MA 3110: Logic, Proof, and Axiomatic Systems (Spring 2009)

MW 5:00–6:15PM, Hyde 315

Instructor Information

Instructor: Dr. Dana Ernst
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Course Information and Policies

Prerequisites: A satisfactory grade in MA 2550 or MA 2490.

Course Description: Mathematical logic is introduced and used in developing techniques of writing proofs in mathematical settings, including topics in abstract algebra. Although the variety of settings may vary each semester, stresses proof development and includes mathematical induction and relations.

Text: *A Transition to Advanced Mathematics*, by D. Smith, M. Eggen, R. St. Andre, 6th edition, (Thomson/Brooks Cole).

Purpose: The primary objective of this course is to develop skills necessary for effective proof writing. Students will improve their ability to read and write mathematics. Successful completion of MA 3110 provides students with the background necessary for upper division mathematics courses. Also, the purpose of any mathematics course is to challenge and train the mind. Learning mathematics enhances critical thinking and problem solving skills.

Writing Connection/Writing in the Discipline (WRCO): MA 3110 satisfies the Writing Connection (WRCO) requirement of the PSU General Education Program. One of the major goals of the course is for students to become competent and confident in reading and writing technical prose that occurs in the discipline of mathematics. The course develops methods of reasoning required to prove theorems and explain solutions to abstract mathematical problems. Students also gain proficiency in the language of abstract mathematical proofs. Writing proofs of theorems or other statements allows students the opportunity to practice logical thinking and document rigorous logical arguments. As students become increasingly skilled in thinking clearly and ordering their thoughts, they should gain greater aptitude in writing clearly and concisely. Students will complete daily homework assignments in which mathematical writing composes the majority of the work. On average, students should expect to be writing a total of 2–3 pages per week. Students are expected to use proper grammar and write in complete sentences. When writing proofs, all underlying assumptions need to be explicitly stated. Mathematical writing comprises over 50% of a student's grade.

Homework: Homework will normally be assigned *every* lecture day (Monday and Wednesday) and will be due at the beginning of the next lecture day. Your homework will *always* be graded for completion and *occasionally* some of the problems will be graded for correctness. You are allowed and encouraged to work together on homework. However, each student is expected to turn in his or her own work. Every homework assignment is worth 5 points. There will be roughly 23 homework assignments. Three (possibly more) of your lowest homework scores will be dropped. Your total homework score will be worth approximately 20% of your final grade. Late homework will *not* be accepted unless you have notified me by phone or email that your homework will be late. Email is the preferable method of notification and the deadline for notification of late homework is 5:00AM the day the assignment is due. When notifying me that you will be turning in your homework late, you should tell me: (1) the assignment number and the corresponding section, and (2) when you plan on turning the homework in. This generous policy should not be abused.

Exams: There will be 3 exams, which are *tentatively* scheduled for the following Wednesdays: **Feb 18**, **Mar 25**, and **Apr 22**. Each exam will be worth 100 points, which is approximately 20% of your final grade. Exams will be a combination of in-class and take-home. There will also be a cumulative final exam, which will be on **Wed, May 13** at **5:00–7:00pm**. The final exam is also worth 100 points (approximately 20% of your final grade). Make-up exams will only be given under extreme circumstances, as judged by me. In general, it will be best to communicate conflicts ahead of time.

Course Evaluation

Grading: You will be graded on your written work, which will be judged on the basis of *correctness*, *completeness*, and *legibility*.

Basis for Evaluation: Your final grade will be determined by the scores of your homework, exams, and final exam.

Homework:	5 points each	(total score is approximately 20% of final grade)
3 Exams:	100 points each	(total score is approximately 60% of final grade)
Final exam:	100 points	(approximately 20% of final grade)

Grade Determination: Your grade will be calculated using the following formula:

$$\frac{\text{your total points}}{\text{total possible points}} \times 100 = \text{your percent score}$$

At any moment during the semester, you can calculate your current grade by dividing the total number of points you have received up until that point by the total number of possible points available up until that point. Grades may be"massaged" at the end of the semester, but in general this is what you should expect:

93–100%	A	73–76%	C
90–92%	A-	70–72%	C-
87–89%	B+	67–69%	D+
83–86%	B	63–66%	D
80–82%	B-	60–62%	D-
77–79%	C+	0–59%	F

Additional Information

Math Center: This student-run organization provides peer tutoring services for most 1000 and 2000 level math courses and some 3000 level courses. Tutors are typically math majors interested in teaching math and practicing their instructional skills. The Math Center is located in Hyde Hall room 351. You can drop in anytime during open hours. More information can be found at:

http://www.plymouth.edu/math/resources/center.html

Student Handbook: The PSU Student Handbook addresses policies pertaining to students with disabilities, religious observation, honor code, general conduct, etc. The Handbook can be found at:

http://www.plymouth.edu/stulife/handbook/handbook.html

ACT for Growth: All teacher education majors are subject to the Areas of Concern/Targets for Growth policy, which is located at:

http://www.plymouth.edu/education/act.html

Closing Remarks

When does the learning happen? It might happen in class, but most likely it happens when you sit down to do your homework. Most of you can follow what I do on the board, but the question is, can you do it on your own? To learn best, you must struggle with mathematics on your own. It is supposed to be difficult. However, if you are struggling too much, then there are resources available for you. I am always happy to help you. If my office hours don't work for you, then we can probably find another time to meet. You can also get help from each other. Get a study buddy! Help each other learn. Go to the Math Center (see above). It is your responsibility to be aware of how well you understand the material. Don't wait until it is too late if you need help. *Ask questions!*