Elementary Number Theory

General course information:

- lecture time and place: Monday, Wednesday, Friday 1:40 pm - 2:30 pm, Damen Hall 438
- textbook: Gilbert and Vanstone, *An Introduction to Mathematical Thinking: Algebra and Number Systems*, 11th edition, Pearson
- webpage: *www.math.luc.edu/∼rgoebel1/Spring10Math201*
- final exam: Monday, May 10th, 1:00 pm - 3:00 pm

Instructor information:

- name: Rafal Goebel
- contact: email rgoebel1@luc.edu (preferred) or office phone 773 508 7541

- office hours: check the course webpage

Course content: The course will present basic concepts in number theory and rely on them in teaching the student how to understand and write proofs. While precalculus is the only prerequisite, the course is meant to be an introduction to abstract mathematics and is designed for students planning to take advanced, 300-level, courses in mathematics. The inclusion of elements of logic and cryptography, and the discussion of several number theory algorithms, may make the course attractive to other audiences, for example to computer science students.

We will cover the following material from the textbook: Chapter 1, *Logic and Proofs*; Chapter 2, *Integers and Diophantine Equations*; Chapter 3, *Congruences*; Chapter 4, *Induction and Binomial Theorem*; elements of Chapter 5, *Rational and Real Numbers* ; Chapter 7, *An Introduction to Cryptography.*

Grading scheme: The course grade will be based on the number of points. The maximum number of points is 100. The grade of A is guaranteed for 95 points or more. The grade of C- is guaranteed for 70 points or more. Points can be accumulated in the following way: homework 20 pts, quizzes 40 pts total, final exam 40 pts.

Homework: Homework assignments will be collected every other Monday, at the beginning of lecture. An exception is the fifth homework, which is due on Wednesday (due to Easter break). A detailed schedule is available on the class webpage. There will be 6 homework assignments. The worst homework score will be dropped, i.e., only the best 5 homework scores will count. Each homework assignment will include several problems that you should solve, and selected problems that you should turn in. Most, but not all, of the problems

that are to be turned in will be graded in detail. Credit will be also given for completeness of the assignment.
Collaboration on homework is allowed, and in fact strongly encouraged. Talk about homework to your classmates, work on the problems together, form study groups. However, write up the final solution on your own, and only hand in your own work.

Quizzes: There will be 6 quizzes, at the end of the lectures on the following Fridays: February 5th and 19th, March 5th and 26th, April 9th and 23rd. Each quiz will be about 30 minutes long. Each quiz will cover the material from the two weeks before the quiz. Problems on the quiz will be similar to the homework problems. Your worst quiz score will be dropped, i.e., only the best 5 quiz scores will count. Quizzes are closed-book. No notes. Collaboration is not allowed.

Final: There will be one final exam, on Monday, May 10th, 1:00 pm - 3:00 pm. It will cover all of the course material. Problems on the final will be similar to the sample final problems solved in the review lectures before the final exam. Final is closed-book, but one letter-sized, double-sided sheet of handwritten notes is allowed. Collaboration is not allowed.

Missing quizzes or exams: Usually, only religious holidays, official Loyola athletic activities, and well-documented emergencies are basis for a make-up quiz or late turn-in of homework. In general, the sooner you notify the instructor about a conflict with a quiz or an exam, the better. Missing a quiz without prior notification and without a well-documented emergency or other extenuating circumstances will result in a score of 0.

Academic integrity: All work performed during quizzes and final exam must be your own work. Cheating may result in a grade of "F" and notification of the appropriate dean. Cheating during quizzes, midterms, and the final includes, but is not limited to: copying another person's work, allowing another person to copy your work, collaborating with another person, using unauthorized references, etc. Remember though: collaboration on homework assignments is OK, and in fact is encouraged.