

LSC Use Only
Number: _____
Action: _____
Date: _____

UWUCC Use Only
Number: 92-23
Action: App
Date: 3/9/93
Senate App 4/6/93

CURRICULUM PROPOSAL COVER SHEET
University-Wide Undergraduate Curriculum Committee

I. Title/Author of Change

Course/Program Title: Bachelor of Science in Education - Physics
Suggested 20 Character Course Title: _____
Department: Physics
Contact Person: Kenneth E. Hershman, Richard Roberts, V. Wijekumar

II. If a course, is it being Proposed for:

_____ Course Revision/Approval Only
_____ Course Revision/Approval and Liberal Studies Approval
_____ Liberal Studies Approval Only (course previously has been approved by the University Senate)

III. Approvals

Kenneth E. Hershman
Department Curriculum Committee

Dennis Whitson
Department Chairperson

A. Kamiasz
College Curriculum Committee

W. J. Cole
College Dean *

Director of Liberal Studies
(where applicable)

Provost (where applicable)

*College Dean must consult with Provost before approving curriculum changes. Approval by College Dean indicates that the proposed change is consistent with long range planning documents, that all requests for resources made as part of the proposal can be met, and that the proposal has the support of the university administration.

IV. Timetable

Date Submitted
to LSC: _____
to UWUCC: _____

Semester to be
implemented: _____

Date to be
published
in Catalog: _____

Bachelor of Science in Education - Physics (*)

Liberal Studies: As outlined in Liberal Studies section with the following specifications: **56-57**
Mathematics: MA 123
Natural Science: CH 111-112
Social Sciences: PC 101
Liberal Studies electives: MA 124, no courses with PY prefix

College: **30**
Professional Education Sequence:
 CM 301 Technology for Learning & Instruction 3 sh
 ED 242 Pre-student Teaching I 1 sh
 ED 342 Pre-student Teaching II 1 sh
 ED 441 Student Teaching 12 sh
 ED 442 School Law 1 sh
 ED 451 Teaching of Science in the Secondary School 3 sh
 EP 202 Educational Psychology 3 sh
 EP 377 Educational Tests & Measurements 3 sh
 FE 202 American Education in Theory & Practice 3 sh

Major: **28**
Required courses:
 PY 131 Physics I-C Lec 3 sh
 PY 132 Physics II-C Lec 3 sh
 PY 141 Physics I-C Lab 1 sh
 PY 142 Physics II-C Lab 1 sh
 PY 222 Mechanics I 2 sh
 PY 231 Electronics 4 sh
 PY 242 Optics 3 sh
 PY 322 Electricity & Magnetism I 2 sh
 PY 331 Modern Physics 3 sh
 PY 350 Intermediate Experimental Physics I 3 sh
Controlled electives:
 Physics electives 3 sh

Other Requirements: **14**
Additional Math & computer courses:
 CO 101 Fundamentals of Computer Science or 3 sh
 CO 110 Problem Solving & Struct Programming 3 sh
 MA 241 Differential Equations 4 sh
 MA 342 Advanced Math for Applications 4 sh
 One biology course approved by adviser 4 sh

Free Electives: (1) **0**

(#) Total Degree Requirements: 128-129

Bachelor of Science in Education - Physics (*)

Liberal Studies: As outlined in Liberal Studies section with the following specifications: **56-57**
Mathematics: MA 123
Natural Science: CH 111-112
Social Sciences: PC 101
Liberal Studies electives: MA 241[⊙]; BI 103[⊙]; GS 110, GS 121, GS 141 or GS 221; no courses with PY prefix

College: **30**
Professional Education Sequence:
 CM 301 Technology for Learning & Instruction 3 sh
 ED 242 Pre-student Teaching I 1 sh
 ED 342 Pre-student Teaching II 1 sh
 ED 441 Student Teaching 12 sh
 ED 442 School Law 1 sh
 ED 451 Teaching of Science in the Secondary School 3 sh
 EP 202 Educational Psychology 3 sh
 EP 377 Educational Tests & Measurements 3 sh
 FE 202 American Education in Theory & Practice 3 sh

Major: **32**
Required courses:
 PY 131 Physics I-C Lec 3 sh
 PY 132 Physics II-C Lec 3 sh
 PY 141 Physics I-C Lab 1 sh
 PY 142 Physics II-C Lab 1 sh
 PY 222 Mechanics I 2 sh
 PY 223 Mechanics II 2 sh
 PY 231 Electronics 4 sh
 PY 242 Optics 3 sh
 PY 322 Electricity & Magnetism I 2 sh
 PY 331 Modern Physics 3 sh
 PY 342 Thermal & Statistical Physics 3 sh
 PY 350 Intermediate Experimental Physics I 3 sh
Controlled electives:
 Physics electives 2 sh

Other Requirements: **8**
Additional Math courses:
 MA 124 Calculus II for Physics & Chemistry 4 sh
 MA 342 Advanced Math for Applications 4 sh

Free Electives: **0**

(#) Total Degree Requirements: 126-127

(*) See requirements leading to teacher certification in the catalog section on Academic Policies, "Admission to Teacher Education."

(1) Selection of approved Liberal Studies courses to meet computer science & biology requirements may reduce total hours to 124 and still permit free electives.

(#) See advisory paragraph "Timely Completion of Degree Requirements" in catalog section on Requirements for Graduation

(*) See requirements leading to teacher certification in the catalog section on Academic Policies, "Admission to Teacher Education."

(#) See advisory paragraph "Timely Completion of Degree Requirements:" in catalog section on Requirements for Graduation.

(⊙) MA 241 and BI 103 are in the process of being submitted for approval by Liberal Studies Committee. If MA 241 is not approved, MA 124 will be used and MA 241 will be required under "Other Requirements". Likewise, if BI 103 is not approved, BI 114 will be used.

Bachelor of Science in Education - Physics (*)

Liberal Studies: As outlined in Liberal Studies section with the following specifications:

56-57

Mathematics: MA 123

Natural Science: CH 111-112

Social Sciences: PC 101

Liberal Studies electives: MA 241^(*); BI 103^(*); GS 110, GS 121, GS 141 or GS 221; no courses with PY prefix

College:

30

Professional Education Sequence:

CM 301 Technology for Learning & Instruction	3 sh
ED 242 Pre-student Teaching I	1 sh
ED 342 Pre-student Teaching II	1 sh
ED 441 Student Teaching	12 sh
ED 442 School Law	1 sh
ED 451 Teaching of Science in the Secondary School	3 sh
EP 202 Educational Psychology	3 sh
EP 377 Educational Tests & Measurements	3 sh
FE 202 American Education in Theory & Practice	3 sh

Major:

32

Required courses:

PY 131 Physics I-C Lec	3 sh
PY 132 Physics II-C Lec	3 sh
PY 141 Physics I-C Lab	1 sh
PY 142 Physics II-C Lab	1 sh
PY 222 Mechanics I	2 sh
PY 223 Mechanics II	2 sh
PY 231 Electronics	4 sh
PY 242 Optics	3 sh
PY 322 Electricity & Magnetism I	2 sh
PY 331 Modern Physics	3 sh
PY 342 Thermal & Statistical Physics	3 sh
PY 350 Intermediate Experimental Physics I	3 sh

Controlled electives:

Physics electives	2 sh
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Other Requirements:

8

Additional Math courses:

MA 124 Calculus II for Physics & Chemistry	4 sh
MA 342 Advanced Math for Applications	4 sh

Free Electives:

0

(#) Total Degree Requirements: 126-127

(*) See requirements leading to teacher certification in the catalog section on Academic Policies, "Admission to Teacher Education."

(#) See advisory paragraph "Timely Completion of Degree Requirements" in catalog section on Requirements for Graduation.

(*) MA 241 and BI 103 are in the process of being submitted for approval by Liberal Studies Committee. If MA 241 is not approved, MA 124 will be used and MA 241 will be required under "Other Requirements". Likewise, if BI 103 is not approved, BI 114 will be used.

The Physics Department wishes to place the following proposal before the College Wide Curriculum Committee (and ultimately the University Wide Curriculum Committee) for approval and inclusion in the undergraduate catalog in a timely manner.

To make the following programmatic changes:

- 1) That the "Liberal Studies Electives" requirement be fulfilled specifically by
MA 241 "Differential Equations"
BI 103 "General Biology"

One of the following:

GS 110 " General Astronomy"
GS 121 "Physical Geology"
GS 141 "Introduction to Ocean Science"
GS 221 "Physical Resources of the Earth"

- 2) That the courses PY 223 "Mechanics II" and PY 342 "Thermal and Statistical Physics" are included as required courses in the major. The total number of semester hours of Physics will be increased to 32.
- 3) That the number of Physics electives specified as "2 sh".
- 4) That requirement of CO 101 "Fundamentals of Computer Science" or CO 110 "Problem Solving and structured Programming" be deleted.
- 5) That MA 241 "Differential Equations" be removed from and MA 124, "Calculus II for Physics and Chemistry" be added to "Other Requirements". The total number of semester hours will be reduced to eight (8).
- 6) That the total number of semester hours in the program be reduced to 126-127.

JUSTIFICATION*

These changes are being sought in order to meet the standards set forth by NSTA/NCATE. During the current evaluation by NSTA/NCATE the IUP Physics Education Program was judged to be "in non-compliance" and these changes are intended to comply with their standards.

- 1) Standard III requires 16 hours of supplemental science including biology, chemistry and earth science. MA 241, Differential Equations, is included in the Liberal Studies Elective to satisfy the Liberal Studies Elective requirement that one course be at the 200 or higher level.
- 2-3) Standard II requires 32 semester hours of physics content coursework.
- 4) Experience in computer literacy, interfacing, programming, and word processing are presently included in General Physics, Modern Physics and Intermediate Experimental Physics sufficient to satisfy the Pennsylvania Department of Education standards.
- 5) MA 124 and MA 241 are currently required by Standard IV.
- 6) The aforementioned changes are being requested in order to meet the standards set forth by
 - a) The Pennsylvania Department of Education
 - b) NSTA/NCATE
 - c) Liberal Studies Program
 - d) Degree requirements of the University

*Letters of support have been requested from the Mathematics, Biology, Computer Science and Geoscience Departments as well as the Liberal Studies Committee.

NSTA/NCATE EVALUATION FOR SECONDARY PHYSICS

>I. Requires systematic and quantitative study of physics and its applications.

Rating: + Comments:

*II. Requires 32 s.h. of physics including significant work in mechanics, heat, optics, relativity, waves, atoms, electricity, magnetism and quantum mechanics (See Note 1).

Rating: R Comments: Only 28 hours of coursework required.

*III. Requires 16 s.h. of supplemental science including biology, chemistry, and earth science (See Note 2).

Rating: - Comments: Only 12 hours are required. Earth science is also needed.

*IV. Requires mathematics including introductory calculus and differential equations.

Rating: + Comments:

>V. Requires study of science, technology and society issues and ethics related to physics.

Rating: - Comments: Issues and ethics related to physics does not appear to be well dealt with by the program.

>VI. Requires experiences in designing, developing and evaluating laboratory, field and instructional activities.

Rating: + Comments:

KEY TO RATING OF STANDARDS: (+) Meets standard; (R) Meets standard with reservations. Should fully comply by next review; (-) does not meet the standard (0) more information is needed to determine compliance; (*) these standards must be passed for a positive compliance rating; (>) two of these three standards must be passed for a positive compliance rating.

NOTE 1: Must include 26 s.h. and 7 areas for an "R" rating.

NOTE 2: Must include 13 s.h. and 2 fields for an "R" rating.

NOTE 3: Semester hours may be calculated by multiplying quarter hours by 2/3.

OVERALL, THIS PROGRAM:

- Fully meets the standards
 - Meets the standards with reservations
 - Does not comply with standards for this program
 - Information is needed to complete the review
-

**To: Department Chairs:
Biology, Computer Science, Geoscience, and Mathematics**

**From: Dennis Whitson, Chair Physics Department
Physics Department Undergraduate Curriculum Committee:
Kenneth Hershman, Richard Roberts, and V. Wijekumar**

Re: Change in the Bachelor of Science in Education - Physics

Date: October 15, 1992

The recent review by NSTA (National Science Teachers Association) and NCATE (National Council for Accreditation of Teacher Education) has led us to restructure our B.S. degree in Physics Education in order to comply with their standards. We request the following departments to help us achieve this through the appropriate actions.

1. Math Department: We request that MA 241 (Differential Equations) be included in the "Liberal Studies Electives". Would you please take the necessary actions to accomplish this? This change will not affect the present enrollment of the Physics Education Majors in this course.

2. Biology Department: We request that BI 103 (General Biology I) be included in the "Liberal Studies Electives". Would you please take the necessary actions to accomplish this? This change will not affect the present enrollment of the Physics Education Majors in this course.

3. Geoscience Department: The Physics Education majors will be required to take one of the following: GS 110 (General Astronomy), GS 121 (Physical Geology), GS 141 (Introduction to Ocean Science), or GS 221 (Physical Resources of the Earth). We need a letter of approval for this programmatic change. The expected increase in enrollment of Physics Education Majors in these courses is not expected to be more than a total of five per year.

4. Computer Science: We request that CO 101 (Microbased Computer Literacy) and CO 110 (Problem Solving and Structured Programming) be removed from the "Other Requirements" in the Physics Education program. We need a letter of support for this programmatic change. The expected decrease in enrollment of Physics Education Majors in these courses is not expected to be more than a total of five per year.

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December 9, 1992

SUBJECT: Change in the Bachelor of Science in Education - Physics

TO: Department Chairs:
Biology, Computer Science, Geoscience, and Mathematics

FROM: Dennis Whitson, Chair Physics Department *D.W.*
Physics Department Undergraduate Curriculum Committee:
Kenneth Hershman, Richard Roberts, and V. Wijekumar

The College Curriculum Committee will be meeting on Tuesday, December 15, 1992 to consider the undergraduate Physics curriculum changes. Attached is a copy of the memo of October 15, 1992 describing these changes. If you have any responses, please let us know as soon as possible.

Enclosure

Date: January 12, 1993

To: Dr. Hilda Richards
Provost

From: Aleksandra B. Kaniasty *A. Kaniasty*
Assistant to the Dean, NS&M

Subject: Curriculum Proposals

Attached please find four curriculum proposals from the College of Natural Sciences and Mathematics to be reviewed by the UWUCC. The course BI 466/566 Principles in Virology has been offered as a Special Topics course therefore will not require additional resources to implement. The other proposals are program revisions, B.S. in Natural Science and B.S. in Physics Education, and a revision of the number of credits that can be taken as a Geoscience internship. None of these revisions require any additional resources.