PH 4390: Computational Methods in Physics

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Class Hours: MF (3:05 PM -3:55 PM, Fisher 231)
Office Hours: TTh (12 Noon -2:00 PM, Fisher 218)

Aim: To develop programming skills through direct experience with the computational problems in physics. An important theme of this course is to understand why the 'error free' programming does not necessarily guarantee meaningful results.

Course description: Students can use MATLAB or FORTRAN (in Unix environment) for their programming assignments. For analyzing the program output, students can use any plotting packages.

Topics

Week 1: Aug. 29	Ch. 1. Introduction
Week 2: Sept. 12	Ch. 2. Roots of a function
Week 3: Sept. 19	Ch. 2. Roots of a function (Cont.)
Week 4: Sept.26	Ch. 2 Roots of a function (Cont.)
Week 5: Oct. 3	Ch. 4. Numerical integration
Week 6: Oct. 10	Ch. 4. Numerical integration (Cont.)
Week 7: Oct. 17	Ch. 4. Numerical integration (Cont.)
Week 8: Oct. 24	Ch. 5. Ordinary differential equation
Week 9: Oct. 31	Ch. 5. Ordinary differential equation (Cont.)
Week 10: Nov. 7	Ch. 5 Ordinary differential equation (Cont.)
Week 11: Nov. 14	Ch. 6 Fourier analysis
Week 12: Nov. 28	Ch. 6 Fourier analysis (Cont.)

December 5: Project Discussion
December 12: Project submission and presentation

Text Book: A First Course in Computational Physics, P. L. De Vries
Reference Book: Numerical Methods for Physics, A. L. Garcia;

Policy: Computational exercises will be assigned each week. *The due date for the submission of programming assignment is one week from the date it is assigned. Due dates for assignments are strictly enforced. Late submission after the due date till one week late is accepted but with **half credit only**. No submission after 2 weeks from the date of assignment will be accepted. Students should not copy the program codes from each other or from the web.*

Grading Policy: 80% programming assignments, 20% project and presentation.

Letter grades are assigned on the basis of the following scales.

90-100: A	80-84: B	70-74:C	
85-89: AB	75-79: BC	65-69: CD	< 65 : D