

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

**Objectives:** To develop skill in creating, describing and analyzing the performance of mathematical models to be used for explaining and predicting phenomena arising in the real world.

**Audience:** Mathematics majors and others having a strong mathematical background.

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

**Text:** "A First Course in Mathematical Modeling," by Giordano, Fox, Horton, and Weir; Brooks/Cole Cengage Learning, 4<sup>th</sup> edition, 2009.

**Note:** The 3<sup>rd</sup> edition of this textbook may be used for this course also.

		Weeks
Chapter 1	<b><i>Modeling Change</i></b> Overview of Modeling, difference equations	1
Chapter 2	<b><i>Modeling Process/Construction</i></b> Development of models using using proportion and geometric similarity.	2
Chapter 3	<b><i>Model Fitting</i></b> Graphical and least squares analysis	1
Chapter 4	<b><i>Experimental Modeling</i></b> Building models from observed data using exponential/logarithmic and polynomial models. Smoothing and cubic splines	2
	<b><i>Team Presentations</i></b> Presentations of team developed models	1
Chapter 5	<b><i>Simulation Modeling</i></b> Simulating probabilistic models. Inventory and queuing models	2
Chapter 6	<b><i>Discrete Probabilistic Modeling</i></b> Reliability in series and parallel systems	1
Chapter 8	<b><i>Dimensional Analysis and Similitude</i></b> Process of dimensional analysis and application to the damped pendulum	1
Chapter 11	<b><i>Modeling with a differential equation</i></b> Logistic Model	1
Chapter 12	<b><i>Modeling with a system of differential/difference equations</i></b> Predator/Prey Model	1
	<b><i>Team Presentations</i></b> Presentations of team developed models	<u>2</u>
		15

### **Evaluation**

Homework Assignments:	25%
Group Project presentations	25%
Mid term	25%
Final	25%

**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.**