Math 330-05 Number Systems
Fall 2014

- **Instructor:** Ding Ding
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- **Office:** OW-335

- **Meeting time & location:** MWF 9:40-10:40 at AB-113, T 8:30-9:55 at SW-330
- **Office hours:** T 12:00-2:00, W 11:00-12:00, or by appointment

If you need to reach me, please e-mail ding@math.binghamton.edu.

Please include [Math330] in the subject line of your email, or your email may not be read promptly.

Prerequisite

Math 222 (grade C or above).

Learning Objectives

The purpose of this course is twofold. On one hand, it explores the properties of different number systems, including the natural numbers $\mathbb{N}$, the integers $\mathbb{Z}$, the rational numbers $\mathbb{Q}$, and the real numbers $\mathbb{R}$. On the other hand, it presents those properties in a logical fashion, so that it will be clear what properties are consequences of others properties. There is a heavy emphasis on proofs, exploring a number of proof methods.

Writing is an essential part of the communication among mathematicians. For that reason, clear and neat writing is emphasized. This course is a Harpur College W course; hence, it may be used to satisfy the all-college writing requirement.

By the end of the semester students are expected to be familiar with the basic properties of the number systems, and be able to prove most of those properties from initial principles (axioms). Those proofs will come sometimes from class notes, sometimes from the textbook, but most of the time, from the student's own work. In any case, the student is expected to present clear and logically sound arguments in the proofs.

This course is a 4-credit course, which means that in addition to the scheduled lectures/discussions, students are expected to do at least 9.5 hours of course-related work each week during the semester. This includes things like: completing assigned readings and homework, studying for tests and examinations, preparing written assignments, and other tasks that must be completed to earn credit in the course.

Textbook

The Art of Proof by M. Beck and R. Geoghegan, Springer, 2010

We plan to cover most of the material in parts I and II, following closely the order and logic framework of the textbook. If time allows, we will go into some of the topics in part III. Even though the book includes proofs for some

propositions, most of the proofs are left as exercises for the student. We plan to present in class some of these proofs, with the remaining left as homework. Some of those homework proofs will be collected every week, and some will be presented on the board by students.

Class Attendance

Attendance is partially mandatory, enforced by board presentations. Following the academic policy listed in the University Bulletin, the final grade will be an *F* if a student misses more than 25% of the class. See more details in the Grading section below.

Grading

The course grade will be based on:

- class participation,
- collected homework,
- two short tests,
- cumulative midterm, and final exams.

Components	**Dates**	**Percentage**	**Time allowed**
Homework	n/a	10%	n/a
Class participation	Tuesdays	10%	n/a
Test 1	Monday, Sept. 29	15%	60 minutes
Midterm	Wednesday, Oct. 22	20%	60 minutes
Test 3	Monday, Nov. 17	15%	60 minutes
Final	Wednesday, Dec. 17	30%	120 minutes
TOTAL		**100%**	

Homework Assignment

- Homework will be assigned after each class session and be posted at Homework Page.

Class participation

- During the discussion sessions on Tuesdays, students will come to the board to present their solutions to selected homework problems.
- Each presentation, if done properly, is worth 2% of your final grade.
- In order to receive full credit for class participation, you need to do five proper presentations.
- You can choose any problem from the homework to present, as long as that problem hasn't been done properly by someone else.
- You won't be punished if you make mistakes.
- You can try as many times as you like, but if more than one student choose the same problem, priorities are given to those with a lower class participation grade.

Some Deadlines

- Sept. 12: Course add and drop/delete deadline.
- Oct. 31: Course withdraw/change grade option deadline.

Note that a “Pass” grade in the “Pass/Fail” grade option does not count toward math degrees. If you are a math major, it is not advised to change the grade option to “Pass/Fail” unless you are ready to retake the course at a later time.

Make-ups

If you need to take a make-up, if possible, an advance request should be given. Checkable written proof to justify the request should be given.

In order to minimize the need for make-up exams and the stress of dealing with multiple exams, within the first two weeks of the semester, all students must check the exam schedules of other courses they are taking and make sure that there is no major conflict. The exam dates may be changed accordingly only if the instructor determines necessary.

Academic Dishonesty

Students found cheating will be reported to the Provost Office following the academic procedure listed in the University Bulletin. Laptop and electrical communication devices cannot be used in a quiz, test or exam. Calculator in a cellphone cannot be used. Calculators are in general not allowed.

Disciplines

No laptop usage in classroom. Text messaging should be minimal. Late arrivals, early departures, cell phone conversations, eating and drinking, etc., are inappropriate behaviors. According to the Faculty-Staff Handbook, the instructor may ask those who, in the instructor’s judgment, have seriously impaired the class’s ability to achieve the objectiveness of the course, to leave the classroom.