

**MATH 310: Mathematical Reasoning**  
**Fall 2014**                      **Section 001**                      **3 credit hours**

**Instructor: Kristen Abernathy**

**Instructor's Teaching Schedule:** MWF 9:30-10:45  
MW 11:00-12:15  
W 3:30-4:45  
TR 12:30-1:45

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**Office:** Bancroft 148

**Office Phone:** 803-323-4681

**Math Department:** 803-323-2175

**Campus Email:**

**Office Hours:** M 3:00-4:30  
W 2:00-3:30  
and by appointment.

The instructor reserves the right to make modifications to this syllabus. Students will be notified in class & by email.

**Determination of Grade:**

**Worksheets (10%)** Group work will be an integral component in familiarizing ourselves with the art of proofs. To that extent, each student will be designated a group and we will have group work that supplements the lecture material. One group will present their example at the end of class and each group is expected to turn in a completed worksheet. These worksheets will be posted online to give the class several examples to look over. In the event that a student misses a class, that student may complete the worksheet on their own and turn it in at the beginning of the next class.

**Homework (20%)** Homework will be assigned every class period and due every Monday. When I collect homework on Monday, I will grade the problems, but not correct them. If a student receives points off for a homework problem, I will simply underline at which step the student began to go wrong. I will return the first round of graded homework on Wednesday and the student has the option to correct the mistakes for half the deducted points back. I encourage you to take advantage of this option, not only to improve your homework grade, but to fully commit to learning the process of coherently and intelligently conveying your ideas and logically arguing your points in the area of mathematics.

**Tests (50%)** There will be three tests during the course of the semester. These tests will be announced in class and posted on the course website as the test day approaches (at least two weeks in advance). Each test will have an in-class portion and a take-home portion. The in-class portion will focus on the memorization of definitions, theorems, examples, and simple proof techniques. The take-home portion will focus on the problems that require more time to think through the best answer. The in-class portion will account for 60% of each test and the take-home portion will account for 40%. The take-home portion will be open book and open notes, but it must be the course textbook (no supplementary material).

You are expected to take the tests and the final exam at the scheduled time. Make-up tests are not given. An unexcused absence will result in the grade of zero for any missed test. Excused absences from tests will be dealt with at the end of the term and may depend on individual circumstances. Anticipated absences should be reported and verified in advance; emergency absences must be verified within one week after returning to class. Any questions concerning grading of tests must also be resolved within one week after the tests are returned.

**Final Exam (20%)** The in-class final exam is scheduled for Tuesday, December 16, 2014, 8:00 AM.

**Letter Grade Determination:**

92-100 A	90-91.99 A-	87-89.99 B+	82-86.99 B	80-81.99 B-	
77-79.99 C+	72-76.99 C	70-71.99 C-	67-69.99 D+	62-66.99 D	60-61.99 D-

**Text, Materials, and Resources**

- Course Text: **Mathematical Reasoning: Writing and Proof** (Version 2.0)
  - Students may download this text for free at <http://scholarworks.gvsu.edu/books/9/>.
- Students are encouraged to use office hours as a way to receive extra help.

**Course Policies**

1. Winthrop University is dedicated to providing access to education. If you have a disability and require specific accommodations to complete this course, contact the Office of Disability Services (ODS) at 323-3290. Once you

have your official notice of accommodations from the Office of Disability Services, please inform me as early as possible in the semester.

2. Review the student code of conduct for university policies on academic misconduct. Academic misconduct will not be tolerated and will result in a failing grade on the assignment and/or in the course. The full handbook is available online at: (<http://www2.winthrop.edu/studentaffairs/handbook/StudentHandbook.pdf>)

I assume that anything turned in with your name on it is your own work. Each time you submit a test, homework, or final exam, you affirm the honor pledge, "I have neither received unauthorized aid nor given aid on this assignment." The minimum penalty for cheating is a grade of zero on the assignment; violators may be reported to the Academic Integrity Review Board, which can impose additional sanctions.

3. All electronic devices (including cell phones) other than a calculator should be set to silent and kept in your book bag or purse throughout class time unless otherwise instructed.
4. Students may not use cell phones, MP3 players, or other electronic devices in place of a calculator. Students may not share calculators during quizzes, tests, or the final exam. Any student caught using an unapproved electronic device during a quiz, test, or the final exam will receive a grade of zero on that assessment and the incident will be reported to the Dean of Students.
5. A grade of C or better in MATH 310 is required to enroll in MATH 351.

**Drop/Add:** Through F 8/29  
**Fall Break:** F 10/17 and M 10/20

**SU and Course Withdraw Date:** F 10/24  
**Final Exam:** T 12/16

### Course Goals and Departmental Goals for Students

This course meets the Logic, Language, and Semiotics requirement through activities and requirements that require students to: (1) use logic and mathematical information to draw reasonable conclusions and (2) use the symbols and language of mathematics to communicate about problems and present solutions.

Course Goals/SLO	University Level Competencies
Students will develop a deep understanding of techniques of mathematical reasoning.	<p><b>Competency 1</b>  <b>Winthrop graduates think critically and solve problems.</b>            Winthrop University graduates reason logically, evaluate and use evidence, and solve problems. They seek out and assess relevant information from multiple viewpoints to form well-reasoned conclusions. Winthrop graduates consider the full context and consequences of their decisions and continually reexamine their own critical thinking process, including the strengths and weaknesses of their arguments.</p> <p><b>Competency 4</b>  <b>Winthrop graduates communicate effectively.</b>            Winthrop University graduates communicate in a manner appropriate to the subject, occasion, and audience. They create texts – including but not limited to written, oral, and visual presentations – that convey content effectively. Mindful of their voice and the impact of their communication, Winthrop graduates successfully express and exchange ideas.</p>
Students will develop their mathematical proof writing skills.	
Students will become competent in expressing their mathematical ideas clearly using mathematical typesetting software.	
Students will become familiar with problem-solving techniques based on Polya's <i>How To Solve It</i>	

For purposes of departmental assessment of student learning in this course, sections of the final exam may be tabulated for all students. Individual tests and course grades may also be used as an indication of progress toward the above goals.

### Tentative Course Schedule

8/27		Intro to Tex and Problem Solving (Polya's <i>How To Solve It</i> )
9/3	1.1 & 2.1	Statements & Connectives
9/8	2.2	Logically Equivalent Statements
9/10	2.3 & 2.4	Open Statements & Quantifiers
9/15	1.2 & 3.1	Direct Proofs
9/17	3.2	Indirect Proofs
9/22	3.3	Proofs by Contradiction
9/24	3.4	Proofs by Cases
9/29	3.5	Division Algorithm
10/1		<b>Test 1</b>
10/6	5.1 & 5.2	Set Theory
10/8	5.3	Set Operations
10/13	5.5	Indexed Families of Sets
10/15	4.1	Mathematical Induction
10/22	4.2 & 4.3	Complete Induction
10/27		Problem Solving (Heuristic Approaches)
10/29		<b>Test 2</b>
11/3	5.4 & 7.1	Cartesian Products & Relations
11/5	7.2 & 7.3	Equivalence Relations
11/10	6.1 & 6.2	Functions as Relations
11/12	6.3	Functions That Are Onto; One-to-One Functions
11/17	6.4	Composition of Functions
11/19	9.1 & 9.2	Finite & Countable Sets
11/24	9.3	Uncountable Sets
12/1		Problem Solving (Strategies)
12/3		<b>Test 3</b>
12/8		Review for Final Exam