

FOUNDATIONS OF ADVANCED MATHEMATICS

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Office hours: by appointment

Textbook: A Transition to Advanced Mathematics by Smith, Eggen, and St. Andre, 8th edition, Brooks/Cole, 2015

Goals and Objectives: The primary goal of MA225 is to prepare students for upper level courses in mathematics. We want them to be able to read and understand written mathematical material and to express mathematical ideas clearly. Here are some specifics: We want to share with our students the “creative” aspect of mathematics; we want them to be able to explore examples, make conjectures and understand the mathematics driving the results; We want our students to understand and be able to write formal mathematical arguments, to understand when there is a need for such arguments and to show that they possess a sound understanding of the underlying mathematics as revealed in the construction of proofs; We want our students to understand and be able to use mathematical language; we want them to be able to express mathematical concepts using precise mathematical symbols and prose; We want our students to understand a core of fundamental mathematical concepts. Throughout the course, a strong emphasis should be placed on conjecturing and the verification or rejection of those conjectures through proofs. The students should be able to apply different techniques of proof and understand when each is appropriate. In summary, students should learn to use the basic language of mathematics (logic, sets, relations, functions) and they should learn to outline, write and criticize mathematical proofs about numbers, sets, relations, functions and cardinality.

Grading: 55% Tests (3); 20% Homework/Quiz; 25% Final exam: the +/- system will be used: 98 - 100 A+; 92-97 A; 90-91 A-; 88-89 B+; 82-87 B; 80-81 B-; 78-79 C+; 72-77 C; 70-71 C-; 68-69 D+; 62-67 D; 60-61 D-; 0-59 F

Absences: No penalty for excessive absences; the reward for good attendance (2 absences or fewer) is to have your worst test grade count half as much as the other two tests. (wo/reward: 18.33/18.33/18.33 or w/reward: 22/22/11)

Homework/Quiz: Homework will be assigned and graded on a regular basis; each homework counts the same amount. Most of the work done outside of class has to do with proof, and it is very important for the students to get plenty of practice writing and critiquing proofs on their own. Quizzes will be announced at least one class period ahead of when they will be given, unless student inattention indicates otherwise.

Students with **documented disabilities** (through NCSU's DRO) will be given all necessary accommodations. Instructor must have paperwork well before testing begins.

Academic Integrity Statement: Academic dishonesty includes the giving; taking, or presenting of information or material by a student with the intent of unethically or fraudulently aiding oneself or another person on any work which is to be considered in the determination of a grade or the completion of academic requirements. More specific definitions are set in the NCSU Code of

Student Conduct. The honor pledge: "I have neither given nor received unauthorized aid on this test or assignment."

Final Exam: Tuesday, June 19 8:00 – 11:00 am SAS1220

J. Griggs' homepage (link to test solutions): <https://jrgriggs.wordpress.ncsu.edu>

Content:

- Chapter 1: Logic and Proofs – all sections (1 week)
- Chapter 2: Set Theory and Mathematical Induction – 2.1 – 2.5 (1 week)
- Chapter 3: Relations – 3.1 and 3.2 (1/2 week)
- Chapter 4: Functions – 4.1 – 4.3 (1. 1/2 weeks)
- Chapter 5: Cardinality – 5.1 – 5.3 (1/2 week)

Test Dates (3): TBA