

Instructor: Dr. Chris Black  
Office: Snoqualmie Hall #302B  
Office Hours: W 2:30 - 4:00, and by arrangement  
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Required Text: *How to Prove It: A Structured Approach*, Second Edition, Daniel J. Velleman, Cambridge University Press, 2006

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#### GOALS FOR COURSE:

Upon completion of MATH 260, students will:

- ... be able to understand and use logical terminology and symbolism, and to write the contrapositive and negation of a compound statement and determine its truth value;
  - ... be able to present logically correct proofs of mathematical statements, using a variety of methods including mathematical induction and proof by contradiction, and be able to determine the veracity of a mathematical statement and then prove or disprove it;
  - ... understand and prove theorems in areas which are basic to much of mathematics, including set theory, functions and relations, elementary number theory and cardinality;
  - ... actively participate in the classroom dialogue, both as an individual and as a member of a small group;
  - ... increase their use of precise mathematical language, both orally and in writing;
  - ... gain sufficient mathematical maturity to be able to successfully undertake the advanced mathematics courses in the remainder of the Career Switcher program.
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#### COURSE PHILOSOPHY:

In this course, we will be using topics from many different branches of mathematics to illustrate different logical structures and methods of proof techniques. We will touch upon ideas in set theory, number theory, calculus, linear algebra, and other topics not listed here. Because modern mathematics is rooted in set theory, much of our ideas will be expressed using set-theoretic terminology. We will focus on learning to speak and write in concise mathematical language, and to formulate and prove our own propositions in areas that form the basis for advanced mathematics.

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#### PROBABLE COURSE TOPICS:

- Sentential and quantificational logic, including truth tables, connectives and set theory
  - Proof strategies & techniques: negations, conjunctions, existence and uniqueness proofs
  - Relations & functions
  - Mathematical induction
  - Cardinality & infinite sets
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#### GRADING:

Homework:	150 - 200 points, as needed
Take-Home Exams (2):	100 points each
Final Exam:	100 points
Participation:	30 points
Attendance/Citizenship:	20 points

#### PARTICIPATION:

One of the goals of this course is to increase your comfort with precise mathematical language. Your future career in the classroom demands that you can communicate using correct mathematical language and symbols, clearly and succinctly. To this end, I will often solicit answers/solutions from the class, and you will be expected to volunteer to present your work at the board. If necessary, I will ‘volunteer’ you, but I prefer that you willingly join in the classroom discussion.

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#### HOMEWORK:

Much of your work for this course will not be collected and graded, and solutions to those problems will be available on Blackboard. Beginning in Chapter 3, I will collect a few selected problems each week. The majority of these problems will be written proofs, which are expected to be written formally. Proofs will be graded according to the *Homework Writing Guidelines*. You may work in groups to discuss the homework problems, however the final version should be written individually. **It is considered plagiarism to find solutions to proofs assigned as homework in other texts or on the internet.** You are invited to come see me for hints on homework problems.

#### HOMEWORK REWRITES:

The main purpose of this course is the mastery of mathematical proof. However, it is not to be expected that this mastery will occur with only one attempt. Thus, graded proofs can be re-worked and re-submitted up to two times. If no numerical grade was assigned, then the proof **must** be rewritten; if the proof received a numerical grade, then you can decide whether or not to rewrite it to improve your score. The score on a rewrite replaces the original score for a problem. When I return homework papers, I will stamp them with the return date. You have one week from that date in which you can analyze your errors, re-write these proofs and return them to me. Each re-written problem must be accompanied by a brief reflection (a few well-thought-out sentences) on the nature of your error, and how you’ve remedied the problem in your rewritten work.

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#### ATTENDANCE/CITIZENSHIP:

Discussion, interaction, and group problem solving will all be important aspects of this course, which necessitate your attendance. Citizenship addresses your behavior and comportsment with class members and the instructor. We each need to be respectful of other students, other cultures, and differing ideas within our learning community. In particular, in a class where you are expected to critique each other, we need to keep our comments constructive.

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#### HONOR AND RESPECT:

Each of us should consider our placement at this institution to be a privilege. We need to have respect for one another, and for ourselves. In light of these facts, cheating in any form will not be tolerated. You are encouraged to work together on homework problems, however anything you turn in with your name on it should have been written by you alone (or with members of an assigned group). In a course where much of your grade is determined by your proof writing, plagiarism is a concern. The word “plagiarize” is defined by Merriam-Webster as “to steal and pass off (the ideas or words of another) as one’s own: use (another’s production) without crediting the source.” This is a very serious offense, and will jeopardize your position in the program.

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#### DISABILITY SERVICES:

Students with disabilities may arrange for academic adjustments by providing the instructor with a copy of the “Confirmation of Eligibility for Academic Adjustments” from the Disability Support Services Office as soon as possible. To obtain this form, contact the Disability Support Services Office at the main campus at [dssreceipt@cwu.edu](mailto:dssreceipt@cwu.edu) or (509) 963-2171.