1. Catalog Description of the Course. [Follow accepted catalog format.]

Prefix PHYS Course# 301 Title CLASSICAL MECHANICS Units (3)
3 hours lecture per week

Prerequisites PHYS 201, MATH 350

Corequisites

Description A differential equation-based introduction to classical mechanics. The areas covered include the Lagrangian formulation, variational principles, Hamiltonian mechanics, and the theory of canonical transformations. Some applications to the motion of rigid bodies, systems of coupled oscillators, and celestial mechanics will be presented.

Graded

Gen Ed CR/NC Repeatable for up to units

Categories
Lab Fee Required A-Z Total Completions Allowed

Mission Based Learning Objectives: Interdisciplinary International Multicultural Service Learning

Title V Section 40404: Government US Constitution US History

2. Mode of Instruction.

<table>
<thead>
<tr>
<th>Components</th>
<th>Units</th>
<th>Hours per Unit</th>
<th>Benchmark Enrollment</th>
<th>Graded Component</th>
<th>CS #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td>3</td>
<td>1</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seminar</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laboratory</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Justification and Learning Objectives for the Course. (Indicate whether required or elective, and whether it meets University Writing, and/or Language requirements) [Use as much space as necessary]

This course is an elective for applied physics majors who wish to pursue graduate study in physics, applied physics or engineering.

Students who successfully complete this course will be able to

• explain the advanced concepts of classical physics
• apply differential equation solutions real world physics problems
• apply vector calculus to generalize problem solution
• identify and solve problems in context
• apply problem solving skills to practical problems in classical mechanics

The course does not meet the University Writing and/or Language requirements.

4. Is this a General Education Course YES ☑ NO ☒

If Yes, indicate GE category and attach GE Criteria Form:

A (English Language, Communication, Critical Thinking)
A-1 Oral Communication
A-2 English Writing
A-3 Critical Thinking

B (Mathematics, Sciences & Technology)
B-1 Physical Sciences
B-2 Life Sciences – Biology
B-3 Mathematics – Mathematics and Applications
B-4 Computers and Information Technology

C (Fine Arts, Literature, Languages & Cultures)
5. Course Content in Outline Form. [Be as brief as possible, but use as much space as necessary]

1. Lagrangian formalism
2. Variational principle
3. Hamiltonian Mechanics
4. Motion of rigid bodies
5. Coupled oscillators
6. Celestial mechanics

Does this course overlap a course offered in your academic program? YES □ NO ☐
If YES, what course(s) and provide a justification of the overlap?

Does this course overlap a course offered in another academic area? YES □ NO ☐
If YES, what course(s) and provide a justification of the overlap?
Signature of Academic Chair of the other academic area is required on the consultation sheet below.

6. Cross-listed Courses (Please fill out separate form for each PREFIX)
List Cross-listed Courses

Signature of Academic Chair(s) of the other academic area(s) is required on the consultation sheet below

Department responsible for staffing: Physics

7. References. [Provide 3 - 5 references on which this course is based and/or support it.]

Classical Dynamics of Particles and Systems Stephen T. Thornton, Jerry B. Marion, Brooks Cole 2003
(ISBN:0534408966)

8. List Faculty Qualified to Teach This Course.

Physics Faculty

a. Projected semesters to be offered: Fall ☐ Spring ☐ Summer ☐

10. New Resources Required. YES □ NO ☐
If YES, list the resources needed and obtain signatures from the appropriate programs/units on the consultation sheet below.
a. Computer (data processing), audio visual, broadcasting needs, other equipment)

b. Library needs

5/25/2004 cp
c. Facility/space needs

11. Will this new course alter any degree, credential, certificate, or minor in your program? YES ☒ NO ☐
   If, YES attach a program modification form for all programs affected.

   Dr. Gregory G. Wood 5/24/2006
   Proposer of Course Date
## Approvals

<table>
<thead>
<tr>
<th>Name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Chair</td>
<td></td>
</tr>
<tr>
<td>Curriculum Committee Chair</td>
<td></td>
</tr>
<tr>
<td>Dean</td>
<td></td>
</tr>
</tbody>
</table>
1. Course Title: PHYS 301 Classical Mechanics

2. Program Area: Math and Applied Physics

**Recommend Approval**

<table>
<thead>
<tr>
<th>Program Area/Unit</th>
<th>Program/Unit Chair</th>
<th>YES</th>
<th>NO (attach objections)</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Art</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biology</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business &amp; Economics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>History</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liberal Studies</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mathematics &amp; CS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple Programs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychology</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Library</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information Technology</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>