

**PRACTICAL INFORMATION**

Class time: MWF 11:00–11:50 am  
Class room: MATH 108  
Instructor: Lars Winther Christensen  
Office: MATH 251  
Office hours: TF 12–1 pm, F 2–3 pm or by appointment  
E-mail: [lars.w.christensen@ttu.edu](mailto:lars.w.christensen@ttu.edu)  
Course homepage: [www.math.ttu.edu/~lchrste/teaching.html](http://www.math.ttu.edu/~lchrste/teaching.html)

**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).

**Prerequisites:** Math 2450 or consent of the department.

**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; these include direct questioning, problems to be solved in class, 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**

Of the 43 class periods, 37 will be spent on lectures and in-class activities and 6 on exams and feedback. The plan is to cover sections 1.1–1.6 (5 class periods), 2.1–2.10 (6 c.p.), 3.1–3.4 (5 c.p.), 4.1

(1 c.p.), 5.1–5.2&4 (3 c.p.), 6.1–6.3 (6 c.p.), 9.1–9.6 (4 c.p.), 10.1–10.5 (5 c.p.), and 11.1–11.3 (2 c.p.). Reading assignments are posted on the course homepage, which is updated after every class.

**Exams:** In-class exams take place on Wednesday 20 February, Monday 25 March, and Wednesday 24 April. The final exam is on Monday 13 May, 1:30–4:00 pm.

**Other important dates:**

Martin Luther King Jr. Day	21 January
Last day to drop a course without penalty	2 February
Spring Break	9–17 March
Last day to drop a course	27 March
No classes	22 April
Last day to withdraw	2 May

## ASSIGNMENTS, GRADES, AND GRADING

Two in-class exams are given during the semester. Regular homework will be assigned 12 times during the semester; in addition 4 week long projects will be assigned during the semester. Students are encouraged to work together on the homework problems. Results and grades are posted at [www.blackboard.ttu.edu](http://www.blackboard.ttu.edu).

**Grading:** On exams and homework, 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.

**Attendance:** Students who without valid reason miss 5 classes receive no attendance credit, those who miss 3 or 4 classes receive half credit, and those who miss at most 2 classes receive full credit.

**Deadlines and make ups:** 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.

**Final grade:** Homework (10 assignments), projects (4), and exams (4) are counted towards the final grade with weights as follows: Homework 30% (3% ea.), projects 12% (3% ea.), in-class exams 30% (10% ea.), and final exam 20%. Attendance counts for 8%.

## 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. For additional information, please contact SDS in West Hall or call 806-742-2405. 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.