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	*Basic Principles of Model Building*	1.0

Introduction and philosophy; axiom systems and models; examples.

Chapter 2	*Model Construction: Selected Case Studies*	2.0

An example from genetics; a transportation problem; a model from physics; a model for simple learning; timing problem; an assignment problem; projects.

Chapter 3	*Markov Chain Models*	2.0

Small-group decision making; basic properties of Markov chains; absorbing Markov chains; projects.

Chapter 5	*Linear Programming Models*	4.0

Formulation of Linear Programming problems; simplex method; duality; sensitivity; integer programming.

Chapter 4	*Simulation Models*	3.0

Growth models for epidemics, rumors, population dynamics, and queues.

	Optional Topics and Projects	2.0

Topics in differential equations and probability; group work and student presentations

Evaluatuion

Homework Assignments	30%
Group Projects and Presentations	20%
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.