



SACRAMENTO  
STATE

# Course Change Proposal Form A



<b>Academic Group (College):</b> Natural Sciences & Mathematics	<b>Academic Organization (Department):</b> Physics & Astronomy	<b>Date:</b> October 14, 2009
<b>Type of Course Proposal:</b> New <input checked="" type="checkbox"/> Change <input type="checkbox"/> Deletion <input type="checkbox"/>	<b>Department Chair:</b> Hossein Partovi	<b>Submitted by:</b> Hossein Partovi
<b>Does this course fulfill a requirement for single-subject or multiple subject credential students?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	<b>For Catalog Copy:</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> <b>CCE (Extension):</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	<b>Semester Effective:</b> Fall <input type="checkbox"/> Spring <input checked="" type="checkbox"/> , 2010 <input type="checkbox"/>

<b>This course replaces experimental course Subject Area (PHYS) and Catalog Nbr (course number):</b>	
<b>If changing an existing course, should new version be considered a repeat of the original version? If so, the same Course ID will be maintained. If not, a new Course ID will be assigned. Note: In PeopleSoft terminology, the Course ID is the unique system identifier, not the Catalog Nbr.</b>	Yes <input type="checkbox"/> No <input type="checkbox"/>

**Change from:**

<b>Subject Area (prefix) &amp; Catalog Nbr (course no.):</b>	<b>Title:</b>	<b>Units:</b>
--	---------------	---------------

**Change to:**

<b>Subject Area (prefix) &amp; Catalog Nbr (course no.):</b> PHYS 163.	<b>Title:</b> Scientific Computing: Modeling, Simulation, and Visualization	<b>Units:</b> 3
---	---	-----------------

**JUSTIFICATION:**

The proposed course has evolved from a 1-2 unit course entitled "Computing with Mathematica" which we have offered under our P199 for a number of years. We are proposing a broadened version of that course in response to (1) current trends in academic and industrial career paths in STEM disciplines which increasingly emphasize general computational skills of simulation and modeling, and (2) the need to reorganize the elective courses offered by the Physics & Astronomy Department with a view to making them better focused and more relevant to students' future careers, as well as achieving better resource efficiency by targeting a wider group of students. The new course PHYS 163 will be the second of two courses that are the upper-division requirements for the Scientific Computing & Simulation certificate program. The focus this course will be the integration and application of the basic elements of scientific computing to the solution of a broad range of problems in science and engineering. The revised course and the certificate program will be offered not only to physics majors but to all students in the NSM and ECS colleges. As a review of the attachment to this proposal will show, this course mainly consists of a series of computing projects encompassing all areas of basic science and engineering.

**NEW COURSE DESCRIPTION:** (Not to exceed 80 words, and language should conform to catalog copy. See <http://www.csus.edu/umannual/acad.htm> - Guidelines for Catalog Course Description)

<b>PHYS 163. Scientific Computing: Modeling, Simulation, and Visualization</b> Application of computer modeling, simulation, and visualization to the solution of scientific and engineering problems. Computer based projects will be used to develop the necessary skills, including a capstone project. Practical experience emphasized throughout. <b>Prerequisites:</b> PHYS 162. <b>Units:</b> 3.0.	
<b>Note:</b>	
<b>Prerequisite:</b> <b>Enforced at Registration:</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> <i>PHYS 162</i>	
<b>Corequisite:</b> <b>Enforced at Registration:</b> Yes <input type="checkbox"/> No <input type="checkbox"/>	
<b>Graded:</b> Letter <input checked="" type="checkbox"/> Credit/No Credit <input type="checkbox"/>	<b>Instructor Approval Required?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
<b>Course Classification (e.g., lecture, lab, seminar, discussion):</b> Lecture Discussion C2	<b>Title for CMS (not more than 30 characters):</b> Sci Comp: Mod & Sim

**Cross Listed?**  
Yes \_\_\_ No X

If yes, do they meet together and fulfill the same requirement, and what is the other course.

How Many Times Can This Course be Taken for Credit? 1

Can the course be taken for Credit more than once during the same term? Yes \_\_\_ No \_\_\_

### FOR NEW COURSE PROPOSALS OR SUBSTANTIVE CHANGES ONLY:

**Description of the Expected Learning Outcomes:** Describe outcomes using the following format: "Students will be able to: 1), 2), etc."  
See the example at <http://www.csus.edu/acaf/example.htm>

- 1) Students will be able to use the computer to do basic calculations.
- 2) Students will be able to use the computer to graph or display results of calculations.
- 3) Students will be able to model basic science and engineering problems and solve them on the computer.
- 4) Students will be able to organize and carry out a computer project for the solution of a science or engineering problem, devising a strategy, writing a program and debugging it, and visualizing the results.

\*\*Attach a list of the required/recommended course readings and activities [Note: it is understood that these are updated and modified as needed by the instructor(s).] This attachment should be forwarded only to your Dean's office, not Academic Affairs. *See attachment.*

**Assessment Strategies:** A description of the assessment strategies (e.g., portfolios, examinations, performances, pre-and post-tests, conferences with students, student papers) which will be used by the instructor to determine the extent to which students have achieved the learning outcomes noted above:

Throughout the course, students will be assigned various computer projects as homework and evaluated. Thus there is a continuous process of assessment as the semester progresses, culminating in the capstone project which is intended to integrate and demonstrate the skills acquired in the course of the semester. By the end of the semester, the set of completed projects constitutes a portfolio, albeit an electronic one. This continuous evaluation process is focused on student projects, especially the end product of each project, and directly measures the outcome of their learning process. In addition, as part of its ongoing assessment effort, the Physics & Astronomy Department probes the effectiveness of its educational programs by surveying its alumni and examining their post-graduation employment or education history. This effort will provide another important means of assessing the overall efficacy of this program and the degree to which it provides an enhancement to the future careers of our students.

For whom is this course being developed?

Majors in the Dept X Majors of other Depts X Minors in the Dept \_\_\_ General Education \_\_\_ Other All students in the NSM and ECS Colleges.

Is this course required in a degree program (major, minor, graduate degree, certificate)? Yes X No \_\_\_

If yes, identify program(s): *Scientific Computing & Simulation* certificate program (see attachments)

Does the proposed change or addition cause a significant increase in the use of College or University resources (lab room, computer facilities, faculty, etc.)? Yes \_\_\_ No X *See attachment for details.*

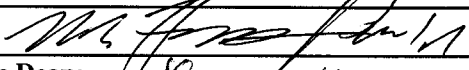
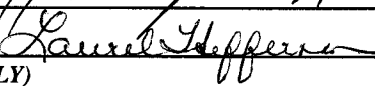
If yes, attach a description of resources needed and verify that resources are available.

Indicate which department or programs will be affected by the proposed course (if any). None outside of physics

*The Department Chair's signature below indicates that affected programs have been sent a copy of this proposal form.*

**Approvals:** If proposed change, new course or deletion is approved, sign and date below. If not approved, forward without signing to the next reviewing authority, and attach an explanatory memorandum to the original copy.

**Signatures:**

	Signatures	Date
Department Chair:		10/14/09
College Dean or Associate Dean:		10/22/09
CPSP (for school personnel courses ONLY)		
Associate Vice President and Dean for Academic Programs		