Agenda Item #06-118
Effective Fall 2008

Eastern Illinois University
New Course Proposal
PHY 3001, Laser Safety

Please check one: ☒ New course ☐ Revised course

PART I: CATALOG DESCRIPTION

1. **Course prefix and number:** PHY 3001
2. **Title:** Laser Safety
3. **Long title:**
4. **Class hours per week, lab hours per week, and credit:** 3-0-3
5. **Term(s) to be offered:** ☒ Fall even years ☐ Spring ☐ Summer ☐ On demand
6. **Initial term of offering:** ☒ Fall ☐ Spring ☐ Summer ☐ Year 2008
7. **Course description:**

An introduction to laser safety in a professional setting. This course develops the fundamentals of laser operation. There is further study into safety issues involved in using lasers including hazards and protection. A working knowledge of the standards of laser safety and how to create a safer workplace is developed in this course. Students learn the practical matters as well as the legal issues facing a laser safety officer.

8. **Registration restrictions:**

   a. **Identify any equivalent courses:** There is no equivalent course.
   b. **Prerequisite(s):** PHY 1161 or PHY 1371 and MAT 1441G or MAT 2110G
   c. **Who can waive the prerequisite(s)?**

      ☐ No one ☒ Chair ☐ Instructor ☐ Advisor ☐ Other

   d. **Co-requisites**: There are no co-requisites.

   e. **Repeat status:** ☒ Course may not be repeated.

   f. **Degree, college, major(s), level, or class** to which registration in the course is restricted, if any: None
   g. **Degree, college, major(s), level, or class** to be excluded from the course, if any: None

9. **Special course attributes:** None
10. **Grading methods**: ☒ Standard letter ☐ C/NC ☐ Audit ☐ ABC/NC
11. **Instructional delivery method:** lecture

PART II: ASSURANCE OF STUDENT LEARNING

1. List the student learning objectives of this course:

   Students will:
   a. Explain the fundamentals of laser operation.
   b. Explain the potential hazards associated with lasers.
   c. Demonstrate a knowledge of the ANSI 136.1 laser classification system.
   d. Apply the laws surrounding laser safety in Illinois and nationally.
   e. Calculate MPE (Maximum Permissible Exposure) for different lasers and determine appropriate OD (Optical Density) for laser protection.
   f. Develop standard operating procedures for a laser program and an outline for a laser safety program.

   a. This is not a general education class.
   b. This is not a graduate level class.

2. Identify the assignments/activities the instructor will use to determine how well students attained the learning objectives:

	Exams	Participation & In Class Activities	Written Project	Final Exam
Explain the fundamentals of laser operation.	X	X		X
Explain the potential hazards associated with lasers.	X	X		X
Demonstrate a knowledge of the ANSI 136.1 laser classification system.	X	X		X
Apply the laws surrounding laser safety in Illinois and nationally.	X	X	X	X
Calculate MPE for different lasers and determine appropriate OD for laser protection.	X	X		X
Develop standard operating procedures for a laser program and an outline for a laser safety program.		X	X	

3. Explain how the instructor will determine students' grades for the course:
   30% in class hour exams (3)
   20% participation and in class activities
   25% written project
   25% final exam

4. This is not a technology delivered course.
5. This course is not for graduate credit.
6. There is no writing designation for this course.

PART III: OUTLINE OF THE COURSE

This course will meet for three 50 minute lectures per week for 15 weeks.

Week 1	Introduction, History of Laser
Week 2	Basic Laser Operation: properties of lasers, theory of lasers
Week 3	Basic Laser Operation: construction of lasers, wavelength, NOVA Laser
Week 4	Laser Hazards: optical hazards, structure of the eye, damage zones
Week 5	Laser Hazards: wavelength dependence, associated hazards
Week 6	Introduction to Maximum Permissible Exposure, OSHA requirements
Week 7	Calculation of Maximum Permissible Exposure
Week 8	Practical Laser Safety: rules of thumb, safety in building and using lasers
Week 9	Laser Accidents, Device Considerations, CDRH requirements
Week 10	Illinois Law: scope, purpose, laser safety officer requirements
Week 11	Illinois Law: safe operation requirements, reporting, signage
Week 12	General Requirements: state regulations, local regulations
Week 13	Laser Safety Plan: structure, reporting, emergency information
Week 14	Develop SOP: develop a laser safe standard operating procedure
Week 15	Selected Topics: standards development, current MPE issues

PART IV: PURPOSE AND NEED

1. Explain the department's rationale for developing and proposing the course.

Much of the material in this proposed course has been taught under the "Selected Topics" course, PHY 3012 and is already a required course in the Radiation Physics option. Since this course is a required course in that option, and since it has become popular with students, the course should be given its own name and number in the catalog. In order to accomplish the objectives of the course at the appropriate breadth and depth of topic coverage, the number of hours needs to be increased from 2 SH to 3 SH. This course is a meaningful

course for technicians in radiation fields because they will need to know how to handle this form of radiation in the workplace.

a. This is not a general education course.

b. This course is not a technology delivered course.

2. Justify the level of the course and any course prerequisites, co-requisites, or registration restrictions.

In order to master this material, students need the basic problem solving techniques learned in the introductory physics sequence, as well as the mathematical skills developed in the co-requisite math course work, including at least one course in calculus.

3. If the course is similar to an existing course or courses, justify its development and offering.
   a. This course is not similar to an existing course.
   b. No courses will be deleted. This material had been offered under the Special Topics number, PHY 3012.

4. Impact on Program(s):
   This course will be required for the B. S. in Physics, Radiation Physics Option. This course will be an approved elective in the B. S. in Physics minor.

PART V: IMPLEMENTATION

1. Faculty member(s) to whom the course may be assigned:
   This course will initially be assigned to Dr. Daniels.
2. Additional costs to students: There is no additional cost to students.
3. Text and supplementary materials to be used (Include publication dates):
   Laser Safety Guide 10th Ed. By Wesley Marshall and David Sliney. Published by the Laser Institute of America. 2000.
   Laser Safety Course Supplement. By S. W. Daniels. Published by the EIU Physics Department. 2001.

PART VI: COMMUNITY COLLEGE TRANSFER

A community college course will not be judged equivalent to this course.

PART VII: APPROVALS

Date approved by the Physics Department 10-16-2006

Date approved by the College of Sciences Curriculum Committee 11-17-2006

Date approved by CAA 12-07-2006