MATH 3340 - Scientific Computing  
Fall 2011

Instructor: Dan Stanescu, 218 Ross Hall, Tel. 766-4380, stanescu@uwyo.edu.
Office Hours: M 2-3PM, T 1-2PM and by appointment.
Class time & room: MWF 1:10-2PM in BU209.


Course Description This course is one of the core courses for the Interdisciplinary Computational Science Minor. The objective of this course is to develop the capacity for algorithmic thinking in a scientific context. The course is intended to be suitable for students in a variety of disciplines who want to use computing to explore scientific problems. The course will consist of three distinct parts. The first part will review basic programming concepts: invoking computations, simple types, collections, files and scripts, functions, conditionals and loops, environment and scope. This first part is expected to take about 4 weeks. The second part will focus on putting these concepts to work in a variety of projects, from searching and extracting information from databases to randomness, visualization and graphics. The third part will actually run all through the semester, and will involve using the skills acquired along the way to write a computer program that reads in a grid, solves a differential equation on this grid, then outputs the results in an easy-to-interpret visual format.

GRADING

• Homework/Computational Projects: 65%. Several homework problems/computational project will be assigned during the semester - currently we expect there will be at least six and at most eight of these projects altogether. They will be designed such that students have an opportunity to engage the skills acquired on various topics. The focus in all these projects will not be only on doing them anyway; rather, it will be on finding a computationally efficient alternative. This may mean coming up with good data structures and storage, a good algorithmic strategy or nice algorithm design etc. depending on the problem. These projects should not take too long if the material in class is properly understood, although it is a good rule to think that you should be able to devote about the same amount of time for individual work as the time you spend in class.

• Final project: 35%. The overall project (constituting the third part of the course) will count separately. We’ll work on it together, from formulating the problem to putting it in a computer program, and I expect the work to be completed by the end of the exam week.

• Class participation. Class participation (meaning both regular attendance and involvement) may make the difference in your getting an A or a B if you’re on the borderline! More importantly, because this is a newly designed class, I will greatly appreciate your attendance and feedback along the way.

Academic Dishonesty Projects are designed to be completed independently. UNIREG 6-802 defines academic dishonesty and specifies the penalties. Three points to remember in this class for your work to be considered independent: (a) do not give a copy of your work to any other student in the class, (b) do assignments individually not as a team, they are not teamwork, (c) do not try to observe as other colleagues do their homework. However, I allow you to offer debugging assistance to your colleagues, under the condition that you only do so after you finished your own assignment.

The information contained herein is tentative. If the instructor finds that changes are necessary, he will announce them in class. If you have a physical, learning, or psychological disability and require accommodations, please let me know as soon as possible. You will need to register with, and provide documentation of your disability to, University Disability Support Services (UDSS) in SEO, room 330 Knight Hall, 766-6189, TTY: 766-3073.