Required Text: *Introduction to Computational Science: Modeling & Simulation for the Sciences, Second Edition* by Angela Shiflet and George Shiflet

Course Description: An introduction to the interdisciplinary field of computational science. Open-ended scientific problems often require numerical algorithms and computational techniques to advance from qualitative to quantitative models and simulations. Students learn fundamental concepts of computational thinking through implementation and exploration of discrete, continuous, and stochastic algorithms in various scientific modeling environments. Throughout, applications in the sciences are emphasized.

Learning Outcomes: In this course you can expect to experience the *power of observation, the excitement of exploration, and the joy of discovery* through studying models and simulations across the domains of mathematics and science. By the end of the course, you should understand the modeling process through multiple representations (*e.g.*, concept map, story, mathematical formulation), and you should be able to demonstrate your ability to implement and extend *empirical, system, and agent models* through individual and collaborative work. In particular, you should understand successive approximation; understand the concept of rate of change; understand a range of models in your own primary field(s) of study and –by analogy and extension– across the sciences. You should be able to run, modify, and develop these models for both deterministic and stochastic phenomena. You should be able to perform *a priori* and *a posteriori* error analyses to address the fundamental question: **How do you know if it is right?** After reflection, you should be able to share your new knowledge through written and oral communications.
Assessment: Your grade will be the grade that you earn by demonstrating the ability to interpret a variety of scientific models that you will run, modify and/or develop using a variety of tools. The work that will be assessed will be accomplished both in class and on your own time, including both individual and team assignments and projects. You will keep a research notebook (provided by instructor) with all projects plans and model designs; this notebook will be collected and reviewed periodically (20%). Besides weekly explorations, reflections and an occasional in-class quiz (30%), there will be two more substantial projects that will require a formal written presentation and in-class oral presentations (20% and 30%). Final grades will be based on the following scale:

A: 90-100%  B: 80-89%  C: 70-79%  D: 60-69%  F: 0-59%

Academic Integrity: (Adapted, mostly copied, from A. Shiflet’s 2014 Syllabus) The Wofford Honor Code requires students to maintain a high standard of individual honor and integrity. Work represented as your own must be your own. You may not copy graded work, or models, or tests in any way from another person or from the Internet. All submitted work is to be pledged by you.

For some assignments you will work as a part of a team. In that case, these principles apply to a team as though it were an individual student. If doing work in a team, every member of the team should participate completely. It is a breach of the honor code to present work including the name of someone who did not fully participate in the project or to have work presented with your name when you did not fully participate in the project. You can always get my help on an assignment. Each student is responsible for reading and following the "Wofford College Honor Code" at http://www.wofford.edu/uploadedFiles/studentLife/Honor%20Code_RightsResp.pdf

Attendance: You are expected to attend every class (see above). If you know in advance that you cannot fulfill this expectation on a specific occasion, please inform me in advance. Unexcused absences may not be eligible to make up lost work.

Late Work: All assignments are due on or before the date/time announced. Unexcused late work will not be accepted.

Special Request: Please do not wear sunglasses, lacrosse helmets or other hats or caps, or have a hoodie pulled over your head.

Accommodation: please let me know if you need any services as described: http://www.wofford.edu/wellnesscenter/accessibilityservices/