

Instructor: Dr. Chris Black  
Office: Snoqualmie Hall #302B  
Office Hours: Tuesdays 10:15 - 11:15, 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 Teaching Secondary Mathematics 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, many 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

#### GRADING:

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|-------------------------|-----------------------------|
| Homework:               | 200 - 250 points, as needed |
| Take-Home Exams (2):    | 100 points each             |
| Final Exam:             | 150 points                  |
| Presentations:          | 50 points                   |
| Participation:          | 15 points                   |
| Attendance/Citizenship: | 25 points                   |

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#### 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, both orally and in writing. To this end, I will often solicit answers/solutions from the class, and you will be expected to present your work at the board. You are expected to willingly join in the classroom discussion.

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#### HOMEWORK:

Much of your work for this course will not be collected and graded. You will be assigned several problems from each section of the text; three of these are candidates for presentations (see below); two of these problems will be presented, and the third will be collected and graded. The majority of these problems will be 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 versions 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 primary goal of this course is 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.

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#### PRESENTATIONS:

Each day, two or three students will present solutions to selected homework problems. Each presentation will be graded out of 25 points. Students will be chosen at random to present their work. The highest two presentation scores of the quarter will count toward the course grade. Problems presented can be resubmitted if necessary.

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#### EXAMS & FINAL EXAM:

Exams will be given as take-home exams, during which the only allowed sources are the professor and the textbook. The final exam will take place on **Thursday, 12/10/09** from 9:00 - 11:00 am. The 100-point final exam will be scaled to 150 points for the final grade calculation.

#### 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 comportment 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. 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 [dssrecept@cwu.edu](mailto:dssrecept@cwu.edu) or (509) 963-2171.