

Bucknell University MATH 280 Logic, Sets, and Proofs

Fall 2010

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COURSE GOAL

This course is often called a "bridge" or "transition" course. The idea is to help you transition from solving problems to reading mathematics, writing your solution up correctly and carefully, and learning to prove interesting results in mathematics. How difficult this transition is for you will depend on many things: where you are now in terms of mathematical growth, how much experience you have with proofs, and (probably most importantly) how hard you work. This will most likely be your most time intensive course this semester.

If your goal is to understand more mathematics, to learn why things are true, to learn how to find out things on your own, and to prepare for a major in mathematics, this is the right course for you. I will help you as much as I can, and I will encourage you to work together.

If your goal is to get a minor via the shortest path, this is the wrong course for you. There are often better choices for students who are getting a minor in mathematics. Please talk to me about this soon.

COURSE TEXT

We will use a preliminary version of Daepf and Gorkin, Reading, Writing, and Proving, Second edition. Springer Verlag

COURSE WORK

There are many things you will do in this class that will contribute to your grade. These are described below.

1. Homework. This is the most important part of the course for you. You must do it whenever it is assigned and it must be handed in ON TIME. Any exceptions must be granted prior to the due date. More than 4 missing or late homework assignments will lower your grade by $1/3$ in addition to the effect that the missing points produce.

Homework can take many forms. We will have standard assignments, assignments that we will rewrite, presentations in class, peer reviewing, etc. Homework will be assigned every evening. Assignments will be posted on

Blackboard. Homework grades will be worth 100 points of your total grade. You can collaborate with other students from the class on these problems. In fact you are encouraged to form study groups that meet regularly. Discuss the homework with each other but make sure that at the end everyone in the group understands what is going on. Please get a ringbook for the homework. Write each problem on a separate sheet of paper so that you can present one problem with the document camera and hand in another one from the same set. All solutions need to be written out clearly and neatly. No first drafts! This is a W-2 course.

2. Mathematical Development. You must obtain 50 points (5 at a time) from one of the following before the last day of classes. Points cannot be obtained during finals week.

- Attending mathematics or physics talks and writing a review of them (up to 20 points).
- Watching movies with mathematical content and writing a review of them. (We have lots of them in the library.) (up to 10 points).
- Reading an article in a mathematics journal and writing a review of it. (Check out the library for mathematics journals. Here are a few titles of interest: The Mathematics Magazine, The Mathematics Teacher, The Journal of Recreational Mathematics, The Fibonacci Quarterly, Chance, Scientific American. The department has additional journals you can check out: The Mathematics Intelligencer, Horizon, The College Mathematics Journal and others.) (up to 15 points)
- 1 point each time you pose or answer a relevant question on the Discussion Forum: "General questions and answers to homework, test preparation, and course." (up to 5 points)
- Reading a mathematical book and writing a review of it. You need to read the book now. You cannot simply write about something you read while in high school. (There are lots of interesting ones like: Fermat's Enigma (Simon Singh), The Code book (Simon Singh), One, Two, Three, Infinity (Constance Reid), anything by Ian Stewart or Martin Gardner, etc.) (up to 10 points)

PACE YOURSELF HERE. IF YOU SAVE IT ALL FOR THE LAST WEEK OF CLASSES THERE WILL BE NO TALK TO GO TO AND YOU WILL HAVE MUCH MORE WORK TO DO! In fact, at least half the points need to be obtained by mid-term (October 13).

Each review has to be given to another student for peer reviewing, it then needs to be rewritten and handed in electronically (as an attachment to an e-mail). Reviews of talks need to be written and given to the peer reviewer by the end of the next day. After a reviewed paper is returned to you, you will have two days to rewrite it and send it on to me.

Everybody also has to work as a reviewer. I will set up a reviewing plan so you will know where to send your report. As a reviewer you have three days to

read the paper and send it back with comments. You also have to send one copy with the comments to me. Each person will get up to 10 more points for the quality of the reviewing that you have done.

3. Mini Take Homes. On six Wednesdays during the semester you will be given four questions. Three are worth equal amounts, and the fourth is more difficult and worth more than the other three. You may choose which three you want to do. You are to work these problems alone--you may not talk to the other students in the class about these problems. You may, however, use the discussion board to post questions on the web under the forum "Questions on mini-exam." I will answer these questions as long as they are posted by Sunday noon. The Mini Take Home will be due on Monday at the beginning of class. (See the course calendar below for the dates.)

Mini take homes are worth 100 points of your grade. There are 6 of them, each will be graded out of 30 points, the lowest score will be dropped and then the total will be scaled to 100 points.

4. Hour Exams. There are three exams. Details to these will be given in time.

* Exam 1 - Monday, September 20

* Exam 2 - Monday, October 25

* Exam 3 - Monday, November 22

Your lowest exam grade will be out of 50 points; the other two will be out of 100 points.

5. Project. A group project will be assigned around the middle of the semester. You will work on these projects in small groups and will have to present your work to the class on Wednesday, December 1 or Friday, December 3. The project and its presentation will be worth 50 points. Details will be given later.

6. Final. There will be a final examination during the assigned time (to be announced by the registrar). The final exam will consist of 150 points.

To summarize:

100 Homework
50 Mathematics Development
10 Reviewing
100 Mini Take Homes
250 Tests
100 Project
150 Final

Your grade will be based on these 760 points.

ASSISTANCE

If you have worked a long time on a problem and know where you need help, you can post a question on the web. This will help you AND everyone else in the class. Not only could this make you very popular, you also get points for it (see above for the fine print conditions).

If you need more help, work in the seminar room (383) close to my office. Hours about the availability of this room will be posted on the outside. If several of you work there, you can help each other even when I'm not in. If you have questions, check whether I am in my office and ask. I will make it a habit to stroll over and visit you in there.

Most students struggle at some point in this course. You are expected to need individual help from me.