Math 510a - Algebra (Fall 2019)

Class Times: Mon/Wed/Fri 12:00pm - 12:50pm
Location: Kaprielian Hall (KAP), Room 134
Course Website: Available through Blackboard

Instructor: Jay Taylor
Office: KAP 470a
Phone: (213) 740-3764
Email: jayt@usc.edu
Personal Webpage: http://dornsife.usc.edu/jay-taylor

Office Hours: Students wishing to speak to the instructor should either come during office hours or arrange an appointment, preferably by email. The following office hours will be in effect from Monday August 25th until Friday December 6th. There will be no office hours on University recognised holidays.

- Monday 3:00pm - 4:00pm in KAP 470a,
- Wednesday 4:00pm - 5:00pm in KAP 470a,
- Friday 10:00am - 11:00am in KAP 470a.

Teaching Assistant: Danjoseph Quijada
Office: KAP 446
Phone: (213) 821-1480
Email: dquijada@usc.edu

Office Hours: Students wishing to speak to the instructor should either come during office hours or arrange an appointment, preferably by email. The following office hours will be in effect from Monday August 25th until Friday December 6th. There will be no office hours on University recognised holidays.

- Monday 4:00pm - 5:00pm in KAP 470a,
- Wednesday 3:00pm - 5:00pm in KAP 470a,
- Friday 10:00am - 11:00am in KAP 470a.

Course Text: We will not confine ourselves to only one textbook in this course. However, the following is a good reference that covers what we need:

- T. W. Hungerford, *Algebra*, Graduate Texts in Mathematics, vol. 73, Springer–Verlag.

Other good texts are:

- S. Lang, *Algebra*, Graduate Texts in Mathematics, vol. 211, Springer–Verlag,
- I. M. Isaacs, *Finite group theory*, Graduate Studies in Mathematics, vol. 92, AMS,
- I. Stewart, *Galois theory*, Chapman and Hall,

- D. A. Cox, *Galois theory*, Pure and Applied Mathematics, John Wiley & Sons.

Course Description: The courses consists of two parts. In the first part we will aim to cover the following topics in group theory:

- group actions and Sylow's theorems,

- permutation groups and linear groups,

- simple and solvable groups.

In the second part we will aim to cover the following topics in field theory:

- Galois extensions and the Galois correspondence,

- radical, transcendental, algebraic, separable, and cyclotomic extensions of fields,

- finite fields.

Learning Objectives and Outcomes: Upon completing the course the student should be able to do the following:

- apply the Sylow theorems to determine information about p-subgroups of finite groups such as their number, whether they're normal or not,

- be able to use GAP to answer questions about finite groups of small order,

- know how to calculate centralisers and conjugacy classes of symmetric groups,

- algorithmically determine the structure of finite abelian groups,

- construct finite fields,

- be able to determine the degree of a field extension.

Prerequisite(s): Undergraduate algebra and linear algebra (Math 410 and 471).

Grading breakdown: Your performance in the course is assessed via a mixture of homework, midterm exams, and a final exam, broken down as follows.

- **Homework** (worth 30%): Hand-written homework will be assigned roughly every two weeks and posted on Blackboard. A selection of the homework problems will be graded with feedback. Homework is an essential component of the course. Some homework problems may require the computer algebra system GAP, which can be downloaded for free from the GAP Website.

  Your homework will be judged not only on the validity of the proposed solution but also on the quality of the exposition. Your solutions should be well thought out and communicated concisely, with appropriately chosen notation. Homework will be announced in advance and will not be accepted late. It is permitted to collaborate on homework assignments, **however** each student must write their solution on their own and in their own words. Identical, or highly similar solutions, will not be tolerated.

- **Midterm Exam** (worth 30%): One in-class midterm exam is tentatively scheduled for:

    – Wednesday, October 16th, from 12:00pm - 12:50pm, in KAP 134.

- **Final Exam** (worth 40%): The final exam has been scheduled by the University for:

    – Friday, December 13th from 11:00am - 1:00pm in KAP 134.

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" of SCampus. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct.

Support Systems: If you are struggling at anytime during the semester then please feel free to reach out to me or to one of the following University wide services.

- Student Health Counseling Services: on call 2/47 at (213) 740-7711. Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

- National Suicide Prevention Lifeline: on call 2/47 at 1 (800) 273-8255. Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

- Relationship and Sexual Violence Prevention Services (RSVP): on call 2/47 at (213) 740-4900. Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

- Office of Equity and Diversity (OED) | Title IX: call (213) 740-5086. Information about how to get help or help a survivor of harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants. The university prohibits discrimination or harassment based on the following protected characteristics: race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, age, physical disability, medical condition, mental disability, marital status, pregnancy, veteran status, genetic information, and any other characteristic which may be specified in applicable laws and governmental regulations.

- Bias Assessment Response and Support: call (213) 740-2421. Avenue to report incidents of bias, hate crimes, and microaggressions for appropriate investigation and response.

- The Office of Disability Services and Programs: call (213) 740-0776. Support and accommodations for students with disabilities. Services include assistance in providing readers, notetakers, interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

- USC Support and Advocacy: call (213) 821-4710. Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

- Diversity at USC: call (213) 740-2101. Information on events, programs and training, the Provost?s Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

- USC Emergency: UPC - call (213) 740-4321. HSC - on call 24/7 at (323) 442-1000. Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

- USC Department of Public Safety: UPC - call (213) 740-6000. HSC - on call 24/7 at (323) 442-120. Non-emergency assistance or information.

Subject to Change: Information contained in the course syllabus may be subject to change with advance notice, as deemed appropriate by the instructor.