Math 4181
Elementary Number Theory
Fall 2019
MWF 1:30 - 2:20 Lockett 132

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Office Hours: 11:00 - 12:00 MWF
                   Other times by appointment

Text

Calvin T. Long, *Elementary Introduction to Number Theory, Third Edition*, 10-digit ISBN 0-88133-836-2 13-digit ISBN 978-0-88133-836-2. Waveland Press

Syllabus

We will cover most of Chapters 1-8. Some specific topics to be covered include:
Integers: Divisibility, prime numbers, greatest common divisor, Euclidean algorithm, unique factorization
Congruences: Basic properties, modular arithmetic, Linear congruences, Euler's phi function, Fermat's, Euler's and Wilson's theorems, Chinese remainder theorem
Quadratic Reciprocity: Quadratic residues, Legendre and Jacobi symbols, Law of quadratic reciprocity
Additional topics, (as time allows): Diophantine equations: Pythagoras, Fermat, Sums of squares, primitive roots, RSA algorithm, arithmetic fundtions, Moebius inversion formula

Examinations

There will be 3 in-class exams and a 2-hour final examination. Tentative Exam dates are:

Exam 1	September 25
Exam 2	October 28
Exam 3	November 25
Final Exam	December 14 (Saturday) 7:30 - 9:30 AM

Homework

The homework assignments and any supplementary materials for the course will be posted on the class webpage `http://www.math.lsu.edu/~adkins/m4181.html`. *You should check this webpage regularly for the assignments and any supplementary materials.* Homework exercises are an integral part of the course. Most of the homework will involve writing proofs. The assigned homework problems will be of two types, suggested problems and problems assigned for collection and grading. I may choose to grade only a portion of the assigned problems (due to time constraints), however you are expected to do *all* of the exercises. Any assigned exercise, whether collected or not, may reappear in some fashion on an exam. The homework grade will be the sum of the homework scores, scaled to 100 points.

Grade

A grade curve for each exam will be determined at the time of the exam. Additionally, a grade curve will be determined for the cumulative total of all graded homework. The raw score on each exam will be translated to a number T between 0 and 100 by the following procedure, which is best illustrated by means of a numerical example. Suppose, *as an example*, that the exam has a total possible of 75 points and the grade curve is given by the table:

A	$66 - 75$
B	$56 - 65$
C	$47 - 55$
D	$38 - 46$
F	$0 - 38$

Suppose your raw score on the exam was 52, which would be a **C** on the above curve. Just linearly interpolate the interval [47, 56] to the interval [70, 80], which is the standard range for **C** on the 10 point scale. Thus, 52 is interpolated to

$$70 + 10 \times \frac{52 - 47}{56 - 47} = 76.$$

Thus, the normalized score T would be 76. Note that this is not the same as the percentage, which would be 69% in this case. As another example, the raw score 72 (an **A**) would be normalized to the score

$$T = 90 + 10 \times \frac{72 - 66}{75 - 66} = 97.$$

The raw and the normalized scores will be given to you on each exam at the time it is returned.

The course grade is computed from a weighted average of the normalized scores on the three exams, the homework and the final exam. If T_1, T_2, and T_3, denote your normalized scores on the 3 in-class exams, H denotes your normalized score on the homework, and E denotes your normalized final exam score, then your score G for the course is determined by the formula:

$$G = .18(T_1 + T_2 + T_3) + .18H + .28E.$$

Thus, each in-class exam counts 18%, the homework counts 18%, and the final exam counts 28%. If it is to your advantage to do so, the lowest of the four exam scores will be replaced by the final exam score E. The number G will then be translated into the course letter grade by the scale:

A+	$G \geq 97$
A	$93 \leq G < 97$
A-	$90 \leq G < 93$
B+	$87 \leq G < 90$
B	$83 \leq G < 87$
B-	$80 \leq G < 83$
C+	$77 \leq G < 80$
C	$73 \leq G < 77$
C-	$70 \leq G < 73$
D+	$67 \leq G < 70$
D	$63 \leq G < 67$
D-	$60 \leq G < 63$
F	$G < 60$