

TMATH 402
UH 1:30-3:10pm JOY 110
Lecturer: Ruth Vanderpool
Office Hours: UH 10:30-11:30am

Winter 2014
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Course Description: This is a proof based course on group theory with an introduction to rings and fields. Topics include: cosets, Lagrange's theorem, homomorphisms, normal subgroups, quotient groups, the isomorphism theorems, cyclic and symmetric groups, Cauchy's theorem, automorphisms, and elementary properties of rings and fields. Prerequisite: TMATH 308 or TCSS 321.

Learning Objectives: By the end of the course students should be able to:

1. define and identify groups, rings, and fields, both abstractly and in applications,
2. derive and prove elementary results about groups,
3. identify and arrange all subgroups of a given group into a lattice ordered by containment,
4. build a well-defined homomorphism and identify its kernel,
5. use the Isomorphism Theorems to prove results about groups,
6. apply abstract algebra to a science, educational, or engineering project of their choosing.

Required Items:

- Text: *Contemporary Abstract Algebra* by Joseph Gallian. 5th Edition
ISBN: 0-618-12214-1

Important Dates:

2/4	Midterm (oral exam)	1/13	Last day to alter your schedule with no fees
3/18	Final (1:30-3:35)	2/24	Last day to change grading option

Grades:

The following weights will be used to calculate your percentage in the course. The function f takes your percentage in the course and returns your grade on a 4. scale.

Reading Quizzes	10%	$f(x) = \begin{cases} 4.0 & \text{if } 90 < x \\ .1x - 5 & \text{if } 57 \leq x \leq 90 \\ 0 & \text{if } x < 57 \end{cases}$
Project	20%	
Assignments	25%	
Midterm	20%	
Final	25%	

Final grades will be assigned in accordance with the UW Tacoma grading system for undergraduate students found at scale posted at: <http://www.tacoma.uw.edu/current-students/grading-policies>.

Reading Quizzes: 10%

Assigned readings are posted on the detailed schedule online and must be completed before the day they are listed. By reading the material beforehand the class will be able to entertain more complicated topics that are both more interesting and better practice for the homework and project.

Regular reading quizzes will be made available on Canvas and are due by 1:30pm *before* any lecture on the same material is given. No make up quizzes will be given unless previously scheduled, but I will drop the lowest quiz to give you some flexibility.

Assignments/Homework Policy: 25%

This course emphasizes proofs and prose writing instead of the usual numerical computations. Generally the homework assignments will contain more words than calculations and are intended to help you internalize the definitions and concepts covered in the course. Each homework assignment will need to be composed and *edited* before a final draft can be turned in. This means the homework will require a lot more time than the assignments in previous math courses (each should take between 4-6 hours).

Homework assigned before the Midterm must be completed in groups of two. Homework assigned after the Midterm must be written up individually but you are encouraged to continue working in groups.

Homework will be assigned regularly at the beginning of class and the previous week's material is due Tuesday by 5pm with 20 minutes set aside on Thursdays to answer homework questions. If completed early, you may turn these in to the Homework folder on Tuesday at the end of class, otherwise slide your *stapled* assignment under my office door in GWP 430 by 5pm on Tuesday. No late homework will be accepted however you are allowed to rewrite *one* of the individually completed homework assignments before the final exam.

Outside Resources:

Come visit me if you have questions! If you are unable to attend my posted office hours but would like to meet, please let me know. I am willing to try and work with your schedule. Also remember that you are not alone in this class and your peers are a valuable (and often underutilized) resource.

The Teaching & Learning Center can offer a number of additional instructional services. Additionally math tutors are available Monday through Thursday from 10am to 6pm. Complete information and updates are available at:

<http://www.tacoma.uw.edu/teaching-learning-center/teaching-learning-center>.

Notes:

- I do *not* check my email after 4pm. Any questions sent to my email after 4pm may not receive a response until the next morning. The University's e-mail policy is posted at: http://www.tacoma.washington.edu/policies_procedures/E-mail_Policy.pdf
- There will be no tolerance for cheating. If caught, any and all disciplinary action will be pursued. All exams and quizzes are to be done individually unless otherwise specified. You are encouraged, however, to work together on the homework and form study groups outside of class.
- The University of Washington Tacoma is committed to making physical facilities and instructional programs accessible to students with disabilities. Disability Support Services (DSS) functions as the focal point for coordination of services for students with disabilities. In compliance with Title II of the Americans with Disabilities Act, any enrolled student at UW Tacoma who has an appropriately documented physical, emotional, or mental disability that "substantially limits one or more major life activities [including walking, seeing, hearing, speaking, breathing, learning, and working]," is eligible for services from DSS. If you are wondering if you may be eligible for accommodations on our campus, please contact the DSS reception desk at 692-4522.
- While I have attempted to make this syllabus as complete as possible, adjustments will be made throughout the course. Announcements will be made during class and it is the responsibility of the student to keep updated if class is missed.
- The Counseling Center offers short-term, problem-focused counseling to UW Tacoma students who may feel overwhelmed by the responsibilities of college, work, family, and relationships. Counselors are available to help students cope with stresses and personal issues that may interfere with their ability to perform in school. The service is provided confidentially and without additional charge to currently enrolled undergraduate and graduate students. To schedule an appointment, please call 692-4522 or stop by the Student Counseling Center (SCC), located in MAT 354.
- Complete safety information and emergency procedures is available at <http://www.tacoma.washington.edu/security>.

The highlights are as follows:

- In case of fire, take your valuables, leave the building, and report to the parking lot next to the Library and across the street from the Mattress factory. Plan to return to class once the alarm has stopped.
- In case of an earthquake, DROP, COVER, and HOLD. Once the shaking stops, take your valuables, leave the building, and report to the parking lot next to the Library and across the street from the Mattress factory. Do not plan to return for the rest of the day.

In both of the above cases, do not return until you have received an all clear from somebody "official," the web, or email.

- Safety Escorts are available Monday - Thursday 5:00pm - 10:30pm. They can be reached either through the duty officer or by dialing #300 from a campus phone. Additional safety information and emergency procedures is available at: <http://www.tacoma.washington.edu/security>.

Tentative Schedule

Week 1	Introduction to Groups Properties of \mathbb{Z} and \mathbb{Z}_n	Chapter 1 Chapter 0
Week 2	Equivalence Relations & Definition of a Group Properties of Groups	Chapter 0 & 2 Chapter 2
Week 3	Terminology & Subgroups Cyclic Groups	Chapter 3 Chapter 4
Week 4	NSA back door to NIST Review	
Week 5	Midterm Rings	Chapter 12
Week 6	Fields Groups vs Rings vs Fields	Chapter 13
Week 7	Permutation Groups Isomorphisms	Chapter 5 Chapter 6
Week 8	Cosets & Lagrange's Theorem Normal Subgroups & Factor Groups	Chapter 7 Chapter 8
Week 9	Factor Groups continued First Isomorphism Theorem	Chapter 8 Chapter 10
Week 10	Catch up/Review Presentations	