

Syllabus Math 510B

Prof: C. Negron

Time and location: 12:00-12:50 pm, KAP138

Office: KAP 444C

Office hours: Fridays

Books: *Finite dimensional algebras*, Drozd and Kirichenko.

Introduction to commutative algebra, Atiyah and Macdonald and/or *Stacks project* Ch 10.

Pre-req: 510 A

Website: c-negron.github.io/510B.S26

Topics covered

This course covers basics for algebras and modules. We plan to cover the following:

- (i) **Finite-dimensional algebras:** Algebras and modules \rightarrow chain conditions \rightarrow Jordan-Holder theorem \rightarrow semisimplicity \rightarrow Jacobson radical \rightarrow Artin-Wedderburn \rightarrow Maschke theorem \rightarrow Artinian implies Noetherian.
- (ii) **Commutative rings:** Noetherian rings \rightarrow Polynomial rings and finite type algebras \rightarrow Spectra and Zariski topology \rightarrow nullstellensatz \rightarrow localization and primes \rightarrow nilradicals \rightarrow finite extensions.
- (iii) **Categories of modules:** Bimodules \rightarrow tensoring and Hom functors \rightarrow \otimes -Hom adjunction \rightarrow Morita theorem \rightarrow Projectives, injectives, and flat modules \rightarrow constructing injectives.

Topics (i) and (iii) are covered in Drozd-Kirichenko, and (ii) is covered in Atiyah-Macdonald.

Homework and examinations

Homework will be quasi-weekly, and turned in in class. HWs will receive commentary from the grader, but no grades will be recorded. We'll have periodic quizzes. The quizzes will ask questions directly off the HW. There will be one midterm on an unknown date.

The final will either be on the last day of class or given on the university prescribed date.

Grades

The final grade will be 30% quizzes, 30% midterm, 40% final.

Important dates

First day of class is Monday Jan 12.

- Begin and end of semester: Mon Jan 12, Fri May 1.
- Holidays: Mon Jan 19, Mon Feb 16, March 15-22.
- Midterm: Fri March 13.
- Final: Probably Fri May 8, 11 am - 1 pm.

Hypothetical quiz dates might be Jan 30, Feb 20, April 3, May 27.

Statement on Academic Conduct and Support Systems

Academic Conduct

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism

in SCampus in Part B, Section 11, “Behavior Violating University Standards” policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, policy.usc.edu/scientific-misconduct.

Students and Disability Accommodations

The university is committed to the full accessibility of our campus, programs, and activities to individuals with disabilities. USC will make a good faith effort to provide reasonable accommodation for qualified visitors, prospective students, enrolled students, employment applicants, and employees with a disability unless the accommodation requested would cause an undue hardship as defined by the ADA. In compliance with Section 504 of the Rehabilitation Act, the university provides academic adjustments and auxiliary aids for students with disabilities.

For the full text, including university disability services contact information see USC Disability Accommodations Policy at policy.usc.edu/disability-accommodations/. Contacts and basic information regarding accessibility services can be found USC’s Office of Student Accessibility Services, osas.usc.edu/.