Math 3130: Fall 2016

General Information

Course Title: Abstract Algebra
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: University of Guelph
Semester Offering: Fall 2016
Class Schedule and Location:
MWF 8:30-9:20 in 305 107 Rozansky Hall

Instructor Information

Instructor Name: Daniel Ashlock
Instructor Email:dashlock@uoguelph.ca
Office location and office hours:521 MacNaughton
Office hours can be found on the instructor's web page.

GTA Information

Jeremy Gilbert, jgilbe01@uoguelph.ca.

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 symmetry groups including the dihedral groups and hyperoctahedral groups.
- Students will be introduced to and demonstrate proficiency with rings and generalizations of standard arithmetic. They will master the classification of rings into integral domains, unique factorization domains, and principle ideal domains.
- Students will master the notions of homomorphism, epimorphism, endomorphism, and isomorphism with respect to both groups and rings.

Lecture Content:

Week	Content
1	Review of logic and proof, Chapter 1 of lecture notes.
2	Review of set theory, Chapter 2.
3	Divisibility, primality, Euclid's algorithm, and relations. Basic properties of the integers, Sections 3.1 and 3.2.
4	Definitions and examples of groups, the dihedral group, Sections 4.1 and 4.2.
5	Permutations, the symmetric group, and automorphisms. Notation for permutations. Generatings sets and the sign of permutations. Section 4.3
6	Subgroups, cosets, and the theory of homomorphisms. Section 4.4.
7	Cyclic groups and proucts of groups. The structure of finite commutative groups. Sections 4.6, 4.7, and 4.9.
8	Group actions on sets. Burnside's counting theorem. Section 4.11
9	Definitions and examples of rings. Integral domains. Section 5.1
10	Ring homomorphisms and ideals. Section 5.2
11	Polynomial rings. Section 5.3
12	Review and reflection; catch up.

All references to chapters and sections are for the class lecture notes.

Labs:
No labs

Course Assignments and Tests:
Assignments consists of 11 problem sets due each Friday except the final week of the course. If Friday of a given week is a holiday the homework is due during the next regular class period. A take-home final examination is due Monday the 12th of December.
Final examination date and time: Take Home, Due Monday Dec. 12th by midnight. Electronic submission as a PDF (no Word documents!) or paper submission are acceptable.

Course Resources

Required Texts: Lecture notes on courselink
Recommended Texts: None
Other Resources: Lecture notes on courselink

Course Policies

Grading Policies
Performance on the homework assignments is worth 80% of the grade, the score on the final exam is worth 20% of the grade.
Late assignments not accompanied by a reasonable medical or personal excuse are docked 5% per class day late to a maximum penalty of 50%. Late assinments may be turned in at any time up to and including December 2nd.
Course Policy on Group Work:
Students are encouraged to work on homework problems together but must each write up individually the material they turn in. Work on the final exam should be done without consultation with other students.
Course Policy regarding use of electronic devices and recording of lectures
Electronic recording of classes is expressly forbidden without consent of the instructor. When recordings are permitted they are solely for the use of the authorized student and may not be reproduced, or transmitted to others, without the express written consent of the instructor.

Additional Course Information

Lecture notes are abvailable on courselink or by e-mail request to the instructor.

Policy Appendix

University Policies

Academic Accommodation of Religious Obligations

If you are unable to complete a course requirement due to religious obligations, please let the instructor know within the first two weeks of class. See the academic calendar for more information:
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-accomrelig.shtml

Academic Consideration

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor in writing, with your name, id, and e-mail contact. See the academic calendar for information on regulations and procedures for Academic Consideration:
http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml

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:
http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml

Accessibility

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact the Student Accessibilities Services (SAS) as soon as possible.
For more information, contact SAS at 519-824-4120 ext. 56208 or email csd@uoguelph.ca or see the website:
http://www.uoguelph.ca/csd/

Course Evaluation Information

Please see http://www.mathstat.uoguelph.ca/files/TeachevaluationformF10.pdf

Drop date

The last date to drop one-semester courses, without academic penalty, is Friday, November 4, 2016. For regulations and procedures for Dropping Courses, see the Academic Calendar:
http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml