

# Course Outline Form: MATH 3130 -Fall 2017

## General Information

Course Title: **MATH 3130 – Abstract Algebra F (3-0) [0.50]**

### **Course Description:**

This course is an introduction to abstract algebra, covering both group theory and ring theory. Specific topics covered include an introduction to group theory, permutations, symmetric and dihedral groups, subgroups, normal subgroups and factor groups. Group theory continues through the fundamental homomorphism theorem. Ring theory material covered includes an introduction to ring theory, subrings, ideals, quotient rings, polynomial rings, and the fundamental ring homomorphism theorem. Prerequisite(s): 1 of MATH\*1160, MATH\*2150, MATH\*2160.

**Credit Weight: 0.5**

**Academic Department (or campus):** Mathematics & Statistics

**Campus:** Guelph

**Semester Offering:** Fall 2107

Class Schedule and Location:

LEC Mon, Wed, Fri

01:30PM - 02:20PM

[MCKN](#), Room 315

## Instructor Information

**Instructor Name:** Monica Gabriela Cojocaru

**Instructor Email:** mcojocar@uoguelph.ca

**Office location and office hours:** MACN 549

**GTA Information:** N/A

## Course Content

### **Specific Learning Outcomes:**

This course will introduce abstract algebra. The learning outcomes are:

- Students will be introduced to the theory of abstract groups.

- Students will master permutations and their relationship to general groups, culminating in Cayley's theorem and the fact that all groups are equivalent to subgroups of symmetric groups.
- Students will be introduced to and demonstrate proficiency with rings and generalizations of standard arithmetic.
- Students will master the notions of homomorphism, epimorphism, endomorphism, and isomorphism with respect to both groups and rings.

**Tentative Content (the order of some sections may change):**

Week 1 & 2

1.1 Quick review: 1-1 and onto mappings; bijective mapping

1.2 Composition of mappings

1.3 Introduction to Groups

1.4 Properties of groups

1.5 Subgroups

Week 3 & 4

2.1 Equivalence Relations

2.2 Consequences of Lagrange's Theorem

2.3 Homomorphisms, automorphisms

Weeks 5 & 6

3.1 Group Homomorphisms

3.2 Image and kernel

3.3 Normal subgroups

Week 7 & 8

4.1 Homomorphism Theorems

Week 9 & 10

5.1 The permutation group

Week 11

6.1 Rings & Ideals

6.2 Polynomial rings

**Labs & Seminars:** N/A

**Course Assignments and Tests:**

**For clarity, the below table refers to:**

**First lecture: Thursday, September 7, 2017**

**Week 1 of classes = Week of Sept. 11, 2017**

**Week 12 of classes = Week of Nov. 27, 2017**

**Reminder: Oct 9 and Oct 10 – NO CLASSES. Classes in these days are scheduled on Nov. 30 and Dec. 1, 2017, respectively, in Week 12.**

Assigned work	Date	Location	Contribution to final mark
Homework 1	Posted online on: Sun Sept. 17 (by 6 PM)	Hand in – via Dropbox in 1week	12%
Homework 2	Posted online on: Sun Oct 1 (by 6PM)	Hand in – via Dropbox in 1 week	12%
Test 1	Wed. Oct. 18	In Class, duration 50 min	10%
Homework 3	Posted online on: Sun Oct 29 (by 6PM)	Hand in – via Dropbox in 1 week	12%
Test 2	Wed. Nov. 8	In Class, duration 50 min	10%
Homework 4	Posted online on: Sun Nov. 19 (by 6PM)	Hand in – via Dropbox in 1 week	12%

EXAM Mon

08:30AM - 10:30AM (2017/12/11) @ Room TBA

**Homework and term tests total = 68% Final exam weighting: 32%**

## **Course Resources**

**Required Texts: N/A**

**Recommended Texts:**

Abstract Algebra 3rd edition by I.N. Herstein, ISBN: ISBN: 978-0-471-36879-3

***Instructor's Notes will be provided via the Courselink site of the course.***

**FREE TEXT:** <http://abstract.ups.edu/download.html>

## **Course Policies**

### **Email communication with Instructor:**

- Student emails will be replied to on a first-come basis. If multiple emails concern an issue for the entire class, the Instructor will email the class list and/or post relevant info on the Courselink site under “NEWS”.
- The Instructor will not answer emails during the weekend, unless in extreme/urgent circumstances.
- The Instructor will not answer homework questions by email, unless the answer can be “yes” or “no”. Homework help is available during Office Hours posted above, on a first-come basis. Students are free to ask and post questions and answers to homework problems in the Courselink Discussion forum. TA may also answer questions.
- Should a student need a large amount of help, or should they need to communicate with the Instructor in confidentiality, please email the instructor 1-2 days in advance, so a specific time can be set.
- Other communication with the class will take place either by email to class, or by posting relevant brief messages, which will be visible to everyone under the “NEWS” header of the page.

### **Homework assignments:**

- Will be posted online on the Courselink page, according to the dates specified in the above Table.
- This year we are taking advantage of the Dropbox on Courselink.
- Each homework in Table above has a corresponding Dropbox folder, which becomes accessible the day the assignment is posted until 11.30PM the day the assignment is due.
- All homework assignments should be scanned and loaded electronically by the hand-in date in Table above. PDF format is required. Only one file is permitted to be submitted per each Homework, per student. Multiple files for one assignment are not permitted – if you have one file for each page, make sure you bundle them in one file before submission. You can merge multiple PDF files online at: <http://www.pdfmerge.com/>
- Submissions should be high enough resolution so that marking can be performed. Partially visible pages and low resolution/illegible files will not be marked.
- To possibly ease the job of students, the Homework assignments will be uploaded in PDF format, with blank spaces left for writing the solution by hand, in an organized way. The student can then scan all pages and upload their draft.
- If a student is not comfortable with the electronic submissions, they should notify the instructor within the 1<sup>st</sup> week of classes, so that help can be provided.

## **Grading Policies**

All marked Tests will be returned to students within 7 calendar days in the OUTBOX assigned to the course.

OUTBOX INFO: BOX # 177 in MACN 3<sup>rd</sup> floor, at the south end of the hallway

Solution and marking scheme for all assignments and tests will be uploaded on the course CourseLink after the hand-in dates.

Any grading concerns should be submitted in writing ( on a separate page, stapled on the front page of the assignment or test) to the Instructor either at end of a class or at Instructor's office after solutions and marking scheme have been posted.

***For further grading procedures please refer to:***

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-grds.shtml>

***Please note that these policies are binding unless academic consideration is given to an individual student.***

## **University Policies**

### Recording of Materials

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

### E-mail Communication

As per university regulations, all students are required to check their <mail.uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

### When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. [See the undergraduate calendar for information on regulations and procedures for Academic Consideration.](#)

### Drop Date

Courses that are one semester long must be dropped by the end of the fortieth class day; two-semester courses must be dropped by the last day of the add period in the second semester. The regulations and procedures for [Dropping Courses](#) are available in the Undergraduate Calendar.

### Copies of out-of-class assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

### Accessibility

The University promotes the full participation of students who experience disabilities in their academic

programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required, however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance, and not later than the 40th Class Day.

More information: [www.uoguelph.ca/sas](http://www.uoguelph.ca/sas)

### Academic Misconduct

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

[The Academic Misconduct Policy is detailed in the Undergraduate Calendar.](#)

### Resources

The [Academic Calendars](#) are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.