Computational Physics

Physics 4301/5322

Course Outline

Spring Semester 2012

Instructor: Thomas L. Gibson **Office:** Sc 27 **Phone:**742-1606
OfficeHours: 10:00-11:00 (M-Th)
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Web page: http://www.phys.ttu.edu/~ritlg/courses/p5322/index.html

Required Text: *Numerical Methods for Physics*, 2nd Edition, by Alejandro L. Garcia (Prentice Hall, 2000).
Recommended Texts: *Gnuplot in Action: Understanding Data with Graphs*, by Philipp K. Janert (Manning Publications, 2009) ISBN-13: 978-1933988399, and *Engineering Problem Solving with C++*, by D.M. Etter and J.A. Ingber (Pearson Prentice Hall, 2008) ISBN-13:978-0-13-601175-0.

Important Notes

- Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services during the instructorÂ¹s office hours. Please note instructors are not allowed to provide classroom accommodations to a student until appropriate verification from Student Disability Services has been provided. For additional information, you may contact the Student Disability Services office at 335 West Hall or 806-742-2405.
- The faculty is strongly committed to upholding standards of academic integrity. These standards, at the minimum, require that students **never** present the work of others as their own.

Grading Policy

Students taking this course for graduate credit under Phys 5322 will have longer and more challenging assignments than students enrolled under Phys 4301. Since there are no formal exams, each student's course grade will be based on how well the assigned work is accomplished. However, no one should expect a high grade based on simply doing the minimum for each assignment; correct, but perfunctory work is, at best, average.

Unannounced quizzes may be given at the discretion of the instructor. Grades on these quizzes will be

used to assign bonus points.

Credit Breakdown:

Project Writeup:	50%
Demonstration of Program:	50%

Late Homework:

- Late homework will not be accepted.

Grading Scale

92-100	A
82-91	B
66-81	C
55-65	D

I do use +/- grades one point either side of a grade boundary, e.g., grades of 90 or 91 earn a B^+ while grades of 92 or 93 earn an A^-.

Course Goals

This course is intended to acquaint students with the basic use of numerical methods for use in science and engineering environments.

Expected Learning Outcomes

Upon successful completion of this course, students will be able to:

1. Write programs to apply basic numerical methods.
2. Display information in graphical or tabular formats.
3. Convey technical information with precision and concision.

Methods for Assessing the Expected Learning Outcomes

The expected learning outcomes for the course will be assessed through:

Guided Classroom Exercises, In-Class Demonstration of Programming Projects, Critique of Writeup for each Programming Project.

Writeup and Demonstration of Program

The writeup should be no more than five pages maximum including any graphical output. Each writeup should contain the following labelled sections:

- Title of assignment.
- Statement of the problem.
- Brief documentation of your program written for a novice user, including a **specific** test case so that the user will know if the program is working..
- **Explicit** (but brief) description of the testing that you did to debug and prove your code.
- If appropriate, clearly labelled results in tabular and/or graphical form.
- Conclusions based on your results. Be sure to mention any problems or pitfalls with the

particular methods used. I do **not** want this section to include **any** of your debugging woes. The demonstration of your program will consist of the instructor sitting at one of the workstations and running your code with you present. Quality of the user interface, ease of use, error trapping, and *accuracy* will determine this portion of your grade.

Here is a checklist for each of your assignments.

Strategy for Success

- Be prepared! Study your notes and read the text as well as other, appropriate materials before you come to class.
- Begin all homework assignments as soon as possible. The assignments take time and thought---never wait until the night before an assignment is due.
- Do your own work. Doing is indispensable to learning. Although you are free to *discuss* the homework or problems with other members of the class, do not rely on others to figure out all of your problems!
- See your instructor if you are stuck---that's why they pay me the big bucks!

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