SYLLABUS

MAT 511-001 (8001) **Abstract Algebra I**
August 28, 2017

College of Engineering, Forestry, and Natural Sciences
Dept. of Mathematics and Statistics
10:20 – 11:10 am, MWF, AMB 207
3 credit hours

Lecturer: Michael Falk Office: AMB 132, 523-6891
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Course web page: http://www.cefns.nau.edu/∼falk/classes/511/index511.html
BBLearn page: http://bblearn.nau.edu

Office hours: MW 4:00 - 5:30, TuF 2:00 - 3:00, Th by appt.
I'm also available to students at many other times during the week; drop by or make an appointment.
Virtual office hours: I encourage students to e-mail me with questions - my e-mail address is above. I will respond quickly.

Course web page, BBLearn, and e-mail: On the course web page I will post hints, solutions, and other useful and/or interesting information. In case I want to communicate with the entire class, I will express myself on the course web page. I will use the course BBLearn page to post grade information, exams and solutions. I will also send occasional e-mails to the entire class.

Text: I. Martin Isaacs, *Algebra, A Graduate Course* (required). There will also be several texts on reserve in Cline Library.

Course Content: This first semester of the two-semester Abstract Algebra sequence is concerned with algebra in a noncommutative setting. We will spend the first nine weeks of the semester studying (finite) group theory, including isomorphism theorems, group actions, the Sylow Theorems, direct and semidirect products, solvable and nilpotent groups, and composition series. For the succeeding three weeks, we will study noncommutative rings, to establish the underpinnings of representation theory and character theory. This material will include rings, ideals, and modules, group rings, complete reducibility and Maschke's Theorem. In the final three weeks of the semester we will study character theory, to the point where a proof of the Burnside p^aq^b theorem can be understood. The group theory material is covered in Chapters 1-8 of the text, most sections of which we will cover in detail. The ring theory portion will be primarily based on lecture notes, with Chapters 10-14 of the text, and Chapter 1 of Isaacs' Introduction the Character Theory providing secondary sources. The source for the final portion of the course will be a set of video lectures of a minicourse at MSRI presented by Dr. Isaacs.
The second semester of the sequence will focus on commutative algebra, including the theory of field extensions, Galois Theory, and elementary algebraic geometry or number theory.

Student Learning Outcomes: Upon successful completion of the course, the student will be able to: (i) understand and express in writing the terminology, concepts, basic properties and methodology of groups, ring and fields; (ii) write correct and understandable proofs on the topics of groups, rings, and fields; (iii) demonstrate an understanding of the applications of groups, rings and fields; (iv) apply the Sylow theorems to analyze and categorize finite groups.

Evaluation : There will be three midterm exams worth 120, 140, and 160 points respectively, a cumulative final worth 220 points, eight problem sets worth 30 points each, and less-formal exercise sets worth a total of 120 points. At the end of the semester, students' overall point totals (out of 1000 possible) are "curved" to arrive at letter grades for the course. This curve is based on my judgment of the performance of the individual and the class as a whole, relative to my experience with other students and classes at a similar level. It is unlikely that the distribution will meet the "straight scale" of 90/80/70/60, and it is also unlikely that a score under 50% will earn a C. Students may obtain information on class standing from me at any time. After each exam, I will produce a "provisional curve" to indicate to the class what grades I might give at various points during the semester, but these intermediate curves have no bearing on the final curve.

Course policies and expectations : Students are encouraged to work together and to seek assistance from the lecturer on all homework. Please don't work in groups larger than three or four. If you use resources such as web pages or other textbooks in a substantial way in your solutions, I have no objection, but these sources should be cited. In every case, students' submitted work should be written individually by the submitting student. Students are expected to attend class, except in case of illness or institutional excuse, engage with the material being presented, take notes, and ask questions in and out of class to mitigate any confusion or lack of understanding. Students are expected to silence cell phones and not use them during class.

Late homework can be handed in any time during the semester for half credit; if handed before solutions are posted (typically the day after the due date), the student will receive 3/4 credit. Students may *use* posted solutions as they work on late homework, but must rewrite the solutions in their own words – copying *verbatim* from my solutions is plagiarism, and will not be granted any credit.

In working on the take-home mid-term exams, students may consult their own lecture notes and any textbooks or web pages, but may not discuss any part of the exam with any other person, in person or via electronic means, except for me. Solutions should not be mined from the web, or otherwise lifted from other peoples' work; students should submit their own work. Enforcement is by the honor code - all students are expected to act with honesty and integrity, in fairness to all. If this is not possible, exams will be given in class. In case of confusing and/or incorrect problem statements, on exams or homework, students should e-mail, telephone, or talk to me in person, and/or check their own e-mail and the course web page. Late exams will not be accepted, except in extremely compelling circumstances.

Tentative exam dates :

Exam 1 (take-home)	Wednesday 9/27, due Tuesday 10/2 (6 pm)
Exam 2 (take-home)	Wednesday 10/25, due Tuesday 10/31 (6 pm)
Exam 3 (take-home)	Wednesday 11/22, due Tuesday 11/28 (6 pm)
Final Exam	Monday 12/11, 10:00 am - 12:00 pm