

**University of Toronto**  
**MAT301H1F Groups and Symmetries**  
**Course Outline- Fall 2018**  
**Instructor: Payman Eskandari**

**Lectures Location and Time:** Mondays, Wednesdays, and Fridays 3-4 pm. Check the timetable for location.

**Instructor:** Payman Eskandari, office: HU1012, email: [payman@math.utoronto.ca](mailto:payman@math.utoronto.ca)

**Office Hours:** To be announced after the first lecture.

**Tutorials:** Check the timetable for schedule and location. Tutorials start during the week of September 10.

**Teaching Assistants:**

- Jack Ding ([jding@math.toronto.edu](mailto:jding@math.toronto.edu))
- Lennart Döppenschmitt ([lennart@math.toronto.edu](mailto:lennart@math.toronto.edu))
- Thaddeus Janisse ([thad.janisse@mail.utoronto.ca](mailto:thad.janisse@mail.utoronto.ca))

**TA office hours:** To be announced.

**Course Webpage:** Announcements will be made on Quercus. Course materials (assignments, lecture notes, etc.) will be posted on the following webpage:

[www.math.utoronto.ca/payman/fall2018/mat301.html](http://www.math.utoronto.ca/payman/fall2018/mat301.html)

Students are responsible to check their emails and the Quercus page regularly for announcements.

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**Course Description:** This is a course on the basics of group theory, with emphasis on theory as well as computations. We will cover topics such as permutations and permutation groups, matrix groups, abstract groups, subgroups, homomorphisms, cosets, Lagrange theorem, normal subgroups, and quotient groups. Time permitting, we may also talk about topics such as group actions and classification of finitely generated abelian groups.

**Exclusion:** MAT347Y1

**Prerequisites:** : MAT224H1/MAT247H1, MAT235Y1/MAT237Y1, MAT246H1/CSC236H1/CSC240H1. (These Prerequisites will be waived for students who have MAT257Y1)

**Assessments:** The final grade breakdown is as follows: assignments 15 percent, two term tests each worth 20 percent, final exam 45 percent.

- **Assignments:** There will be 6 assignments, each **due in class at the beginning of a lecture**. (Assignments will not be accepted in tutorials.) Due dates are as follows:
  - Problem Set 1 due Wednesday September 19
  - Problem Set 2 due Monday October 1
  - Problem Set 3 due Monday October 22
  - Problem Set 4 due Friday November 2
  - Problem Set 5 due Friday November 23
  - Problem Set 6 due Wednesday December 5

Only your best 5 assignments will contribute towards your final grade, and those 5 assignments will be weighted equally. Assignments will be posted on the course website about a week before they are due. You should try to start working on them as early as possible. Please note that the TAs will grade only a selected number of questions on each assignment (due to time limitations and class size).

In addition to the mandatory assignments that are to be handed in for grading, most weeks you will be provided with a list of “practice problems”. Solutions to these practice problems will not be posted. You are more than welcome to use the tutorials and office hours to discuss these questions.

- **Term tests:** The term tests will be each about 100 minutes long and will take place on the following dates, at locations to be announced:
  - Test 1: Thursday October 11, during 6-8 pm
  - Test 2: Thursday November 15, during 6-8 pm
- **Final Exam:** The final exam will be 3 hours long and during the exam period.

No aids will be allowed for any of the assessments.

**Policy for missed/late assignments:** Late assignments will not be accepted. If for any reason an assignment is missed, a grade of zero will be recorded. Note that the assignment with the lowest grade will be dropped anyway.

**Policy for conflicts:** Students who will not be able to write a term test due to a conflict must send an email to the instructor during the week prior to the test with a request for special consideration. The email must include the appropriate supporting documentation. For instance, if the student is taking another course with a test conflicting with a MAT301 term test, they must attach their ACORN timetable and the syllabus of the conflicting course confirming that the two tests overlap. If the request for special consideration is approved, the student will have to write a make up test, which will take place at a date and time decided and announced by the instructor later (likely during the week after the regular test). A grade of zero will be recorded for students who (after missing the original sitting) also miss the make up test. Requests for exceptions to this rule must come from official university channels, such as the office of the registrar or Test and Exam Services.

**Policy for missed term test due to an emergency:** Students who miss a term test for reasons beyond their control must submit a request for special consideration to the instructor no later than one week after the

missed quiz or term test, explaining the reason for missing the assessment. The request must be accompanied with the appropriate supporting documentation, such as the Verification of Illness or Injury Form (<http://www.illnessverification.utoronto.ca/>) in the case of a medical emergency. The initial submission of the documents may be electronically, but the documents must be submitted in physical form as well. If the request for special consideration is approved, the student will have to write a make up test, which will take place at a date and time decided and announced by the instructor later. A grade of zero will be recorded for students who (after missing the original sitting) also miss the make up test. Requests for exceptions to this rule must come from official university channels, such as the office of the registrar or the Test and Exam Services.

**Policy for term work regrade:** Regrade requests for any piece of term work, if submitted later than a week after the date on which the grades for the assessment in question have become available on Quercus, may be denied.

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**Collaboration versus plagiarism:** You are encouraged to discuss the problems sets with each other, but each of you must write up your own solutions independently. Solutions that are “strangely similar” will not be tolerated. Academic integrity will be taken seriously. You are expected to have read the document *How Not to Plagiarize* available at <http://www.writing.utoronto.ca/advice/using-sources/how-not-to-plagiarize> . Solutions copied from the internet will also not be tolerated.

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**Accessibility Services:** The University of Toronto is committed to accessibility. If you require accommodations for a disability, or have any accessibility concerns about the course, the classroom or course materials, please contact Accessibility Services ([www.studentlife.utoronto.ca/as](http://www.studentlife.utoronto.ca/as)) as soon as possible.

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**Email policy:** Due to the class size and the nature of the course, math questions will not be answered over email. Emails are mainly to be used for administrative purposes. Please use your [@mail.utoronto.ca](mailto:@mail.utoronto.ca) or [@utoronto.ca](mailto:@utoronto.ca) email account to contact the teaching staff, and include MAT301 in the subject line. Due to the class size, if the answer to your email is included in the syllabus, the email will likely receive no response.

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**Textbook:** There will be no required textbook for the course. Lecture notes will be posted on the course webpage, and these notes together with the problem sets, and what is discussed in class and tutorials are the primary resources for the course.

It is very important that you attend the lectures and tutorials. While lecture notes will contain most of what is discussed in class, there might be some differences. Also, this is an abstract course, and you might find it difficult if you want to learn the material by yourself, by just reading the notes. If you come to the lectures, even if you don't understand everything, you will find it much easier to read the notes after. Also, note that at times, we will use the tutorials to cover new material. It is your responsibility to be aware of what is discussed in lectures and tutorials.

**Recommended textbook and other useful references:** The following book can be considered as our recommended textbook: *Contemporary Abstract Algebra* by Joseph Gallian, 9nd edition. This book is a friendly introduction to abstract algebra, and as such is fairly easy to read, especially as a first reading on the subject at the undergraduate level. It is also an excellent source of problems. . We might often assign some of Gallian's exercises as "practice problems", i.e. problems that you are strongly recommended to work on, but are not to be handed in for grading.

Some other useful reference books: Most books on abstract algebra or group theory cover essentially every topic in the course. Two good such books are:

- *Abstract Algebra* by Dummit and Foote: This is an excellent book, but as a first reading on the subject can be a little difficult. If you are looking for a more serious book on abstract algebra, this is a great one.
- *Algebra* by Michael Artin: This is also a great book, with an effort made to keep it less technical and more friendly, but may still seem more serious and not as easy to read as Gallian.

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**Note:** Last day to drop F section code courses without academic penalty is November 5.