Foundations of Higher Mathematics

MATH 225-01 and 225-02

Time: 12-12:50 MWF for section -02; 1-1:50 MWF for section -01.
Classroom: Alter 208
Instructor: Dr. Dena Morton
Office: Hinkle 108
Phone: x3674
Office Hours:
   By appointment (including phone appointments) or without an appointment on
   ▪ Monday 11-12
   ▪ Tuesday 12:30-1
   ▪ Wednesday 11:30-12 and 2-3
   ▪ Friday 11-12

E-mail: morton@xavier.edu
Note: this is the best way to reach me – I check my e-mail on a regular basis.

Web Page: http://cerebro.xu.edu/~morton/aclasses.html
Note: I update my webpage every day – all homework assignments and readings are always posted online. Also, check out the beautiful mathematical pictures!

Purpose and Content:
For most of you, the mathematical training you have received so far has emphasized processes of calculation – the computation of answers to problems – usually based on examples from the professor. In this course we will concentrate on learning to formulate proofs of theorems using logical understanding. This will allow you to begin to bridge the gap between the computational and the theoretical aspects of mathematics and computer science, and start towards a deeper understanding of general theory. Discrete structures will provide a beautiful and meaningful environment for testing one’s logical reasoning, and form the content of the course.

It is essential that you be conscientious about completing both the reading and the written assignments on time, and at least attempt every assigned problem. Questions are welcome at any time during class and also privately, by email or in office hours. I encourage you to participate actively in class by asking questions and by answering questions posed by either myself or by other students.

Text: Mathematical Proofs A Transition to Advanced Mathematics, third edition, by Gary Chartrand, Albert Polimeni, Ping Zhang. Please bring your text with you for each class session.

Class Activities: Classes will consist of small group activities, discussion, individual activities, and lectures.

Homework: Some homework will be assigned weekly, to be turned in for grading. Some will be assigned daily for you to work on before the next class. Doing homework for this
course is the best way for you to pinpoint difficulties. It is also a wonderful learning tool. I will take questions about the homework at the beginning of each class session.

**Quizzes:** Weekly quizzes will be given on Mondays. The lowest quiz score will be dropped, so makeup quizzes will not be given. Quizzes will not be given during exam weeks. Many quiz problems will involve statements of definitions; if you don’t know the definitions, you cannot possibly expect to do the mathematics.

**Exams:** There will be four exams given throughout the semester, and a comprehensive final exam. Each of these exams will have an in-class component and a take-home component (in which you are on the honor’s system). If you must miss an exam for religious or academic reasons, or in cases of illness or emergency, you must submit a written excuse. A makeup may be scheduled -- this will be decided on a case-by-case basis.

**Class Participation:** In order for a class to be successful, students must participate in their education! Thus students can expect to participate in class by asking questions of the professor and other students, by presenting proofs or solutions to exercises, and by answering questions posed by the professor and other students.

**Grading:** Quiz performance constitutes 8% of your final score. Each exam will be worth 14% of your final grade. Homework and class participation constitute 16% of your final score. The final exam is worth 20% of your grade.

Each exam will be curved separately and assigned a number grade between 0.0 (the lowest possible F) and 5.0 (the highest possible A). I will announce the cutoffs when returning the exam. If, for example, the cutoff for an A is 87 and the cutoff for a B is 71 and you get an 83, then the number grade corresponding to your 83 would be a 3.75 (B corresponds to 3.0 and you are 12/16=.75 of the way to the next cutoff). The homework and quizzes will be treated similarly. The total course grade may be curved further (that is, a 3.9 would result in an A or A- in the course), but the resulting curve will never lower your grade (that is, a 4.1 would always result in at least an A- in the course. I reserve the right to assign a grade of “F” to any student who earns less than 50% on the final exam.

**Important Dates (exam dates may be subject to change):**

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<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>Monday, Aug 22</td>
<td>First day of class</td>
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<tr>
<td>Monday, Sept 5</td>
<td>Labor Day Holiday – no classes</td>
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<tr>
<td>Friday, Sept. 16</td>
<td>Exam I</td>
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<tr>
<td>Wednesday, Oct. 12</td>
<td>Exam II</td>
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<td>Thursday-Friday, Oct. 6-7</td>
<td>Fall Holiday – no classes</td>
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<td>Friday, Nov. 4</td>
<td>Exam III</td>
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<td>Monday, Nov. 21</td>
<td>Last day to withdraw</td>
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<td>Wednesday-Friday, Nov. 23-25</td>
<td>Thanksgiving Holiday – no classes</td>
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<td>Friday, Dec. 2</td>
<td>Exam IV</td>
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<td>Friday, Dec 9</td>
<td>Last day of class</td>
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<td>Monday, Dec. 12 from 12:00-1:50</td>
<td>Final Exam for section -02 (MWF 12:00-12:50)</td>
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<tr>
<td>Wednesday, Dec. 14 from 12:00-1:50</td>
<td>Final Exam for section -01 (MWF 1-1:50)</td>
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Missed Classes: If you must miss a class due to illness or an emergency, you must first get a copy of the notes from one of your classmates. (If you do not know anyone in the class, I will help you contact someone to get notes.) Review the missed notes, and write detailed questions as you are reading them. I will be happy to answer all of your questions (as many as you would like to ask!), but I cannot re-lecture for you. As noted above, quizzes cannot be made up.

Group Work: Working in a group can be beneficial for everyone involved, provided that you do not abuse the privilege. Make sure that everyone in your group is making a contribution. Do not copy answers from one another, as this will only backfire against you come test-time (and is also cheating)! Instead, let concepts gel after group discussion, and then write up the solutions by yourself.

Academic Honesty: You are expected to conduct yourself with integrity in this course. Cheating will be dealt with as harshly as University regulations permit (usually cheating in one of my courses is met with a final course grade of “F”); measures will be taken during exams to prevent cheating. Students are directed to the undergraduate handbook for further information. Note: talking during an exam (to anyone other than me) is grounds for a failing grade on the exam. Using (un-cited) sources is cheating and plagiarizing! So is copying homework from someone else.

Calculators: From time to time you might need some sort of calculator. Cell phone calculators are not allowed. You may not have any programs on your calculator.

Cell phones: Please turn all cell phones off during class (no texting either, please). Cell phones must be away during exams.

How to Do Well in this Course: Come to class! Come visit me during office hours! Read the books and articles! Try the problems! Smile! Study hard! Read your class notes! Make sure you keep up with the material in class! Review your class notes! Don't Panic! Enjoy! Most important of all, if you feel that you are falling behind, or that you do not understand a certain topic, or if you would just like to discuss a mathematical idea (or anything else), come to visit me in my office. That’s why I am here!☺
Math 225 Learning Outcomes for Mathematics and Computer Science

Mathematics, B.S. Learning Outcomes:
The following are Mathematics Learning Outcomes of MATH 225:

1. Construct, follow and explain logical arguments by appropriate use of justification and proof.
2. Provide mathematical reasoning through written, symbolic and graphical means.
3. Provide mathematical reasoning through oral presentations aimed at a level appropriate to the audience.
4. Demonstrate familiarity with the methods and processes of mathematical research.

(The complete list of all six Mathematics Learning Outcomes is here.)

Computer Science, B.S. Learning Outcomes:
The following are Computer Science Learning Outcomes of MATH 225:

1. Construct, follow and explain logical arguments by appropriate justification.
2. Evaluate, learn and use appropriate languages, software or hardware to solve problems.
3. Clearly communicate ideas, solutions and arguments in writing.
4. Clearly communicate ideas, solutions and arguments orally to and within groups.

(The complete list of all six Computer Science Learning Outcomes is here.)