

FALL 2014

The University of Iowa
The College of Liberal Arts and Sciences

Department of Mathematics

Topics in Algebra: MATH:7030 / 22M:330 Section 001

11:30-12:20 MWF, in 105 MLH

Instructor: Ryan Kinser

Office location and office hours: Tuesday 11-2 and by appointment in 25F, MLH

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Website address: <http://homepage.math.uiowa.edu/~rkinser/2014falltopics/index-topics.html>

DEO Contact Information: Dan Anderson, 14 MLH, dan-anderson@uiowa.edu

Some of the policies relating to this course (such as the drop deadline) are governed by its administrative home, the College of Liberal Arts and Sciences, 120 Schaeffer Hall.

Description of Course:

The course introduces students to the representation theory of finite-dimensional associative algebras, mainly using the language of quivers. This has connections to algebraic geometry, combinatorics, and many other fields. It is assumed that students are already familiar with multilinear algebra, as well as the language of rings and modules.

Objectives and Goals of the Course:

The goal is to become familiar with the language of representation theory and the fundamental results in the theory of finite-dimensional algebras. The ability to construct and analyze examples is emphasized.

Texts:

There is no required textbook. Students are expected to take notes during class and carry out further investigation (i.e., filling in unfamiliar background) outside of class.

MATERIAL TO BE COVERED:

The exact pace and special topics covered will be tailored to the interests and background of the students. We will cover at least:

- Fundamentals (quivers with relations, the category of representations of a quiver with relations, path algebras)
- Homological tools (projectives and injectives, hereditary, Ext, Euler form)
- Gabriel's Theorem, Kac's theorem
- Quivers of tame representation type
- Exceptional modules
- Auslander-Reiten quivers

Grading System and the Use of +/-:

Possible course grades are A, A-, B+, B, B-, C+, C.

Assignments and Percentage of Final Grade:

Every student will give an in-class presentation. The course grade will be based on the quality of the presentation, and completion of a few homework assignments.

Exams and Percentage of Final Grade:

There are no exams.

Course Policies:

Course attendance: Attendance of every class period is expected for all students. If you have a valid reason for not attending, you should formally let me know in person or by email.

Participation in class discussions: Students are expected to take notes, ask questions, and answer questions during class.

Timely completion of assignments: Late homework is not accepted.

Student Collaboration:

For homework, each student should (1) try the problems on your own, (2) discuss and agree on solution ideas with other students, (3) write up complete, careful solutions completely on your own. You may (and should) read each others solutions for improvement, but the final product which is turned in should represent your own personal explanation of the solution.

For the presentation, students should use all available resources to make the best presentation possible. This should include several meetings with the instructor.

Teaching Policies & Resources

Syllabus Insert

Administrative Home

The College of Liberal Arts and Sciences is the administrative home of this course and governs matters such as the add/drop deadlines, the second-grade-only option, and other related issues. Different colleges may have different policies. Questions may be addressed to 120 Schaeffer Hall, or see the CLAS Academic Policies Handbook at <http://clas.uiowa.edu/students/handbook>.

Electronic Communication

University policy specifies that students are responsible for all official correspondences sent to their University of Iowa e-mail address (@uiowa.edu). Faculty and students should use this account for correspondences ([Operations Manual, III.15.2, k.11](#)).

Accommodations for Disabilities

A student seeking academic accommodations should first register with Student Disability Services and then meet with the course instructor privately in the instructor's office to make particular arrangements. See www.uiowa.edu/~sds/ for more information.

Academic Honesty

All CLAS students or students taking classes offered by CLAS have, in essence, agreed to the College's [Code of Academic Honesty](#): "I pledge to do my own academic work and to excel to the best of my abilities, upholding the [IOWA Challenge](#). I promise not to lie about my academic work, to cheat, or to steal the words or ideas of others; nor will I help fellow students to violate the Code of Academic Honesty." Any student committing academic misconduct is reported to the College and placed on disciplinary probation or may be suspended or expelled ([CLAS Academic Policies Handbook](#)).

CLAS Final Examination Policies

The final examination schedule for each class is announced by the Registrar generally by the fifth week of classes. Final exams are offered only during the official final examination period. No exams of any kind are allowed during the last week of classes. All students should plan on being at the UI through the final examination period. Once the Registrar has announced the date, time, and location of each final exam, the complete schedule will be published on the Registrar's web site and will be shared with instructors and students. It is the student's responsibility to know the date, time, and place of a final exam.

Making a Suggestion or a Complaint

Students with a suggestion or complaint should first visit with the instructor (and the course supervisor), and then with the departmental DEO. Complaints must be made within six months of the incident ([CLAS Academic Policies Handbook](#)).

Understanding Sexual Harassment

Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff. All members of the UI community have a responsibility to uphold this mission and to contribute to a safe environment that enhances learning. Incidents of sexual harassment should be reported immediately. See the [UI Comprehensive Guide on Sexual Harassment](#) for assistance, definitions, and the full University policy.

Reacting Safely to Severe Weather

In severe weather, class members should seek appropriate shelter immediately, leaving the classroom if necessary. The class will continue if possible when the event is over. For more information on Hawk Alert and the siren warning system, visit the [Department of Public Safety website](#).