Minneapolis 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.

- College: Science, Engineering and Technology
- Department: Physics and Astronomy
- Program: Physics B.S.
- Course Designator: Phys 435, 3
- Title Current: Modern Physics I
- Title Proposed: Modern Physics I
- 24-Char. Abbrev: Phys 335, 3 (if applicable)

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

Special theory of relativity. Quantum nature of waves and particles: photons, de Broglie wavelength of matter and wave packet description of particles. Bohr model of hydrogen. Schrodinger wave equation in one-dimension; energy quantization, potential barriers, simple harmonics oscillator. One-electron atoms. X-ray and optical excitation of multielectron atoms. Lecture and laboratory. Pre: PHYS 212 or 222 and MATH 122 S

Rationale or Justification for change:
The course is taught at 300-level, not at 400-level. Students should take this course following Phys 212 or 222 in their sophomore of junior year.

***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>
</tr>
<tr>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

For Writing Intensive Courses, attach a description of the kind and quantity of writing.

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***

- Course is an elective.
- Grading Format: Grade P/N
- Other courses are being changed or eliminated. (Explain.)

- 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.)

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.

- If 400/500 level course, an explanation of added expectations of graduate students.
### Signature Page

**Department**
- Recommended
- Not Recommended

**College Curriculum Committee**
- Recommended
- Not Recommended

**College Dean**
- Recommended
- Not Recommended

**General Education Subcommittee**
- Recommended
- Not Recommended

**Undergraduate Curriculum and Academic Policy Committee**
- Recommended
- Not Recommended

**Faculty Association Graduate Committee**
- Recommended
- Not Recommended

**Graduate Dean**
- Recommended
- Not Recommended

**Academic Affairs Council**
- Recommended
- Not Recommended

**Senior Vice President and Vice President for Academic Affairs**
- Approved
- Not Approved

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**Comments:**

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**Date:**

- 10/6/2006
- 10/20/06
- 10/23/06
- 
- Assistant Vice President
- Sr. Vice President / Vice Pres. Academic Affairs

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**Signed:**

- [Signature]
- [Signature]
- [Signature]
- [Signature]
- [Signature]
- [Signature]
- [Signature]
- [Signature]
Modern Physics: Physics 335

Minnesota State University
Department of Physics and Astronomy

Lectures: TR C108: Tuesdays 8:30 – 9:40 am; Thursdays 9:00 – 9:40 am

Lab: TR C108: Mondays 2:00 – 4:50 pm

Instructor: Dr. Russell Palma
Office: TR N-156
Phone: 389-5743 (Dept. Of Physics and Astronomy)
389-6204 (Instructor’s Office)
email: russell.palma@mnsu.edu
Office Hours: see posted schedule

Textbook: Modern Physics (2nd ed.) by Kenneth Krane; Wiley Publishing.

Lab Manual: Modern Physics I (available at the Trafion Copy Shop)

Course Description: The course is designed to provide an appreciation of the concepts and methods of twentieth-century physics, including relativity and quantum physics.

Exams: Three exams will be given after completing the following chapters: exam 1—Chapters 1 and 2; exam 2—Chapters 3 and 4; exam 3—Chapters 5 and 6. You will be given at least one week’s notice before an exam. The Final Exam is scheduled on Thursday, May 11, 8:00 am - 10:00 am and will cover Chapters 7 and 8 only. A tentative schedule for the course is below.

Grading Policy: The course grade will be determined as shown in Tables 1 and 2.

<table>
<thead>
<tr>
<th>Class Component</th>
<th>% of grade</th>
<th>Scale</th>
<th>grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participation and homework</td>
<td>20</td>
<td>≥85%</td>
<td>A</td>
</tr>
<tr>
<td>Tests 1, 2 and 3 (15 % each)</td>
<td>45</td>
<td>75-84%</td>
<td>B</td>
</tr>
<tr>
<td>Lab reports</td>
<td>20</td>
<td>60-74%</td>
<td>C</td>
</tr>
<tr>
<td>Final exam</td>
<td>15</td>
<td>50-59%</td>
<td>D</td>
</tr>
<tr>
<td>Potential extra credit (see below)</td>
<td>5</td>
<td>&lt; 50%</td>
<td>F</td>
</tr>
</tbody>
</table>

Problem Assignments: Problems will be assigned on a routine basis and are to be turned in on the due date. Late homework will not be accepted. Selected problems will be graded, and others may be assigned at random for classroom presentation of the solution.
**Tentative Schedule:**

<table>
<thead>
<tr>
<th>Week beginning</th>
<th>Course Material Covered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 16</td>
<td>Introduction and Chapter 1</td>
</tr>
<tr>
<td>Jan 23</td>
<td>Chapters 1 and 2</td>
</tr>
<tr>
<td>Jan 30</td>
<td>Chapter 2</td>
</tr>
<tr>
<td>Feb 6</td>
<td>Chapters 2 and 3</td>
</tr>
<tr>
<td>Feb 13</td>
<td>Exam 1 and Chapter 3</td>
</tr>
<tr>
<td>Feb 20</td>
<td>Chapters 3 and 4</td>
</tr>
<tr>
<td>Feb 27</td>
<td>Chapters 4</td>
</tr>
<tr>
<td>Mar 6</td>
<td>Chapter 5 and Exam 2</td>
</tr>
<tr>
<td>Mar 13</td>
<td><em>Spring Break</em></td>
</tr>
<tr>
<td>Mar 20</td>
<td>Chapters 5</td>
</tr>
<tr>
<td>Mar 27</td>
<td>Chapter 6</td>
</tr>
<tr>
<td>Apr 3</td>
<td>Chapters 6 and 7</td>
</tr>
<tr>
<td>Apr 10</td>
<td>Exam 3 and Chapter 7</td>
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<tr>
<td>Apr 17</td>
<td>Chapters 7</td>
</tr>
<tr>
<td>Apr 24</td>
<td>Chapter 8</td>
</tr>
<tr>
<td>May 1</td>
<td>Chapter 8</td>
</tr>
<tr>
<td>May 8</td>
<td>Final Exam</td>
</tr>
</tbody>
</table>

**Lab:** Your lab manual has information on error and graphical analysis and also 5 labs. You should read the error and graphical analysis information before starting the first lab, but there is nothing to actually turn in for grading (you don’t need to do the graphing problems on pages A-15, 16). The 5 labs will not actually begin until several weeks into the course so that we can cover some of the material before you attempt any of the labs. However, there is only 1 set-up for each lab, so it will be necessary in some cases to do a lab before the material is discussed in class. I will make out a schedule that allows each 2 person group to have time for each lab. You will have a different lab partner for each lab.