PURDUE UNIVERSITY
REQUEST FOR ADDITION, EXPIRATION, OR REVISION OF AN UNDERGRADUATE COURSE
(10000-40000 LEVEL)

DEPARTMENT: Physics
EFFECTIVE SESSION: Fall 2011

INSTRUCTIONS: Please check the items below which describe the purpose of this request.

1. New course with supporting documents
2. Add existing course offered at another campus
3. Expansion of a course
4. Change in course number
5. Change in course title
6. Change in course credit/型

PROPOSED:
Subject Abbreviation: PHYS
Course Number: 20000
Long Title: X-Ray Physics
Short Title:

EXISTING:

TERMS OFFERED:
Check All That Apply:
- Summer
- Fall
- Spring

CAMPUS(ES) INVOLVED:
- N. Central
- Fl. Wayne
- Tech Slate/Camp
- W. Lafayette
- Indianapolis

Abbreviated title will be entered by the Office of the Registrar if omitted, (20 CHARACTERS ONLY)

<table>
<thead>
<tr>
<th>CREDIT TYPE</th>
<th>Course Attributes: Check All That Apply</th>
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<tbody>
<tr>
<td>1. Fixed Credit: Cr. Hrs.</td>
<td>0. Registration Approval Type</td>
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<td>2. Variable Credit Range:</td>
<td>Department</td>
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<td>Minimum Cr. Hrs. (Check One)</td>
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<td>Maximum Cr. Hrs.</td>
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<td>Equivlant Credit: Yes</td>
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<tr>
<th>Schedule Type</th>
<th>Minutes Per Week</th>
<th>Meetings Per Week</th>
<th>Weeks Offered</th>
<th>% of Credit Allocated</th>
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<tr>
<td>Lecture</td>
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<td>15</td>
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<td>Recitation</td>
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COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):
This course provides background in physics necessary to understand the generation and usage of X-Rays. It will cover basic concepts in Physics such as Force, Energy, and Power. Concepts in Electricity and Magnetism will be explored as an introduction to Electromagnetic Radiation. Physical models of Electromagnetic Radiation and Matter will be developed. The interaction between Electromagnetic Radiation and Matter will be explored. Particular focus will be placed on the physical mechanism of generating X-Rays and the use of X-Rays.

Prerequisites: MA 153

COURSE LEARNING OUTCOMES:
1. Students will be able to describe basic AC circuit concepts such as current, voltage, and induction.
2. Students will describe physical models of electromagnetic radiation: Photons, Waves, Rays.
3. Students will comprehend the interaction of electromagnetic radiation with matter.
4. Students will explain the process of generation of X-Rays and their detection.

OFFICE OF THE REGISTRAR
Instructor: Mark Masters  
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phone: 260-481-6153  
Office: KT127

Course Description:
This course provides background in physics necessary to understand the generation and usage of X-Rays. It will cover basic concepts in Physics such as Forces, Energy and Power. Concepts in Electricity and Magnetism will be explored as an introduction to Electromagnetic Radiation. Physical models of Electromagnetic Radiation and Matter will be developed. The interaction between Electromagnetic Radiation matter will be explored. Particular focus will be placed the physical mechanism of generating X-Rays and the use of X-Rays.

Prerequisites: MA 153

Topics Covered
Nature of Science  
Forces, Energy and Power  
Coulomb's law (Force between charged particles)  
Electric Fields  
Current and Voltage (Ohm's Law)  
Resistors, Capacitors and Inductors  
Magnetic Fields  
Induction and Transformers  
Diodes and rectifiers  
Electromagnetic Radiation and Physical Models  
Point and Extended sources  
Physical Models of Matter  
Interaction of EM radiation with matter  
X-Rays and atoms  
Generating X-Rays  
X-Ray Optics and Detectors

Student Learning Goals
1. Students will be able to describe basic AC circuit concepts such as current, voltage, and induction.
2. Students will describe physical models of electromagnetic radiation: Photons, Waves, Rays.
3. Students will comprehend the interaction of electromagnetic radiation with matter.
4. Students will explain the process of generation of X-Rays and their detection.

This class will be taught using a technique called interactive engagement. In this method, you are expected to participate. Participation does not mean simply showing up for class, but means that you have to be actively involved with the class. You must ask questions, you will be asked questions with the expectation that you will endeavor to answer, to think about the material. If you are wrong, it does not matter. You will be expected to work in assigned groups.
Class will also involve, as often as possible, the use of hands on activities and explorations. For example, with AC circuits, and in particular with Transformers, diodes and rectifiers, we will make measurements to understand how they work. We will explore electric charge and magnetism through hands on activities. We will do some simple optics investigations and also some simple photography (pin hole cameras).

You will be assigned homework. The homework is not simple plug in the numbers type of work but will involve thinking. As such, do not leave it until the last minute to start. Give yourself time to think and consider.

There will also be 3 tests. The tests will each be comprehensive.

Grading:
Homework: 30%
Exams: 30%
Participation 10%
In Class Activities 30%

Grades: A 90% and above; B 80% to 89%; C 70% to 79%; D 60% - 69%; F less than 60%