JOHNS HOPKINS UNIVERSITY

AS.110. 401.88 Syllabus

Introduction to Abstract Algebra

Course Information

Expanded Course Description:

Lectures and Live Meetings

Recorded lectures will be uploaded to Canvas. Individual reviews with the instructor may be arranged at any time by email.

Homework

In order to master the material, there will be required homework problems. Homework will be assigned once a week and posted in Canvas. Homework will be due by end of day Sunday. Please make sure scanned homework is readable before you submit it. You may collaborate on homework, but each student must write up their own solutions.

Exams

There will be a midterm exam and a (noncumulative) final exam. Both exams are given in Canvas, using Respondus LockDown Browser and Monitor. You may refer to your textbook and notes.

Some exam problems may be of true/false, multiple choice, or fill-in-the blank types. Others will be of ``essay'' type, i.e., proofs or examples that you will type up in text boxes. You are not required to use the equation editor for the essay questions.

Course Topics (Chapters 1-4, 7, 8)

1. Arithmetic of Integers (Division Algorithm, Divisibility, Primes and Unique Factorization)
2. Congruence of Integers and Modular Arithmetic (Congruence Classes, Modular Arithmetic, The Structure of Z_p (p prime) and Z_n.)
3. Rings (Definitions and Examples of Rings, Basic Properties of Rings, Isomorphisms and Homomorphisms)
4. Arithmetic in F[x] (Polynomial Arithmetic and the Division Algorithm, Divisibility in F[x])
7. Groups (Definition and Examples of Groups, Basic Properties of Groups, Subgroups, Isomorphisms and Homomorphisms, Symmetric and Alternating Groups)
8. Normal Subgroups and Quotient Groups (Congruence and Lagrange's Theorem, Normal Subgroups, Quotient Groups, Quotient Groups and Homomorphisms)

Course Information:

Introduction to Abstract Algebra
AS.110. 401 88 (4.0 Credits)

Description
An introduction to the basic notions of modern abstract algebra and can serve as as Introduction to Proofs (IP) course. This course is an introduction to group theory, with an emphasis on concrete examples, and especially on geometric symmetry groups. The course will introduce basic notions (groups, subgroups, homomorphisms, quotients) and prove foundational results (Lagrange's theorem, Cauchy's theorem, orbit-counting techniques, the classification of finite abelian groups). Examples to be discussed include permutation groups, dihedral groups, matrix groups, and finite rotation groups, culminating in the classification of the wallpaper groups.Prerequisites: Grade of C- or better in 110.201 or 110.212 Area: Quantitative and Mathematical Sciences.

Department: AS Mathematics
College: Krieger School of Arts and Sciences

Instructor Information :

Instructor

Nicholas Marshburn
✉ nmarshb1@jhu.edu

Course Learning Outcomes

Course Learning Outcomes:

> ℹ No Course Learning Outcomes are available for this course.

Required Text and Other Materials

Textbooks:

Abstract Algebra, An Introduction (3rd ed.) by Hungerford; ISBN: 978-1111569624

Evaluation and Grading
Note that the final course syllabus may differ from the information below.

Grading Breakdown:

The final grade breakdown is as follows:

40% Homework
30% Midterm
30% Final

KSAS Academic Policies
The policies below are regularly updated to reflect KSAS teaching policies and guidelines.

Academic Policies:

University Statement on Equal Opportunity

Johns Hopkins University is committed to equal opportunity for its faculty, staff, and students. To that end, the university does not discriminate on the basis of sex, gender, marital status, pregnancy, race, color, ethnicity, national origin, age, disability, religion, sexual orientation, gender identity or expression, veteran status or other legally protected characteristic.

Academic Integrity

The strength of the university depends on academic and personal integrity. In this course, you must be honest and truthful. Ethical violations include cheating on exams, plagiarism, reuse of assignments, improper use of the Internet and electronic devices, unauthorized collaboration, alteration of graded assignments, forgery and falsification, lying, facilitating academic dishonesty, and unfair competition.

Report any violations you witness to the instructor. You may consult the associate dean of student conduct (or designee) by calling the Office of the Dean of Student Life at 410-516-8208 or via email at studentconduct@jhu.edu.

Students with Disabilities - Accommodations and Accessibility

Johns Hopkins University values diversity and inclusion. We are committed to providing welcoming, equitable, and accessible educational experiences for all students. Students with disabilities (including those with psychological conditions, medical conditions and temporary disabilities) can request accommodations for this course by providing an Accommodation Letter issued by Student Disability Services (SDS). Please request accommodations for this course as early as possible to provide time for effective communication and arrangements.

For further information or to start the process of requesting accommodations, please contact Student Disability Services at Homewood Campus, Shaffer Hall #101, call: 410-516-4720 and email: studentdisabilityservices@jhu.edu or visit the website

https://studentaffairs.jhu.edu/disabilities/

Inclusivity and Classroom Climate

Johns Hopkins University is committed to creating a classroom environment that values the diversity of experiences and perspectives that all students bring. Everyone on campus has the right to be treated with dignity and respect. JHU believes fostering an inclusive climate is important because research shows that students who interact with peers who are different from themselves learn new things and experience tangible educational outcomes.

Please help create a welcoming and vibrant classroom climate. You should expect to be challenged intellectually by instructors, the TAs, and your peers, and at times this may feel uncomfortable. Indeed, it can be helpful to be pushed sometimes in order to learn and grow. But at no time in this learning process should someone be singled out or treated unequally on the basis of any seen or unseen part of their identity.

Student Health and Wellness

https://studentaffairs.jhu.edu/counselingcenter/

The Counseling Center provides a safe, confidential, non-judgmental space where students can feel free to explore a wide variety of concerns and issues.

If you are struggling with anxiety, stress, depression or other mental health related concerns, please consider visiting the JHU Counseling Center. If you are concerned about a friend, please encourage that person to seek out their services

The Counseling Center offers a wide variety of services to assist students including drop-in hours, workshops, group therapy, brief individual therapy, couples counseling, psychiatric evaluations and medication management, substance use assessments, eating assessments, and 24/7 crisis intervention services.

🏛 Religious Holidays

Religious holidays are valid reasons to be excused from class. Students who must miss a class or an examination because of a religious holiday must inform the instructor as early in the semester as possible in order to be excused from class or to make up any work that is missed. If possible, instructors should try to avoid scheduling exams for major holidays. Below we list some of the major religious holidays and holy days that may overlap dates of instruction or exams of our students, faculty, and staff for Fall. Please note that this is not an all-encompassing list for every religious tradition.

More information, including a list of religious holy days, may be found at the Religious and Spiritual Life (https://studentaffairs.jhu.edu/campus-ministries/) website.

If you have any questions regarding a particular case or would like any guidance, please do not hesitate to contact the Johns Hopkins University Chaplain at 410-516-1880 or kschnurr@jhu.edu. Thank you for your sensitivity to this matter.