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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: Major Minor X Track
 X **New Program*** B. S. in Applied Physics Electro-Optics Track
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. Zeh 1/12/01
College Dean

[Signature] 1/15/01
*Provost (where applicable)

BACHELOR OF SCIENCE-APPLIED PHYSICS ELECTRO-OPTICS TRACK

Description of Curriculum Change

Complete Catalog Description:

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 that 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, 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.

BACHELOR OF SCIENCE-APPLIED PHYSICS ELECTRO-OPTICS TRACK

LIBERAL STUDIES: As outlined in Liberal Studies section with the following specifications: 56

Mathematics: MATH 121

Natural Science: CHEM 111-112

Liberal Studies Electives: MATH 122, no course with PHYS prefix

MAJOR: 44

Required courses:

PHYS 100	Prelude to Physics	3 sh
PHYS 115	Physics I for Electro-Optics	3 sh
PHYS 116	Physics II for Electro-Optics	3 sh
EOPT 105	Computer Interfacing in Electro-Optics	3 sh
EOPT 110	Geometric Optics	3 sh
EOPT 120	Wave Optics	3 sh
EOPT 125	Introduction to Electronics	4 sh
PHYS 222	Mechanics I	2 sh
PHYS 322	Electricity and Magnetism I	2 sh
PHYS 331	Modern Physics	3 sh
PHYS 350	Intermediate Experimental Physics I	3 sh

Choose two of the following three:

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

Choose two of the following three:

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

Other requirements:

COSC/BEDU/IFMG 101 or COSC/BEDU/COMM/IFMG 201	3 sh
COSC 110 Problem Solving & Structured Programming	3 sh
COSC 250 Introduction to Numerical Methods	3 sh
MATH 241 Differential Equations	3 sh
SAFE 145 Workplace Safety Today and Tomorrow	3 sh
Foreign Language-Intermediate Level (1)	0-6 sh

15-21

(1) Intermediate-level Foreign Language may be included in Liberal Studies Electives and if it is, 6 credits will be applied to Liberal Studies Electives and 0 credits here.

FREE ELECTIVES: 3-9

TOTAL DEGREE REQUIREMENTS: 124

Rationale/justification for the Electro-Optics track in Applied Physics

This new track will allow a student to receive an Associates Degree in Applied Science in Electro-Optics in two years and then in two more years of coursework be able to receive a B.S. in Applied Physics. This opens up an opportunity for a student who thought only of attaining a two-year degree but later decided he/she wanted to further his/her education. Since the Physics courses at main campus are the same ones (albeit fewer) that the Physics major takes, this path does not preclude the possibility of the student obtaining graduate degrees. This new track will not cost IUP anything since all the courses would already be in place.

Credit requirements, sequencing, and restrictions

The program requires 124 credits. For sequencing and restrictions see the course schedule below.

Implementation

Students already in one of the existing programs in Physics will not be affected by this new track. Space, equipment, supplies, travel funds, and faculty teaching loads will not be affected because the courses that the student would take on main campus and at the branch campus would be offered whether or not there was anyone in the Electro-Optics track of the Applied Physics program. There is no problem with the number of seats available since the upper level Physics courses are not heavily populated. Also, the number of students enrolling in the track is not expected to be large enough to cause any problems. We expect an increase in the number of students because of these revisions, but not to the extent that it will cause any problems.

Course Proposals

Proposals for the new courses for this degree are the same ones as for the Associate in Applied Science in Electro-Optics (A.A.S.E.O.) proposal and the Associate in Science in Electro-Optics (A.S.E.O.) proposal.

B.S. in Applied Physics with an Electro-Optics Track
First Two Years at the IUP Armstrong Branch Campus
Second Two Years at the IUP Main 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

*Or BEDU/IFMG 101

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

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

Fall II

¹ HPED 143 Health & Wellness	3
CHEM 111 General Chemistry I	4
PHYS 116 Physics II for Electro-Optics	3
² MGMT 234 Statistical Quality Control	3
² EOPT 210 Detection and Measurement	3
² EOPT 220 Introduction to Lasers	<u>3</u>
	16

¹FDNT 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.

² Choose two of these three

Spring II

⁴ Humanities Elective	3
Fine Arts	3
SAFE 145 Workplace Safety Today and Tomorrow	3
³ EOPT 240 Fiber Optics	3
³ EOPT 250 High Vacuum Technology	3
³ EOPT 260 Industrial App. of Lasers	<u>3</u>
	15

³ Choose two of these three

Fall III

MATH 122 Calculus II	4
COSC 110 Prob Solving & Struc. Prog.	3
ENGL 202 Research Writing	3
⁴ HIST 195 The Modern Era	3
Foreign Language	<u>3</u>
	16

Spring III

PHYS 222 Mechanics I	2
MATH 241 Differential Equations	3
⁴ ENGL 121 or FNLG 121 Intro to Lit	3
CHEM 112 General Chemistry II	4
Foreign Language	<u>3</u>
	15

Fall IV

PHYS 331 Modern Physics	3
COSC 250 Intro to Numerical Methods	3
Free Elective	3
Social Science	3
LBST 499 Senior Synthesis	<u>3</u>
	15

Spring IV

PHYS 350 Intern. Exp. Physics I	3
PHYS 322 Electricity & Magnetism I	2
⁴ Philosophy or Religious Studies	3
Free Elective	3
Social Science	<u>3</u>
	14

⁴ One of these is a free elective if the course was taken during the first four semesters as a Humanities Elective.

STUDENT NAME _____

SS# _____

**B.S. IN APPLIED PHYSICS WITH AN ELECTRO-OPTIC TRACK
CHECK SHEET**

	Date Taken	Grade Rec'd		Date Taken	Grade Rec'd
LIBERAL STUDIES (56 cr)			PROGRAM REQ (44 cr)		
Learning Skills (11 cr)			PHYS 100 Prelude to Physics	_____	_____
ENGL 101 College Writing (4)	_____	_____	PHYS 115 Physics I Electro-Optics	_____	_____
ENGL 202 Research Writing	_____	_____	PHYS 116 Physics II Electro-Optics	_____	_____
MATH 121 Calculus I (4)	_____	_____	EOPT 105 Computer Interfacing in E-O	_____	_____
Humanities (9 cr)			EOPT 110 Geometric Optics	_____	_____
HIST 195 History: The Modern Era	_____	_____	EOPT 120 Wave Optics	_____	_____
ENGL 121 or FNLG 121 Intro to Lit	_____	_____	EOPT 125 Intro to Electronics (4)	_____	_____
Philosophy or Religious Studies	_____	_____	PHYS 222 Mechanics I (2)	_____	_____
_____	_____	_____	PHYS 322 Electricity and Mag. I (2)	_____	_____
			PHYS 331 Modern Physics	_____	_____
			PHYS 350 Interm. Exp. Physics I	_____	_____
Fine Arts (3 cr)			Choose two of the following three:		
ARHI 101 Intro to Art or			EOPT 210 Fiber Optics	_____	_____
MUHI 101 Intro to Music or			EOPT 220 High Vacuum Technology	_____	_____
THTR 101 Intro to Theater or			EOPT 250 Introduction to Lasers	_____	_____
THTR 102 Intro to Dance	_____	_____			
Natural Science (8 cr)			Choose two of the following three:		
CHEM 111 General Chemistry I (4)	_____	_____	MGMT 234 Statistical Quality Control	_____	_____
CHEM 112 General Chemistry II (4)	_____	_____	EOPT 240 Detection and Measurement	_____	_____
			EOPT 260 Industrial App. of Lasers	_____	_____
¹ Social Science (9 cr)			Other Requirements (15 cr)		
No two courses may have the same prefix			COSC 101 Microbased Comp Literacy or		
_____	_____	_____	COSC 201 Internet & Multimedia	_____	_____
_____	_____	_____	COSC 110 Prob. Solv. & Struct. Prog.	_____	_____
_____	_____	_____	COSC 250 Intro to Numerical Methods	_____	_____
			MATH 241 Differential Equations	_____	_____
²Health and Wellness (3 cr)			SAFE 145 Workplace Safety	_____	_____
HPED 143 Health and Wellness	_____	_____			
Liberal Studies Electives (10 cr)			FREE ELECTIVES (9 cr)		
MATH 122 Calculus II (4)	_____	_____	_____	_____	_____
Foreign Language Requirements:			_____	_____	_____
FRNC 201 & 202 (College French I & II) or			_____	_____	_____
GRMN 251 & 252 (German III & IV) or			_____	_____	_____
ITAL 201 & 202 (Interm. Italian III & IV) or			_____	_____	_____
³ SPAN 102 & 201 (El SP II & Inter SP-6 cr)					
Other levels should be considered as electives					
_____	_____	_____			
_____	_____	_____			
Synthesis (3 cr)					
LBST 499 Senior Synthesis	_____	_____			

¹ If one of these courses does not meet the Non-western cultures requirement, then an elective must be used

² Veterans are given 4 semester hours toward this requirement by validating two years active duty via form DD214.

³ Total credits from SPAN 102 (4 cr) and SPAN 201 (4cr) is 8 credits. Two credits included in electives.

Indiana University of Pennsylvania

Department of Computer Science
Stright Hall, Room 319
210 South Tenth Street
Indiana, Pennsylvania 15705-1087

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Internet: <http://www.iup.edu>

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 Electro-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



Indiana University of Pennsylvania

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

724-357-2608
Fax: 724-357-7908
Internet: <http://www.iup.edu>

*Honoring Yesterday
Creating Tomorrow*

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

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 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





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
Creating Tomorrow*

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. 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,



Russ Van Fossen Ramsey
Chairperson, Chemistry Department