

MA 261-001
Introduction to Number Theory
Fall 2015
MWF 09:00–09:50 am — CB 337 (Classroom Building)

Instructor: Alberto Corso.

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Email: alberto.corso@uky.edu (preferred method for reaching me).

Phone: 257-3167.

Office Hours: MWF 11:00–11:50 am, and also by appointment, since I realize that this time may not be convenient for everyone.

Course Web Page: I will post materials here: <http://www.ms.uky.edu/~corso/teaching/MA261/Fall15/index.html>

Course Description: Topics from classical number theory, including discussions of mathematical induction, prime numbers, division algorithms, congruences, and quadratic reciprocity.

Prerequisites: Grade of C or better in MA 114 or consent of instructor.

Student Learning Outcomes: Students will prove theorems and solve problems in number theory, and communicate their results orally and in writing.

Required Materials: *Number Theory Through Inquiry* by David C. Marshall, Edward Odell, and Michael Starbird, Mathematical Association of America Textbooks, 2007, ISBN-10: 0883857510, ISBN-13: 978-0883857519. A PDF version is available for \$25 at <http://www.maa.org/publications/ebooks/number-theory-through-inquiry>.

Attendance and Participation: Attendance is expected, and I will be keeping track. After three unexcused absences you will lose 2% of your course grade for each additional

unexcused absence.

This course will be conducted in an inquiry-based learning style. Your text will contain introductory material, followed by lists of theorems to prove and problems to solve. In this manner, the course material will be developed by the entire class, rather than through lectures from the instructor. You will be responsible for keeping up with the material, being prepared at any time to present your proofs and solutions to the class, and to critique the proofs and solutions of others. Simply searching the internet or other sources for proofs and solutions is not beneficial and not permitted.

You will be actively supporting each other as you gain experience and understanding. Multiple ideas and points of view are important. You will benefit from hearing others' approaches to proving and problem solving, and they will benefit from you. So attendance and active participation are required. I will keep track of how many times you present at the board, and will pay attention to your participation in class discussions.

I expect all activities in class to be related to the course. In particular, cellphones should be silenced, and any use of laptops and other electronic devices should be devoted to the course activities.

If you miss a class for any reason, please let me know the reason immediately—an email message will suffice. I will give you an opportunity to make up graded work missed if it is due to an excused absence.

S.R. 5.2.4.2, <http://www.uky.edu/StudentAffairs/Code/part2.html>, defines the following as acceptable reasons for excused absences: (a) serious illness, (b) illness or death of family member, (c) university-related trips, (d) major religious holidays, and (e) other circumstances found to fit “reasonable cause for nonattendance” by the professor.

Students anticipating an absence for a major religious holiday are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays no later than the last day in the semester to add a class. Information regarding dates of major religious holidays may be obtained through the religious liaison, Mr. David T. Beach (859-257-2754).

Students are expected to withdraw from the class if more than 20% of the classes scheduled for the semester are missed (excused or unexcused) per university policy.

Students may be asked to verify their absences in order for them to be considered excused. Senate Rule 5.2.4.2 states that faculty have the right to request “appropriate verification” when students claim an excused absence because of illness or death in the family. Appropriate notification of absences due to university-related trips is required prior to the absence.

Homework: There will be frequent homework assignments, usually assigned weekly, with specified due dates. The homework problems will have varying length and complexity. Some homework might actually be classwork collected in class. It is fine to discuss the homework together, but you must write up your own solutions in your own words. Your solutions should be written full sentences and be grammatically correct. Each homework problem will be graded using the following rubric:

- 5 Correct mathematical proof and very well written
- 4 Small mathematical and/or grammatical errors, but overall a correct proof
- 3 Contains some good ideas, but overall an incorrect mathematical proof
- 2 Significant mathematical errors
- 1 Come and see me for help!
- 0 No submission

No late homework will be accepted, except as provided for by an officially excused absence.

Quizzes: There will be weekly quizzes, each consisting of one proof. This will either be a proof already discussed in class or a proof similar to what has been covered in class. Each quiz will be graded on the following scale:

- 5 Correct mathematical proof and very well written
- 4 Small mathematical errors, but overall a correct proof
- 3 Contains some good ideas, but overall an incorrect mathematical proof
- 2 Significant mathematical errors
- 1 Present for the quiz, but no worthwhile mathematics turned in
- 0 Not present for the quiz

The quiz grades will be cumulative up to each exam, and graded out of 15 points. If you achieve 15 points before the next exam, you do not have to take the remaining quizzes before that exam. Missed exams can be made up only as provided for by an officially excused absence.

Exams: I am planning to have three in-class exams during the semester. It is possible that

some of these might have take-home components. The tentative dates for the exams are September 25, October 30, and December 4.

Final Exam: Tuesday, December 15, 8:00 am – 10:00 am, in our regular classroom.

Missed exams can be made up only as provided for by an officially excused absence.

Grading: Your course score will be based on the following percentages:

- 30% Homework and Participation
- 20% Quizzes
- 50% Exams

Your letter grade will be determined according to the common 100% scale, rounded to the nearest percent:

- 90–100% A
- 80–89.9% B
- 70–79.9% C
- 60–69.9% D
- 0–59.9% E

Academic Integrity: Per university policy, students shall not plagiarize, cheat, or falsify or misuse academic records. Students are expected to adhere to University policy on cheating and plagiarism in all courses. The minimum penalty for a first offense is a zero on the assignment on which the offense occurred. If the offense is considered severe or the student has other academic offenses on their record, more serious penalties, up to suspension from the university may be imposed.

Plagiarism and cheating are serious breaches of academic conduct. Each student is advised to become familiar with the various forms of academic dishonesty as explained in the Code of Student Rights and Responsibilities. Complete information can be found at the following website: <http://www.uky.edu/Ombud>. A plea of ignorance is not acceptable as a defense against the charge of academic dishonesty. It is important that you review this information as all ideas borrowed from others need to be properly credited.

Part II of Student Rights and Responsibilities (available online <http://www.uky.edu/StudentAffairs/Code/part2.html>) states that all academic work, written or otherwise,

submitted by students to their instructors or other academic supervisors, is expected to be the result of their own thought, research, or self-expression. In cases where students feel unsure about the question of plagiarism involving their own work, they are obliged to consult their instructors on the matter before submission.

When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording or anything else from another source without appropriate acknowledgment of the fact, the students are guilty of plagiarism. Plagiarism includes reproducing someone else's work, whether it be a published article, chapter of a book, a paper from a friend or some file, or something similar to this. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work which a student submits as his/her own, whoever that other person may be.

Students may discuss assignments among themselves or with an instructor or tutor, but when the actual work is done, it must be done by the student, and the student alone. When a student's assignment involves research in outside sources of information, the student must carefully acknowledge exactly what, where and how he/she employed them. If the words of someone else are used, the student must put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content and phraseology intact is plagiaristic. However, nothing in these Rules shall apply to those ideas which are so generally and freely circulated as to be a part of the public domain (Section 6.3.1).

Please note: Any assignment you turn in may be submitted to an electronic database to check for plagiarism.

Accommodations Due to Disability: If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Suite 407 of the Multidisciplinary Science Building, 725 Rose Street; phone: 859-257-2754; email address: tbeac1@uky.edu) for coordination of campus disability services available to students with disabilities.

Suggestions and Other Course Issues: Suggestions for improvement are welcome at any time. Any concern about the course should be brought first to my attention. Further recourse is available through the Mathematics Director of Undergraduate Studies and the Department Chair, both accessible from the Main Office in 715 Patterson Office Tower.

Important Dates:

August 25 — Tuesday — Last day a student may officially drop a course or cancel registration with the University Registrar for a full refund of fees.

August 26 — Wednesday — First day of classes.

September 1 — Tuesday — Last day to add a class for the 2015 Fall Semester.

September 1 — Tuesday — Last day to officially withdraw from the University or reduce course load and receive an 80 percent refund.

September 7 — Monday — Labor Day — Academic Holiday.

September 16 — Wednesday — Last day to drop a course without it appearing on the student's transcript.

September 23 — Wednesday — Last day to officially withdraw from the University or reduce course load and receive a 50 percent refund.

October 19 — Monday — Midterm of 2015 Fall Semester.

November 13 — Friday — Last day to withdraw from the University or reduce course load. Students can withdraw or reduce course load after this date only for urgent non-academic reasons.

November 25–28 — Wednesday through Saturday — Thanksgiving — Academic Holidays.

December 11 — Friday — Last day of classes.