

MA (BMA) 573

Time: 1:30 - 2:45 MW

Place: HA 263

Instructor: Ralph Smith

Office: SAS 4140, Tel: 515-7552

Email: rsmith@eos.ncsu.edu

Web: <http://www4.ncsu.edu/~rsmith/>

Text: *Mathematical and Experimental Modeling of Physical and Biological Processes* by H.T. Banks and H.T. Tran, CRC Press, 2009.

Computing: We will use Matlab and Maple.

Grades: The gradescale is: 90-100 A-,A; 80-89 B-,B,B+; 70-79 C-,C,C+; 60-69 D-,D,D+; below 60: F. The grades are based on the following coursework:

Homework and Projects:	60 %
Midterm Exam:	15 %
Final Exam (December 16, 2009):	25 %

Course Topics:

- Motivating Examples and Modeling Concepts
 - Dimensional analysis and scaling
- Mathematical and Statistical Aspects of Inverse Problems
 - Parameter estimation issues
 - Statistically based model comparison techniques
- Compartmental Analysis and Conservation Laws
 - Advection, convection and diffusion processes
 - General transport equations
 - Conservation of mass and momentum
 - Traffic flow and analysis
- Heat Transfer
 - Laboratory experiment: Heat conduction in a rod
- Population Models
- Analytic and numerical solution techniques for PDE
- Validation and Verification Techniques

Academic Integrity and Disabilities Information: This is provided at the following web sites:

http://www.ncsu.edu/provost/academic_regulations/integrity/reg.htm

http://www2.ncsu.edu/ncsu/stud_affairs/counseling_center/dss/