Instructor: Yue Zhang  
Office: 3117 Kelley Engineering Center  
Email: zhangyue@onid.oregonstate.edu  
Prerequisite: Linear Algebra, Trigonometry, Matlab

Description:  
Introductory course in mathematical modeling and numerical simulation with several applications in engineering and science. Some fundamental modeling techniques and numerical methods are discussed.
  - Scalar initial value problem  
    - Existence of solutions  
    - Numerical methods for finding solutions  
  - Continuous models  
    - System of equations  
    - Scaling and dimensional analysis  
  - Numerical simulation methods  
    - Finite difference  
    - Finite element  
    - Finite volume

Learning Objectives:  
Understanding of the capability and limitation of numerical modeling and simulation  
- Develop math models for physical and engineering problems  
- Identify numerical methods to find solutions  
- Implement simulations with matlab or other tools  
- Distinguish errors from limitation in modeling and simulation

Textbooks:  

Reading Materials:  
Open source notes on finite difference, finite element and finite volume methods.

Projects and Grading:  
There are five homework assignments and two projects. Each homework is worth 10%, the first project is worth 20% and the second project is worth 30% of the final grade.
Late Policy
Late assignments will be marked off 10% for each weekday that it is late.

Academic Dishonesty
Please do your own work. The default consequence for academic dishonesty is a failure for the course. It is okay to discuss with other students general ideas about implementing a program. It is not okay to copy another student’s program. It is okay to discuss possible program bugs. It is not okay to debug another student’s program.

Expectations
Students are expected to attend lectures, participate in the discussions, and work with their group members on group projects. You should come to class prepared and speak up when something is not clear. Being prepared means completing the assigned reading and assignments. Students are expected to be creative and have fun!

Students with documented disabilities who may need accommodations, who have any emergency medical information the instructor should be aware of, or who need special arrangements in the event of evacuation, should make an appointment with the instructor as early as possible, and no later than the first week of the term. Class materials will be made available in an accessible format upon request.