SYLLABUS

MAT 411 **Introduction to Abstract Algebra**
August 26, 2019

College of the Environment, Forestry, and Natural Sciences
Dept. of Mathematics and Statistics
10:20 - 11:10 am, MWF, AMB 220
3 credit hours

Lecturer: Michael Falk Office: AMB 132, 523-6891
 e-mail: `michael.falk@nau.edu`
 Personal web page: `http://www.cefns.nau.edu/∼falk`
 Course web page: `http://www.cefns.nau.edu/∼falk/classes/411/index411.html`
 BBLearn page: `https://bblearn.nau.edu/webapps/login/`

Office hours: MT ThF 3:00 – 4:00. Weekly Problem Session: W 3:00 – 4:00, location to be determined. I'm also available to students at most other times during the week - I will post my teaching/seminar schedule on my office door. Please don't hesitate to 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.

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

Prerequisite: Grade of C or better in MAT 320(W), Foundations of Mathematics

Text: *Abstract Algebra and Applications*, by Audrey Terras.

Course Content: 1. Group Theory: axioms, examples of groups of numbers, matrices, and permutations; abelian groups, cyclic groups; order of an element, subgroups, cosets, normal subgroups, factor groups, homomorphisms, kernels; Cayleys Theorem, LaGranges Theorem, First Isomorphism Theorem. 2. Rings: axioms, examples of rings of numbers, matrices, and polynomials; unity, units, divisibility, zero-divisors, integral domains, division rings, field of quotients, ideals, homomorphisms, factor rings, prime and maximal ideals. 3. Fields: axioms, examples; polynomials, divisibility criteria, irreducible polynomial, construction of finite fields and their cyclic multiplication groups.

Student Learning Outcomes: Upon successful completion of the course, students will be able to do the following within the topics of groups, rings and fields: 1. Read and write expository text on elementary aspects. 2. Distinguish truth from falsehood. 3. Provide examples and counterexamples of statements. 4. Perform needed computations. 5. Construct concise and correct proofs.

Evaluation: The grading system is based on a total of 1000 points, apportioned as follows: homework (problem sets and exercises) - 350 points; three midterm exams - 360 points; comprehensive final exam - 250 points, attendance - 25 points. Two types of homework will be assigned and collected weekly: problem sets and exercises. Exercises will be assigned from the text, collected on Monday of each week except when there is an exam, starting week 3, will be read and commented on and graded on a binary scale. The total exercise score will comprise 125 points of the homework grade. Problem sets will be assigned (almost) weekly, and collected on Wednesdays; there will be ten in all, worth 20 points each. Problems will be selected from the exercises, or will come from my problem bank, and will be distributed electronically. Homework may be submitted (and graded) electronically. There will be three mid-term exams, given in class, on Wednesday of weeks five, nine, and thirteen, and worth 120, 140, and 140 points, respectively. Attendance will be taken daily; there are no excused absences, because the effect of one absence on the overall grade is just 0.06%. If there are unusual circumstances resulting in a several absences, please speak with me about it. Course letter grades will be determined by the distribution of course point totals; estimates of current course grades will be provided after each exam, and can be obtained from me at any time. Barring unusual circumstances, the median score will be in the middle to upper part of the C range; this is typically around 65%. The lowest A is typically around 85%.

Academic Integrity and late homework policy: Students are encouraged to talk about the homework with each other, to read and comment on each others' work, and to consult outside sources, but should submit solutions that they have composed themselves. Anything quoted verbatim from other sources must be enclosed in quotes, and should be kept to a minimum, to avoid plagiarism. Any outside help, from fellow students or from other people or resources such as web pages, textbooks, or solutions manuals, should be explicitly acknowledged.

Students are encouraged to complete the AcademicIntegrity@NAU course in their BBLearn shell, or otherwise to review the new university academic integrity policy, to understand their responsibilities and rights in case of violations. Students will be asked to confirm the following statement with their initials on each exam and problem set: "I affirm that all work submitted in this assignment is my own original work and all work from other sources is acknowledged and cited."

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 should submit solutions that they write themselves, as discussed above.

Exams : *Students may bring one sheet of notes to consult during in-class exams.* This is a blanket policy, and will apply even if it is not explicitly announced in class. Three to four pages of notes will be allowed for the final exam.

Tentative exam dates:

Exam 1	Wednesday 9/25
Exam 2	Wednesday 10/23
Exam 3	Wednesday 11/20
Final Exam	Monday 12/9, 10:00 am - 12:00 pm