Minnesota State University, Mankato

Curriculum Proposal

Please type or select the requested information. Print completed forms, add appropriate paper attachments, and route through MSU's curricular process for recommendations and decisions.

Collge: Science, Engineering and Technology
Department: Physics and Astronomy
Program: Physics B.S.
Type of Change: COURSE PROPOSALS
Proposed: New Course
Title Current: General Physics II Laboratory
Title Proposed: General Physics II Lab
24-Char. Abbrev: PHYS 232

Proposal #: 101
Effective Date of Change: 07-01-08
Academic Year: 07-08
(For Office Use Only)
Course Designator: PHYS 232
Number of Credits: 1

Include a course or program description for the Bulletin (30-40 words maximum for courses, 100 for programs):

Designed for science and engineering students. Laboratory course accompanying PHYS 222. Experiments involving electric and magnetic fields, electric potential, electric and magnetic forces, and simple circuits. Laboratory only. Pre: PHYS 221 with a "C" or better; and PHYS 222 or concurrent. Fall, Spring

Rationale or Justification for change:
The proposal is to change the General Physics sequence from the current two semester sequence (3cr + 3cr) to a three semester one (6cr + 3cr + 3cr). We believe the current two semester sequence gives students too much material in a short time. By making this change we hope to accomplish the following:
1. Give students more time to absorb the material.
2. Improve student retention rate and understanding of physics.
This is the laboratory course accompanying PHYS 222 (General Physics II). Separating this course from PHYS 222 gives students options to take PHYS 222 with or without the laboratory component.

For General Education or Cultural Diversity Courses Only

<table>
<thead>
<tr>
<th>GE Category #</th>
<th>GE Category Name (Maximum of 3 Categories)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td></td>
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<tr>
<td>N/A</td>
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<tr>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

* For Writing Intensive Courses, attach a description of the kind and quantity of writing.
* For Upper Division Courses, include a description of the respects in which it is broad and general rather than narrow and specific, and so suitable as GE.

Attach paper copies of the following:
a. Syllabus or course outline.
b. Course's student learning outcomes associated with each GE competency or CD designation.
c. List of strategies to be used to assess students' achievement of each GE competency or CD designation.

For New Courses

Instructional Type: Lab
Grading Format: Grade
P/N

Course will be offered:
Fall Semester
Spring Semester
Summer Session

Course content or title is similar to courses in other departments. (Attach copy of letter of agreement with other program(s) contacted. Indicate the nature of the discussions and/or resolution of differences or potential conflicts.)

For New Courses

PHYS 222 will be in the new course, PHYS 232.

PHYS 222 is being changed from 5cr to 3cr. The lab content of PHYS 222 will be in the new course, PHYS 232.

Attach paper copies of the following:
a. Syllabus or course outline.
b. Course's student learning outcomes.
c. A list of resources required to offer and support this course.
d. A description of how teaching this course will affect department staffing.
e. If 400/500 level course, an explanation of added expectations of graduate students.

Revised September 2002
### Signature Page

**Department**
- **Recommended** (Category/ies________) [Signature] 9 Oct. 2007  
  Department Chair  
- **Not Recommended** (Category/ies________)  
  Comments:

**College Curriculum Committee**
- **Recommended** (Category/ies________)  
  Committee Chair  
- **Not Recommended** (Category/ies________)  
  Comments:

**College Dean**
- **Recommended** (Category/ies________)  
  Dean  
- **Not Recommended** (Category/ies________)  
  Comments:

**General Education Subcommittee**
- **Recommended** (Category/ies________)  
  General Education Subcommittee Chair  
- **Not Recommended** (Category/ies________)  
  Comments:

**Undergraduate Curriculum and Academic Policy Committee**
- **Recommended** (Category/ies________)  
  UCAP Faculty Chair  
- **Not Recommended** (Category/ies________)  
  Comments:

**Faculty Association Graduate Committee**
- **Recommended**  
  Faculty Association Graduate Chair  
- **Not Recommended**  
  Comments:

**Graduate Dean**
- **Recommended**  
  Graduate Dean  
- **Not Recommended**  
  Comments:

**Academic Affairs Council**
- **Recommended** (Category/ies________)  
  Assistant Vice President  
- **Not Recommended** (Category/ies________)  
  Comments:

**Senior Vice President and Vice President for Academic Affairs**
- **Approved** (Category/ies________)  
  Sr. Vice President / Vice Pres. Academic Affairs  
- **Not Approved** (Category/ies________)  
  Comments:
PHYS 232 (1cr)  General Physics II Laboratory

Rationale:
We propose to change the General Physics sequence from the current two semester sequence [5cr + 5cr] to a three semester one [4cr + (3+1)cr + (3+1)cr]. We believe the current two semester sequence gives students too much material in a short time. By making this change, we hope to accomplish the following:
1. Give students more time to absorb the material.
2. Improve student retention rate and understanding of physics.
This is the laboratory course accompanying PHYS 222 (General Physics II). Separating this course from PHYS 222 gives students options to take PHYS 222 with or without the laboratory component.

Catalog Course Description:
Designed for science and engineering students. Laboratory course accompanying PHYS 222. Experiments involving electric and magnetic fields, electric potential, electric and magnetic forces, and simple circuits. Laboratory only.
Pre: PHYS 221 with a “C” or better; and PHYS 222 or concurrent.
Fall, Spring

Course Objectives:
To learn how to make observations, measurements involving electric and magnetic fields, electric potential, electric and magnetic forces, and simple circuits, and to learn how to draw conclusions from physics experiments.

Laboratory Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Experiments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No lab</td>
</tr>
<tr>
<td>2</td>
<td>Review of Uncertainty Analysis</td>
</tr>
<tr>
<td>3</td>
<td>Mapping Electric Fields Using Graphic Method</td>
</tr>
<tr>
<td>4</td>
<td>Equipotential Lines and Electric Fields</td>
</tr>
<tr>
<td>5</td>
<td>The Oscilloscope and Function Generator</td>
</tr>
<tr>
<td>6</td>
<td>Discovery Experiment</td>
</tr>
<tr>
<td>7</td>
<td>Ohm’s law, Kirchoff’s Rules, and Power Transfer</td>
</tr>
<tr>
<td>8</td>
<td>First Laboratory Test</td>
</tr>
<tr>
<td>9</td>
<td>Transient Current in RC circuit</td>
</tr>
<tr>
<td>10</td>
<td>The Current Balance</td>
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<tr>
<td>11</td>
<td>The Magnetic Field of a Solenoid</td>
</tr>
<tr>
<td>12</td>
<td>Self and Mutual Inductance</td>
</tr>
<tr>
<td>13</td>
<td>AC Circuit</td>
</tr>
<tr>
<td>14</td>
<td>Rectifiers and Filters</td>
</tr>
<tr>
<td>15</td>
<td>Second Laboratory Test</td>
</tr>
</tbody>
</table>

2 hours laboratory every week. Students’ learning outcomes are assessed by laboratory reports and practical tests.
Learning Outcomes:
To be able to measure electric and magnetic fields, electric and magnetic forces, electric potential, and characteristics of simple circuits by using laboratory equipment.
To understand the nature and source of electric and magnetic forces.
To understand the nature and source of electric and magnetic fields.
To be able to operate the oscilloscope, and make measurements of voltage, frequency, and phase with it.
To be able to measure voltage drops, current, resistance, capacitance, and inductance in simple circuits.

Resources required: No new resources are required.

Staffing plan:
Offering this course has minor effects on the department's staffing plan. With careful planning, offering this course should not increase the load of the faculty presently in the department.
To: UCAP Committee members
From: Youwen Xu, Chair, CSET Curriculum Committee
Date: Oct. 26, 2007
Subject: Endorsement for the proposed new General Physics course sequence

The endorsements for the proposed new General Physics course series (Phys 221, 222, 223, 232, and 233) from departments and programs that are affected by the changes are attached with the proposal of Phys 221. Please note that the endorsements are for the whole sequence, not just for one course.