

MATH 300

Introduction to Proof with Real Analysis

Fall '17

MTWR 3:00 - 3:50 CCC 111

Instructor: Dr. Susan Talarico

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Office Hours: T, W 1:00 – 1:50

R 2:00 – 2:50

**or by appointment **

Text: Analysis with an Introduction to Proof, 4th ed., by Steven Lay

Prerequisite: Math 121

Course Goals:

Math 300 is a transition from computational to abstract mathematics. Students will learn logic, proof techniques, set theory, relations and functions; elementary properties of integers, rational numbers, and real numbers; open sets, closed sets, cardinality, limits, and continuous functions; also reading and writing formal mathematical proofs.

Course Learning Outcomes:

- Students will be able to recognize classic methods of mathematical proof-writing including induction and proof by contradiction. Students will be able to write correct proofs in a mathematical format.
- Students will be able to read proofs written by someone else and identify whether they are correct or not. If the proof is incorrect, the student will be able to explain what is incorrect.
- Students will understand basic set theory and the properties of real numbers and real functions well enough to write correct proofs about said topics.

The outcomes of this course align well with the *General Education Learning Outcomes for Written Communication in the Major*: upon completion of the course, students will be able to

- apply discipline specific standards of ... written communication to compose an articulate, grammatically correct, and organized ...piece of writing with the [proper support]... suitable to the audience, and
- critique their own and others' writing... presentations to provide effective and useful feedback to improve their communication.

Course Outline:

Chapter 1: Logic and Proof (Sections 1-4)

Chapter 2: Sets and Functions (5-8)

Chapter 3: The Real Numbers (10-13)

As time allows, selected sections from:

Chapter 4: Sequences (16, 17, 19)

Chapter 5: Limits and Continuity (20-22)

Attendance Policy: Attendance is expected at each class period. It is your responsibility to obtain notes and information from missed class time. Any arrangements for make-up quizzes and exams must be made before the scheduled quiz or exam time, and then only for sufficient reason.

Evaluation: Your final grade will be determined as follows - 600 pts total:

Homework	20%	
Quizzes	17%	
Proof Critiques	13%	
Exams	30%	3 in-class exams
Final Exam	20%	comprehensive final exam

Exams: There will be 3 in-class exams.

Tentative dates:

Thursday, October 5th

Thursday, November 9th

Thursday, December 7th

Make-up exams will be available only in very special cases and will be handled on an individual basis. Arrangements in such cases must be made prior to the examination.

Quizzes: There will be 5 in-class quizzes.

They will all be announced ahead of time.

Proof Critiques: When I hand back a HW assignment (once we start writing proofs), we will begin in-class critiquing an anonymous classmate's typeset proof. I will hand out copies of the proof and have you write comments on the proof. We will then, together as a class, discuss what you found. The goal of this is to gain practice recognizing mistakes in proofs (both issues with the mathematical logic and with the actual writing, including stylistic issues regarding either Word or LaTeX), and to practice clarifying written work. You can then use what we discuss and apply it to your typeset proof for resubmission.

Homework: Homework problems will be given for each section covered and turned in for grading. Your success in learning the material presented requires that you complete each assignment and do not fall behind. Write your answers NEATLY, IN ORDER, AND WELL-SPACED. Do not crowd your writing or skimp on space. We will use some class time to go over HW questions. We will not, however, have enough class time for all of the questions that may arise. I recommend working together with classmates *and consulting me during my office hours*. **When working with others, be certain to WRITE UP YOUR OWN ANSWERS, not copy another student's work (plagiarism!).** Homework will be collected approximately once per week.

DON'T CHEAT

The university has developed a set of expectations for the conduct of all students and instructors. This set of expectations is known as the *Rights and Responsibilities* document, and it is intended to help establish a positive living and learning environment at UWSP. It is located here: <http://www.uwsp.edu/dos/Documents/CommunityRights.pdf>. For more information see the UWSP "Student Academic Standards and Disciplinary Procedures" section of the *Rights and Responsibilities* document, Chapter 14.

Looking up a mathematical proof online, copying it down and submitting it as your own work is *academic dishonesty and plagiarism*. This is UNACCEPTABLE!

Final Exam: The final exam is comprehensive.

Exam time: Thursday, December 21st, 8-10 a.m.

NOTE:

- You may not leave the classroom while taking a quiz or exam, including the final exam.
- You may not use a cell phone, smartwatch, or any computing device capable of remote transmission on a quiz or exam. In fact, you must stow your smartwatch away in your backpack during any quiz or exam.

Grading Scale:

Course letter grades will be based on the scale below, with + and - marks within each range. I may adjust this scale downward if the class average warrants.

A: 90 - 100

B: 80 - 89

C: 70 - 79

D: 60 - 69

F: below 60

I may use discretion to raise a student's grade if her/his final grade does not reflect the quality of her/his work in the course (for example, from a low exam score early in the course). I will not, however, use such discretion to lower a student's final grade.

Rights & Responsibilities: You are expected to be fully aware of your rights and responsibilities as a UWSP student.

In accordance with UW system policies, Math 300 is dedicated to a *safe, supportive and non-discriminatory environment for all persons regardless of age, race, religion, gender, sexual orientation or disability, etc.*

Relevant websites:

UWSP Community Bill of Rights and Responsibilities:

<http://www.uwsp.edu/dos/Documents/CommunityRights.pdf>

In particular, this includes the UWSP Student Academic Disciplinary Procedures:

<http://www.uwsp.edu/dos/Pages/Academic-Misconduct.aspx>

Information concerning accommodations made as per Section 504 of the Rehabilitation Act or the Americans with Disabilities Act can be found at:

<http://www.uwsp.edu/disability/Pages/legalInformation/index.aspx>

In particular, to request any accommodations of this type, relevant to this class, please discuss the matter with the Disability Services Office. Information and contact information may be found at:

<http://www.uwsp.edu/disability/Pages/testingAccommodations/default.aspx>