

**Instructor:** Dragos Ghioca, dghioca@math.ubc.ca.

**Lectures:** MWF 13:00 - 13:50 in Math 105

**Course available on CANVAS**

**Office hours:** MWF 14:30 - 15:25 in MATX 1223

**Course outline:** Extensive lecture notes available on Canvas, including practice sets of problems with solutions.

1. Divisibility, primes (approximately 2 weeks).
2. Congruences, Chinese Remainder Theorem, Hensel's Lemma, Number Theory from an Algebraic Viewpoint (approximately 3 weeks).
3. Quadratic Residues, Quadratic Reciprocity, Sums of squares, Primitive roots (approximately 4 weeks).
4. Diophantine equations (approximately 1 week).
5. Arithmetic functions, Recurrence sequences, Algebraic Numbers, Diophantine Approximation (approximately 2 weeks).

**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 1 homework assignment, due online on December 5th (worth 20%) and 4 in-class exams:

1. October 10th (worth 20%)
2. October 24th (worth 20%).

3. November 7th (worth 20%).
4. November 21st (worth 20%).

### **Course Policies:**

1. **Students not feeling well (for example, with Covid-19 symptoms), should not attend class.** Instead those students should consult the extensive online lecture notes.
2. **Missing homework:** If you don't submit the homework, its weight will be moved to the exams.
3. **Missing exams:** If you miss **one** exam, then you will receive for the missing exam the **lowest** score you got on the other 3 exams. **Any additional missed exam will result in a score of 0.**

### **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>

**The instructor reserves the right to change this course outline at any time during the semester.**