MATH 437/537   Number Theory   Sep. 2020

Instructor: Dragos Ghioca, dghioca@math.ubc.ca.
Lectures: MWF 12:00 - 13:00, ONLINE
Course webpage: http://www.math.ubc.ca/~dghioca/courses/537.html
Office hours: Tu 11:45 - 13:05 & Th 14:45 - 16:05, ONLINE

Course outline: Section numbers below refer to the (optional) textbook.

Chapter 1: Divisibility, primes (approximately 2 weeks).

Chapter 2: Congruences, Chinese Remainder Theorem, Hensel's Lemma, Number Theory from an Algebraic Viewpoint (approximately 3 weeks).

Chapter 3: Quadratic Residues, Quadratic Reciprocity, Sums of squares, Primitive roots (approximately 4 weeks).

Chapter 4: Arithmetic functions (1 week); this topic will be treated at various times during the semester, at the same time with certain topics from Chapters 2 and 3 above.

Chapter 5: Diophantine equations (1 week).

Other topics: Recurrence sequences, Algebraic Numbers, Diophantine Approximation (1 week).

Text (optional): Introduction to the Theory of Numbers, 5th edition, by Niven. However, any other introductory textbook to Number Theory (the library has several such books) would be suitable.

Learning goals: The students are expected to learn the following, which also includes being able to solve questions combining all of these topics:

- the Fundamental Theorem of Arithmetic;

- properties of congruences;

- Fermat's Little Theorem and Euler's Theorem;

- important multiplicative functions;

- properties of the primitive root corresponding to a given moduli;

- the quadratic reciprocity theorem;

- basic Diophantine Equations and basic Diophantine Approximation.

Evaluation: The final mark will be based on 5 homework assignments due September 25, October 9, October 30, November 20 and December 2.

Course Policies:

1. Submitting the homework: Each homework must be sent by email to

dghioca@math.ubc.ca

as a PDF attachment – no other formats or ways of submission for the homework is allowed.

2. Missing homework: If you miss the homework's deadline, there is no make-up homework and you will receive a mark of 0 points for the missed homework assignment unless there is a valid reason for missing this homework. Any student who misses the homework assignment should send me an email containing a completed Department of Mathematics self-declaration form (available on my website) for reporting a missed assessment within 72 hours of the due date for the assignment. In the case of missing the assignment for a valid reason, the weight of this assignment will be evenly distributed among the remaining assignments in this course.

Academic Misconduct:

1. UBC takes cheating incidents very seriously. After due investigation, students found guilty of cheating on tests and examinations are usually given a final grade of 0 in the course and suspended from UBC for one year.

2. While students are encouraged to study together, they should be aware that blatant copying of another student's work is a serious breach of academic integrity. Please discuss with your instructors their expectations for acceptable collaboration on any assigned coursework. Cases of suspected cheating will be investigated thoroughly.

3. Note that academic misconduct includes misrepresenting a medical excuse or other personal situation for the purposes of postponing an examination or quiz or otherwise obtaining an academic concession.

Statement on UBC's Policies and Resources to Support Student Success:

UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and so there are additional resources to access including those for survivors of sexual violence. UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom. UBC provides appropriate accommodation for students with disabilities and for religious and cultural observances. UBC values academic honesty and students are expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions. Details of the policies and how to access support are available at

https://senate.ubc.ca/policies-resources-support-student-success