Math 541: Modern Algebra

Credits: 3

Canvas Course URL: *https://canvas.wisc.edu/courses/82441*

Course Designations and Attributes:
Breadth - Natural Science
Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
This course has an optional honors component.

Meeting Time and Location:
MWF 9:55 – 10:45, Birge Hall 346

Instructional Mode:
Face-to-face.

How credit hours are met by the course:
One hour (i.e. 50 minutes) of classroom or direct faculty/instructor instruction and a minimum of two hours of out of class student work each week over approximately 15 weeks.

Instructor Title and Name: *Dr. Michael K. Brown, Van Vleck Visiting Assistant Professor*

Instructor Availability:
Office hours: Tuesdays 2:30 p.m. - 4:00 p.m., Wednesdays 12:30 p.m. - 2:00 p.m. If you can't make it to my office hours, feel free to email me to set up another time to meet.

Instructor Email: *mkbrown5@wisc.edu*

Course Description:
Groups, normal subgroups, Cayley's theorem, rings, ideals, homomorphisms, polynomial rings, abstract vector spaces.

Requisites:
MATH 341 or MATH 375 or (MATH 421 and MATH 320) or (MATH 421 and MATH 340)

Learning Outcomes:

You will be conversant with the foundations of group theory and ring theory. More specifically,

- *You will have a working knowledge of introductory notions in group theory such as subgroups, homomorphisms, group actions, and quotient groups; and you will have learned some foundational results concerning finite groups such as Lagrange's theorem, Cauchy's theorem, and the Class Equation.*
- *You will have been introduced to fundamental notions in ring theory such as ideals, subrings, prime and maximal ideals, fields, Euclidean domains, principal ideal domains, and unique factorization domains.*
- *You will be familiar with key examples in group theory (such as modular integers, dihedral groups, symmetric groups, and alternating groups) and ring theory (such as the integers, polynomial rings, and matrix rings).*

You will also be able to coherently and concisely communicate mathematical ideas in the form of proofs.

Grading:

- Quizzes: 20%.
- Exam 1: 25%.
- Exam 2: 25%.
- Final Exam: 30%.

Course grades will be determined as follows:

- 93-100%: A
- 86-92%: AB
- 80-85%: B
- 73-79%: BC
- 67-72%: C
- 60-66%: D
- < 60%: F

Required Textbook:

Abstract Algebra, by Dummit and Foote, Third Edition, 2004.

Homework:

There will be weekly problem sets. Homework will not be graded, but there will be weekly quizzes based on the homework.

Rules, rights, and responsibilities

See the guide to Rules, Rights and Responsibilities.

Academic integrity:

By enrolling in this course, each student assumes the responsibilities of an active participant in UW-Madison's community of scholars in which everyone's academic work and behavior are held to the highest academic integrity standards. Academic misconduct compromises the integrity of the university. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these acts are examples of academic misconduct, which can result in disciplinary action. This includes but is not limited to failure on the assignment/course, disciplinary probation, or suspension. Substantial or repeated cases of misconduct will be forwarded to the Office of Student Conduct & Community Standards for additional review. For more information, refer to studentconduct.wiscweb.wisc.edu/academic-integrity/.

McBurney Disability Resource Center syllabus statement:

"The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty [me] of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty [I], will work either directly with the student [you] or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA."
http://mcburney.wisc.edu/facstaffother/faculty/syllabus.php.

Institutional statement on diversity: *"Diversity is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals.*

The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background – people who as students, faculty, and staff serve Wisconsin and the world." *https://diversity.wisc.edu/*