Math 290–001 (Introduction to Advanced Mathematics)
Fall 2018

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Office hours: TR 10:30am–12:00pm, and by appointment.
Text: D. Smith, M. Eggen, R. St. Andre, *A Transition to Advanced Mathematics* (eighth edition)
Topics: The course will cover portions of Chapters 1–5 in the text.

General Comments:

The main purpose of this course is to teach the student how to write, read, and recognize correct mathematical proofs. Along the way, the student will be introduced to some elementary concepts of advanced mathematics including elementary propositional logic, set theory, relations, functions, and cardinality.

This course has been designated by the Math Department as a writing-intensive course. Therefore much emphasis will be laid on correct grammar, good organization and clarity of expression as well as correct logic in all graded work.

Content for this course will be delivered in the form of both in-class lectures and recorded lectures that are to be watched outside of class. This means that there will be some work done in class that will be collaborative in nature. Details on this will be provided as needed. Recorded lectures will be made available through BlackBoard.

A BlackBoard page will be set up for this course. This page will contain announcements, handouts, solutions to exams, class notes, and other important information. You should check BlackBoard regularly to avail yourself of these helpful resources.

You are required to be familiar with some flavor of the mathematical typesetting software TeX, such as LaTeX. You are not expected to come in with this familiarity, but it is required that you typeset solutions to the homework sets using TeX. More details on this will be available on the BlackBoard page for this course.

This class is identified as a Students as Scholars Scholarly Inquiry course. Through the individual written assignments and group work, emphasis will be placed on learning the type of thinking that is involved in understanding advanced mathematical concepts, and in furthering the mathematical enterprise. This includes learning how to formulate conjectures and proof strategies based on evidence gathered from examples, and special cases. In addition, the student will learn the value of the proper formulation of a definition. All of these are basic skills required to understand the motivations and techniques that inform all mathematical research. Finally, students will learn how to write mathematics using the TeX software package which is how virtually all professional mathematics is written.

Grading:

Homework Exercises: Included with this syllabus is a list of homework exercises for the course taken from the exercises at the end of each section of the book. Students are expected to

complete these homework problems in a timely fashion as the corresponding sections are covered in class. These exercises will not be collected. Collaboration is *encouraged* on these assignments.

Graded Writing Assignments: There will be approximately 10 short writing assignments given throughout the semester. The assignments will involve writing mathematically and grammatically correct solutions to problems, usually involving proofs. Your grade for these assignments will be based on the correctness of your proofs and clarity and correctness of your writing. You will receive feedback on your writing assignments which will total at least 3500 words according to the guidelines of the Writing Across the Curriculum Committee. Precise assignments and due dates will given on BlackBoard. Collaboration is **not permitted** on these assignments.

The student should be aware of the following requirements for all homework sets:

- No late assignments will be accepted under any circumstances.
- All assignments are to be typed up using some flavor of TeX, such as LaTeX, and are to be submitted to me electronically through BlackBoard as a *pdf* file (no other file format is acceptable).

If any one of these rules is violated, the assignment will not be accepted. *You have been warned.* The average of your written homework assignment scores will count for 40% of the final grade.

In-Class Work: As mentioned above, there will be some graded assignments that will be done in-class, some of which may be collaborative in nature. Details will be provided on the nature of these assignments on Blackboard close to the time each is assigned. Your average score on these assignments will count for 10% of the final grade.

Semester Project and Presentation: You will be required to submit a semester project consisting of (1) a written paper of at least 3500 words (so around 7 pages) on a mathematical topic of your choosing (but approved by me) and (2) a 15 minute presentation to be given at the end of the semester. The goal of the project will be for you have the experience of investigating and understanding a somewhat advanced mathematical topic to sufficient depth to write an expository paper on that topic and give a presentation of your paper to your classmates. Details and due dates will be posted on Blackboard. Your grade on the project will count for 15% of your final grade.

Midterm Exams: One midterm exam will be given which will take the full class period, on Tuesday November 6. The midterm exam will count for 15% of the final grade. Makeup exams will be given only in cases of extreme hardship and then only when the student has ***contacted me in advance***. If I am not contacted in advance, no makeup will be given.

Final Exam: There will be a **cumulative final exam** given on Thursday, December 13, 2018, 7:30am–10:15am in the same room where we have class. The final exam will count for 20% of the final grade.

The grading scale is as follows, and is based on your correctly rounded semester average. There will be no curve.

A+:	98+	A:	93 - 97;	A-:	90 - 92;
B+:	88 - 89;	B:	83 - 87;	B-:	80 - 82;
C+:	78 - 79;	C:	73 - 77;	C-:	70 - 72;
D:	60 - 69;			F:	0 - 59

Homework Exercises

Section	Exercises
1.1	1(a)-(e), 2(a)-(f), 3(a)-(g), 4(a)-(g), 5(a)-(c), 6(a), 6(d), 8(a)-(b), 10(a)-(c)
1.2	1(a)-(e), 2(for parts (a)-(e) of 1), 3(a)-(d), 4(a)-(e), 5(a)-(d), 6(a)-(c), 12(a)-(c), 16(a)-(d)
1.3	1(a)-(e), 2(for parts (a)-(e) of 1), 5, 8(a)-(e), 10(a)-(d)
1.4	3, 5(a)-(e), 6(a)-(d), 7(a)-(e), 9(a)-(b)
1.5	3(a)-(d), 4(a)-(c), 6(a)-(b), 7(a)-(c)
1.6	1(a)-(f), 2(a)-(c), 4(a)-(e)
1.7	1(a)-(f), 2, 3(a)-(e), 5(a)-(e), 7(a)-(b), 8(a)-(c), 9(a)-(c)
1.8	6(a)-(c), 7(a), (b), (d), 9(a)-(b), 10, 11, 13, 15, 17(a)-(c)
2.1	1(a)-(e), 4(a)-(e), 5(a)-(g), 6(a)-(c), 7, 8, 9, 14(a)-(d), 15(a)-(g), 17(a)-(f)
2.2	1(a)-(e), 2(a)-(e), 6(a)-(e), 9(a)-(d), 10(a)-(c), 11(a)-(c), 15(a)-(d), 17(a), (b)
2.3	1(g), (i), (n), (o), (p), 7, 8, 9(a), (b), 10, 16(a)-(c)
2.4	1(a)-(c), 2(a)-(c), 4(a)-(e), 5(a)-(c), 6(a)-(c)
2.5	1(a)-(c), 3, 2, 5(a)-(b), 7(a), (b), (d), 9, 13(a)-(b)
3.1	1(a)-(b), 2(a)-(e), 6(a)-(d), 7(a)-(c), 8(a)-(d), 9(a)-(d)
3.2	1(a)-(e), 2(a)-(d), 5(a)-(b), 6(a)-(c), 8(a)-(c), 11, 15(a), 17, 18
3.3	2(a)-(c), 3(a)-(c), 4(a)-(c), 6, 10
3.4	3, 8(a)-(b), 9(a)-(b), 10
3.5	1(a), (b), (c), (f), 2(a)-(c), 3, 4, 8, 9(a)-(b)
4.1	1(a), (b), (d), (i), (j)-(e), 13(a)-(c), 14(a)-(c), 15(a)-(c)
4.2	5(a)-(b), 9(a)-(b), 12
4.3	1(a)-(f), 2(for parts (a)-(f) of 1), 4, 5, 6, 9(a)-(d), 12(a)-(b)
4.4	1, 3(b), (d), 4, 5(a), 6, 8
4.5	1(a), 2(a)-(d), 4(a)-(d), 7(a)-(c), 10(a)-(b), 12(a)-(c), 13(a)-(b), 14(a)-(b)
5.1	4, 7(a)-(b), 8(a)-(b), 10, 12, 13, 17, 18(a)-(b), 19(a), (e)
5.2	1, 3(a)-(c), 4(a)-(c), 10, 11
5.3	5(a), (b), (d), 6, 7, 9(a)-(c), 11, 12(a)-(b), 14(a)-(b)2, 8(a)-(c), 10, 12, 13(a), 14(a)-(b)
5.4	3(a)-(b), 4(a)-(c), 5, 7, 9(a)-(c), 13(a)-(c), 11, 15
5.5	1(a)-(d), 3, 5, 8