

Syllabus for Math 415

Modern Algebra I

Fall 2019

Sections 200, 501

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Office: Blocker 513c

Office hours: Wednesday 2:00 to 3:00 pm and Thursday 11:30 am to 12:30 pm or by appointment.

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Class hours:

TR 12:45–2:00 pm BLOC 161

MATH 415 web page: The web page of the course is

<http://www.math.tamu.edu/~nekrash/teaching/19F/415/M415.html>

Text. “A First Course in Abstract Algebra,” 7th ed., by John B. Fraleigh, Addison-Wesley, 2003, ISBN 0-201-76390-7.

Topics covered. This is a first course in abstract algebra. The main topics the course will cover are the introductory theories and applications of groups, rings, and fields. There will be separate homework assignments and exams for two sections.

Grading. Your grade will be determined by homework, two midterm exams and a *cumulative* final exam. The weights of each of these are as follows.

Homework	Exam I	Exam II	Final Exam	Total
20 pt	25 pt	25 pt	30 pt	100
weekly	≈ Oct. 8	≈ Nov. 5	Dec 11, 8:00–10:00 a.m.	

I may curve any grade and will then compute the course grade by the following rule: *A* for at least 90 points, *B* for at least 80 points, *C* for at least 70 points, *D* for at least 60 points and *F* for less than 60 points.

Plan of lectures.

- 8/27** 2. Binary operations. 4. Groups.
- 8/29** 3. Isomorphic Binary structures. 5. Subgroups.
- 9/3** 6. Cyclic Groups.
- 9/5** 7. Generating Sets and Cayley Graphs. 10. Cosets and the Theorem of Lagrange.
- 9/10** 8. Groups of permutations. 9. Orbits, Cycles, and the Alternating Groups.
- 9/12** 12. Plane Isometries.
- 9/17** 11. Direct Products and Finitely Generated Abelian Groups.
- 9/19** 13. Homomorphisms. 14. Factor Groups.
- 9/24** 15. Factor-Group Computations and Simple Groups. 34. Isomorphism Theorems.
- 9/26** 16. Group Actions on a Set.
- 10/1** 17. Applications of G -Sets to Counting.
- 10/3** Overview.
- 10/8** First midterm exam.
- 10/10** 18. Rings and Fields.
- 10/15** 19. Integral Domains.
- 10/17** 20. Fermat's and Euler's Theorems.
- 10/22** 21. The Field of Quotients of an Integral Domain.
- 10/24** 22. Rings of Polynomials.
- 10/29** 23. Factorization of Polynomials over a Field.
- 10/31** 24. Non-commutative Examples. 25. Ordered Rings and Fields.
- 11/5** Second midterm exam.
- 11/7** 26. Homomorphisms and Factor Rings.

11/12 27. Prime and Maximal Ideals. 28. Gröbner Bases for Ideals.

11/14 45. Unique Factorization Domains.

11/19 46. Euclidean Domains.

11/21 47. Gaussian Integers and Multiplicative Norms.

11/26 Overview.

12/3 Overview.

Make-up policy: Make-ups for missed quizzes and exams will only be allowed for a university approved excuse in writing. Wherever possible, students should inform the instructor before an exam or quiz is missed. Consistent with University Student Rules, students are required to notify an instructor by the end of the next working day after missing an exam or quiz. Otherwise, they forfeit their rights to a make-up.

Scholastic dishonesty: Copying work done by others, either in-class or out of class, is an act of scholastic dishonesty and will be prosecuted to the full extent allowed by University policy. Collaboration on assignments, either in-class or out-of-class, is forbidden unless permission to do so is granted by your instructor. For more information on university policies regarding scholastic dishonesty, see University Student Rules.

Remember the Aggie Code of Honor: *“An Aggie does not lie, cheat, or steal or tolerate those who do.”*

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- Allegations of sexual assault, sexual discrimination, or sexual harassment when they involve TAMU students, faculty, or staff, or third parties visiting campus.

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Students and faculty can report non-emergency behavior that causes them to be concerned at <http://tellsomebody.tamu.edu>.