COURSE INFORMATION
MATH 3H03 (Number Theory) – Winter 2020

I. Course Objectives. MATH 3H03 is an introduction to the area of number theory. Some of the topics covered in this course are divisibility, prime numbers, congruences, Euler's functions, the group of units, quadratic residues, and Fermat's Last Theorem. The main objectives of this course are

- to learn the basic terminology and results concerning elementary number theory
- to learn and improve your proof writing skills, and
- to collaborate with your some of your classmates on a project related to number theory.

The prerequisite for this course is credit in at least 12 units of Mathematics or Statistics Level II or above.

II. Administrative Details.

Time	Class: MWTh 10:30-11:20
Place	Class: HH 302
Instructor	Adam Van Tuyl
	Office: Hamilton Hall 419
	Office Hours: WTh 11:30-12:20
Text	[Required] *Elementary Number Theory* by Gareth A. Jones and J. Mary Jones
Email	`vantuyl@math.mcmaster.ca`
Web Page	`https://ms.mcmaster.ca/~vantuyl/courses/2020_winter_math3H03.html`

The best way to contact me is via email. The class webpage is also a good source of information. My goal is to update the webpage after every class.

III. Course Schedule. By the end of the semester, I hope to cover Chapters 1-7 and Chapter 11 of the class text book. We will spend roughly 1-1.5 weeks per chapter.

IV. Course Assessment. The final grade is composed of three components.

1. **Homework (9 Assignments)** There will be nine short homework assignments, given weekly. The lowest mark of the nine homework assignments will be dropped. A homework assignment will be given out weekly, and will be due the following Friday at 11:59PM. Assignments will be submitted via Crowdmark. You will receive an email link to your McMaster address to upload your assignment. In general, there are two types of problems: (a) computational problems and (b) proof problems.

   (a) Computational Problems

   Computation problems are exercises that review the concepts and definitions introduced in the section. These exercises will be marked out of 2 points as follows:

2 pts	Near perfect or perfect solution. A near perfect solution is a solution that is correct up to the final stage with possible mistake or sign error at the last step.
1 pt	The solution shows some of the needed ideas, but fails to have the final solution.
0 pts	Little or no progress is made toward the solution.

   (b) Proof Problems

   These exercise usually involve proving statements using the results and concepts of the corresponding section.

   Exercises will usually involve proving statements using the results and concepts from the corresponding section. Exercises will also be graded on how the proof has been written. These problems will be graded out of 5 points as follows:

5 pts A correct solution and a well written proof.
4 pts Most of the required ingredients are present, but there are a few technical problems with the solution.
3 pts Some of the needed ideas are present. However, the solution either lacks the final conclusion or has some problems in the exposition.
2 pts The proof has at most one or two of the needed ideas and/or the proof is poorly written.
1 pt An attempt to the solution has been made, but there is a major flow in the logic of the proof, or the proof is not well written.
0 pts Little or no progress is made toward the solution.

2. **Project** As part of this course, you will have to create a poster as part of a group. Details on the project will be provided as a separate handout.

3. **Exams (2 Midterms, 1 Final Exam)** There will be two midterms and a cumulative final exam (2.5 hours). Both midterms will be held during class time (50 minutes). I will give more details about the tests (including locations) nearer to the test dates. The tentative dates of the midterm are:

   February 12, 2020 - Midterm 1
   March 18, 2019 - Midterm 2

   For all midterms and the final, you must bring your student ID. For the midterm and final, you will be allowed to use McMaster Standard Calculator is the Casio fx-991 MS or Casio fx-991 MS Plus.

Calculation of Final Mark. Your mark will be calculated in two different ways. I will take the higher mark of the following two methods.

Weight 1.

- Homework (using the best 8 of the 9)= 20%
- Project = 10%
- Two midterm tests $2 \times 15\% = 30\%$
- Final Examination 40%

Weight 2.

- Homework (using the best 8 of the 9)= 20%
- Project = 10%
- Maximum among {Midterm 1, Midterm 2} = 15%
- Final Examination 55%

V. Class Policies. Though attendance is not mandatory, I would appreciate the fact that you show up on time if you do decide to come to class. I highly recommend that you do come to class. Some of the topics can be quite complicated.

VI. Important Dates.

Jan 6, 2020 - Second semester classes begin
Feb 12, 2020 - Midterm 1
Feb 17-21, 2020 - Winter break (no classes)
Mar 13, 2020 - Last day for cancelling courses without failure by default
Mar 18, 2020- Midterm 2
Apr 7, 2020 - First semester classes end
Apr 13-28, 2020 - Final Exams

OFFICIAL McMASTER POLICIES

1. Policy on Academic Ethics. You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at:

`http://www.mcmaster.ca/academicintegrity/`

The following illustrates only three forms of academic dishonesty: (1) plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained. (2) improper collaboration in group work, and (3) copying or using unauthorized aids in tests and examinations.

2. Academic Accommodation of Students with Disabilities. Students with disabilities who require academic accommodation must contact Student Accessibility Services (SAS) to make arrangements with a Program Coordinator. Student Accessibility Services can be contacted by phone 905-525-9140 ext. 28652 or e-mail `sas@mcmaster.ca`. For further information, consult McMaster Universitys Academic Accommodation of Students with Disabilities policy.

3. Requests for Relief for Missed Academic Term Work. If you have missed work, it is your responsibility to take action.

If you are absent from the university for medical and non-medical (personal) situations lasting fewer than 3 days, you may report your absence, once per term, without documentation, using the McMaster Student Absence Form (MSAF). Please see

`http://academiccalendars.romcmaster.ca/content.php?catoid=13&navoid=2208`
`#Requests_for_Relief_for_Missed_Academic_Term_Work`

Absences for a longer duration or for other reasons must be reported to your Faculty/Program office, with documentation, and relief from term work may not necessarily be granted. **In Math 3H03, the percentages of the missed work will be transferred to the final examination.** Please note that the MSAF may not be used for term work worth 25% or more, nor can it be used for the final examination.

In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar Requests for Relief for Missed Academic Term Work. Please note these regulations have changed beginning Fall 2015.

4. Academic Accommodation for Religious, Indigenous or Spiritual Observances (RISO). Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the RISO policy. Students requiring a RISO accommodation should submit their request to their Faculty Office normally within 10 working days of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

5. Important Message. The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

6. On-line Statement for Courses Requiring Online Access or Work. In this course we will be using Crowdmark and possibly other online resources. Students should be aware that, when they access the electronic components of this course, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in this course will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.