

**PRACTICAL INFORMATION**

Class time: MWF 9:00–9:50 am  
Class room: MATH 115  
Instructor: Dr. Alexander Solynin  
Office: MATH 231  
Office hours: MWF 3:00–4:00 pm or by appointment  
E-mail: alex.solynin@ttu.edu

**COURSE DESCRIPTION**

The goal of this course is to teach students how to construct and organize their mathematical reasoning and develop skills for reading and writing mathematical proofs.

**Required text:** *Mathematical Proofs: A Transition to Advanced Mathematics*, 4<sup>th</sup> edition by Chartrand, Polimeni, and Zhang. Pearson (2018).

**Expected learning outcomes:** The students will understand and be able to use the following concepts:

- Sets (element, subset, union, intersection, product, cardinality)
- Functions (injective, surjective, bijective, composition)
- Equivalence relations (equivalence class, congruence module  $n$ , modular arithmetic)

The students will become proficient in reading and writing mathematical proofs. To this end the following concepts will be covered:

- Truth tables and logic (statements, negation, implications, quantifiers, logical equivalence)
- Direct proofs
- Contrapositive proofs
- Proof by contradiction
- Proof by cases
- Proof by mathematical induction

**LEARNING ASSESSMENT**

Graded assessment is done through homework and exams. Other assessment techniques will also be used, such as direct questioning and discussions during office hours. Additionally, problems will be assigned for student self-assessment. The homework problems will focus on the concepts listed above. They will be constructed such that they facilitate the students' development of skills in understanding and creating written mathematical argumentation. Exam problems will be constructed such as to test if the students have acquired the expected command of the concepts and developed the expected skills in mathematical argumentation.

**COURSE ORGANIZATION**

The plan is to cover sections 1.1–1.6, 2.1–2.10, 3.1–3.4, 4.1, 5.1–5.2&4, 6.1–6.3, 9.1–9.6, 10.1–10.5, and 11.1–11.3.

**Midterm exams:** In class on 24 February and 8 April, 9:00–9:50 am.

**Final exam:** Thursday, May 7, 2020, 7:30am - 10:00am, Room MATH 115.

**ASSIGNMENTS, ATTENDANCE, GRADES, AND GRADING**

Homework will be assigned every week during the semester.

**Deadlines and make-up exams:** Homework is not accepted after the deadline. Make-up exams are only given if the original exam was missed for a valid, university approved, reason.

**Grading policy:** On exams, partial credit for correct steps will be awarded even if the final answer is wrong. Full credit will be given only if the final answer and all intermediate steps are correct. A correct final answer does not *per se* guarantee any credit.

**Final grade:** Homework 15%, Pop Quizzes 15%, First Midterm Exam 20%, Second Midterm Exam 20%, and Final Exam 30%. Students with less/equal than 4 missed classes for the entire semester will receive a bonus of 4% on the final grade.

## GENERAL POLICIES

**Academic integrity:** It is the aim of the faculty of Texas Tech University to foster a spirit of complete honesty and high standard of integrity. The attempt of students to present as their own any work not honestly performed is regarded by the faculty and administration as a most serious offense and renders the offenders liable to serious consequences, possibly suspension. "Scholastic dishonesty" includes, but it not limited to, cheating, plagiarism, collusion, falsifying academic records, misrepresenting facts, and any act designed to give unfair academic advantage to the student or the attempt to commit such an act. See [www.depts.ttu.edu/opmanual/OP34.12.pdf](http://www.depts.ttu.edu/opmanual/OP34.12.pdf).

**Students with disabilities:** Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services (SDS) during the instructor's office hours. Please note: instructors are not allowed to provide classroom accommodations to a student until appropriate verification from SDS has been provided. Please see more on-line at

[www.depts.ttu.edu/opmanual/OP34.22.pdf](http://www.depts.ttu.edu/opmanual/OP34.22.pdf)

**Religious holy days:** Students are allowed to take time to travel and observe a religious holy day as detailed in [www.depts.ttu.edu/opmanual/OP34.19.pdf](http://www.depts.ttu.edu/opmanual/OP34.19.pdf). Note that prior notice must be given to the instructor in writing.