Syllabus: MAP 3930 Special Topics (Abstract Algebra)

Course Information

- **Course Number and Title:** MAP 3930 Special Topics (Abstract Algebra)
- **Credit Hours:** 3 semester hours
- **Academic Term:** Spring 2026

Instructor Information

- **Instructor:** Dr. Dipali Swain
- **Office Location:** IST 2023
- **Office Hours:** MW 11:00am – 12:00pm ; Tuesday 1:00pm-2:00pm; and by appointment
- **Email address:** dswain@floridapoly.edu

Course Delivery and Course Description

- **Delivery Mode**: Face-to-face
- **Class Meetings**: MWF 3:00pm-3:50pm in IST 1017
- **Course Website**: Canvas course site

Textbook

- Contemporary Abstract Algebra 9th Edition by Joseph A. Gallian **(required material)**
  ISBN: 978-1305657960
- Other Supplemental Material (you may choose to refer to):
  1. Abstract Algebra 3rd Edition by I. N. Herstein
  2. Abstract Algebra 3rd Edition by David S. Dummit and Richard S. Foote (may use it for practice problems / computational problems) *Note: This is a graduate level textbook but most of the topics are undergraduate friendly. It can also act like a workbook for students trying to get a good grasp on topics in algebra.*

Course Objectives and Outcomes

Student Learning Outcomes

- State and apply the basic definitions of algebraic structures like groups, rings, and fields.
- Demonstrate proficiency in writing formal mathematical proofs.
- Use the properties and relationships about structures (such as subgroups, homomorphisms, and factor structures) to solve theoretical and applied problems.
- Understand and apply key theorems in group, rings and fields.
- Gain experience constructing counter examples.

Grading Scale

Grade	A	A-	B+	B	B-	C+	C	D	F
Percentage	90%	87%	84%	80%	77%	74%	70%	60%	< 60%

Assignments / Evaluation Methods

Written Homework	15%
Quizzes	15%
Midterm 1	17%
Midterm 2	17%
PROJECT	8%
In-Class Presentation	8%
Final Exam	20%
Total	100%

Grade Components:
Below is a summary of each component of the course; additional guidance for each will be made available in the respective assignments in Canvas.

Written homework: Written homework will be handwritten and submitted in person at the beginning of class the day it is due. Homework will be posted on a weekly basis.
Your **two lowest written homework** scores will be dropped at the end of the semester.

Quiz: Quizzes will be given in bi-weekly basis. Tentative dates of the quiz are posted in the schedule below. In case of any change of date, the same will be intimated via announcements a week prior.
One lowest quiz score will be dropped.

Projects
Project will be completed in groups and will typically span two weeks of work. The project will focus on applications of abstract algebra, allowing students to engage with problems where algebraic structures have concrete or computational significance. The goal is to connect theory to practice

and develop collaborative problem-solving skills.

In-Class Presentation
A key component of abstract algebra is the ability to construct rigorous proofs from given hypotheses. In-class presentations will emphasize precise logical reasoning and the implications of the theory developed throughout the semester. Presentations will be done in groups on selected topics. Each group will gather relevant material, prepare collaboratively, and present either using Beamer slides/PowerPoint slides or the board-and-marker format.

Midterm exams: Two midterm exams will be given in class. Tentative dates are listed in the course schedule below. Exam dates are subject to change, and any changes will be communicated in class and via Canvas.

Comprehensive final exam: There will be a comprehensive common final exam given per the final exam schedule, which will be posted in Canvas when it becomes available.

Late Work / Make-up work

Assignments and due dates are posted on Canvas. Students are responsible for checking Canvas regularly to be aware of assignment deadlines and other class information. Extensions without penalty may be granted on a case-by-case basis in extreme circumstances. Please communicate with Dr. Hale as soon as possible if alternative arrangements are needed.

Homework and projects submitted up to 24 hours late will be accepted with a 20% penalty. Assignments submitted more than 24 hours late will not be accepted.

Make-up exams will be given only in case of an emergency or if requested in advance for an appropriate reason. Documentation will be required for all make-up exams.

Attendance & Participation

Students are expected "to attend all of their scheduled University classes and to satisfy all academic objectives as defined by the instructor" (University Policy, FPU-5.0010AP). This is an advanced mathematics course – missing even just one day can significantly set back your understanding. Moreover, class meetings will feature numerous collaborative components and opportunities to participate actively in discussions and problem solving. Students should make every effort to attend each class and consistently contribute to in-class activities.

Students are expected to participate fully in the classroom experience. Questions are welcome during class and office hours. Students are asked to turn off and put away their cell phones (noting exceptions for authorized accommodations) except when requested to use them for a class-related purpose. The use of earbuds or headphones during class is specifically not allowed (noting exceptions for authorized accommodations). Be respectful of your fellow classmates and engage with every opportunity to learn!

Official Email Address

Florida Polytechnic University email is the official method of communication for the University. Students are required to check their email frequently (at least once per day). We cannot reply to any email received from an address other than those that end in floridapoly.edu.

Changes to Syllabus

This syllabus is subject to change. All updates will be communicated in class and via Canvas.

Got questions?

I want every student to be successful! Please take advantage of office hours or ask questions in class or via email/Canvas. I am always happy to discuss any details about our course and related concepts!

Communication

Students with a concern or issue should feel free to email their instructor. Instructors will make every reasonable effort to respond by the end of the next class day. If, after sending the instructor a follow-up email, the issue is not resolved, the student may email the department chair, Dr. Mike Brilleslyper at mbrilleslyper@floridapoly.edu. Students may request an appointment with the department chair for further discussion, if needed.

Course Schedule (Subject to Change)

Week		
Week 1: Jan 12-16	Groups, Finite Groups, Subgroups	
Week 2: Jan 19-23	Cyclic Groups Permutation Groups Symmetric group Sn	**Quiz 1** **(01/23/2026)**
Week 3: Jan 26-30	Group Isomorphism Cosets	
Week 4: Feb 02-06	Lagrange's Theorem, Normal Subgroups Simple Groups –Finite Simple Groups	**Quiz 2** **(02/02/2026)**
Week 5: Feb 09-13	Alternating Group A5 is simple. **Review**	**Exam 1** **(02/13/2026)**
Week 6:Feb 16-20	Quotient Groups External Direct Product	**Quiz 3** **(02/23/2026)**
Week 7: Feb 23-27	Group Homomorphism, Automorphism The Isomorphism Theorems – Statements and Consequences	
Week 8: Mar 02-06	Cayley's Theorem, Structure of Groups	**Quiz 4** **(03/02/2026)** **(PROJECT)** **(intro: 03/06/2026)**
Mar 09-13		
Week 9: Mar 16-20	Rings, Ring homomorphism Ideals	**PROJECT** **(deadline:** **03/20/2026)**
Week 10: Mar 23 - Apr 27	Integral Domain Characteristic and Zero Divisor and Field of Fractions **Review**	**Exam 2** **(03/27/2026)**

Week 10: Mar 30- Apr 03	Polynomial Rings Irreducibility of Polynomials	**Quiz 5 (03/30/2026)**
Week 12: Apr 06-10	Fields-Definition Examples Field Extensions	
Week 13: Apr 13-17	Finite Fields; The field integer modulo p	**Quiz 6 (04/13/2026)**
Week 14: Apr 20- 24	Structure on Finite Fields Project Presentation	**Project Presentation (04/24/2026)**
Week 15: Apr 27- May 01	**Review**	**Project Presentation (05/01/2026)**
Week 16: May 04 - 08		**Final Exam**

University Policies

Reasonable Accommodations

The University is committed to ensuring equal access to all educational opportunities. The Office of Disability Services (ODS), facilitates reasonable accommodations for students with disabilities and documented eligibility. It is the student's responsibility to self-identify as a student with disabilities and register with ODS to request accommodations. If you have already registered with ODS, please ensure that you have requested an accommodation letter for this course through the ODS student portal, and communicate with your instructor about your approved accommodations as soon as possible. Arrangements for testing accommodations must be made in advance. Accommodations are not retroactive. If you are not registered with ODS but believe you have a temporary health condition or permanent disability requiring an accommodation, please contact ODS as soon as possible: DisabilityServices@floridapoly.edu; (863) 874-8770; www.floridapoly.edy/disability.

Accommodations for Religious Observances, Practices and Beliefs

The University will reasonably accommodate the religious observances, practices, and beliefs of individuals in regard to admissions, class attendance, and the scheduling of examinations and work assignments. (See University Policy.)

Title IX

Florida Polytechnic University is committed to ensuring a safe, productive learning environment on our campus that prohibits sex discrimination and sexual misconduct, including sexual harassment, sexual assault, dating violence, domestic violence and stalking. Resources are available if you or someone you know needs assistance. Any faculty or staff member you speak to is required to report the incident to the Title IX Coordinator. Please know, however, that your information will be kept private to the greatest extent possible. You will not be required to share your experience. If you want to speak to someone who is permitted to keep your disclosure confidential, please seek assistance from the Florida Polytechnic University Ombuds Office, BayCare's Student Assistance Program, 1-800-878-5470 and locally within the community at Peace River Center, 863-413-2707 (24-hour hotline) or 863-413-2708 to schedule an appointment. The Title IX Coordinator is available for any questions to discuss resources and options available.

Academic Integrity

Violations of academic integrity regulation include actions such as cheating, plagiarism, use of unauthorized resources (including but not limited to use of Artificial Intelligence tools), illegal use of intellectual property,

and inappropriately aiding other students. Such actions undermine the central mission of the university and negatively impact the value of your Florida Poly degree. Suspected violations will be fully investigated, possibly resulting in sanctions up to and including expulsion from the university.

Recording Lectures
Students may, without prior notice, record video or audio of a class lecture for a class in which the student is enrolled for their own personal educational use. Recordings may not be used as a substitute for class participation or class attendance. Recordings may not be published or shared in any way, either intentionally or accidentally, without the written consent of the faculty member. Failure to adhere to these requirements is a violation of state law (subject to civil penalty) and the student code of conduct (subject to disciplinary action). *Recording class activities including, but not limited to, lab sessions, student presentations (whether individually or part of a group), class discussion (except when incidental to and incorporated within a class lecture), and invited guest speakers is prohibited.*

Academic Support Resources

- **Library**: Students can access the Florida Polytechnic University Library through the University website and Canvas, on and off campus. Students may direct questions to library@floridapoly.edu.
- **Tutoring and Learning Center**: The Tutoring and Learning Center (The TLC) provides tutoring to all Florida Poly students who may need additional academic support. The TLC is staffed by students who have excelled in the courses they tutor. They offer support by reviewing concepts and materials from class, clarifying points of confusion and providing assistance with learning strategies. While the focus of TLC is to provide support to students in freshman-level courses, upper-level courses are also tutored at the Center. The TLC is located in the IST Commons (second floor).
    - **Knack Tutoring**: Students looking for additional assistance outside of the classroom are advised to consider working with a peer tutor through Knack. Florida Polytechnic University has partnered with Knack to provide students with access to verified peer tutors who have previously aced this course. To view available tutors, visit floridapoly.joinknack.com and sign in with your student account.
- **Academic Success Coaches**: All students at Florida Poly are assigned an Academic Success Coach. Your Academic Success Coach can assist you with academic success strategies. Please visit the Student Success Center on the second floor of the IST building to meet with an Academic Success Coach.
- **Writing Center**: Located on the second floor of the IST (2059/2061), the Writing Center helps students to develop their writing and presentation skills. Consultations are available in person and virtually. For more detail, visit floridapoly.edu/writing center.