

**SU DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE**  
**SYLLABUS (Tentative)**  
**MATH 465/515\* *Mathematical Models and Applications***

**Objectives:** To explore the role mathematical models play in explaining and predicting phenomena arising in the real world. To apply and modify mathematical techniques, as needed, to develop and analyze models.

**Intended for:** Mathematics majors and those with a strong background in mathematics.

**Prerequisite:** MATH 306 - Linear Algebra (may be taken concurrently).

**Text:** "Mathematical Modeling and Computer Simulation," by Maki and Thompson; Thomson/Brooks-Cole Publishing, 2006.

	Weeks
Chapter 1 <b><i>Basic Principles of Model Building</i></b> Introduction and philosophy; axiom systems and models; examples.	1.0
Chapter 2 <b><i>Model Construction: Selected Case Studies</i></b> Mendelian Genetics, Growth Processes, Social Choice, A Transportation Problem, Stratified Population Model, Simulation Models.	4.0
Chapter 3 <b><i>Markov Chain Models</i></b> Small-group decision making; basic properties of Markov chains; absorbing Markov chains; projects.	2.0
Chapter 5 <b><i>Linear Programming Models</i></b> Formulation of Linear Programming problems; simplex method; duality; sensitivity; integer programming.	3.0
Chapter 4 <b><i>Simulation Models</i></b> Growth models for epidemics, rumors, population dynamics, and queues.	2.0
<b><i>Optional Topics and Projects</i></b>	<u>2.0</u>
Group work and student presentations.	14.0

**Evaluatuion**

Homework Assignments 25 - 30%  
Group Projects and Presentations 20 - 25%  
Two Examinations      50%

**NOTE:** Once a student has received credit, including transfer credit, for a course, credit may not be received for any course with material that is equivalent to it or is a prerequisite for it.

**\*Graduate students will be assigned special homework/test problems or projects.**