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| LSC Use Only No: | LSC Action-Date: | UWUCC USE Only No. | UWUCC Action-Date: | Senate Action Date: |
| | | 11-36 | AP 10/25/11 | App 11/08/11 |

Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

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|---|---------------------------------------|
| Contact Person Stanley Sobolewski / Devki Talwar | Email Address sobolews@iup.edu |
| Proposing Department/Unit Physics | Phone 724 357 2370 or 724 357 4590 |

Check all appropriate lines and complete information as requested. Use a separate cover sheet for each course proposal and for each program proposal.

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|--|-----------------------------|
| 1. Course Proposals (check all that apply) <input type="checkbox"/> New Course <input type="checkbox"/> Course Prefix Change <input type="checkbox"/> Course Deletion <input type="checkbox"/> Course Revision <input type="checkbox"/> Course Number and/or Title Change <input type="checkbox"/> Catalog Description Change | |
| <i>Current Course prefix, number and full title</i> <i>Proposed course prefix, number and full title, if changing</i> | |
| 2. Additional Course Designations: check if appropriate <input type="checkbox"/> This course is also proposed as a Liberal Studies Course. <input type="checkbox"/> Other: (e.g., Women's Studies, Pan-African) <input type="checkbox"/> This course is also proposed as an Honors College Course. | |
| 3. Program Proposals <input type="checkbox"/> New Degree Program <input type="checkbox"/> Program Title Change <input type="checkbox"/> Program Revision <input type="checkbox"/> New Minor Program <input checked="" type="checkbox"/> New Track <input type="checkbox"/> Other <i>Catalog Description Change</i> | |
| <i>Current program name</i> <i>Proposed program name, if changing</i> <i>Track</i> Bachelor of Science - Physics/Electro-Optics | |
| 4. Approvals | |
| Department Curriculum Committee Chair(s) | <i>[Signature]</i> 9/7/11 |
| Department Chair(s) | <i>[Signature]</i> 9/7/2011 |
| College Curriculum Committee Chair | <i>[Signature]</i> 9/22/11 |
| College Dean | <i>[Signature]</i> 9/26/11 |
| Director of Liberal Studies * | |
| Director of Honors College * | |
| Provost * | <i>[Signature]</i> 9/27/11 |
| Additional signatures as appropriate: (include title) | |
| UWUCC Co-Chairs | <i>[Signature]</i> 11/08/11 |

Part II. Description of Curriculum Change

1. Catalog description

1. Complete catalog description for new track. This includes both the description about the track and the list of courses and credits for the new track.

Bachelor of Science –Physics/Electro-Optics Track

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| Liberal Studies: As outlined in Liberal Studies section with the following specifications: | 48 |
| Mathematics: MATH 125 | |
| Natural Science: PHYS 131-141 and 132-142 | |
| Liberal Studies Electives: 3cr, MATH 126, no courses with PHYS prefix | |
| Major: | 37 |
| Required Core Courses: | |
| PHYS 131 Physics I-C Lecture | *cr (1,2) |
| PHYS 132 Physics II-C Lecture | *cr (1,2) |
| PHYS 141 Physics I-C Lab | *cr (1) |
| PHYS 142 Physics II-C Lab | *cr (1) |
| PHYS 331 Modern Physics | 3cr |
| PHYS 345 Optics | 3cr |
| PHYS 441 Classical Mechanics | 3cr |
| PHYS 451 Electricity and Magnetism | 3cr |
| Additional Required Courses (3) | |
| PHYS 350 Intermediate Experimental Physics I | 3cr |
| EOPT 105 Computer Interfacing in Electro-Optics | 3cr |
| EOPT 110 Geometric Optics | 3cr |
| EOPT 120 Wave Optics | 3cr |
| EOPT 125 for Electronics for Electro Optics | 4cr |
| EOPT 126 Electronics II | 3cr |
| EOPT 150 Fundamentals of Photonics and Laser Safety | 3cr |
| EOPT 240 Fiber Optics | 3cr |
| Other Requirements: | 17-23 |
| CHEM 111 General Chemistry I | 4cr |
| CHEM 112 General Chemistry II | 4cr |
| COSC 110 Problem Solving & Structural Programming (4) | 3cr |
| COSC 250 Introduction to Numerical Methods | 3cr |
| MATH 241 Differential Equations | 3cr |
| Foreign Language Intermediate Level (4) | 0-6cr |
| Free Elective: | 12-18 |
| Total Degree Requirements: | 120 |

- (1) Credits are counted in the Liberal Studies Natural Science requirement.
- (2) PHYS 115 may replace PHYS 131, PHYS 116 may replace PHYS 132
- (3) EOPT courses are offered at the Northpointe campus
- (4) 6cr of computer programming will substitute for the foreign language requirement: COSC 110, COSC 210 or higher-level computer science courses (COSC 250 recommended), with department permission.

2. Detailed Description of the Bachelor of Science - Physics/Electro-Optics Track

Rationale and Justification for the Physics/Electro-Optics track

There is an Associate of Science in Electro-Optics offered at the Northpointe Campus. After earning the A.S. in Electro-Optics, students may seek employment in industry. However, some students choose to pursue more education; the B.S. in Physics / Electro-Optics Track offers the option of earning a B.S. by applying the credits earned in the A.S. degree to the B.S. Degree.

Before this new track proposal, the department of Physics offered an Electro-Optics Track in the Applied Physics program. In an attempt to increase efficiency, the department is adding an Electro Optics (EO) track to the B.S. in Physics program, and in a subsequent document, removing the B.S. in Applied Physics /Electro-Optics Track

Part III. Implementation - Provide answers to the following questions:

1. How will the proposed revision affect students already in the existing program?

Students in the current B.S. Applied Physics program will easily be able to transfer to the new B.S. Physics / Electro-Optics program without any difficulty. The courses they are taking will not change because of changing programs.

2. Are faculty resources adequate? If you are not requesting or have not been authorized to hire additional faculty, demonstrate how this course will fit into the schedule(s) of current faculty.

These students are currently served by the physics department and are currently enrolled in the classes offered. There will be no change in enrollment patterns, so yes, resources are adequate; no additional sections or faculty will be necessary.

3. Are other resources adequate? (Space, equipment, supplies, travel funds)

The resource issue must be addressed for both the Northpointe and Indiana Campus.

Presently at Northpointe one EOPT course has the highest enrollment of 24 students. Some of the classrooms at the Northpointe campus can accommodate more than 24 students, so there is space available. With the elimination of the SDR/WMD program, the faculty member involved in that program will be available to teach additional sections at the Northpointe and Indiana Campus. PHYS 350 is a lab course with a room capacity of 24.

While students start the Electro-Optics program at Northpointe, to earn the Bachelor's degree, they would need to take classes at the Indiana Campus. Most classrooms where physics courses are taught can hold 30 to 50 students; currently there are about 20 per class so space is adequate. Equipment and supplies are only an issue in one class, PHYS 350. Up to this point in time the class maximum has been 16, so there is still room for expansion in that class. If students in this course work in groups of three, rather than two, then up to 24 students could be accommodated.

4. Do you expect an increase or decrease in the number of students as a result of these revisions? If so, how will the department adjust?

The total number of students in the BS Physics program would remain unchanged following this rearrangement - the students in the separately listed programs (now deleted) would transfer into the new tracks.

Part IV. Periodic Assessment

Departments are responsible for an on-going review of curriculum. Include information about the department's plan for program evaluation:

The assessment of the proposed changes describe in this proposal will be performed as part of the Physics Departments' overall curriculum assessment policies. The department evaluates both students currently in the program as well as graduates. Current students are assessed at the beginning and at the end of the program. During the first week of the first physics course, (PHYS 131) all students must take the Force Concept Inventory (FCI), a nationally recognized assessment on physics thinking. The test distinguishes between Aristotelian thinkers and Newtonian thinkers. Students below a certain score are required to talk to their advisor during the second week of class. During this advisement meeting, the advisor will ask about the student's background, performance in other courses and will advise the student to seek extra help, especially in the physics department's tutoring center. Advisers will carefully monitor the progress of students in this category. At the end of the same semester, students will again take the FCI and the improvement of the class as a whole as well as the target individuals will be examined. If over a few semesters, a sufficient number of students do not show a significant gain in their scores, the department will consider a modification of the introductory course sequence. The second assessment is given to students and their eighth semester. This assessment is a collection of physics problems from the various topics in physics that the students must solve. This assessment identifies the strengths and weaknesses of student knowledge. The result of this program evaluation has resulted in the development of the new course PHYS 401, which shows the students connection between various topics in physics. These two assessments have a yearly cycle, the first in the fall and the second in the spring. The department also surveys graduates. We asked them what their current position is, the usefulness of different courses, and ways to change the program for the better. While we are happy to learn that most of our graduates are successful in their fields, and have positive things to say about our program, there has not been a major change because of this assessment. Students enrolled in the physics education program also take the ETS administered PRAXIS II test. When this assessment was first required, some of our students did not achieve a satisfactory score. Over the years we have changed our advising policy to include meetings with the Physics education majors twice per month. Since we have invoked this policy, all of our Physics education majors have passed the PRAXIS II test on the first attempt.

Part V. Course Proposals

There are no new courses with this proposal

Part VI. Letters of Support or Acknowledgement

NA