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CURRICULUM PROPOSAL COVER SHEET
University-Wide Undergraduate Curriculum Committee

I. CONTACT

Contact Person Dennis Whitson and W. Larry Freeman Phone 7-4593/4592

Department Physics

II. PROPOSAL TYPE (Check All Appropriate Lines)

 COURSE _____
Suggested 20 character title

 New Course* _____
Course Number and Full Title

 Course Revision _____
Course Number and Full Title

 Liberal Studies Approval + _____
for new or existing course Course Number and Full Title

 Course Deletion _____
Course Number and Full Title

 Number and/or Title Change _____
Old Number and/or Full Old Title

New Number and/or Full New Title

 Course or Catalog Description Change _____
Course Number and Full Title

PROGRAM: X Major Minor Track

 X New Program* Associate in Science in Electro-Optics
Program Name

 Program Revision* _____
Program Name

 Program Deletion* _____
Program Name

 Title Change _____
Old Program Name

New Program Name

III. Approvals (signatures and date)

Kenneth E. Hershman 11/16/00
Department Curriculum Committee

Richard D. Roberts 11/16/00
Department Chair

[Signature] 01/12/01
College Curriculum Committee

John D. Ed 1/12/01
College Dean

[Signature] 1/11/01
*Provost (where applicable)

+ Director of Liberal Studies (where applicable)

ASSOCIATE IN SCIENCE IN ELECTRO-OPTICS (A.S.E.O.)

Description of Curriculum Change

1. A catalog description of the new program.

Old Catalog Description:

The goal of the Department of Physics is to prepare fully qualified individuals for productive careers in physics. Three degrees are offered within the College of Natural Sciences and Mathematics: the Bachelor of Science in Physics, the Bachelor of Arts in Physics, and the Bachelor of Science in Applied Physics. These programs offer adequate preparation for graduate study in physics or for research in industrial technology. The applied physics degree provides a strong technical background for work in solid-state electronics or for interdisciplinary research in the areas of computer science, chemistry, biology, and geology. A Bachelor of Science degree in Education with a major in Physics is offered through the College of Education. A two-year pre-engineering program is offered in cooperation with Drexel University wherein students transfer to Drexel after two years. The department also offers a minor in Physics, as well as general science courses which satisfy the Natural Science requirements of the Liberal Studies program.

New Catalog Description:

The goal of the Department of Physics is to prepare fully qualified individuals for productive careers in physics. Five degrees are offered within the College of Natural Sciences and Mathematics: the Bachelor of Science in Physics, the Bachelor of Arts in Physics, the Bachelor of Science in Applied Physics, the Associate in Applied Science in Electro-Optics, and the Associate in Science in Electro-Optics. The first three programs offer very good preparation for graduate study in physics or for research in industrial technology. The applied physics degree provides a strong technical background for work in solid-state electronics or electro-optics or for interdisciplinary research in the areas of computer science, chemistry, biology, and geology. A Bachelor of Science degree in Education with a major in Physics is offered through the College of Education. A two-year pre-engineering program is offered in cooperation with Drexel University wherein students transfer to Drexel after two years. The department also offers a minor in Physics, as well as general science courses that satisfy the Natural Science requirements of the Liberal Studies program.

The two Associate Degrees in Electro-Optics, Associate in Applied Science in Electro-Optics (A.A.S.E.O.) and Associate in Science in Electro-Optics (A.S.E.O.) are designed to produce trained and skilled workers that will move into senior technician slots in the electro-optics industry, both locally and nationally. With the A.S.E.O. degree the student has a choice of either going directly to work or matriculating at IUP main campus in the Electro-Optics track in Applied Physics. The two Associate Degrees, A.A.S.E.O and A.S.E.O. are offered at the Armstrong Branch Campus of IUP.

Associate in Science in Electro-Optics (A.S.E.O.)

Liberal Studies: The following are the Liberal Studies courses that are required in this program. 30

English Composition: ENGL 101	4sh
Mathematics: MATH 121	4sh
Humanities	3sh
Fine Arts	3sh
Natural Sciences: CHEM 111	4sh
Social Sciences	3sh
Health / Wellness	3sh
Liberal Studies Electives: SAFE 145,	3sh
COSC/BEDU/IFMG 101 or COSC/BEDU/COMM/IFMG 201	3sh

Major: 34

Required Courses:

PHYS 100	Prelude to Physics	3sh
PHYS 115	Physics I for Electro-Optics	3sh
PHYS 116	Physics II for Electro-Optics	3sh
EOPT 105	Computer Interfacing in Electro-Optics	3sh
EOPT 110	Geometric Optics	3sh
EOPT 120	Wave Optics	3sh
EOPT 125	Introduction to Electronics	4sh

Choose two of the following three:

MGMT 234	Statistical Quality Control	3sh
EOPT 210	Detection and Measurement	3sh
EOPT 220	Introduction to Lasers	3sh

Choose two of the following three:

EOPT 240	Fiber Optics	3sh
EOPT 250	High Vacuum Technology	3sh
EOPT 260	Industrial Applications of Lasers	3sh

Total Degree Requirements 64

2. A rationale/justification for the new program.

This program will provide an associate degree program that is essential to serve unmet educational needs in Pennsylvania. To our knowledge, there are no existing degrees in Pennsylvania that have the extensive breadth (7 or 8 courses in electro-optics) that will be offered with this curriculum. This proposed program would go a long way to filling this educational void.

When this program is in place it will help to provide leadership for the economic revitalization and development of the Commonwealth. Since the electro-optics industry comprises many small businesses, any region in the world can be part of the electro-optics revolution. In order for this industry to be attracted to Western Pennsylvania there must be trained personnel available to perform the requisite work. This program will produce trained personnel at the senior technician level.

Demand for workers in the electro-optics industry, especially at the technician level, is acute and evident. Companies like Spectra and Coherent give \$1,000 finder's fee for laser technicians. The Center for Occupational Research and Development (CORD) estimates that the industry will need 740,000 new workers in the next two years. A survey conducted by BOLT estimated that the industry will need 1.5 million new workers by the year 2006 and around 650,000 in the next two years. BOLT System, Inc. is a company that does hands-on training for laser and optical practitioners. The electro-optics industry is expected to grow from \$34 billion today to \$500 billion by 2010.

In a survey of the members of the Electro-Optics Alliance (EOA) conducted by Wendy Gilpin of the Electro-Optics Center (EOC), every respondent reported that they would be increasing the number of technicians. One firm even reported they would be hiring 300 new technicians by the year 2005.

At the local level one company is planning on hiring approximately nine technicians with associate degrees each year over the foreseeable future. Two other local companies will probably be hiring 1 or 2 each year.

3. A summary of the program including a list of courses, requirements and/or restrictions.

This is taken care of by the list of courses above in the catalog description (section 1), the 4-semester course sequence below (section 4), and the check list below.

4. A 4-semester course sequence that illustrates a recommended schedule for the students in the Associate in Science in Electro Optics (A.S.E.O.) Program.

**Associate in Science in Electro-Optics (A.S.E.O.)
at IUP Armstrong Branch Campus**

Fall I

ENGL 101 College Writing	4
PHYS 100 Prelude to Physics	3
*COSC 101 Microbased Computer Literacy	3
EOPT 105 Computer Interfacing in E-O	3
EOPT 110 Geometric Optics	<u>3</u>
	16

Spring I

Social Science	3
MATH 121 Calculus I	4
PHYS 115 Physics I for Electro-Optics	3
EOPT 120 Wave Optics	3
EOPT 125 Introduction to Electronics	<u>4</u>
	17

*Or BEDU/IFMG 101

*Or COSC/BEDU/COMM/IFMG 201 Internet and Multimedia

Fall II

³ HPED 143 Health & Wellness	3
CHEM 111 General Chemistry I	4
PHYS 116 Physics II for Electro-Optics	3
¹ MGMT 234 Statistical Quality Control	3
¹ EOPT 210 Detection and Measurement	3
¹ EOPT 220 Introduction to Lasers	<u>3</u>
	16

Spring II

Humanities Elective	3
Fine Arts Elective	3
SAFE 145 Workplace Safety Today and Tomorrow	3
² EOPT 240 Fiber Optics	3
² EOPT 250 High Vacuum Technology	3
² EOPT 260 Industrial App. of Lasers	<u>3</u>
	15

¹ Choose two of these three courses.

² Choose two of these three courses.

³ FDNT 143, Nutrition and Wellness may be substituted. Veterans are given 4 semester hours toward this requirement by validating two years active duty via form DD214.

STUDENT NAME _____ SS# _____

**ASSOCIATE IN SCIENCE IN ELECTRO-OPTICS (A.S.E.O.)
CHECK SHEET**

	Date Taken	Grade Rec'd		Date Taken	Grade Rec'd
LIBERAL STUDIES (27 cr)			PROGRAM REQ (34 cr)		
English Composition (4 cr)			PHYS 100 Prelude to Physics	_____	_____
ENGL 101 College Writing (4)	_____	_____	PHYS 115 Physics I Electro-Optics	_____	_____
Mathematics (4 cr)			PHYS 116 Physics II Electro-Optics	_____	_____
MATH 121 Calculus I (4)	_____	_____	EOPT 105 Computer Interfacing in E-O	_____	_____
Humanities Elective (3 cr)			EOPT 110 Geometric Optics	_____	_____
_____	_____	_____	EOPT 120 Wave Optics	_____	_____
Fine Arts Elective (3 cr)			EOPT 125 Intro. to Electronics (4)	_____	_____
ARHI 101 Intro to Art or			Choose two of the following three:		
MUHI 101 Intro to Music or			EOPT 210 Fiber Optics	_____	_____
THTR 101 Intro to Theater or			EOPT 220 High Vacuum Technology	_____	_____
THTR 102 Intro to Dance	_____	_____	EOPT 250 Introduction to Lasers	_____	_____
Natural Science (4 cr)			Choose two of the following three:		
CHEM 111 General Chemistry I (4)	_____	_____	MGMT 234 Statistical Quality Control	_____	_____
Social Science Elective (3 cr)			EOPT 240 Detection and Measurement	_____	_____
_____	_____	_____	EOPT 260 Industrial App. of Lasers	_____	_____
*Health and Wellness (3 cr)			Other Requirements (3 cr)		
HPED 143 Health and Wellness	_____	_____	SAFE 145 Workplace Safety	_____	_____
Liberal Studies Electives (3 cr)					
COSC 101 Microbased Comp Literacy or					
COSC 201 Internet and Multimedia	_____	_____			

*Veterans are given 4 semester hours toward this requirement by validating two years active duty via form DD214.

Indiana University of Pennsylvania

Department of Computer Science
Stright Hall, Room 319
210 South Tenth Street
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November 14, 2000

Dr. Dennis Whitson
Physics Department
IUP

Dear Dr. Whitson:

The Computer Science Department supports the two new degrees being developed by the Physics Department, Associate of Science (A.S.) and Associate in Applied Science (A.A.S.) in Electro-Optics at the IUP Armstrong Branch Campus. The Computer Science Department will support teaching the courses COSC 101, Microbased Computer Literacy, and COSC 201, Internet and Multimedia, at the branch campus. The Computer Science Department also supports the development of the course EOPT 105, Computer Interfacing.

Sincerely Yours



Dr. Gary Buterbaugh
Chair, Computer Science Department

Attachment B2-A for the Syllabus of Record for PHYS 100, Prelude to Physics

Dr. Dennis Whitson and Dr. Larry Freeman informed Dr. Buriok of their intention to initiate a new course called PHYS 100 that would be part of the new Program in Electro-Optics. They gave Dr. Buriok a copy of the Syllabus for the course and a copy of the curriculum for the program. Dr. Buriok later requested that we make a breakout of the Math subjects that would be taught in the course. This breakout explicitly listed 10 hours of math that would be taught in the course.

Dr. Whitson and Dr. Freeman received the following e-mail on 10/23/00:

Professors Whitson and Freeman:

Thank you for informing the Mathematics Department faculty of your desire to initiate a new course, PHYS100 Prelude to Physics, for the Associate Degree Electro-Optics programs to be offered at the Armstrong Campus. As these programs have been developing, you have kept us informed of the need for mathematics courses. We are very appreciative of that, and in turn, we are supportive of the development of these programs.

In addition to the materials you prepared for the College Curriculum Committee, the "Summary of Mathematics Topics in PHYS100 for the Elector-Optics Program" is very helpful. Since enrollment in this course will be restricted to students in the Associate in Applied Science in Electro-Optics and the Associate in Science in Electro-Optics, the topics you listed seem appropriate and we have no objection to their inclusion in the course. If students are unable to reach the appropriate level of mathematical knowledge with this course, I assume you will recommend they schedule MATH100 Intermediate Algebra to gain the proper background rather than going directly to MATH110 Elementary Functions.

Gerald Buriok, Chairman
Mathematics Department

At this point we informed Dr. Buriok that we did have plans on also teaching PHYS 100 on main campus to some of our students whom we felt were inadequately prepared for taking PHYS 131. We did not plan on restricting the enrollment to Electro-Optics students.

Dr. Whitson and Dr. Freeman received the following e-mail on 10/27/00:

Professors Whitson and Freeman:

I distributed to the faculty of the Mathematics Department the materials you sent me regarding your proposal for PHYS 100 Prelude to Physics, and we discussed the proposal at a department meeting on October 26, 2000. A motion was passed at that meeting

stating that we do not support the approval of PHYS 100. It was suggested that you consider other alternatives rather than teaching ten hours of mathematics content in this course. For example, you might make MATH100 a prerequisite or corequisite for PHYS100.

Gerald Buriok, Chairman
Mathematics Department

We followed the suggestions of the Mathematics Department and took out the ten hours of mathematics and made MATH 100 a prerequisite if the student appears to need some more background in mathematics, which is determined by the student's class ranking, his/her board scores, and his/her score in the BA (basic algebra) test given to all incoming freshman. The following e-mail was received by Dr. Whitson and Dr. Freeman on 11/7/00.

Professors Freeman and Whitson:

The most recent version of the syllabus and course analysis questionnaire for PHYS100 Prelude to Physics you sent to the Mathematics Department deals with the concerns expressed by faculty of our department with regard to remedial mathematics. As a result, we no longer have an objection to your seeking university approval of this course.

Gerald Buriok, Chairman
Mathematics Department



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Creating Tomorrow*

Indiana University of Pennsylvania

Department of Mathematics
Stright Hall, Room 233
210 South Tenth Street
Indiana, Pennsylvania 15705-1072

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Fax: 724-357-7908
Internet: <http://www.iup.edu>

December 11, 2000

Dr. Dennis Whitson
Physics Department
IUP

Dear Dr. Whitson:

The Mathematics Department supports the two degree programs currently under development by the Physics Department, namely the Associate of Science (A.S.) and the Associate in Applied Science (A.A.S.) in Electro-Optics at the IUP Armstrong Campus. We have met with you several times in the past year to discuss the role of the Mathematics Department in these programs, and we have agreed to offer MATH 110 Elementary Functions and MATH 121 Calculus I for Business, Natural and Social Sciences at the Armstrong Campus in support of these programs.

Sincerely,

Gerald Buriok, Chairman
Mathematics Department

Indiana University of Pennsylvania

Department of Management
The Eberly College of Business
664 Pratt Drive
Indiana, Pennsylvania 15705-1071

724-357-2535
Fax: 724-357-5743
Internet: <http://www.iup.edu>

October 25, 2000

Dr. Dennis Whitson
Physics Department
IUP

Dear Dr. Whitson:

The Department of Management supports the two new degrees being developed by the Physics Department, Associate of Science (A.S.) and Associate in Applied Science (A.A.S.) in Electro-Optics at the IUP Armstrong Branch Campus. The Department of Management has developed a new course, MGMT 234 Statistical Quality Control that is being submitted along with this proposal. The Department of Management will support the teaching of MGMT 234 at the branch campus.

Sincerely Yours

Prashanth B.N.

Prashanth B. Nagendra, Ph.D.
Chairperson, Department of Management



Dennis Whitson

From: Lon Ferguson <ferguson@grove.iup.edu>
To: <whitson@grove.iup.edu>
Cc: Tony Joseph <ajjoseph@grove.iup.edu>
Sent: Thursday, October 19, 2000 9:34 AM
Subject: Support for Associate Program

Hi Dennis:

This email is written in support of the AS in Electro-Optics. Specifically, the Safety Sciences Department agrees to develop the course SAFE 145 Workplace Safety Today and Tomorrow which will be a required course in the AS curriculum sequence. Please keep in mind we plan to develop this course as a liberal studies course at IUP and are considering offering it as a distance education course so the audience can be increased hopefully improving enrollment!

Dr. Lon H. Ferguson
Chairperson - Safety Sciences
116 Johnson Hall
Indiana, PA 15705
(724) 357-3018



Indiana University of Pennsylvania

Department of English
Leonard Hall, Room 110
421 North Walk
Indiana, Pennsylvania 15705-1094

724-357-2261
Fax: 724-357-2265
Internet: <http://www.iup.edu>

*Honoring Yesterday
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25 October 2000

Dr. Dennis Whitson
Physics Department
IUP

Dear Dr. Whitson:

The English Department supports the two new degrees being developed by the Physics Department, Associate of Science (A.S.) and Associate in Applied Science (A.A.S.) in Electro-Optics at the IUP Armstrong Branch Campus. The English Department will support the teaching of ENGL 101, College Writing, at the branch campus. The English Department also supports the B.S. in Applied Physics with an Electro-Optics track. Our staff at Armstrong has taught ENGL 121 Humanities Literature and ENGL 202 Research Writing regularly for some time and looks forward to teaching students from these programs.

Yours truly,

Dr. Donald McClure, Chair



Indiana University of Pennsylvania

Department of Health and Physical Education
Zink Hall
1190 Maple Street
Indiana, Pennsylvania 15705-1073

724-357-2770
Fax: 724-357-3777
Internet: <http://www.iup.edu>

*Honoring Yesterday
Creating Tomorrow*

October 31, 2000

Dr. Dennis Whitson
Physics Department
Indiana University of Pennsylvania
Indiana, PA 15705

Dear Dr. Whitson:

The Department of Health and Physical Education supports the two new degrees being developed by the Physics Department, Associate of Science (A.S.) and Associate in Applied Science (A.A.S.) in Electro-Optics at the IUP Armstrong Branch Campus. The Department of Health and Physical Education will support the teaching of HPED 143, Health and Wellness, at the branch campus.

Sincerely yours,

Dr. James G. Mill, Chairperson
Department of Health and Physical Education


October 26, 2000

Dr. Dennis Whitson
Physics Department
Indiana University of Pennsylvania
Indiana, PA 15705

Dear Dr. Whitson:

The Chemistry Department supports the two new degrees being developed by the Physics Department, Associate of Science (A. S.) and Associate in Applied Science (A. S.) in Electro-Optics at the IUP Armstrong Branch Campus. The Chemistry Department will support the teaching of CHEM 111, General Chemistry I, at the branch campus. The Chemistry Department also supports the B. S. in Applied Physics with an Electro-Optics track. The latter students would take CHEM 112 at the main campus.

Sincerely yours,


Ruiess Van Fossen Ramsey
Chairperson, Chemistry Department