



Proposal to the Senate Educational Policy Committee

PROPOSAL TITLE: Revision LAS Specialized Curriculum in Physics, College of Liberal Arts and Sciences

SPONSOR: Mats Selen, Ph.D.

Associate Head for Undergraduate Programs, Department of Physics
(217) 333-4173
mats@illinois.edu

COLLEGE CONTACT: Karen Carney, Ph.D. , College of Liberal Arts and Sciences, Assoc. Dean , (217) 333- 1350, kmcarey@illinois.edu

BRIEF DESCRIPTION:

Revision to Fixed Physics Core and Flexible Physics Core.

Remove PHYS 403 from Fixed Physics Core.

Revise Flexible Physics Core *from*

Choose One From: PHYS 401, PHYS 404, PHYS 406 *to*

Choose Two From: PHYS 401, PHYS 402, PHYS 403, PHYS 404, PHYS 406.

JUSTIFICATION:

Requiring all LAS Specialized Physics students to take PHYS 403 has placed an undue burden on the students' progress through the degree program. PHYS 403 has limited resources each semester and the need for advanced laboratory training cannot be met by simply increasing enrollment. The minimum required hours for the major remain unchanged (85 hours).

BUDGETARY AND STAFF IMPLICATIONS:

1) Resources

- a. How does the unit intend to financially support this proposal?

All of the listed courses are currently offered during the academic year by the Department of Physics.

- b. How will the unit create capacity or surplus to appropriately resource this program? If applicable, what functions or programs will the unit no longer support to create capacity?

All of these courses are currently resourced by the Department of Physics.

- c. Will the unit need to seek campus or other external resources? If so, please provide a summary of the sources and an indication of the approved support.

No further support is required for this revision.

- d. Please provide a letter of acknowledgment from the college that outlines the financial arrangements for the proposed program.

The Department of Physics has stated that this revision will not affect the department financially, therefore financial arrangements are not needed.

2) Resource Implications

- a. Please address the impact on faculty resources including the changes in numbers of faculty, class size, teaching loads, student-faculty ratios, etc.

This change should minimally impact overall per class size and faculty resources. The proposed laboratory courses are taught each semester currently. This change will redistribute students. See charts in Appendix B.

- b. Please address the impact on course enrollment in other units and provide an explanation of discussions with representatives of those units.

This curriculum change will not impact enrollment in other units.

- c. Please address the impact on the University Library

This curriculum change will not impact University Library operations beyond normal library business.

- d. Please address the impact on technology and space (e.g. computer use, laboratory use, equipment, etc.)

DESIRED EFFECTIVE DATE:

Fall 2016

STATEMENT FOR PROGRAMS OF STUDY CATALOG:

Physics

- [Overview](#)
- [Majors](#)
- [Courses](#)

Dale Van Harlingen

209 Loomis Laboratory of Physics, 1110 West Green, Urbana

PH: (217) 333-3761

<http://physics.illinois.edu>

The major in Physics in the Sciences and Letters Curriculum allows students maximum flexibility to develop scientifically oriented careers in fields requiring a physics background through the Physics Concentration or the Physics Teaching Concentration.

The Physics Concentration is a flexible program for students who plan to pursue technical or professional careers in areas requiring a sound grounding in physical science and mathematics. Students can use the concentration to prepare for employment immediately upon graduation or for continuing on to graduate study in a wide variety of fields.

The Physics Teaching Concentration fulfills state certification requirements to teach both physics and general science.

The LAS Specialized Curriculum in Physics is designed for students who plan to pursue graduate study in physics or a closely allied field. In some cases, however, the greater flexibility of the Science and Letters Curriculum may make it a better choice for graduate school preparation for those who want to pursue a combined major and minor, a double major, or double degrees.

See also [Engineering Physics](#) in the College of Engineering. See the Physics Department for additional information.

MAJORS TAB:

For the Degree of Bachelor of Science in Liberal Arts and Sciences

Major in Sciences and Letters Curriculum

- [Physics Concentration](#)—no changes requested
- [Physics Teaching Concentration](#)—no changes requested

For the Degree of Bachelor of Science in Physics

- [LAS Specialized Curriculum in Physics](#)

LAS Specialized Curriculum in Physics

E-mail: 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. Students must also 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. Students who desire 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 the following grade point averages:

- overall of at least 2.5.
- required mathematics and physics courses of at least 2.5.

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 during the first year fall semester and plan ahead to allow space in their programs for undergraduate research.

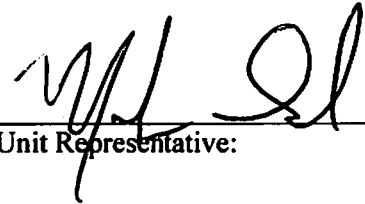
Fixed Physics Core		38
PHYS 110	Physics Careers	
PHYS 211	University Physics: Mechanics	
PHYS 212	University Physics: Elec & Mag	
PHYS 213	Univ Physics: Thermal Physics	

PHYS 214	Univ Physics: Quantum Physics	
PHYS 225	Relativity & Math Applications	
PHYS 325	Classical Mechanics I	
PHYS 326	Classical Mechanics II	
PHYS 435	Electromagnetic Fields I	
PHYS 436	Electromagnetic Fields II	
PHYS 427	Thermal & Statistical Physics	
PHYS 486	Quantum Physics I	
PHYS 487	Quantum Physics II	
Flexible Physics Core (Select two course from the list below)		8-10
PHYS 401	Classical Physics Lab	
PHYS 402	Light (with lab)	
PHYS 403	Modern Experimental Physics	
PHYS 404	Electronic Circuits	
PHYS 406	Acoustical Physics of Music	
Supporting Technical Courses		24-26
MATH 221	Calculus I ¹	
MATH 231	Calculus II	
MATH 241	Calculus III	
MATH 285 or MATH 286	Intro Differential Equations Intro to Differential Eq Plus	
MATH 415	Applied Linear Algebra	
CHEM 102	General Chemistry I	
CHEM 103	General Chemistry Lab I	
CS 101	Intro Computing: Engrg & Sci	
General Education - Students must complete the Campus General Education requirements.		Variable
Free Electives (No restrictions on these courses.)		15-35
Minimum		85

¹ [MATH 220](#) 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: (Clearances should include signatures and dates of approval. These signatures must appear on a separate sheet. If multiple departments or colleges are sponsoring the proposal, please add the appropriate signature lines below.)

Signatures:



Unit Representative:

6/2/15

Date:



College Representative (LAS):

11/5/15

Date:

Appendix A: (Proposed Curriculum Revisions)

Current Requirements		Current Hours	Revised Requirements		Revised Hours
Fixed Physics Core		43	Fixed Physics Core		38
PHYS 110	Physics Careers		PHYS 110	Physics Careers	
PHYS 211	University Physics: Mechanics		PHYS 211	University Physics: Mechanics	
PHYS 212	University Physics: Elec & Mag		PHYS 212	University Physics: Elec & Mag	
PHYS 213	Univ Physics: Thermal Physics		PHYS 213	Univ Physics: Thermal Physics	
PHYS 214	Univ Physics: Quantum Physics		PHYS 214	Univ Physics: Quantum Physics	
PHYS 225	Relativity & Math Applications		PHYS 225	Relativity & Math Applications	
PHYS 325	Classical Mechanics I		PHYS 325	Classical Mechanics I	
PHYS 326	Classical Mechanics II		PHYS 326	Classical Mechanics II	
PHYS 403	Modern Experimental Physics				
PHYS 435	Electromagnetic Fields I		PHYS 435	Electromagnetic Fields I	
PHYS 436	Electromagnetic Fields II		PHYS 436	Electromagnetic Fields II	
PHYS 427	Thermal & Statistical Physics		PHYS 427	Thermal & Statistical Physics	
PHYS 486	Quantum Physics I		PHYS 486	Quantum Physics I	
PHYS 487	Quantum Physics II		PHYS 487	Quantum Physics II	
Flexible Physics Core (Select one course from the list below)		3-5	Flexible Physics Core (Select <i>two</i> courses from the list below)		8-10
PHYS 401	Classical Physics Lab		PHYS 401	Classical Physics Lab	
			PHYS 403	Modern Experimental Physics	
PHYS 404	Electronic Circuits		PHYS 404	Electronic Circuits	
PHYS 406	Acoustical Physics of Music		PHYS 406	Acoustical Physics of Music	
			PHYS 402	Light (with lab)	
Supporting Technical Courses		24-26	Supporting Technical Courses		24-26
MATH 221	Calculus I ¹		MATH 221	Calculus I ¹	
MATH 231	Calculus II		MATH 231	Calculus II	
MATH 241	Calculus III		MATH 241	Calculus III	
MATH 285	Intro Differential Equations		MATH 285	Intro Differential Equations	
or			or		
MATH 286	Intro to Differential Eq Plus		MATH 286	Intro to Differential Eq Plus	
MATH 415	Applied Linear Algebra		MATH 415	Applied Linear Algebra	
CHEM 102	General Chemistry I		CHEM 102	General Chemistry I	
CHEM 103	General Chemistry Lab I		CHEM 103	General Chemistry Lab I	
CS 101	Intro Computing: Engrg & Sci		CS 101	Intro Computing: Engrg & Sci	
General Education - Students must complete the Campus General Education requirements.		Variable	General Education - Students must complete the Campus General Education requirements.		Variable
Free Electives (No restrictions on these courses.)		15-35	Free Electives (No restrictions on these courses.)		15-35

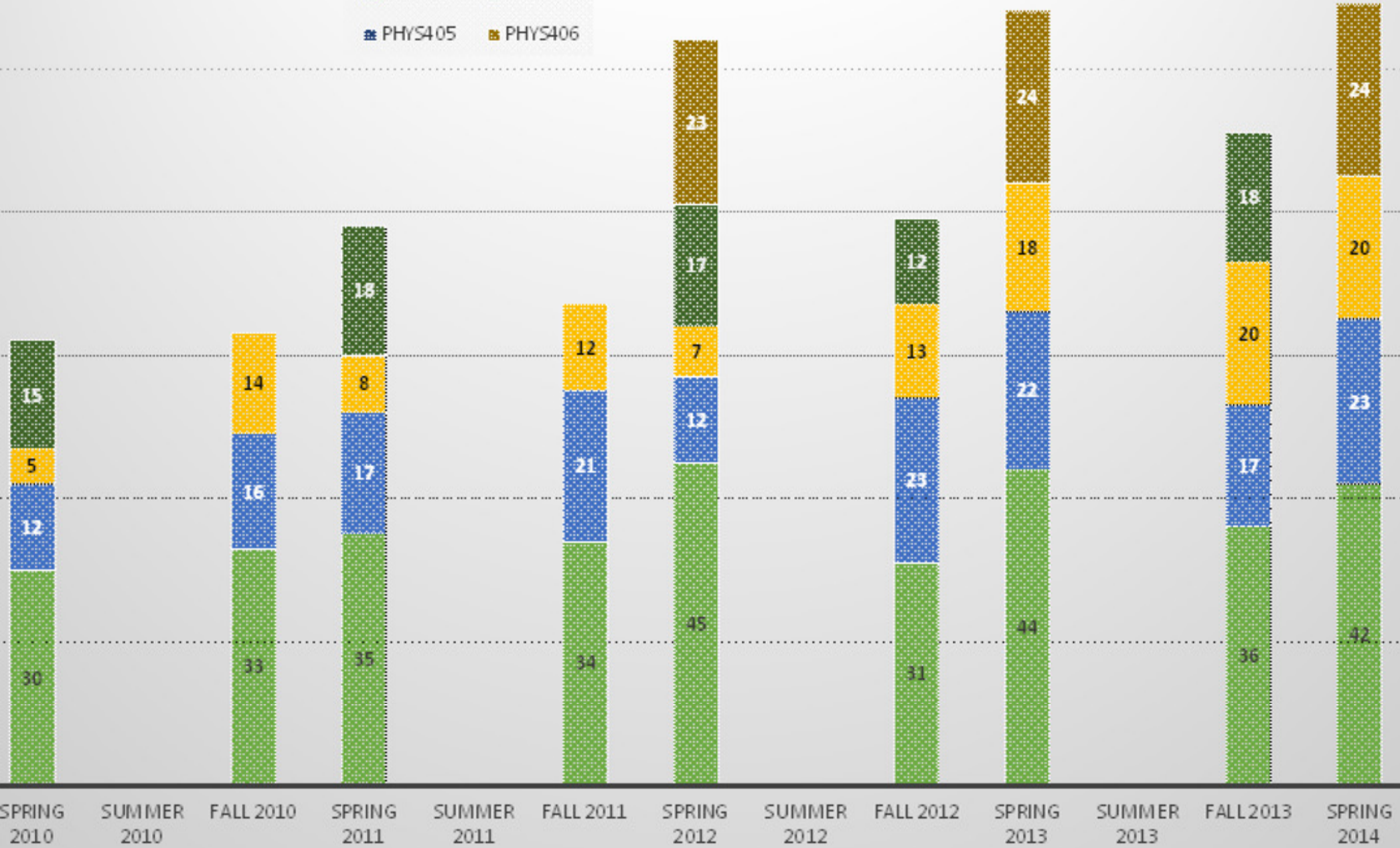
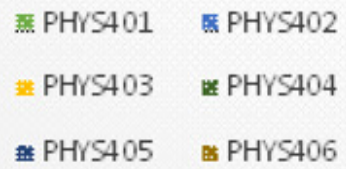
Appendix B: Current Advanced Undergraduate Laboratory Course Usage

The current LAS Specialized Curriculum in Physics requires all students enrolled in this curriculum to complete PHYS 403: Modern Physics Lab. This laboratory course was designed to serve 16 students per semester during the regular spring and fall terms. In the last year a third summer session has been opened to serve six to 12 students. Enrollment in PHYS 403 during the spring and fall has also been allowed to exceed the design parameters, increasing enrollment to 20. This over-taxes the available supplies and faculty resources.

Each year the Department of Physics has approximately 90 students in this curriculum prepared to take PHYS 403. In an effort to temporarily alleviate the issue, enrollment in the last two semesters (including the SUMMER 2015 semester) has been restricted to students in LAS Specialized Curriculum in Physics to facilitate reasonable progress through the degree program. Even with this adjustment it could take as many as six semesters to move all of the prepared students through PHYS 403 alone. This has effectively eliminated PHYS 403 as a laboratory elective for our Engineering Physics majors. PHYS 403 is a laboratory elective in that curriculum, and our students in Engineering Physics are now placed at a disadvantage with respect to the LAS Specialized majors.

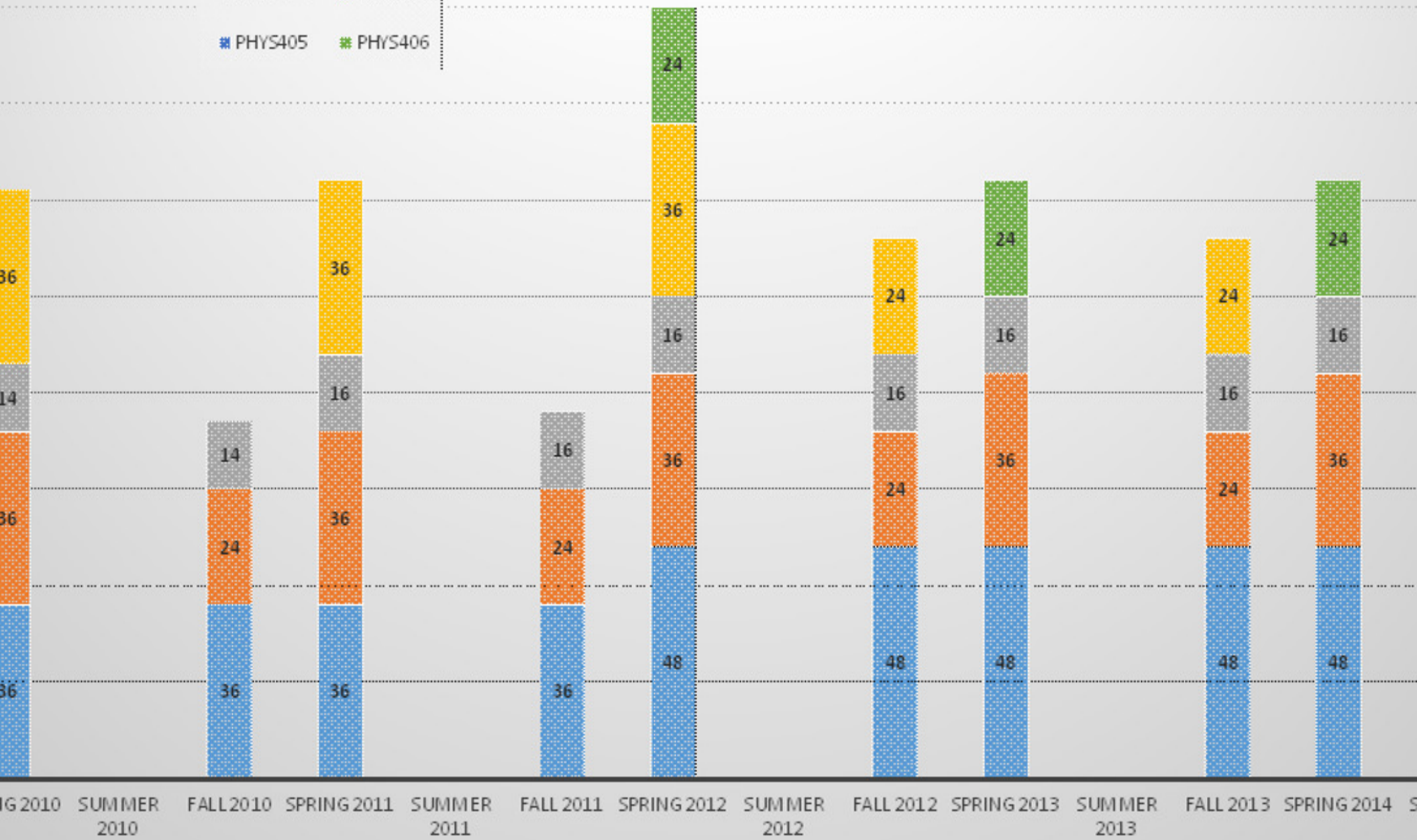
Allowing the curriculum adjustment for students in the LAS Specialized Curriculum in Physics to select two advanced labs from the list of available advanced labs will alleviate this bottleneck. The figures below show the total number of students in all curricula (undergraduate and graduate) served by the Department of Physics advanced laboratory courses since the Fall Semester 2009. Notice nearly all available lab courses have increased maximum enrollment to accommodate increasing enrollments across all curricula.

Undergrads in 400 Level Labs By Semester



Maximum Lab Seats/Semester

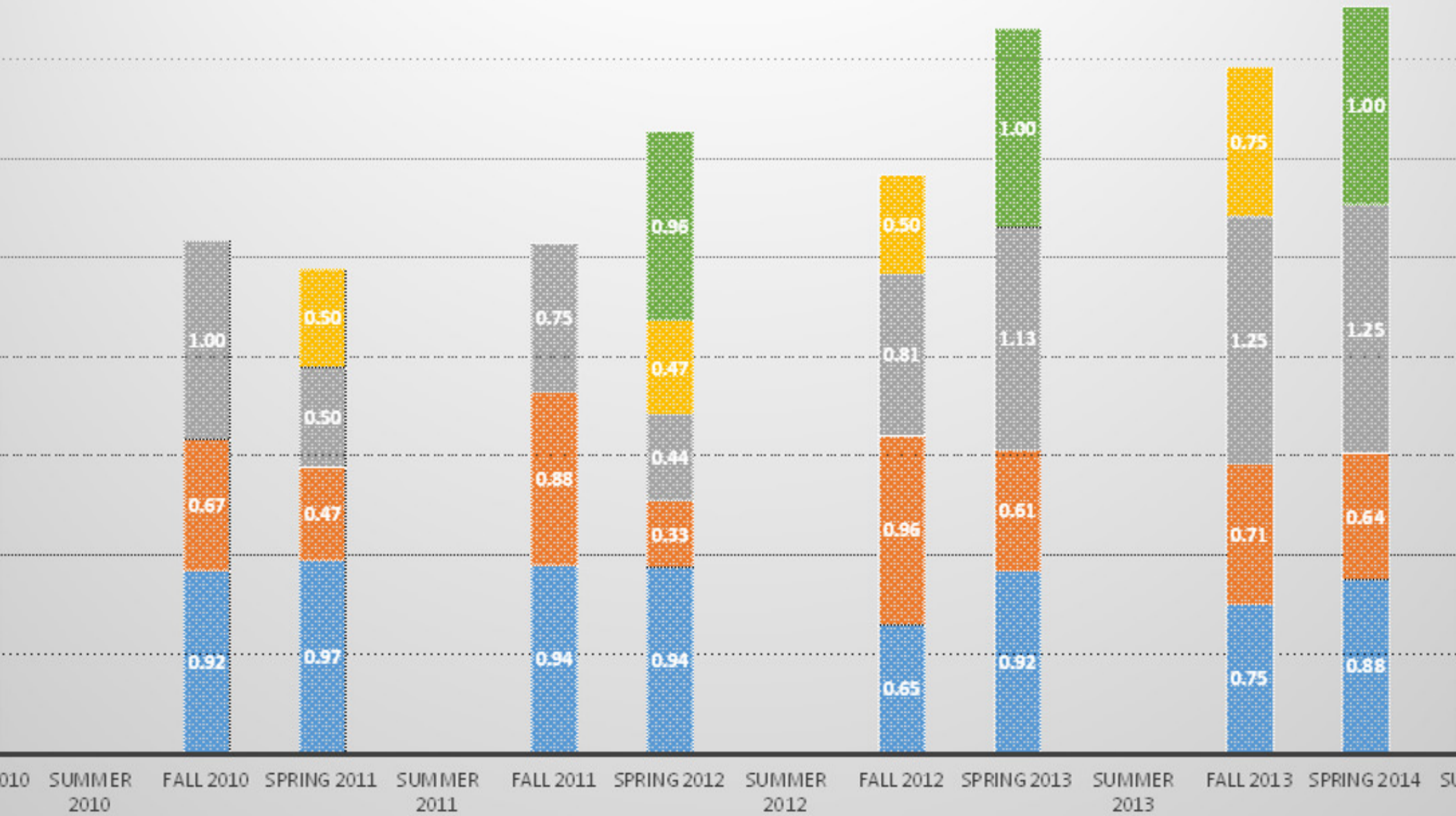
- PHYS401
- PHYS402
- PHYS403
- PHYS404
- PHYS405
- PHYS406



The figure below, however, shows that there is room in our advanced laboratory course offering for our students. The laboratory courses PHYS 402, PHYS 404, and PHYS 401 are undersubscribed. These three courses represented a total of 180 seats in the Spring 2014 and Fall 2014 semesters together. Accounting for the undersubscription rate this makes 149 advanced laboratory seats available to our LAS Specialized Physics majors. These are seats already staffed and supplied, minimally impacting Departmental resources.

Seats Used as a Percentage of Seats Available

- PHYS401
- PHYS402
- PHYS403
- PHYS404
- PHYS405
- PHYS406



Name of existing Illinois (UIUC) degree: _____

Name of non-Illinois partnering institution: _____

Location of non-Illinois partnering institution:

State of Illinois US State: _____ Foreign country: _____

- B. Proposal to create a new academic unit (college, school, department, program or other academic unit):

Name of proposed new unit: _____

- C. Proposal to rename an existing academic unit (college, school, department, or other academic unit):

Current name of unit: _____

Proposed new name of unit: _____

- D. Proposal to reorganize existing units (colleges, schools, departments, or program):

1. Proposal to change the status of an existing and approved unit (e.g. change from a program to department)

Name of current unit including status: _____

2. Proposal to transfer an existing unit:

Current unit's name and home: _____

Proposed new home for the unit: _____

3. Proposal to merge two or more existing units (e.g., merge department A with department B):

Name and college of unit one to be merged: _____

Name and college of unit two to be merged: _____

Proposed name and college of new (merged) unit: _____

4. Proposal to terminate an existing unit:

Current unit's name and status: _____

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

Nature of the proposal: _____

Revised 10/2012

UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

College of Liberal Arts and Sciences
Office of the Dean

2090 Lincoln Hall
702 S. Wright Street, MC-448
Urbana, IL 61801



November 5, 2015

Kathryn Martensen
Associate Provost
Office of the Provost and Vice Chancellor for Academic Affairs
207 Swanlund Administration Building
MC-304

Dear Kathy:

The Committee on Courses and Curricula on behalf of the Faculty of the College of Liberal Arts and Sciences has voted to approve the following proposal:

Revision LAS Specialized Curriculum in Physics (Bachelor of Science in Physics)

Please address all correspondence concerning this proposal to me. This proposal is now ready for review by the Senate Educational Policy Committee for proposed implementation in Fall 2016.

Sincerely,

A handwritten signature in black ink that reads "Karen M. Carney".

Karen M. Carney
Associate Dean

enclosure

C: Professor Mats Selen