Applied Numerical Computing for Scientists & Engineers

Fall 2018
3 credit hours
Meeting Time: MW 8-9:15
Location: LSE 113
Instructor: Dr. Ashlee N. Ford Versypt, School of Chemical Engineering

Course Description
This course will train science and engineering students to use practical software tools for computational problem solving & research including Python, MATLAB, LaTeX, and Git. The course emphasizes best practices of code development and documentation and application of numerical computing methodologies (primarily ODE solvers and parameter estimation) to solve realistic continuum scale problems in science and engineering. Guest lectures from science and engineering faculty conducting computational research will supplement the course.

Prerequisites
- Senior undergraduates (CHE 4753) and graduate students (CHE 5753) from any discipline of science, engineering, or mathematics.
- An undergraduate or graduate level differential equations course
- Familiarity with at least one programming language (e.g. C/C++, Fortran, Python, MATLAB, Maple, Java, Polymath, VBA)

Course Topics
- Basic Unix shell scripting
- Version control using Git
- Digital documentation and scientific communication using LaTeX
- Numerical computing in Python and MATLAB
- Solving systems of differential equations, performing parameter estimation, and creating publication quality figures using libraries and built-in functions
- Research areas in the interdisciplinary field of computational science and engineering
- Additional topics may include solving stochastic differential equations, simulating agent-based models, and/or developing GUIs for interactive model reuse

To enroll, use CRN 69715 for CHE 4753 and CRN 69716 for CHE 5753
For questions, contact the instructor at ashleefv@okstate.edu