MA 797 Uncertainty Quantification for Physical and Biological Models

Time: 11:45 - 1:00 TH Place: Daniels 232 Instructor: Ralph Smith Office: SAS 4140, Tel: 515-7552 Email: rsmith@eos.ncsu.edu Web: http://www4.ncsu.edu/~rsmith/

Text: Uncertainty Quantification: Theory, Implementation and Applications

Computing: We will use Matlab and provided software

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 coursework will consist exclusively of projects.

Course Topics:

- Motivating applications and prototypical models
- Fundamentals of probability, random processes and statistics
- Representation of random inputs
- Parameter selection techniques
- Frequentist and Bayesian model calibration
- Uncertainty propagation in models
- Stochastic spectral methods and sparse grid techniques
- Prediction in the presence of model discrepancy
- Surrogate models
- Global sensitivity analysis

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/