Finite Mathematics

MAT 120–Fall 2001
MWF 8:00-8:50 pm–Harris 208

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Office Hours: MWF 9:00-10:00 am or by appointment

Course Description and Goals

The uses of finite mathematics are ubiquitous; from lotteries to Boeing Corporation's plane dimensions, from license plates to the NSA's secure communications strategies. In this introductory finite mathematics course, you will learn logic and counting principles, determine probabilities associated with games of chance and solve linear equations and linear programming problems. Some unique features of this course are Casino Week, creative homework assignments and group projects. During Casino Week, you will gamble with extra credit points by "playing" games of chance (that is, solving problems of chance). Creative homework assignments allow you an opportunity to invent and solve finite mathematics problems that interest you. Group projects provide exploration of how finite mathematics is used beyond simple textbook problems.

As a graduate of this course you will be able to do the following:

- explain and define fundamental concepts of finite mathematics.
- use this increased knowledge to gain computational proficiency.
- extend the fundamental concepts of finite mathematics to model problems and questions in the real world, thereby increasing your problem-solving abilities.
- recognize the power and limitations of technology aids.
- gain an appreciation of finite mathematics and its uses in the world.

Hopefully, through interesting projects and examples, you will also realize that finite mathematics can be fun and exciting. As a result, this should foster greater mathematical confidence.

Prerequisites

Text

Required Text: Long, Paul and Jay Graening. *Finite Mathematics: An Applied Approach.* Second edition. New York: Addison-Wesley, 1997.

Suggested References:

- Kemeny, John G., J. Laurie Snell and Gerald L. Thompson. *Introduction to Finite Mathematics.* Second edition. New Jersey: Prentice-Hall, 1974.
- Larson, Roland E. and Bruce H. Edwards. *Elementary Linear Algebra.* Lexington, Massachusetts: D. C. Heath and Company, 1991.
- Smith, Douglas, Maurice Eggen, and Richard St. Andre. *A Transition to Advanced Mathematics.* Fourth edition. New York: Brooks/Cole, 1997.
- Websites: Chance website for probability: `http.://www.dartmouth.edu/~chance/`

Course Requirements and Evaluation

Students will be evaluated by numerous homework assignments and projects. In addition, there will be four in-class exams and one final. The homework assignments will occur about every two weeks. They will generally consist of 5-8 well-chosen problems which will allow you to practice the material and will allow me to assess the progress of the class. These problems will address goals 1 and 2 of this course. Suggested homework problems will also be given almost every class. These are optional but they will help you self-assess your progress. Before or after class you may ask me suggested homework questions. Suggested homework problems will also serve as study guides and practice problems before exams. The project assignments address course goals 3, 4 and 5. More details on the more involved assignments will be supplied at the appropriate times during the semester. (The Casino Week assignment and concept map assigment are included at the end to give you an idea of my expectations.)

Clearly, the setup of the evaluation is such that memorization of material for in-class examination is not emphasized. Rather, the evaluation is designed to help students develop computational and modeling skills in addition to confidence. Evaluation is formative rather than summative, meaning I encourage you to view each assignment as a learning *process*; drafting, discussing during office hours, reviewing feedback, revising, submitting and resubmitting are encouraged. You need not worry that your initial submission will be your final submission, upon which I place a final judgment as to your ability. Partial credit is given for valiant attempts at homework problems and all papers and projects are graded based on your achievement of a predetermined set of criteria, which are included with each assignment. This course will require a great deal of work which will be spread out throughout the semester. The number of assignments and their frequency are designed to force you to learn continually and to avoid cramming before tests. I have also designed the assignments with a great deal of choice and variety in order to encourage creativity and enjoyment of the subject.

The weighting of all evaluation instruments is given below:

- Homeworks (3) – 12%

- Concept Maps (3) – 12%
- Projects (4) – 20%
- In-class exams (4) – 40%
- Final – 16%

Examples of Assignments

To give you an idea of the nature of the assignments in this class and my expectations, I have included two assignments you will see during the semester. One pertains to Casino Week, the week where you gamble with extra credit points by "playing" games of chance (ie, solving problems of chance). The second assignment is a typical concept map assignment.

Course Policies

Class attendance is not mandatory. Yet attendance does correlate with success in any class. During many classes we will do group work or discuss problems which cannot be found in the book. Thus attending class will be to your benefit. Late assignments will not be accepted, except in extenuating circumstances (death in the family, university activity requiring travel). When possible, make arrangements prior to your absence and submit your work early. Plagiarism will not be accepted! If you are ever unsure as to what constitutes plagiarism, see me.

Course Organization

Week 1

- W, Aug. 22 – Introduction, syllabus
- F, Aug. 24 – 5.1, 5.2

Week 2

- M, Aug. 27 – 5.3, *Work Assigned:* HW #1
- W, Aug. 29 – 5.4, *Work Assigned:* Uses of Logic and Counting
- F, Aug. 31 – 5.5, 5.6 *Work Due:* HW #1, *Work Assigned:* Concept Map Ch. 5

Week 3

- M, Sept. 3 – holiday
- W, Sept. 5 – 5.7, review, *Work Due:* Uses of Logic and Counting

- F, Sept. 7 – review, *Work Due:* Concept Map Ch. 5

Week 4

- M, Sept. 10 – Exam #1
- W, Sept. 12 – 6.1, *Work Assigned:* Concept Map Ch. 6
- F, Sept. 24 – 6.2

Week 5

- M, Sept. 17 – 6.3, *Work Assigned:* HW #2
- W, Sept. 19 – 7.1, *Work Due:* Concept Map Ch. 6
- F, Sept. 21 – 7.2, *Work Due:* HW #2

Week 6

- M, Sept. 24 – 7.3, *Work Due:* Casino Week problem–Part 1
- W, Sept. 26 – 7.4, Casino Week begins, *Work Due:* revised Casino problem
- F, Sept. 28 – review

Week 7

- M, Oct. 1 – review, Casino Week ends 7:59 am, *Work Due:* Casino Week–Part 2
- W, Oct. 3 – Exam #2
- F, Oct. 5 – 1.1, *(optional) Work Due:* extra credit on RNG

Week 8

- M, Oct. 8 – 1.2, *Work Assigned:* HW #3
- W, Oct. 10 – 1.3
- F, Oct. 12 – 1.4

Week 9

- M, Oct. 15 – holiday
- W, Oct. 17 – 2.1, *Work Due:* HW #3, *Work Assigned:* Cartoon Guide plus HW
- F, Oct. 19 – 2.2

Week 10

- M, Oct. 22 – 3.1, *Work Due:* Cartoon Guide plus HW
- W, Oct. 24 – 3.2
- F, Oct. 26 – 3.3, *Work Assigned:* Technology Aids Tournament

Week 11

- M, Oct. 29 – 3.4, explanation of MC research
- W, Oct. 31 – review
- F, Nov. 2 – Technology Aids Tournament presentations, *Work Due:* Technology Aids Tournament

Week 12

- M, Nov. 5 – Exam #3
- W, Nov. 7 – 4.1
- F, Nov. 9 – 4.2, NSA research explanation

Week 13

- M, Nov. 12 – 4.3
- W, Nov. 14 – technology practice
- F, Nov. 16 – technology practice, *Work Due:* Concept Map Ch. 4, *Work Assigned:* Intelligence Belts

Week 14

- M, Nov. 19 – technology practice
- W, Nov. 21 – holiday
- F, Nov. 23 – holiday

Week 15

- M, Nov. 26 – review, *Work Due:* Intelligence Belts
- W, Nov. 28 – review
- F, Nov. 30 – Exam #4

Week 16

- M, Dec. 3 – no class, study for final
- W, Dec. 5 – no class, study for final

FINAL–M, Dec. 10, 6-8pm, room TBA