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This document may be revised.

PHYS 329
Topics in Advanced Physics: Computational Physics

Mount Holyoke College - Fall 2008

Meeting Times:

Kendade G06 – TTh 8:35a – 9:50a, (optional fourth hour) F 1:15p-2:05p [this schedule may change**]**

Instructor: **Rob Salgado** **Visiting Assistant Professor of Physics** Office: **Kendade 215** Voice: **(413)-538-2816**	Email (the best way to contact me): **rsalgado@mtholyoke.edu** Instant-Messengers: AOL, MSN, Yahoo: **mhcphyrob** (do *not* email here)	Office hours: **-to be announced**

Catalog Description:

PHYS 329 - Topics in Advanced Physics: Computational Physics (4 credits) - [65718]
This course is intended for Physics majors who are interested in scientific modeling, computation, simulation, and visualization. We will draw on a variety of examples from introductory and intermediate physics. More advanced examples may be considered, depending on student interest. Some previous computer programming experience will be helpful, but not required as a prerequisite. We will work in the Python programming language, together with the VPython visualization module.
[Prerequisite: PHYS 216 or permission of instructor.]

Required Textbook:

"Introduction to Computer Simulation Methods: Applications to Physical Systems (3rd Ed)",
Harvey Gould, Jan Tobochnik, and Wolfgang Christian [Addison-Wesley (2006), ISBN: 0-8053-7758-1]

Electronic Materials:

I will maintain a website (for now: **`http://www.mtholyoke.edu/~rsalgado/329/`**)
that links to computer programs, electronic-whiteboard notes, and handouts.

Course Goals:

A. To introduce techniques in scientific computing.
B. To reinforce important concepts in physics and mathematics.
C. To further develop physical intuition, mathematical reasoning, and problem solving skills.
D. To have fun using the computer to learn physics.

Course Requirements:

Come to class **ON TIME and AWAKE**.
Attendance on Tuesdays and Thursday is **REQUIRED.** The Friday fourth hour is an optional period set aside for you to work on your computer assignments, during which I will be available to answer any questions and offer help.

Homework (assigned periodically):

Homework will be assigned and graded. (Late homework loses 10% per day.)
Most of the learning you do in this course is done by your doing homework problems outside of class! (I am merely a guide for you.)
You are strongly encouraged to discuss the homework with other students. However, be sure that you can do the homework *by yourself* and that you present your own work. You can always ask me for help after you have made an effort.

Grades are roughly weighted as follows:

40% HOMEWORK
20% PROJECT #1
20% PROJECT #2
20% FINAL PRESENTATION OF ONE OF THE PROJECTS

Sequence of PHYS 329 topics (loosely following the topics in the textbook):

(aspects of Ch 1 and 2) Introduction to Python programming and the VPython module
(Ch 3) Simulating Particle Motion
(Ch 4) Oscillatory Systems
(Ch 5) Few-Body Problems: The Motion of the Planets
(Ch 6) The Chaotic Motion of Dynamical Systems
(Ch 7) Random Processes
(Ch 8) The Dynamics of Many-Particle Systems
(Ch 10) Electrodynamics
(Ch 11) Numerical and Monte Carlo Methods

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2008  September               October                 November                December
Su Mo Tu We Th Fr Sa   Su Mo Tu We Th Fr Sa   Su Mo Tu We Th Fr Sa   Su Mo Tu We Th Fr Sa
          4  5                      2  3                                     2     4  5
       9    11 12             7     9 10 |=          4     6  7            9    11 12
      16    18 19       BREAK =|    16 17            11    13 14          |====EXAMS===|
      23    25 26              21    23              18    20 21
      30                       28    30 31           25 THANKSGIVING
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Away giving a seminar:
(a Tuesday yet to be determined)

At a Conference:
Oct 24-26

Final Presentations