

# Math 5031: Algebra I

## Fall 2019

**Instructor:** Martha Precup

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**Lecture:** MWF at 2:00-2:50pm in Cupples I 216

**Textbook:** *Algebra*, by Thomas W. Hungerford

**Course Content:** Math 5031 is an introductory graduate course on the basic structures and methods of algebra. Topics include:

- **Groups:** subgroups, homomorphisms, Cayley and Lagrange theorems, group actions, automorphisms, cosets, normal subgroups, quotient groups, free groups, the Sylow theorems.
- **Rings:** integral domains, ideals, homomorphisms, polynomial rings, the Euclidean algorithm, principal ideal domains (PIDs), unique factorization domains (UFDs), Gauss's lemma, irreducibility tests
- **Modules:** submodules and homomorphisms, modules over a PID, applications to linear algebra

**Homework:** Completing written assignments plays a key role in learning the material. Your homework will consist of writing up complete and correct proofs of each assigned problem. Problems will be posted on Canvas and solutions are due in class every Wednesday. **Late or illegible homework will not be accepted, but I will drop the lowest two grades you receive on homework.**

You are encouraged to work with others, but you must write up solutions individually. If your proof is based on an idea you read or heard about from someone else, a textbook, or an on-line resource then **you must cite your sources**. You are allowed to use any resources to solve the homework provided you cite them properly. Citations are worth one point for each HW problem.

**Exams:** There will be one midterm exam (in class) on **Friday, October 18**. The final exam will take place on **Monday, December 16** at 3:30-5:30pm. There are no make-up exams, and attendance at the midterm and final exam is expected.

**Grading:** Grading of all assignments is based on content and form. Your work must demonstrate your mastery of the mathematical topics and be clearly expressed. Final grades are weighted by:

Homework	40 %
Midterm	20 %
Final Exam	40 %

### Preparing written assignments:

- **Both content and form count in grading.** Write in complete sentences. Make use of all relevant mathematical terms and use proper mathematical grammar.
- Your writing should be clear and concise.
- Any regrade requests must be made within a week of the assignment being returned.
- Any work submitted under your name is expected to be your own, neither composed by anyone else as a whole or in part, nor handed over to another person for complete or partial revision. **Be sure to document all ideas that are not your own.**

**Academic Integrity:** Students must comply with Washington University regulations regarding academic integrity. For more information, see: <https://wustl.edu/about/compliance-policies/academic-policies/undergraduate-student-academic-integrity-policy/>. Plagiarism is a form of cheating or fraud; it occurs when a student misrepresents the work of another as their own.

### Other Resources:

- *Abstract Algebra*, by D.S. Dummit and R. M. Foote
- *Algebra*, by S. Lang