

**Course Subject, Number and Title**

MATH 541 – Modern Algebra 2

**Credits**

3

**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

**Honors - Honors Optional (%) Course****What does “Honors Optional” mean for this course?**

There will be extra starred problems on homework assignments throughout the course. You must complete 75% of the honors homework problems to receive honors.

There will also be an oral exam based on a mini final project determined individually.

**Meeting Time and Location**

VAN VLECK B211, 11:00 - 12:15 , TuTh

**Instructional Mode**

Face-to-face

**how Credit Hours are met by the Course**

This class meets for two 75-minute class periods each week over the fall/spring semester and carries the expectation that students will work on course learning activities (reading, writing, problem sets, studying, etc) for about 3 hours out of classroom for every class period. The syllabus includes more information about meeting times and expectations for student work.

**INSTRUCTORS AND TEACHING ASSISTANTS****Instructor Title and Name**

Associate Professor Tullia Dymarz

**Instructor Availability**

Afterclass or Wednesdays 3-4 in VV 509

**Instructor Email/Preferred Contact**

dymarz@math.wisc.edu

**OFFICIAL COURSE DESCRIPTION**

**Official Course Description**

- Modules: submodules, homomorphisms, quotients, simple modules, cyclic modules, free modules, linear transformations
- Matrices: determinants, elementary matrices, Smith normal form over a PID, characteristic roots
- Finitely generated modules over a PID
- Classification of Finite abelian groups
- Normal forms for matrices: rational canonical form, Jordan canonical form
- Field extensions, roots of polynomials
- Galois Theory

**Requisites**

MATH 541 or graduate/professional standing or member of the Pre-Masters Mathematics (Visiting International) Program

**LEARNING OUTCOMES**

**Course Learning Outcomes**

*After taking this course students should be able to work with modules over abstract rings as well as modules over a PID. Students should be able to find the rational canonical form and Jordan canonical forms of a matrix. Students should be able to list all finite abelian groups of a given order up to isomorphism. Students should be able to find a Galois group of a given field extension.*

**GRADING**

- Midterm - 35%
- Final - 35%
- Homework + Quizzes - 30%
- All homework will be weighted equally and a quiz will count as one graded homework problem.
- The lowest homework grade and quiz grade will be dropped.
- The final grades are curved depending on the strength of the class
- Attendance and/or participation in class is not mandatory but is strongly encouraged

## **DISCUSSION SESSIONS**

*No discussion sessions.*

## **REQUIRED TEXTBOOK, SOFTWARE & OTHER COURSE MATERIALS**

- Dummit and Foote - Abstract Algebra 3rd edition (optional)
- course notes

## **EXAMS, QUIZZES, PAPERS & OTHER MAJOR GRADED WORK**

- Midterm (In class, Thursday March 26 - Modules)
- Final (10:05 - 12:05, Tuesday May 7 - Galois Theory )
- No books, no notes, no electronic devices

## **HOMEWORK & OTHER ASSIGNMENTS**

- Homework will be assigned weekly.
- Homework is due at the beginning of class each Thursday and a short quiz may be given based on one of the homework problems. Completing the homework should be enough preparation to take the quiz. Make up quizzes will not be given.
- Late homework will not be accepted however if you cannot make it to class then you can leave your homework in my mailbox on the 2nd floor of Van Vleck Hall before class starts.

## **RULES, RIGHTS & RESPONSIBILITIES**

- To see the Guide's Rules, Rights and Responsibilities information, refer to <http://guide.wisc.edu/undergraduate/#rulesrightsandresponsibilitiestext>.

## **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/](http://studentconduct.wiscweb.wisc.edu/academic-integrity/).

## **ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES**

**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>

## **DIVERSITY & INCLUSION**

**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/>