NEW COURSE – OR – 
REVISION TO EXISTING COURSE PROPOSAL

Please use this form to: **add a new course**, or to **revise the title or content of an existing course**, including changes to co-requisite and pre-requisite unit values.

Before you proceed, please review the approval process in advance and leave time for each involved person or committee to review the proposal.

**DATE:** 5 December 2006
**DEPARTMENT/SCHOOL:** PHYSICS / COP
**CONTACT PERSON:** James Hetrick
**PHONE:** 63128
**BLDG & ROOM NO:** 101 Olson Hall

**New Courses:** Please complete **this entire** section (items 1-18)
**Revisions to Courses:** Please complete items 1-4 and only those items 5-18 that are being revised.

1. Please complete a. or b., not both.
   a. **New Courses:**
      - Proposed Course Subject/Number/Title/Prerequisites/Units (e.g., HIST 035 : History of... : prerequisites - none : 4 units):

        **PHYS 127 Computational Physics 4 units**
        Prerequisites: PHYS 55 *(Principles of Physics II)*
        MATH 57 *(Differential Equations)*
        COMP 51 *(Introduction to programming)*
        or
        Programming Experience with permission of the instructor

   For approval of new course numbers: Send the request to this email: registrar@pacific.edu. The request needs to include the department, the course title, and a suggested discipline & number. Please attach the email approving the new course number to this proposal.

   b. **Revision to Existing Course:**
      - Current Course Subject/Number/Title/Prerequisites/Units (e.g., HIST 035 : History of... : prerequisites - none : 4 units):

        Proposed new Course Subject/Number/Title/Prerequisites/Units (if applicable)

U.O.P.

JAN 02 2007

REGISTRAR
2. Please attach syllabus with all required elements, including course learning objectives, (see Faculty Handbook 11.7 for Syllabus requirements).

   Attached

3. Please provide the copy as it is to appear in the catalog. This includes the course description, specific prerequisites, co-requisites, and any restrictions on registration (e.g., majors only). Note: Unless indicated here, a passing grade for a prerequisite course is considered a “D.”

CATALOG COPY:

PHYS 127 Computational Physics (4)
This course provides an introduction to the main computational techniques used in modern physics. Topics include Ordinary differential equations, Partial differential equations, Matrix methods, Monte Carlo and other simulation methods, computer algebra.
Prerequisites: PHYS 55 and MATH 57. Offered in the spring semester of EVEN years.

DEGREE AUDIT INFORMATION

4. Does this course satisfy undergraduate General Education requirements?
   No

5. Was this course ever offered under a Special Topics number?
   Yes If yes, provide info below.
   | Special Topics Subject/Course # | Last year taught | 193 | 2004 |
   | Course title                   | Computational Physics |

6. Does this course fulfill General Education or major requirements for your program?
   Yes If yes, then what area/requirement does it fulfill? An Elective

7. Does this course fulfill undergraduate minor requirements for your program?
   Yes If yes, then what area/requirement does it fulfill (e.g. upper division elective)? An Elective

REGISTRATION INFORMATION

8. Units: 4

9. Grading options available to students who enroll (check all that apply):
   X - Letter (A-F) X - Pass/No Credit X - Audit

10. Schedule Type (check all that apply):
    X - Lecture Thesis/Doctoral Project Activity Course
    Lab Internship, Co-op, Fieldwork Practicum
11. Expected Enrollment: 12-15

12. Is a special fee to be charged?
   No   Yes  If yes, list the charge and fee code:
      Per unit   -or-   Flat fee

13. Is this course cross-listed with others?
    No

14. Course Similarities
   a. Is this course similar in content to course(s) in another school or department?
      No
   b. If yes, how is this course distinctive?

15. Will other courses be deleted as a result of this proposal when this course is created?
   (Note: if course is still being taught in the future do not delete it here.)
   No

16. Is the deleted course cross-listed with other courses?
    No

17. What is the anticipated impact on resources (e.g., faculty, funds, facilities, library, technology, etc.)

   None. This course is needed as part of our set of electives.

18. Will University computer labs be needed?
    Yes   If yes, what software will be needed?

    The Physics department (Sunray) computer lab will be used. All software needed is presently working on this system.

*Please remember to make the corresponding changes to your program’s catalog copy when you receive page proofs for next year’s catalog.*
UNIVERSITY OF THE PACIFIC

NEW COURSE – OR – REVISION TO EXISTING COURSE PROPOSAL
APPROVAL SHEET

DATE: 5 December 2006
DEPARTMENT/SCHOOL: PHYSICS / COP
CONTACT PERSON: James Hetrick
PHONE: 63128
BLDG & ROOM NO: Olson 101

Please obtain signatures in the order they appear below, as applicable.

1. DEPARTMENT CHAIR: 
   NAME: [Signature]
   DATE: 5 DEC 2006

2. CHAIRS OF OTHER INVOLVED DEPARTMENTS (if applicable):
   NAME: [Signature]
   DATE: 12-20-06

3. CHAIR, SCHOOL/COLLEGE CURRICULUM COMMITTEE:
   NAME: [Signature]
   DATE: 12-20-06

4. DEAN OF SCHOOL/COLLEGE:
   NAME: [Signature]
   DATE: 12-20-06

5. GENERAL EDUCATION COMMITTEE (if applicable):
   NAME: [Signature]
   DATE: 12-20-06

6. DEAN OF THE LIBRARY:
   NAME: [Signature]
   DATE: 12-24-06

7. DIRECTOR, EDUC. TECH. SERVICES (if computer lab, software needed):
   NAME: [Signature]
   DATE: 12-24-06

8. GRADUATE STUDIES COMMITTEE (if applicable):
   NAME: [Signature]
   DATE: 12-24-06

9. REGISTRAR:
   NAME: [Signature]
   DATE: 01-17-07

ACADEMIC AFFAIRS COMMITTEE:

DATE: 

New and Revised Course form, Page 4 of 4
Rev. 10006
Computational Physics

Professor: Dr. J. E. Hetrick
Office: 101-C Olson Hall, phone: 946-3128
Office Hours: 2:00-3:00 M-W-F, and by appointment
Email: jhetrick@pacific.edu

Text: An Introduction to Computer Simulation Methods... by Gould and Tobochnik
Course Webpage: http://blackboard.pacific.com

Course Outline and Objectives

Objectives:
• Introduce students to working in a scientific computing environment
• Learn how to translate physics problems onto a computer.
• Learn data analysis and visualization
• Complete the simulation or solution of a non-trivial computational project.

Outline:
• The scientific computing environment
• Simple (Ordinary) Diff Eqs
• Vector Diff Eqs
• Two-Body problems
• Oscillations
• Non-linear systems
• Partial Diff Eqs
• Potential / Boundary value problems
• Numerical Packages
• Random variables
• Monte Carlo techniques
• Projects

Prerequisites
Programming experience.
PHYS 55
MATH 57

Grades
75% Homeworks, programs, and mini-project writeups
25% Final Project
This course will be part lecture and part in-class lab work, using the Physics department's Sunray Unix lab adjacent to the lecture room.

For each of the topics in the above outline, we will learn the physics motivating the problem(s), learn some new programming techniques, then do a mini-project on the topic (or sometimes combine two topics in a mini-project). New programming methods and new physics will be practiced with homeworks, and a mini-project is summarized by a multipage technical report.

The final project is graded on both a written presentation and an oral presentation to the class.

Some projects in recent years have been:

- Current flow in a random network of resistors
- The thermodynamics of the 2-D Ising spin model
- Chaos in planetary orbits
- Accurate modelling of physics in video games

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Honor Code

"The University Honor Code is an essential element of academic integrity. It is a violation of the Honor Code to give or to receive information from another student during an examination, or to submit all or part of someone else's work or ideas as one's own."

This is particularly true of computer programs!

"Written work must give appropriate credit for all sources. If a student violates the Honor Code the penalty may be a zero credit for the examination or assignment or failure of the course, at the instructor's discretion. The Office of Student Life will handle disputed cases, and may be informed in any case. The student may also be reprimanded or suspended from the University. A complete statement of the Honor Code may be found in the student handbook, Tiger Lore."
Hi Dr. Hetrick,
I show PHYS 127 has not been previously used and can use it for "Computational Physics."

Tricia Isbill
Office of the Registrar
tisbill@pacific.edu
209-946-2135

Hi Tricia,
I am submitting a New Course Proposal form to the Curriculum Committee to get our special topics course from 2004 "Computational Physics" moved to a regular course.

The new form says that I must attach a permission from the Registrar for the requested course number: PHYS 127.

Can I get that from you? Attached is the Course request form and the syllabus.

Thanks, --Jim

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