Course Change Proposal
Form A

Academic Group (College): Natural Sciences and Mathematics
Academic Organization (Department): Physics and Astronomy
Date: August 30, 2007

Type of Course Proposal:
New ____ Change X ____ Deletion ____

Department Chair:
Gary Shoemaker
Submitted by:
Gary Shoemaker

Does this course fulfill a requirement for single-subject or multiple subject credential students?
Yes ___ No X ___

For Catalog Copy: Yes X ___ No ___
CCE (Extension): Yes ___ No X ___

Semester Effective:
Fall X ___ Spring ____ , 2008

This course replaces experimental course Subject Area (prefix) and Catalog Nbr (course number):

Change from:
Subject Area (prefix) & Catalog Nbr (course no.): PHYS 156
Title: Advanced Classical Physics
Units: 3

Change to:
Subject Area (prefix) & Catalog Nbr (course no.): PHYS 156
Title: Classical and Statistical Mechanics
Units: 3

JUSTIFICATION:

Our proposed changes are a response to the requirements of physics graduate programs. It became clear that a deficiency in our core program requirements was precisely in the areas addressed by the changes in this course. Our previous Physics 156 course contained many topics that our now adequately covered in our recently added Physics 136 course, required in both the BA and BS degree programs.

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


Note:
Prerequisite:
Enforced at Registration: Yes ___ No X ___
Corequisite:
Enforced at Registration: Yes ___ No X ___
CAN (California Articulation Number): N/A

Graded: Letter X ___ Credit/No Credit ___
Instructor Approval Required? Yes X ___ No ___

Course Classification (e.g., lecture, lab, seminar, discussion):
Lecture (C-02)

Title for CMS (not more than 30 characters)
Classical/Statistical Physics

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 X ___
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

Students will be able to:
1) Understand the fundamental principles of Hamiltonian and Lagrangian dynamics,
2) Solve sophisticated problems that involve the application of these fundamental principles
3) Understand the fundamental principles of statistical mechanics and the underlying statistical basis of thermodynamics,
4) Solve sophisticated problems that involve the application of these fundamental principles.

**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.

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:

1) Typically an instructor will give 2 or 3 midterm exams (1-hour) given at approximately equal intervals during the semester. One final exam (2-hour) is given during exam week and/or part of the exam could be given as a take-home exam. Generally exams are weighted considerably greater than 50% of the course grade.
2) Problem sets of 4-8 problems will be assigned per week. Students are expected to solve these problems using primarily their own efforts; however, some collaboration with other students and the instructor is encouraged. Often some of the problems and their solutions would be discussed in class.

For whom is this course being developed?
Majors in the Dept. X  Majors of other Depts. ___  Minors in the Dept. ___  General Education ___  Other ___
Is this course required in a degree program (major, minor, graduate degree, certificate)? Yes X No ___
If yes, identify program(s): Physics BS degree

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 ___
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 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:  

<table>
<thead>
<tr>
<th>Department Chair: [Signature]</th>
<th>Date: 9/13/07</th>
</tr>
</thead>
<tbody>
<tr>
<td>College Dean or Associate Dean: [Signature]</td>
<td>Date: 9/20/07</td>
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<tr>
<td>CPSP (for school personnel courses ONLY)</td>
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<tr>
<td>Associate Vice President and Dean for Academic Programs</td>
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Distribution: Academic Affairs (original), Department Chair and College Dean. Dean’s office to send original after approval to Academic Affairs, at mail zip 6016. An electronic copy must also be sent.
Physics 156 Course Syllabus (Model)

Expected Learning Outcomes

Students will be able to:
1) Understand the fundamental principles of Hamiltonian and Lagrangian dynamics,
2) Solve sophisticated problems that involve the application of these fundamental principles,
3) Understand the fundamental principles of statistical mechanics and the underlying statistical basis of thermodynamics,
4) Solve sophisticated problems that involve the application of these fundamental principles.

Course Activities and Assessment:

1) Typically an instructor will give 2 or 3 midterm exams (1-hour) given at approximately equal intervals during the semester. One final exam (2-hour) is given during exam week and/or part of the exam could be given as a take-home exam to evaluate student mastery of fundamental principles and application to the subject areas listed in the catalog description. Generally exams are weighted considerably greater than 50% of the course grade.
2) Problem sets of 4-8 problems will be assigned per week. Students are expected to solve these problems using primarily their own efforts; however, some collaboration with other students and the instructor is encouraged. Often some of the problems and their solutions would be discussed in class. Some instructors may require or encourage a paper on a topic appropriate to the course.
3) Course content will be generally split 50-50 between topics in classical dynamics and statistical mechanics.

Readings and Activities

Textbooks:


- **Statistical Mechanics.** Classical and Statistical Thermodynamics, Ashley Carter (Prentice Hall), Thermal Physics, Kittel & Kroemer (Freeman), Thermal Physics, D. Schroeder (Addison Wesley Longman), Thermal Physics, Baierlein (Cambridge), Fundamentals of Statistical & Thermal Physics, Reif (McGraw-Hill). Useful reference sources are the graduate texts Statistical Mechanics, Huang (Wiley) and Statistical Mechanics & Thermodynamics, Garrod (Oxford).