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## Proposal to the Senate Educational Policy Committee

**PROPOSAL TITLE:** Revisions to the Specialized Curriculum in Physics: BS in Physics, College of Liberal Arts and Sciences

**SPONSOR:** Diane Musumeci, Associate Dean College of Liberal Arts and Sciences, 3-1350, [musumeci@illinois.edu](mailto:musumeci@illinois.edu) and Kevin T. Pitts, Professor of Physics, 333-3946, [kpitts@illinois.edu](mailto:kpitts@illinois.edu).

**COLLEGE CONTACT:** Diane Musumeci, Associate Dean College of Liberal Arts and Sciences, 3-1350, [musumeci@illinois.edu](mailto:musumeci@illinois.edu)

**BRIEF DESCRIPTION:** We proposed to add two new required courses to this curriculum: PHYS 225 Relativity and Math Applications (2 hrs) and PHYS 403 Modern Physics Laboratory (5 hrs). The total number of hours for the program is unchanged (126 hours). We are also updating course titles, removing courses that have been discontinued, and stating in the grid that Campus General Education requirements must be completed.

**JUSTIFICATION:** The Physics Department has been actively evaluating its curricula. We found that the transition from the introductory sequence (PHYS 211-214) to the intermediate sequence (PHYS 325 and beyond) was too challenging and abrupt for many students. We therefore developed PHYS 225 two-hour “bridge” course to aid the transition from the introductory to intermediate course levels. In doing so, we moved special relativity from PHYS 325 to PHYS 225. We therefore want to add PHYS 225 to the Specialized curriculum.

The Specialized curriculum is designed for students who want to go to graduate school and pursue a career in physics research. In evaluating our program compared to our peer institutions, and based upon feedback from faculty, we found that the laboratory component of the Specialized curriculum was weak. With the recent redevelopment of PHYS 403 Modern Experimental Physics to incorporate high quality, topical experiments, this course is now an important component of our program and we propose to remove it as an option within the Flexible Physics Core and add it as a requirement.

In the current Specialized physics curriculum, the number of required technical hours (math+physics+Chemistry+computer science) is 66-69 hours. This proposal would take the total number of technical hours required to 70-74.

Both of the modifications proposed here were implemented in the Engineering Physics professional option beginning in the fall 2009 semester. The LAS Specialized Physics

program is the mirror of the Engineering Physics professional option, so these changes would put the two programs back in step with one another.

PHYS 405 Electronic Circuits II has been discontinued. The title for PHYS 404 has been updated. Since students cannot receive credit for MATH 241 and MATH 380, we have decided to remove MATH 380 from the list of courses. We had listed only free electives in our current POS grid which may have been confusing to students since those hours did not include the Campus General Education requirements. We are adding a separate statement regarding fulfilling Campus General Education requirements.

#### **BUDGETARY AND STAFF IMPLICATIONS:**

- a. Additional staff and dollars needed  
The courses are already offered every semester. No additional funding is necessary.
- b. Internal reallocations (e.g., change in class size, teaching loads, student-faculty ratio, etc.)  
Since it is a prerequisite for PHYS 325, the enrollment in PHYS 225 already includes all of the students in the LAS Specialized curriculum. Therefore, PHYS 225 enrollments will not change. PHYS 225 was created in the spring 2010 semester and has been offered every semester since. Current enrollment is about 130 students per semester. We are requesting this established course be added to the POS. Based upon historical trends and our current enrollment, we anticipate that enrollment in PHYS 403 will increase by about 5-8 students per semester. We currently have 12-14 PHYS 403 students per semester, and the course has staffing and space for 24 students.
- c. Effect on course enrollment in other units and explanations of discussions with representatives of those departments  
Since these courses are required for physics majors, they will not directly compete with any other courses. This change is reducing the number of free elective hours for students in the LAS Specialized curriculum.
- d. Impact on the University Library (*A letter of acknowledgement from the University Librarian must be included for all new program proposals.*)  
No impact on the Library is envisioned.
- e. Impact on computer use, laboratory use, equipment, etc.  
The increased enrollment in PHYS 403 will result in a slight increase in the usage of the physics computer lab, room 257. The capacity of this lab will easily handle the increased usage without requesting new computers.

**DESIRED EFFECTIVE DATE:** Fall 2012

#### **STATEMENT FOR PROGRAMS OF STUDY CATALOG:**

### **Specialized Curriculum in Physics**

#### **LAS Specialized Curriculum in Physics**

E-mail: [undergrad-info@physics.illinois.edu](mailto:undergrad-info@physics.illinois.edu)

Degree Title: Bachelor of Science in Physics

General Education: Students must complete the [Campus General Education](#) requirements.

Minimum hours required for graduation: 126

Departmental distinction: Graduation with distinctions awarded to students who complete 8 additional hours of 300- or 400-level physics courses or advanced courses in closely related technical subjects and who have attained cumulative grade point averages as follows: distinction, 3.2; high distinction, 3.5; highest distinction, 3.8.

The LAS Specialized Curriculum in Physics is designed for students who plan to pursue graduate study in physics or a closely allied field. However, students who want to pursue a combined major and minor, a double major, or a double degree should consider the LAS Science and Letters Curriculum in Physics because of the greater flexibility it offers. Students in the Specialized Curriculum beyond the freshman year must maintain an overall grade point average of at least 2.5 and also a grade point average of 2.5 in all required mathematics and physics courses.

Entering freshmen typically take calculus, chemistry, rhetoric, and PHYS 110 during the first semester and begin the general physics sequence in the second semester. Students with advance placement in mathematics should begin the general physics sequence in the first semester. All students are strongly encouraged to take a Freshman Discovery Seminar sometime during the first year and plan ahead to allow space in their programs for undergraduate research.

Hours	Requirements
43	Fixed Physics Core
	PHYS 110 - Careers in Physics
	PHYS 211 - Univ Physics (Mechanics)
	PHYS 212 - Univ Physics (Elec & Mag)
	PHYS 213 - Univ Physics (Thermal Physics)
	PHYS 214 - Univ Physics (Quantum Phys)
	PHYS 225- Relativity & Math Applications
	PHYS 325 – Classical Mechanics I
	PHYS 326 – Classical Mechanics II
	PHYS 403 - Modern Experimental Physics
	PHYS 435 - Electromagnetic Fields I
	PHYS 436 - Electromagnetic Fields II
	PHYS 427 - Thermo & Statistical Physics
	PHYS 486 - Quantum Mechanics I
	PHYS 487 - Quantum Mechanics II
3-5	Flexible Physics Core (Select one course from the list below)
	PHYS 401 - Classical Physics Lab
	PHYS 404 - Electronic Circuits

24-26	Supporting Technical Courses
	MATH 221 - Calculus I <sup>1</sup>
	MATH 231 - Calculus II
	MATH 241 - Calculus III
	MATH 285 - Intro Differential Equations or MATH 286- Intro to Differential Eq Plus
	MATH 415 - Linear Algebra
	CHEM 102 - General Chemistry I
	CHEM 103 - General Chemistry Lab I
	CS 101 - Intro to Computing, Eng & Sci
Variable	General Education- Students must complete the <u>Campus General Education requirements.</u>
15-35	Free Electives
	(No restrictions on these courses.)

1.Math 220-Calculus (5 hours) may be substituted with four of the five credit hours applying toward the degree. MATH 220 is appropriate for students with no background in calculus.

**CLEARANCES:**

Signatures:

\_\_\_\_\_  
Unit Representative:

*Diane [unclear]*

\_\_\_\_\_  
College Representative:

\_\_\_\_\_  
Date:

*11/11/11*

\_\_\_\_\_  
Date:

**Appendix A:**  
**Physics Specialized Curriculum Comparison Chart**

<b>Proposed</b>		<b>Current</b>	
<b>Hours</b>	<b>Requirements</b>		
43	Fixed Physics Core	36	Fixed Physics Core
	PHYS 110 - Careers in Physics (0hours)		PHYS 110 - Careers in Physics
	PHYS 211 - Univ Physics (Mechanics) (4hours)		PHYS 211 - Univ Physics (Mechanics)
	PHYS 212 - Univ Physics (Elec & Mag) (4 hours)		PHYS 212 - Univ Physics (Elec & Mag)
	PHYS 213 - Univ Physics (Thermal Physics) (2 hours)		PHYS 213 - Univ Physics (Thermal Physics)
	PHYS 214 - Univ Physics (Quantum Phys) (2hours)		PHYS 214 - Univ Physics (Quantum Phys)
	PHYS 225- Relativity & Math Applications (2hours)		
	PHYS 325 – Classical Mechanics I (3hours)		PHYS 325 - Mechanics and Relativity I
	PHYS 326 – Classical Mechanics II (3hours)		PHYS 326 - Mechanics and Relativity II
	PHYS 403 - Modern Experimental Physics (5hours)		
	PHYS 435 - Electromagnetic Fields I (3hours)		PHYS 435 - Electromagnetic Fields I
	PHYS 436 - Electromagnetic Fields II (3hours)		PHYS 436 - Electromagnetic Fields II
	PHYS 427 - Thermo & Statistical Physics (4hours)		PHYS 427 - Thermo & Statistical Physics
	PHYS 486 - Quantum Mechanics I (4hours)		PHYS 486 - Quantum Mechanics I
	PHYS 487 - Quantum Mechanics II (4hours)		PHYS 487 - Quantum Mechanics II
3-5	Flexible Physics Core (Select one course from the list below)	3-5	Flexible Physics Core (Select one course from the list below)

	PHYS 401 - Classical Physics Lab (3hours)		PHYS 401 - Classical Physics Lab
	PHYS 404 - <b>Electronic Circuits</b> (5hours)		PHYS 403 - Modern Experimental Physics (5hours)
			PHYS 404 - Electronic Circuits I (5hours)
			PHYS 405 - Electronic Circuits II
<b>24-26</b>	Supporting Technical Courses	27-28	Supporting Technical Courses
	MATH 221 - Calculus I <sup>1</sup> (4hours)		MATH 221 - Calculus I <sup>1</sup>
	MATH 231 - Calculus II (3hours)		MATH 231 - Calculus II
	MATH 241 - Calculus III (4hours)		MATH 241 - Calculus III
	MATH 285 - Intro Differential Equations (3hours) or MATH 286- Intro to Differential Eq Plus (4hours)		MATH 285 - Intro Differential Equations or MATH 286- Intro to Differential Eq Plus
			MATH 380-Advanced Calculus <sup>2</sup> (3hours)
	MATH 415 - Linear Algebra (3 or 4 hours)		MATH 415 - Linear Algebra
	CHEM 102 - General Chemistry I (3 hours)		CHEM 102 - General Chemistry I
	CHEM 103 - General Chemistry Lab I (1 hour)		CHEM 103 - General Chemistry Lab I
	CS 101 - Intro to Computing, Eng & Sci (3 hours)		CS 101 - Intro to Computing, Eng & Sci
<b>Variable</b>	<b>General Education- Students must complete the <u>Campus General Education requirements.</u></b>		
15-35	Free Electives	15-35	Free Electives
	(No restrictions on these courses.)		(No restrictions on these courses.)

**Senate Educational Policy Committee  
Proposal Check Sheet**

**PROPOSAL TITLE** (Same as on proposal): Revisions to the Specialized Curriculum in Physics:  
BS in Physics, College of Liberal Arts and Sciences

**PROPOSAL TYPE** (Please select all that apply below):

A.  **Program and degree proposals**

1. This proposal is for a graduate program or degree

Yes     No

2. **Degree** proposal (e.g. B.S., M.A. or Ph.D.)

New degree — please name the new degree: \_\_\_\_\_

Revision of an existing degree — please name the existing degree to be revised:  
\_\_\_\_\_

3. **Major** proposal (disciplinary focus, e.g., Mathematics)

New major — please name the new major: \_\_\_\_\_

Revision of an existing major — please name the existing major to be revised:  
Specialized Curriculum in Physics (BS in Physics)

**Concentration** proposal (e.g. Financial Planning)

New concentration — please name the new concentration: \_\_\_\_\_

Revision of an existing concentration — please name the existing concentration to be  
revised: \_\_\_\_\_

4. **Minor** proposal (e.g. Cinema Studies)

New minor — please name the new minor: \_\_\_\_\_

Revision of an existing minor — please name the existing minor to be revised: \_\_\_\_\_

5.  Proposal for renaming an existing degree, major, concentration, or minor

degree       major       concentration       minor

Please provide the current name: \_\_\_\_\_

Please provide the proposed new name: \_\_\_\_\_

6.  Proposal for terminating an existing degree, major, concentration, or minor

Please name the existing degree, major, concentration, or minor: \_\_\_\_\_

7.  Proposal for a multi-institutional degree between Illinois (UIUC) and a foreign institution

Please name the existing Illinois degree or program: \_\_\_\_\_

Please name the partnering institution: \_\_\_\_\_

B.  **Proposal for renaming existing academic units** (college, school, department, or program)

Please provide the unit's current name: \_\_\_\_\_

Please provide the unit's proposed new name: \_\_\_\_\_

C.  **Proposal for reorganizing existing units** (colleges, schools, departments, or programs)

Change in status of an existing and approved unit (e.g. change from a program to department) — please indicate current unit name including status: \_\_\_\_\_

Transfer an existing unit

Please provide the current unit's name and home: \_\_\_\_\_

Please provide the new home for the unit: \_\_\_\_\_

Merge two or more existing units (e.g., merge department A with department B)

Please provide the name and college of unit one to be merged: \_\_\_\_\_

Please provide the name and college of unit two to be merged: \_\_\_\_\_

Terminate an existing unit — please provide the current unit's name and status: \_\_\_\_\_

D.  **Other educational policy proposals** (e.g., academic calendar, grading policies, etc.)

Please indicate the nature of the proposal: \_\_\_\_\_

UNIVERSITY OF ILLINOIS  
AT URBANA-CHAMPAIGN

EP.12.18

Office of the Provost and Vice Chancellor  
for Academic Affairs

Swanlund Administration Building  
601 East John Street  
Champaign, IL 61820



January 5, 2012

Gay Miller, Chair  
Senate Committee on Educational Policy  
Office of the Senate  
228 English Building, MC-461

Dear Professor Miller:

Enclosed is a copy of a proposal from the College of Liberal Arts and Sciences to revise the Specialized Curriculum in Physics (BS in Physics).

This proposal has been approved by the Committee on Courses and Curricula in the College of Liberal Arts and Sciences. It now requires Senate review.

Sincerely,

A handwritten signature in cursive script that reads "Kristi A. Kuntz".

Kristi A. Kuntz  
Assistant Provost

KAK/njh

Enclosures

c: A. Elli  
D. Musumeci  
K. Pitts

UNIVERSITY OF ILLINOIS  
AT URBANA-CHAMPAIGN

Office of the Dean  
College of Liberal Arts and Sciences  
294 Lincoln Hall  
702 South Wright Street  
Urbana, IL 61801-3631



November 11, 2011

Kritsi Kuntz  
Assistant Provost  
Swanlund Administration Building  
MC-304

Dear Kristi:

The Committee on Courses and Curricula, on behalf of the Dean's Cabinet, and Executive Committee has voted to approve the following proposals:

**Revisions to the BSLAS Physics Concentration**  
**Revisions to the Specialized Curriculum in Physics (BS in Physics)**

Please address all correspondence concerning these proposals to me. These proposals are now ready for review by the Senate Educational Policy Committee for proposed implementation Fall 2012..

Sincerely,

A handwritten signature in black ink that reads "Diane Musumeci". The signature is written in a cursive style.

Diane Musumeci  
Associate Dean

enclosure  
C: Professor Kevin Pitts