Number Theory – MTH 320
Spring 2012

Instructor: Dr. Natacha Fontes-Merz
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Class Meetings: MWF 3:10-4:10 HSC 150
Office Hours: TR 9:00-10:30, W 4:15-5:15, F 10:30-11:30
Text: Number Theory: A Lively Introduction with Proofs, Applications, and Stories, James Pommersheim, Tim Marks, and Erica Flapan.

Prerequisites: MTH 241 and MTH 250

Course Description: Number theory is the study of the most basic of mathematical systems, the natural numbers {1, 2, 3, …}. The subject is famous for having a number of easy-to-state conjectures that have resisted all efforts at proof, in some cases for centuries, as well as an abundance of beautiful theorems.

Topics for this course include the Fibonacci numbers, divisibility, prime numbers, greatest common divisors, division theorem, Euclidean algorithm, congruences, Diophantine problems, Euler's theorem, primitive roots, and quadratic residues. If time permits, we will also discuss Gaussian integers and continued fractions.

Goals/Outcomes: Upon successful completion of this course, you will:

- have a better understanding of the prime numbers and their distribution among the natural numbers.
- sharpen your ability to write about and explain mathematics, and gain more practice with the proof techniques you learned in Discrete Mathematics, such as induction and proof by contrapositive.
- improve your ability to learn mathematics through reading your textbook and assigned articles.

Grading

2 Tests (100 pts. each) ----------200 points
Cumulative Final Exam ----------100 points
Homework Quizzes----------50 points
Article Quizzes----------50 points
URAC/Colloquium/Participation---15 points

Grading scale:
92 - 100 ----------A
90 - 91----------A-
88 - 89----------B+
82 - 87----------B
80 - 81----------B-
78 - 79 ---------- C+
72 - 77----------C
70 - 71 ----------C-
60 - 69 ----------D
Below 60 ----------F

Homework Quizzes: At the end of each section we cover in class, you will be assigned homework problems (usually two per section). At the end of each week, I will choose two of your homework problems from the week for you to complete independently at the end of class. These problems will be collected and graded.

You will not be permitted to use any outside resources on these quizzes, such as your textbook or notes. Each homework quiz is equally weighed. Your two lowest grades will be dropped.

Reading/Article Quizzes: It is *very* important to read the textbook. Investing a few hours reading and understanding each section will help you solve your homework problems more efficiently and will help you to understand the subject better. You will be responsible for the material in the sections of the textbook which we cover in class.

In addition to reading your textbook, I will assign articles for you to read. You will be quizzed on these articles in class. You can find most of the articles at the Westminster Library Electronic Resources link under JSTOR.

Participation: Besides participating in class (i.e. coming to class, answering questions in class, actively participating in group work, being prepared to successfully complete in-class problems), I would like for you to attend a colloquium and talks at the URAC conference. You will be required to:

- write about two math talks given at the Undergraduate Research Symposium on Wednesday, April 25th
- attend one on-campus math or computer science colloquium (dates TBA)

Exams: Tests are tentatively scheduled for the following days: **Friday, March 2 and Wednesday, April 18.** Your final exam is cumulative and is scheduled for **Tuesday, May 8**, 11:30 – 2:00 PM. Any deviation from these dates will be announced in class. It is your responsibility to be in class and know when the exams will be given. The following is the college's official stance on absences from examinations:

Absence from an announced examination results in a failing grade for the examination, unless suitable arrangements are made for a special examination. A student who seeks such a privilege should petition the instructor in writing ***prior*** *to the scheduled examination date. If the instructor considers that the petition should be granted, then a note to the effect is added and the petition is presented to the dean of the College. The examination may be given only if the dean also approves the petition.*

Westminster College 2011-12 Undergraduate Catalog, p. 71

Therefore, a make-up exam is given only if it is previously approved by the dean. In the case of illness, a medical excuse should be attached to the petition.

Academic Integrity:
Central to the purpose and pursuit of any academic community is academic integrity. All members of the Westminster community, including students, faculty, staff, and administrators, are expected to maintain the highest standards of honesty and integrity, in keeping with the philosophy and mission of the College.

Westminster College 2011-12 Undergraduate Catalog, p. 71

Some forms of academic dishonesty include (but are not limited to): copying a classmate's work (homework, quizzes, or exams), divulging answers or information to another student during a quiz or exam, using unauthorized aids (e.g., calculator/cell phone programmed with formulas or notes) during an exam or quiz. Academic dishonesty will not be tolerated in this class. The penalty for academic dishonesty is minimally the grade of 0 on the assignment and, except for unusual circumstances, a grade of F for the course. Any event of academic dishonesty is reported to the Dean of the College. Other details of violations and consequences are given in the Catalog, beginning on page 72.

Accessibility Statement: Westminster College actively strives for the full inclusion of all our students. Students with disabilities who require access solutions for environmental or curricular barriers should contact Corey Shaw, Director of Disability Resources, located in 209 Thompson-Clark Hall. phone: 724-946-7192 e-mail: shawcj@westminster.edu

Tentative schedule

Underline = Homework Quiz
* = Article Quiz

W	Jan. 18	Intro to the course, 2.3
F	Jan. 20	2.4, 3.1
M	Jan. 23	3.1, 3.2
W	Jan. 25	3.2, 3.3
F	Jan. 27	3.3, 3.4
M	Jan. 30	3.4, 3.5
W*	Feb. 1	3.5, 3.6
F	Feb. 3	3.6, 4.1
M	Feb. 6	4.1, 4.2
W	Feb. 8	4.2, 5.1
F	Feb. 10	5.1, 5.2
M	Feb. 13	5.2, 5.3
W	Feb. 15	5.3, 5.4
F	Feb. 17	5.4, 6.1
M	Feb. 20	6.1, 6.2
W*	Feb. 22	6.2, 7.1
F	Feb. 24	7.1, 7.2
M	Feb. 27	7.2, 7.4
W	Feb. 29	7.4, 7.5
F	**March 2**	**EXAM 1**

M	March 5	BREAK
W	March 7	BREAK
F	March 9	BREAK
M	March 12	7.5, 8.1
W	March 14	8.1, 8.2
F	March 16	8.2, 8.3
M	March 19	8.3, 8.5
W*	March 21	8.5, 9.1
F	March 23	9.1, 9.2
M	March 26	9.2, 9.3
W	March 28	9.3, 9.4
F	March 30	9.4, 9.5
M	April 2	9.5, 10.1
W*	April 4	10.1, 10.2
F	April 6	BREAK
M	April 9	BREAK
T	April 10	Monday Classes Meet, 10.2, 10.3
W	April 11	10.3, 10.4
F	April 13	10.4, 11.1
M	April 16	11.1, 11.2
W	**April 18**	**EXAM 2**
F	April 20	11.2, 11.3
M	April 23	11.3, 11.4
W	April 25	Undergraduate Research Symposium
F	April 27	11.4, 11.5
M	April 30	11.5, 11.6
W*	May 2	11.6, 14.1
F	May 4	14.1, 14.2
T	May 8	**FINAL EXAM** – 11:30-2:00 PM