

## Finite Mathematics.

MATH104, Section 01, Fall 2004

**Instructor:** Annette Pilkington

**Office:** Hayes-Healy Room 124

**Telephone:** 631-3369

**e-mail address:** Pilkington.4@nd.edu

**Room/Time:** Hayes-Healy, Room 117, MWF, 12:50-1:40 pm

**Office Hours:** Monday, 10 - 11 am or by appointment

**Text:** Finite Mathematics and its Applications, 8th edition, Goldstein, Schneider and Siegel. Available from the bookstore.

**Website:** <http://www.nd.edu/aberline/teaching/math104.html>

**Exams:** Three one hour exams will be given during the semester.

Exam 1, Tues., Sept 21.

Exam 2, Tues., Oct 26.

Exam 3, Thurs., Nov 18.

The final exam will be comprehensive.

Final Exam, Thurs., Dec 16. 1:45-3:45.

Five 10 minute quizzes will be given in class.

Quiz 1 - Wed, Sept 15, Quiz 2 - Fri, Oct 01, Quiz 3 - Wed, Oct 13,

Quiz 4 - Fri, Nov 12, Quiz 5 - Mon, Dec 06.

These quizzes are meant to help you prepare for exams. They will give you feedback on your strengths or weaknesses before the exam.

**Homework:** Homework will be assigned each day. I will collect homework once a week on Wednesdays. It is essential to work on homework as it is assigned and not to let it pile up.

**Grades:** A total of 600 points will be distributed as follows: Homework Assignments: 100/600 (16.66%), Quizzes: 10 pts ea., total of 50/600 (8.33%), Exams 1 -3: 100pts ea., total of 300/600 (50%), Final Exam: 150/600 (25%).

**Help:** Help is available from a number of sources:

1. Office hours (See above)
2. questions by e-mail (see address above)
3. Freshman learning center
4. Tutorial TBA

**Course Content:** We will cover the following material:

Chapter 5. Sets and Counting (Sections 5.1-5.6, topics from 5.7)

Chapter 6. Probability (6.1-6.6)

Chapter 7. Probability and Statistics (7.1, 7.2, 7.4-7.6)

Chapters 1 & 2. Linear Equations and matrices, briefly. (Material from 1.1-1.3, 2.3)

Chapter 3. Linear Programming (3.1-3.3)

Chapter 9. The Theory of Games (9.1-9.3)

Chapters 5, 6 and 7 deal with probability and elementary statistics. This starts with an exposition of some useful and efficient techniques of counting. Next we apply these techniques to the calculation of probabilities or chances of various events occurring. Statistical inference is the final topic where we make inferences about probabilities on the basis of calculations on a sample from a population of interest.

Chapter 1 is mostly a revision of results about lines. In Chapter 2 we examine systems of linear equations and their solutions. Matrices are introduced and it is shown how these can be used to solve systems of equations.

In Chapter 3 we deal with the problem of maximizing something like exam scores, given a number of constraints, e.g. if you have a limited amount of time to devote to math homework and other useful endeavors, that would be a constraint. We will need to be able to graph lines and solve equations in two variables from Chapter one in order to do this.

In Chapter 9 we will look at Game theory i.e. the mathematics of strategy in playing games such as playing tic tac toe or the stock market! We will use a little linear programming from Chapter 3 and matrices from chapter 2 for this.

**Late H.W./Make up exams:** Late Homework must be accompanied by a written note from the student's advisor, the Office of the First Year of Studies, Health Services or The Athletics Department. The homework must be handed to me personally, otherwise a grade will not be recorded for it. The homework will not be graded, but a score of the average of you other homework grades will be recorded for it. More than 2 late homeworks will not be accepted.

There will be no make-up quizzes, the average of your other quiz grades will be recorded when the appropriate documentation for your absence has been turned in. Again this will not happen more than twice.

A similar written note must accompany a request for a make up exam. Please call my office and leave a message as soon as possible if you miss an exam. If you have an exam conflict, please contact me during the first week of classes so that we can resolve it. Do not make travel plans conflicting with any exam date!

**Honor Code:** You may discuss homework with your classmates. in fact you are

encouraged to do so. If you haven't contributed to the solution of a problem, try a similar problem to make sure that you understand the solution. Copying homework solutions without understanding is in violation of the Honor Code. You will **not** be allowed to collaborate on Exams or quizzes. You will be allowed to use calculators on exams or quizzes.

**Course Philosophy:** This course gives you a gentle introduction to Probability and statistics, linear programming and to game theory. We look at how the ideas of chance, working with constraints and strategy can be made precise with the language of mathematics. The course is structured so that the topics are relatively independent making it easier to study the material.

### **The Usefulness of Studying Mathematics**

The very idea that you can describe the notions of chance, working with constraints and strategy precisely through the language of mathematics means that the theory can be developed to make predictions about the future.

In our own everyday life it is important to have confidence in your ability to understand these ideas precisely, since many professionals appeal to these notions (sometimes erroneously) to attempt to influence our decisions.

In every math course you exercise your problem solving capabilities and your ability to reason logically. In addition to learning about a specific theory, you are building mental muscle. I'm sure you will not have to look far to find instances where you use these capabilities in everyday life.

**Study Suggestions:** It is helpful to

1. **personalize the information given to you** by perhaps picking out the main points and summarizing the lecture on a single page after class. You should keep these summaries for reference before exams.
2. You should **read through the corresponding section of your book** and
3. **work through the examples** with pen and paper.
4. Then **attempt your homework**. If you encounter a problem that you cannot solve immediately, this is not a bad thing. In fact I think this is a very good thing, because now you are ready to practice your problem solving abilities. So what do you do? The main thing is to
  - a. **keep a positive attitude**. See this as a challenge. The best attitude to adopt is to imagine you are trying to solve a puzzle that you like, or that you are playing checkers or chess or some game that you like. So now you are happy and ready. First
  - b. **make sure you understand the problem**, what is being asked, what quantities or information are you given. Then
  - c. **summarize the information**. Don't be afraid to sit back and
  - d. **let your mind play with the problem**. Now of course it has to be an application of something that you have studied, so if you are still stuck,
  - e. **see if any of the formulas that you have in your stockpile apply**.
  - f. Have a **look at the examples given in class or in the book** and see if any of those are similar. If no solution comes forth and it's time to go to dinner, make a note of the problem and
  - g. **get help**, from a classmate, or the FLC, or at the tutorial or from me. When you finally see the solution
5. **it is important to understand where the solution came from and know that you could do a problem just like it if it were to appear on the exam.**

The day to day groundwork is very important. When it comes to **exam time** you will need to review everything within a short time period. At this point it would be good to have summaries on hand so that you do not have to read through the entire book again. You need to make sure you can do examples of all possible types of problems without looking at notes or the book. You also need to pay attention to the exam type problems that are given out in the review or in quizzes or as examples in class. You should also make sure that you get enough sleep before your exam. Research has shown that your math capabilities decrease with lack of sleep, so an all nighter before a math exam is a very bad idea.