

## Syllabus for Math 245, *Introduction to Proof via Discrete Math*, Fall 2006

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**Office Hours:** M,W,F 11:00am-12:00noon (Math 107, Location-TBA) M, W 2:15-3:15 (Math 245, Roop 111), and by appointment.

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**COURSE DESCRIPTION:** Math 245 is a “bridge course” designed to be a transition for math majors and minors from the computational courses like calculus, to the proof based courses such as number theory and analysis. In this course we will study proof techniques in the context of discrete math. It is hoped that by the end of the course, you will read, write and think mathematics like a mathematician. Specific topics include set theory, mathematical induction, divisibility, combinatorics, logic, functions and relations, graph theory, Fibonacci numbers, cardinality and Pascal’s triangle.

**TEXT:** *A Discrete Transition to Advanced Mathematics*, Richmond and Richmond

**SUPPLEMENTAL TEXTS:**

*L<sup>A</sup>T<sub>E</sub>X: A Document Preparation System*, Leslie Lamport

*Mathematics: A Discrete Introduction*, E. Scheinerman

*How to Prove It: A Structured Approach*, D. Velleman

*A Transition to Advanced Mathematics*, Smith, Eggen and St. Andre

*Foundations of Higher Mathematics*, Fletcher and Patty

Note: These books are for reference only. You do not need to purchase any of them.

**GRADING:** The grading will be assigned on a 580 point scale:

A: 522-580

B: 464-521

C: 406-463

D: 348-405

F below 348

There will be no curves and no extra credit. I will assign +/- on an individual basis. WF’s will not be assigned. Points are assigned as follows:

Quizzes (10) - 100 points

Midterm exams (3) - 100 points each

Homework - 80 points

Final exam - 100 points

**QUIZZES:** There will be a 10 point quiz at the beginning of class each Monday. This quiz will cover material through the previous Friday’s class. Quiz questions will consist mainly of definitions, theorems and short answers, rather than proofs. The 10 best quiz scores will be kept, and the rest will be dropped. There will be no make up quizzes given.

**MIDTERMS and FINAL:** There will be three midterms during the semester worth 100 points each and a final exam worth 100 points. The questions on the exams will be similar to homework questions and will contain proofs. If you cannot make it to a scheduled exam, you **MUST** contact the instructor **BEFORE** the exam if at all possible, or if an emergency, **WITHIN 24 HOURS** after the exam if you need to schedule a make up exam. Make up exams will only be given for extreme excuses. A doctor's note or some other physical excuse is required. Dates for exams (subject to change):

Midterm I - Friday September 29

Midterm II - Friday October 27

Midterm III - Friday November 17

**Final Exam** - Section 01 Friday Dec. 15 8am-10am

Section 02 Friday Dec. 15 10:30am-12:30pm

**L<sup>A</sup>T<sub>E</sub>X:** As part of our objective to “write” mathematics (as well as to learn it and to speak it) we will learn to use the mathematical typesetting program L<sup>A</sup>T<sub>E</sub>X. L<sup>A</sup>T<sub>E</sub>X is the standard typesetting tool of mathematicians all over the world. Whether you will be teaching, working in business or in academia, L<sup>A</sup>T<sub>E</sub>X will be useful for preparing mathematical documents. See my website for information on installing and running L<sup>A</sup>T<sub>E</sub>X.

**HOMEWORK:** Homework will be assigned after each section. We will discuss the homework, but most of it will not be collected. Once a week I will assign one problem to be typed in L<sup>A</sup>T<sub>E</sub>X and handed in for grading. Each assignment will be worth 8 points. For each assignment, 3 of the 8 points will be for typesetting in L<sup>A</sup>T<sub>E</sub>X. The remaining 5 points will be for the correctness of the problem.

**CLASS STRUCTURE:** Monday there will be a quiz at the beginning of class. The rest of Monday and Wednesday will be spent on material from the text. Friday is discussion day and catch up day. Be prepared to discuss topics from class and to write solutions to homework problems on the board. Homework will be assigned Wednesday and collected Monday morning.

**ADDITIONAL HELP:** You are encouraged to work together in this class and form study groups. **TALK** about mathematics with each other. **WRITE** down your thoughts and ideas. **SHARE** these ideas with the class on Fridays. Go to the library or internet and research topics that interest you or are difficult for you. The supplementary texts listed above are a starting place. You are welcome to e-mail questions to me, but if you are referring to a homework problem, please include the entire question, because I may not have access to a book when I answer your e-mail.

**HONOR CODE** You are to abide by the JMU honor code at all times. Ignorance of the law is no excuse. Cheating will not be tolerated and will be prosecuted to the fullest extent.

## Math 245 Fall 2006 tentative outline

- Week 1 **Aug 28-Sept. 1** Class overview, introduction to L<sup>A</sup>T<sub>E</sub>X, 1.1-1.3  
Friday Sept. 8, Math Dept Picnic, Purcell Park, time TBA
- Week 2 **Sept. 4-8** Sections 1.4-1.5
- Week 3 **Sept. 11-15** Sections 1.6-2.1
- Week 4 **Sept. 18-22** Sections 2.2
- Week 5 **Sept. 25-29** Sections 2.3, 3.1  
Wednesday September 27 **review**  
Friday Sept. 29 **MIDTERM I** Chapters 1 and 2
- Week 6 **Oct. 2-6** Sections 4.1, 4.2
- Week 7 **Oct. 9-13** Sections 8.5, 8.7 (skip 8.6)  
Friday October 13 **No class** Fall Semester Holiday
- Week 8 **Oct. 16-20** Sections 4.5, 5.1
- Week 9 **Oct. 23-27** Sections 5.2  
Wednesday Oct. 25 **Review**  
Friday Oct. 27 **MIDTERM II** Sections 3.1, Chapter 4, 5.1 and 5.2  
Saturday Oct. 28 **SUMS Conference at JMU** Extra credit for attending, more  
for presenting a poster or talk
- Week 10 **Oct. 30-Nov. 3** Sections 5.3, 5.4
- Week 11 **Nov. 6-10** Sections 6.1, 6.2
- Week 12 **Nov. 13-17** Sections 6.3  
Wednesday Nov. 15 **Review**  
Friday Nov. 17 **MIDTERM III** Sections 5.3, 5.4, 6.1-6.3
- Week 13 **Nov. 20-24** Sections 6.4  
Wednesday Nov. 22-Friday Nov. 24 **No Class** Thanksgiving break
- Week 14 **Nov. 27-Dec. 1** Sections 7.1, 7.2
- Week 15 **Dec. 4-8** Sections 9.1, 9.2  
Friday Dec. 8 **Last Day of Class**
- Week 16 **Dec. 11-15** **Finals Week**