

1-2014

## M 115.30: Probability and Linear Mathematics

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**MATH 115 --- TENTATIVE SYLLABUS --- SPRING SEMESTER 2014****Professor Joyce Schlieter****Section 30 meets MW 5:10-6:30 in MA 103 [no Labs]**Text : *Finite Mathematics* by Soo T. Tan(UM custom edition from 10<sup>th</sup> edition by Cengage Learning  
bundled with WebAssign access code)

Notes : (1) a few copies are on "Reserve" in the Library

(2) Graphing Calculator required

(3) software "www.webassign.net" needed for Homework

Supplement : some handouts may be given during the semester

[the following schedule is subject to minor revisions  
as the semester progresses]

| <b>WEEK #</b>  | <b>MONDAY</b>                | <b>WEDNESDAY</b>             |
|--|------------------------------|------------------------------|
| 1 : Chapter 1  | Jan 27 : WU, 1.1, 1.2        | Jan 29 : 1.2, 1.3            |
| 2 : Chap 1/2   | Feb 3 : 1.3, 1.4             | Feb 5 : 1.4, 1.5             |
| 3 : Chapter 2  | Feb 10 : 1.5, 2.1            | Feb 12 : 2.2, 2.3 (GC)       |
| 4 : Chapter 2  | Feb 17 : HOLIDAY             | Feb 19 : 2.4-2.6/rev         |
| 5 : EXAM1, Chap 3  | Feb 24 : rev/ <b>EXAM1</b>   | Feb 26 : 3.1, 3.2            |
| 6 : Chapter 3, 6.1   | March 3 : 3.2, 3.3           | March 5 : 3.3, 6.1           |
| 7 : Chapter 6, 7.1   | March 10 : 6.2-6.4           | March 12 : 6.4, 7.1          |
| 8 : Chapter 7  | March 17 : 7.2-7.4           | March 19 : 7.4, 7.5/rev      |
| 9 : EXAM2, Chap 7  | March 24 : rev/ <b>EXAM2</b> | March 26 : 7.5, 7.6          |
| 10 : Spring Break  | March 31 : HOLIDAY           | April 2 : HOLIDAY            |
| 11 : Chapter 8   | April 7 : 8.1, 8.2           | April 9 : 8.2, 8.3           |
| 12 : Chapter 8   | April 14 : 8.4               | April 16 : 8.5               |
| 13 : Chap 8, EXAM3   | April 21 : 8.5, 8.6/rev      | April 23 : rev/ <b>EXAM3</b> |
| 14 : Chapter 8/9?  | April 28 : 8.6, 9.1?         | April 30 : 9.1, 9.2?         |
| 15 : Final Review  | May 5 : 9.2?/rev             | May 7 : review               |
| <b>FINAL EXAM - Day : <u>WED MAY 14th</u>    Time : <u>5:30 - 7:30pm</u></b> |                              |                              |

## Learning Goals

1. To master the basic concepts of lines, linear systems, matrices and linear programming (graphical method only).
2. To understand basic probability concepts : probability models (Venn diagrams, two-way tables), sample spaces with equally likely outcomes (counting), conditional probability (tree diagrams), Bayes' Theorem, binomial probabilities, prob dist.
3. To understand the rudiments of statistics : measures of center and spread, the normal dist [normal approx of binomial?].
4. To learn how to use the above concepts to solve application problems (including precisely formulating a problem and then interpreting solutions).

Course Content [we will cover Chapters 1-3 and 6-8 of the text, plus as much of Chapter 9 on Markov Chains as time allows]

### Chapter 1 : Straight Lines and Linear Functions

- 1.1 = The Cartesian Coordinate System
- 1.2 = Straight Lines
- 1.3 = Linear Functions and Mathematical Models
- 1.4 = Intersection of Straight Lines
- 1.5 = The Method of Least Squares (& Correlation Coefficient)

### Chapter 2 : Systems of Linear Equations and Matrices

- 2.1 = Solutions of Linear Equations : An Introduction
- 2.2 = Systems of Linear Equations : Unique Solutions
- 2.3 = Systems of Linear Equations : Under/Over Determined
- 2.4 = Matrices
- 2.5 = Multiplication of Matrices
- 2.6 = The Inverse of a Square Matrix

### Chapter 3 : Linear Programming : A Geometric Approach

- 3.1 = Graphing Systems of Linear Inequalities (two variables)
- 3.2 = Linear Programming Problems
- 3.3 = Graphical Solution of Linear Programming Problems

### Chapter 6 : Sets and Counting

- 6.1 = Sets and Set Operations
- 6.2 = The Number of Elements in a Finite Set
- 6.3 = The Multiplication Principle
- 6.4 = Permutations and Combinations

### Chapter 7 : Probability

- 7.1 = Experiments, Sample Spaces and Events
- 7.2 = Definition of Probability
- 7.3 = Rules of Probability
- 7.4 = Use of Counting Techniques in Probability
- 7.5 = Conditional Probability and Independent Events
- 7.6 = Bayes' Theorem

### Chapter 8 : Probability Distributions and Statistics

- 8.1 = Distributions of Random Variables
- 8.2 = Expected Value
- 8.3 = Variance and Standard Deviation
- 8.4 = The Binomial Distribution
- 8.5 = The Normal Distribution
- 8.6 = Applications of the Normal Distribution

### Chapter 9 : Markov Chains

- 9.1 = Markov Chains
- 9.2 = Regular Markov Chains
- 9.3 = Absorbing Markov Chains