

Math 641-01 Abstract Algebra
Mon-Tue-Thu 11:00 – 11:50 AM
Classroom: Wissink Hall 286
My Office: Wissink Hall 263

Professor: Dan Singer
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Office Hours: MWH 2-3, T 1-3

Course Description: A rigorous excursion through some of the topics of abstract algebra which are essential components of the background of a masters level graduate student.

Prerequisite: Math 345.

Textbook: *Introduction to the Galois Correspondence, Second Edition*, Maureen H. Fenrick, Birkhäuser, 1998.

Course Format: We will study Galois theory this semester with an ultimate goal of proving four outstanding theorems in the realm of abstract algebra and number theory: (1) The field of complex numbers is algebraically closed; (2) polynomials of degree 5 and greater are not necessarily solvable by radicals; (3) certain geometric constructions, such as duplicating the cube, squaring the circle, and trisecting an angle, are not possible using only ruler and compass, (4) for any positive integer n there are infinitely many primes p congruent to $1 \pmod n$. Along the way we will develop the theory of groups, permutations, fields, and polynomials. My plan is to work through all the material up to page 187 of the textbook, which averages out to 12 or 13 pages each week. A tentative schedule is provided on the second page of this syllabus. Please familiarize yourself with the material ahead of schedule so that we can make the most of our class time. I will assign regular homework and collect it weekly. Please write up all solutions carefully, including those I sketch in class. There will be four take-home exams. Students are encouraged to study together and ask questions in class and in office hours, but all homework and exam solutions are to be the work of each student working individually.

Attendance Policy: Attendance is mandatory. Excessive absences will result in a failing grade.

Student Conduct: Please arrive to class on time, do not talk unless making a contribution to the class, and stay for the entire class period. Use of electronic devices (smart phones, laptops etc.) is forbidden.

Academic Integrity: You are welcome to consult the internet or other textbooks for background material, but you must never copy a solution from these sources and claim it as your own.

Grade Calculation: Exams are worth a total of 40% of your grade. Homework is worth a total of 60% of your grade. Each assignment receives points on a 0 — 100 scale. I award grades on a straight scale: 90-100% is an A, 80-89% is a B, etc.

Grade Policy: Your grade is based on your performance during the 16 weeks of the semester in accordance with the grade calculation above. I will not change any grades after they have been submitted to the Registrar, and I will not consent to extra-credit opportunities designed for the express purpose of raising the grade of one individual.

Tentative Class Schedule:

Week 1, August 25, 26, 28: pp. 1 – 13	
Week 2, September 2, 4: pp. 14 – 25	
Week 3, September 8, 9, 11: pp. 26 – 38	Exam 1 distributed
Week 4, September 15, 16, 18: pp. 39 – 50	Exam 1 due
Week 5, September 22, 23, 25: pp. 51 – 63	
Week 6, September 29, 30, October 2: pp. 64 – 75	
Week 7, October 6, 7, 9: pp. 76 – 88	Exam 2 distributed
Week 8, October 13, 14, 16: pp. 89 – 100	Exam 2 due
Week 9, October 20, 21, 23: pp. 101 – 113	
Week 10, October 27, 29, 30: pp. 114 – 125	
Week 11, November 3, 4, 6: pp. 126 – 138	Exam 3 distributed
Week 12, November 10, 11, 13: pp. 139 – 150	Exam 3 due
Week 13, November 17, 18, 20: pp. 151 – 163	
Week 14, November 24, 25: pp. 164 – 175	
Week 15, December 1, 2, 4: pp. 176 – 187	Exam 4 distributed
Finals Week, December 8 – 12:	Exam 4 due