due date	Type
Sept 4	Sept 11	Collaborative
Sept 18	Sept 25	Solo
Oct 2	Oct 9	Collaborative
Oct 16	Oct 28	Solo
Oct 30	Nov 11	Collaborative
Nov 13	Nov 25	Solo

Throughout this course, and in particular for the tests, I am more interested to see what you can do when given the time to think creatively, rather than having you repeat back information. Thus you may find some of the test problems challenging and frustrating at first. Dont be discouraged. The goal is to learn how to appreciate the exploring of the unknown; I dont expect you to have perfect solutions.

Projects: Each student is required to participate to a group project and each group will consist of 2 or 3 students. The projects will have a written part and an oral part. The last 4 classes or so will be reserved for oral presentations and the groups will turn in the written part by the last day of class. The topic of the project can be chosen from a list of topics I will distribute in early October or it can be a mathematical topic of particular interest to you. Before starting a project the group should communicate its members to me and we should briefly discuss the project topic. All the members of the group will receive the same grade so it is important that each person in the group participate fully and equally.

Department Grading Policy: Students who believe their academic evaluation has been prejudiced or capricious have recourse for appeals to (in order) the instructor, the department chair, the departmental appeals committee, and the college appeals committee.