

Soave, Melissa

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**Subject:** FW: Semester Conversion proposal for BS in Engineering Physics  
**Attachments:** physicsMajorTransitionPolicy.pdf

>  
>Hello Marilyn  
>  
>First let me apologize for the late response to your Nov 24th email.  
>Unfortunately this email was caught by my spam filter. I usually spin  
>through this every week to make sure that important emails are not  
>missed, but I think since this was so close to Thanksgiving I must have  
>forgotten to do this.  
>  
>To address you specific issues:  
>1) The transition policy is too confusing:  
>  
>I agree that as written the transition policy is not as clear as I  
>would like, and in fact, the requirement of "rounding up by 0.5" is  
>actually unnecessary. The minima in each category are actually set at  
>a level that makes this step superfluous. This can be removed if you  
>like. I realize that the "Transition Worksheet" may appear quite  
>complicated, but since this program straddles both Engineering and the  
>sciences, it is important that we ensure our students take the  
>appropriate number of credits in both areas (this will also be crucial  
>for accreditation of our Engineering Physics program).  
>  
>You may know that here in Physics we actually manage two undergraduate  
>degree programs: the Arts and Sciences Physics major and the  
>Engineering Physics major. These two majors are of course very  
>similar, and the transition policies are also quite similar. Since the  
>Arts and Sciences Physics major conversion proposal came somewhat after  
>the Engineering Physics proposal, we modified it slightly. In  
>particular, we removed the "rounding up by 0.5" for the reasons stated  
>above, and we added information regarding how we plan to (and in fact  
>have already begun to) advise ALL of our majors with respect to the  
>transition. We also noted a website available for our students which  
>gives sample plans for all possible variants of transition (1 quarter,  
>3 semesters; 2 quarters, 2 semesters, etc):  
> <http://www.physics.ohio-state.edu/undergrad/majorSemesters.php>  
>  
>I have attached the Physics major transition policy to this email.  
>Although it is written for Arts and Sciences Physics majors, it applies  
>equally to Engineering Physics majors.  
>  
>2) Bridge courses:  
>There \*will\* be bridge courses for the introductory Physics classes,  
>and they will be offered the first year of the transition for sure.  
>Depending on need they may be offered the second year after transition  
>as well, but it will be difficult to estimate the need until sometime  
>during the first year of semesters.  
>  
>The only question of additional bridge courses is in regard to the  
>possibility of "Mathematical Methods in Physics", for students who are

>behind in the Math prep due to the transition. My expectation is that  
>such bridge courses will not be needed, but since this was a concern we  
>had as we developed the conversion plan, we thought it prudent to note  
>that we would develop such courses if it became apparent that they  
>would be necessary. This is somewhat dependent on how courses  
>(particularly in linear algebra and vector calculus) in the Math  
>department are organized and when they will be offered in the first  
>year after the transition.

>  
>I hope these make things more clear. I am happy to modify the  
>transition policy text to reflect the above clarifications.

>  
>Regards,

>  
>Richard Hughes

>--

>=====

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>Content-Type: application/pdf; name="physicsMajorTransitionPolicy.pdf"  
>Content-Disposition: attachment; filename="physicsMajorTransitionPolicy.pdf"  
>X-Attachment-Id: f\_gihjxbf60

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## Transition policy

Students who began their degree under quarters will not be penalized as we move to semesters, either in terms of progress towards their degree or their expected date of graduation. Transition plans are currently being developed for students who will be at a variety of different stages (one year towards degree, two years, etc.). We do not at present see a need for bridge courses in Physics for any students who are beyond the introductory (i.e. first year) Physics classes. However, bridge courses (1-2 credit semester hours) in Mathematical Methods in Physics are being considered for Physics majors who may be somewhat behind in math preparation due to the transition. Bridge courses will be available for students who have completed part of the 3-quarter introductory sequence in either of our service courses in Physics (i.e Physics 111-2-3 or 131-2-3). The bridge courses will be offered during the summer prior and first year after the transition. They may be offered the 2nd year after the transition.

To address the details of how students who have credits under both semesters and quarters will graduate, we have implemented a “Quarters to Semesters Transition Advising Worksheet”, which will be filled out for every physics major who will graduate with physics courses accumulated under both quarters and semesters.. The basic strategy is to combine credit hours accumulated under quarters, semesters, or both, in broad categories. The credit hours under quarters are weighted by 0.67, summed with semester hours for that same category, and compared to a minimum for that category. In addition, minima are defined for overall hours summed among groups of categories. The minima are chosen so that students are not penalized for course sequences taken partially under quarters and completed under semesters, while ensuring that the requirements of the program are still met.

**This worksheet will be filled out for every Physics Major** as part of the requirements for Physics 295 (or Physics 2095 under semesters), a course all Physics majors take in the first quarter (or first semester) of their second (sophomore) year in the Physics program. **Students who are in Physics 295 in Autumn 2010 are the first group of students expected to graduate under semesters, and we have devoted approximately 20% of our available class time to discussing the semester transition alone.** We are confident that this **individual attention to every physics major who will graduate under semesters** will ensure a smooth transition from quarters to semesters.

As an added help, we have put together a website available for students which has both a description of the changes involved in moving from quarters to semesters, as well as sample plans for the majority of our students. The sample plans include examples for students with the following mix of years under quarters and semesters: (3Q1S), (2Q2S), (1Q3S), and of course (0Q4S). The website is:

<http://www.physics.ohio-state.edu/undergrad/majorSemesters.php>

We have 1 full time staff member and 1 faculty member who are charged with providing advising to all Physics majors. Sample transition plans for all students will be made up by the first quarter (or semester) of their second year in the program (usually the sophomore year), and kept on file. As long as students stick to these plans we do not anticipate any impediment to their graduation date. Students will be encouraged to seek advising help if they change their plans in any significant way.



College of Engineering

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2070 Neil Avenue  
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Phone 614-292-2651  
FAX 614-292-9379  
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Date: 7 October 2010

To: Randy Smith  
Vice Provost, Office of Academic Affairs

From: Ed McCaul   
Secretary College of Engineering Committee on Academy Affairs (CCAA)

Subject: Semester Conversion Proposal for the BS Degree in Engineering  
Physics

Attached is a letter from James Beatty, Department Chair of Physics, as well as a semester conversion proposal for their BS Degree in Engineering Physics.

This proposal was reviewed by a subcommittee of CCAA. After reviewing the proposal and having some changes made to it the subcommittee recommended to the full committee that it be approved. After a discussion, CCAA unanimously approved the proposal on the 27<sup>th</sup> of September 2010 and requested that I forward the proposal to you for consideration by CAA. If you have any questions concerning this proposal please let me know.



Department of Physics

Office of the Chair  
191 West Woodruff Avenue  
Columbus, OH 43210-1117

Phone (614) 292-2653  
Fax (614) 292-7557

To: Office of Academic Affairs  
From: James J. Beatty, Chair, Department of Physics  
Date: October 1, 2010  
Re: Semester Program Proposal for Undergraduate Physics Major

A handwritten signature in black ink that reads "James J. Beatty".

The Physics department has the following programs which will be converted from quarters to semesters:

- 1) The Undergraduate Engineering Physics Major
- 2) The Undergraduate Physics Major
- 3) The Undergraduate Physics Minor
- 4) The Combined Physics BS/MS
- 5) The Graduate Physics PhD

The subject of this proposal is the Undergraduate Physics Major; the other programs will be addressed in separate proposals.

The Undergraduate Studies Committee of the Department of Physics has worked hard to produce this proposal, describing the conversion of our current Undergraduate Major in Physics from the quarter system to the semester system.

The contents of this proposal have been discussed at length in a variety of Undergraduate Studies Committee meeting as well as faculty meetings through the 2009-2010 academic year. A preliminary version of the proposal was presented and discussed in a "Town Meeting" with undergraduate Physics and Engineering Physics majors on April 15, 2010. Based on their comments, a revised proposal was unanimously approved in a meeting of the Undergraduate Studies Committee on April 20, 2010. This version was then circulated for faculty review and comments, with a vote on the proposal completed on April 30. The outcome of the vote was 44 in favor, 0 opposed.

Richard E. Hughes  
Vice Chair Undergraduate Studies  
Version 4.0  
September 30, 2010

## ENGINEERING ENGINEERING PHYSICS MAJOR SEMESTER PROPOSAL

- 1) **Program name: Engineering Physics**
- 2) **Degree title: Bachelor of Science in Engineering Physics**
- 3) **Academic unit: Physics**
- 4) **Type of program: Undergraduate Bachelors degree**
- 5) **Semester Conversion designation: Re-envisioned with significant changes to program goals and/or curricular requirements.**

### 6) **Program learning goals**

Our educational goals are classified in two main categories: “objectives” and “outcomes”. Objectives describe the future attributes that students will have after graduation, while outcomes are the direct educational results of the courses in our curriculum.

#### I) Objectives:

- A. Our graduates will use their understanding of engineering and physics to form a strong foundation appropriate for a wide variety of successful careers, in areas such as academia, industry, and government.
- B. Our graduates will be prepared to enter and be successful in graduate schools in engineering and physics.
- C. Our graduates will be prepared to work in a variety of non-technical professional positions that benefit from some knowledge of engineering and physics, such as management, teaching, and law.
- D. Undergraduate Engineering Physics majors will be able to effectively communicate their physical understanding both professionally and colloquially (orally and in writing).
- E. Understand the environmental, ethical, diversity, cultural, and contemporary aspects of their work.

#### II) Outcomes. By the time of graduation, our students will have:

- (a) an ability to apply knowledge of mathematics, science, and engineering
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data

- (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- (d) an ability to function on multidisciplinary teams
- (e) an ability to identify, formulate, and solve engineering problems
- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- (i) a recognition of the need for, and an ability to engage in life-long learning
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

## 7) List of Semester Courses in the program

The Engineering Physics program under semesters will consist of 8 different specializations, each of which leads to a Bachelor of Sciences degree in Engineering Physics. The specializations each consist of a common core of Engineering, Physics, Math and prerequisite courses, along with additional required and/or recommended courses in selected Engineering disciplines. Beside each course is listed in parentheses the expected number of semester credit hours. A sample schedule under semesters is shown in Appendix A.

### I. General Education Courses (Required of all Engineering Students)

- A. Writing Level 1 (3)
- B. Writing Level 2 (3)
- C. Literature (3)
- D. Arts (3)
- E. Historical Study (3)
- F. Social Science 1 (3)
- G. Social Science 2 (3)
- H. Culture and Ideas or Historical Study (3)

### II. Engineering Core (Required of all Engineering Students)

- A. Engineering Survey 1100 (1)
- B. First Year Engineering 1181 (2)
- C. First Year Engineering 1182 (2)
- D. Physics 1250: Introductory Mechanics, Thermodynamic and Waves (5)
- E. Physics 1251: Introductory Electricity & Magnetism, Special Relativity and Quantum Mechanics (5)
- F. Math 1251: Calculus I (5)
- G. Math 1258: Calculus II (5)

III. Core Prerequisites (Required for all Engineering Physics Degree Specializations)

A. CSE 1222: Introduction to C++ programming (2)

IV. Additional Math (Required for all Engineering Physics Degree Specializations)

A. Math 2249: Calculus III (3)

B. Math 2431: Linear Algebra and Differential Equations (3)

V. Core Physics (Required for all Engineering Physics Degree Specializations)

A. Physics 2300: Intermediate Mechanics and Mathematical Methods for Physicists I (4)

B. Physics 2301: Intermediate Mechanics and Mathematical Methods for Physicists II (4)

C. Physics 2295: Physics Undergraduate Seminar (1)

D. Physics 3700: Methods in Experimental Physics Lab (3)

E. Physics 5400/H5400: Electricity and Magnetism I (regular/honors) (4)

F. Physics 5500/H5500: Quantum Mechanics I (regular/honors) (4)

G. Specialized Laboratory: Physics 4700: Electronics Laboratory (3)

H. Physics 5700: Advanced Laboratory (3)

VI. Capstone Design Course (Required for all Engineering Physics Degree Specializations)

This is a new requirement. Engineering Physics is seeking ABET accreditation for the first time, and a capstone experience is required for such accreditation. We anticipate a two semester sequence, with each course in the sequence worth 3 credit hours. However, since some of our students may seek to satisfy this requirement in other departments (such as the department in which they will specialize), our formal credit hour requirement will be  $\geq 5$  credit hours.

A. Physics 5800: Engineering Physics Capstone I (3)

B. Physics 5801: Engineering Physics Capstone II (3)

VII. Elective Physics (at least one course of  $\geq 3$  credit hours must be chosen):

A. Physics H5501: Honors Quantum Mechanics II (4)

B. Physics H5401: Honors Electricity and Magnetism II (4)

C. Physics 5600: Thermodynamics and Statistical Physics (4)

D. Physics 3470: Optics (3)

E. Physics H3455: Honors Holography (3)

F. Physics 68xx: Special Topics in Physics (4)

G. Physics 5300: Classical Mechanics (4)

VIII. Specialization Requirements:



These are a set of technical electives chosen arranged in eight possible specializations depending on the interests of the student. We currently require a minimum of 30 hours within each specialization under quarters, and we will require a minimum of 24 semester hours of courses at the 2000 level or above will be required for each specialization. The specialization options are:

- A. Aerospace Engineering
- B. Chemical and Biomolecular Engineering
- C. Computer and Information Science
- D. Electrical and Computer Engineering
- E. Industrial and Systems Engineering
- F. Materials Science and Engineering
- G. Mechanical Engineering
- H. Nuclear Engineering

IX. Engineering/Math/Physics Technical Electives:

At least 12 credit hours must be chosen in Math, Physics, or Engineering courses at a level of 2000 or above, according to the interests of the student.

8) **Comparison of current quarter-based and proposed semester-based curriculum advising sheets.**

See the next three pages.

Current quarter-based curriculum advising sheet:

2009-10

MAJOR PROGRAM FORM  
Bachelor of Science Program in Engineering Physics/GEC's

Name: \_\_\_\_\_

Last name.#: \_\_\_\_\_ OSU ID: \_\_\_\_\_

I hereby apply to the College of Engineering for Admission to Candidacy for the degree B.S. in Engineering Physics. **I expect to complete work for the Engineering Physics degree at the end of: \_\_\_Quarter, 20\_\_\_**  
(Concentration: \_\_\_\_\_)

\_\_\_\_ Check if updating your quarter of graduation  
\_\_\_\_ Check if registered with the Placement Office, Rm 199 Hitchcock

Signature \_\_\_\_\_ date \_\_\_\_\_

(Below) INSTRUCTIONS: Put grade next to appropriate course. If course substitutions were made, cross out the relevant course and write in the substitution. Current quarter courses should be listed as "IP" below.

Math	151	5	___	Physics	131	5	___
Math	152	5	___	Physics	132	5	___
Math	153	5	___	Physics	133	5	___
Math	254	5	___	Physics	261	4	___
Math	415	4	___	Physics	262	4	___
Math	568	3	___	Physics	263	4	___
Math	513	3	___	Physics	295	1	___
				Physics	416	4	___
				Physics	517	4	___
				Physics	555	4	___
Chemistry	121	5	___	Physics	616	4	___
Chemistry	125	4	___	Physics	621	4	___
Eng Graph	167	4	___	Physics	631	4	___
Mech Eng	410	5	___	Physics	632	4	___
Eng	181	3	___	Physics	633	4	___
Eng	183	3	___	Physics	656	4	___

**General Education**

\*One of these courses must be a SOCIAL DIVERSITY course

<b>English &amp; Comm Skills</b>	<b>(13)</b>
English	110 5 ___
English * 367.xx	5 ___
Physics	596 3 ___

<b>Social Science *</b>	<b>(9)</b>
_____	( ) ___
_____	( ) ___

<b>Historical Survey</b>	<b>(10)</b>
_____	( ) ___
_____	( ) ___

<b>Arts &amp; Humanities* (9)</b>	
<b>a. Literature (1 course)</b>	
_____	( ) ___
<b>b. Visual/Performing Arts or Other Humanities (1 course)</b>	
_____	( ) ___

<b>Program Approved</b>	
Adviser's Printed Name _____	Date _____
Adviser's Signature _____	
Exit Interview & Picture Done _____	

<b>ENGINEERING TECH ELEC (30 hrs)</b>	
_____	( ) ___
_____	( ) ___
_____	( ) ___
_____	( ) ___
_____	( ) ___
_____	( ) ___
_____	( ) ___
_____	( ) ___
_____	( ) ___

Earned hours to date	___
___ Qtr proposed hours	___
___ Qtr proposed hours	___
Total proposed hours	___
Hrs required for degree	___
Final CPHR	___

Please PRINT your name EXACTLY as you wish it to appear on your diploma and in your official university records:			
<b>First Name</b>	<b>MI</b>	<b>Last</b>	<b>Suffix</b>
LOCAL ADDRESS (will be used to send you commencement information. You are required to report changes in information to the graduate coordinator immediately.)			
Street _____			
City _____	State _____	Zip code _____	
HOMETOWN (this is the city listed as your hometown in the commencement program).			
City _____ State _____			
Date logged in: _____ Date reviewed: _____ Initials: _____			

Physics Elective  
Course \_\_\_\_\_ Credit hrs \_\_ Grade \_\_\_\_

<b>Proposed schedule for your last two quarters</b>	
Qrt/Yr: _____	Course & Number *Options _____
_____	_____ ( ) ___
_____	_____ ( ) ___
_____	_____ ( ) ___
_____	_____ ( ) ___
_____	_____ ( ) ___
_____	_____ ( ) ___
_____	_____ ( ) ___
_____	_____ ( ) ___
_____	_____ ( ) ___
_____	_____ ( ) ___
_____	_____ ( ) ___
_____	_____ ( ) ___
_____	_____ ( ) ___
_____	_____ ( ) ___
_____	_____ ( ) ___
_____	_____ ( ) ___
_____	_____ ( ) ___
_____	_____ ( ) ___
_____	_____ ( ) ___

Options: Audit=R, PA/NP=p, Grad School Credit-G

Proposed semester-based advising sheet (see next page):

COLLEGE OF ENGINEERING BACHELOR OF SCIENCE: MAJOR ENGINEERING PHYSICS 13 of 22

Last name:				Address	
First Name:				City	
Middle:				Zip Code	
OSU ID					
lastname.#					
Expected graduation		(quarter)		(year)	
Additional Majors					
Additional Minors					

Have you filed a degree application in the college office? Yes \_\_\_ No \_\_\_ (NOTE: This form is NOT a degree application)

**Major Program (Minimum grade of "C-" required. Minimum grade average of "C" (2.00))**

INSTRUCTIONS: Put grade next to appropriate course. If course substitutions were made, cross out the relevant course and write in the substitution. Current quarter courses should be listed as "IP" below.

Intro Physics	Credits	Grade		College Required	Credits	Grade
Physics 1250	5			Eng 1100	1	
Physics 1251	5			Eng 1181	2	
				Eng 1182	2	
Intro Math	Credits	Grade		CSE 1222	2	
Math 1251	5					
Math 1258	5			Eng/Phys Tech Elec	Credits (>=12)	Grade
				Course:		
Core Physics	Credits	Grade		Course:		
Physics 2295	1			Course:		
Physics 2300	4			Course:		
Physics 2301	4			Course:		
Physics 3700	3					
Physics 5400	4			Specialization Electives	Credits (>=24)	Grade
Physics 4700	3			Course:		
Physics 5500	4			Course:		
Physics 5700	3			Course:		
				Course:		
				Course:		
Core Math	Credits	Grade		Course:		
Math 2249	3			Course:		
Math 2431	3			Course:		
				Course:		
				Course:		
Physics Tech	Credits (>=3)	Grade				
Course:						
				Capstone Design	Credits (>=5)	Grade
GEC				Physics 5800	3	
Course Name	Credits	Grade		Physics 5801	3	
Course:	3					
Course:	3					
Course:	3					
Course:	3					
Course:	3					
Course:	3					
Course:	3					
Course:	3					

Signature of advisor \_\_\_\_\_ Date \_\_\_\_\_

9) Curriculum map, indicating how program goals are accomplished via specific courses.

The following table indicates how Educational Outcomes a) through k) (see pages 1 and 2 for a description of these) are attained in the Engineering Physics program.

Course(s)	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Eng 1181	***	**	*	**	***	*	**	*			***
Eng 1182	**	**	***	**	**		**				***
CSE 1222	**	*	***		***		*		**		***
Physics 2300: Intermediate Mechanics I	***		*		***						**
Physics 2301: Intermediate Mechanics II	***		*		***						**
Physics 2295: Seminar								**	**		
Physics 5400: Electricity & Magnetism I	***		*		***						**
Physics 5500: Quantum Mechanics I	***		*		***						**
Physics 3700: Methods in Exp Physics Lab	***	***	**		***	*	***	*			***
Physics 4700: Electronics Lab	***	***	**		***		***	*			***
Physics 5700: Advanced Physics Lab	***	***	**	**	***	**	***	*			***
Physics 5800: Eng Physics Design I	***	***	***	***	***	**	***	***	*	**	***
Physics 5801: Eng Physics Design II	***	***	***	***	***	**	***	***	*	**	***
Physics Elective (>=3 credit hours)	Outcomes depend on electives chosen.										
Eng/Physics/Math Tech Electives (>=12 credit hours)	Outcomes depend on electives chosen.										
Engineering Specialization Tech Electives (>=24 credit hours)	Outcomes depend on electives chosen.										

In each row, the level of coverage steadily increases from beginner to intermediate to advanced. The number of asterisks indicates the amount of coverage for a particular outcome:

- i) \* means some contribution (1-2 hours)
- ii) \*\* means substantial contribution (3-6 hours)
- iii) \*\*\* means significant contribution (7+ hours)

**4) Rationale for Program Changes**

The primary changes to our program are twofold:

- i) Addition of a 2-semester Capstone Design sequence to enhance the design component of the Engineering Physics program.
- ii) A reduction in the required minimum Physics credit hours, compensated for by an increase in credit hours which can be flexibly targeted to Physics, Math and/or Engineering credit hours based on the interests of the student.

These two changes are explained in more detail in section 12) below.

**11) Table highlighting credit hour changes**

<b>Program credit hour requirements</b>	<b>A.) Number of (quarter-based) credit hours in current program</b>	<b>B.) 2/3 of column A.)</b>	<b>C.) Number of (semester-based) credit hours of proposed program</b>
<b>Total Credit hours for completion of the program</b>	191	127.4	128
<b>Prereq Credit hours required for admission</b>	0	0	0
<b>Required credit hours offered by Physics</b>	68	45.4	57-45
<b>Required credit hours outside of Physics</b>	123	82	71-83

“Required credit hours offered by Physics” includes: introductory and upper level physics courses.

“Required credit hours outside of Physics” includes GEC courses, introductory and upper level math, and additional 100-level science outside of physics (usually Chemistry 121 and 125 under quarters) from the Engineering core, as well as 100-level Engineering courses including the survey course and required Engineering Core courses, and upper level Engineering courses required for the student’s chosen engineering specialization.

The range of credit hours under semesters reflects the added flexibility of 12 credit hours which can be targeted toward either upper level Physics, Math, or Engineering courses depending on the interests of the student. Note also, that the “Required Credit Hours Offered By Physics”

under semesters includes the new Engineering Physics Capstone Design courses I and II (a total of 6 credit hours).

## 12) Rationale for credit hour changes

The table on the previous page makes it difficult to see how the credit hours have shifted among and within the areas of engineering and physics courses that our students take. To make things more transparent, please consult the table on the following page as well as the following points:

(i) Row d: This is the total credit hours outside of Engineering and Physics that our students are required to take. There is a reduction in this category as we move from quarters to semesters of approximately 5 credit hours, most of which is due to a reduction in required second year Math. Note that this number does not include the 100-level Chemistry course requirements which are in the Engineering core under quarters.

(ii) Row j: This is the total amount of credit hours of Physics courses our students are required to take. There is a reduction of 6 credit hours as we move from quarters to semesters. Even with this reduction, we note that the amount of Physics credit hours taken by Engineering Physics majors will still be equal to or greater than the minimum number of Physics credit hours taken by Math and Physical Sciences Physics majors under semesters. In addition, there is significant flexibility for our students to add physics credit hours. More on this in point (iv) below.

(iii) Row o: This is the total amount of credit hours of Engineering College courses our students are required to take. There is a reduction of 1 credit hour as we move from quarters to semesters. Within this change, there is a reduction in the Engineering Core as we move from quarters to semesters, which in turn allows us to add a Capstone Design experience, which we are introducing to enhance the design component of the Engineering Physics program. In addition, there is again significant flexibility for our students to add still more engineering credit hours. More on this in point (iv) below.

(iv) Row p: This is the total amount of additional credit hours of Engineering, Physics, or Math courses our students are required to take. This is a completely new requirement, not present under quarters, which adds a total of 12 credit hours to our program. This, along with the reductions noted in items (i), (ii), and (iii) above, leads to an overall change of just 0.5 credit hours in our program as we move from quarters to semesters.

We view these changes primarily as a change in emphasis: we are taking a variety of small reductions in credit hours in the sub-categories of Physics, Math, and the Engineering core, and compensating with the introduction of a capstone, and a significant increase in credit hour flexibility (of 12 hours) depending on the needs and interests of the student. Students who plan to go on to Physics (approximately 25% of our Engineering Physics majors) would be advised to target these hours to Physics or Math, while those who plan to go on to Engineering graduate school (approximately 10% of our Engineering Physics majors) or who intend to seek employment or other graduate school after graduation would be advised to take on additional courses based on their interests.



Row	Requirements	EngPhys (Quarters)	2/3 Conversion to Semesters	EngPhys (Semesters)	Notes
a	Introductory Math	15	10	10	No Change
b	Upper Division Math	15	10	6	Reduction
c	Additional GEC Requirements	38	25.3	24	Does not include 3rd writing course
d	Total non (Physics or Engineering)	68	45.4	40	Overall reduction in required hours
	<u>Physics-only Related:</u>				
e	Intro Physics	15	10	10	No Change
f	Intermediate Physics	12	8	8	No Change
g	Advanced Physics (Quantum, E&M, Sophomore Seminar class)	25	16.7	9	Same as Applied Physics semesters option in NMS
h	Physics Elective	4	2.7	3	No Change
i	Physics Labs	12	8	9	No Change
j	Total Physics (rows e+f+g+h; excluding p row below)	68	45.4	39	Overall reduction in required hours
	<u>Engineering-only Related:</u>				
k	Prerequisite (CSE 202/EngGr 167)	4	2.7	2	Not included below in Core
l	Engineering Core	20	13.3	4	Quarters-based Core includes 9 hours of chemistry
m	Engineering Specialization	30	20	24	Increase
n	Senior Capstone Design Project	0	0	5	New requirement
o	Total Required Engineering (rows k+l+m+n; excluding row p below)	54	36	35	Overall minimal change
	<u>Physics or Engineering Related:</u>				
p	**Additional Required Physics, Math, or Engineering Elective	0	0	12	Target to Physics, Math, or Engineering depending on Student interests
q	Total Required Physics plus Engineering (rows j+o+p)	122	81.4	86	
r	Engineering Survey	1	0.7	1	No Change
s	Total Program Credit Hours	191	127.5	128	No Change

**13) Transition policy**

Students who began their degree under quarters will not be penalized as we move to semesters, either in terms of progress towards their degree or their expected date of graduation. Transition plans are currently being developed for students who will be at a variety of different stages (one year towards degree, two years, etc.). We do not at present see a need for bridge courses in Physics for any students who are beyond the introductory (i.e. first year) Physics classes. However, bridge courses (1-2 credit semester hours) in Mathematical Methods in Physics are being considered for Engineering Physics majors who may be somewhat behind in math preparation due to the transition. Bridge courses are also being considered for students who have completed part of the 3-quarter introductory sequence in either of our service courses in Physics (i.e. Physics 111-2-3 or 131-2-3). The bridge courses may be offered during the summer prior to and first two years after the transition.

To address the details of how students who have credits under both semesters and quarters will graduate, we have implemented a “Quarters to Semesters Advising Worksheet”, which is attached at the end of this document, in Appendix B. The basic strategy is to combine credit hours accumulated under quarters, semesters, or both, in broad categories. The credit hours under quarters are weighted by 0.67, summed with semester hours for that same category, rounded up by 0.5, and compared to a minimum for that category. In addition, minima are defined for overall hours summed among groups of categories. The minima are chosen so that students are not penalized for course sequences taken partially under quarters and completed under semesters, while still ensuring that the requirements of the program are still met.

**14) Expected changes in assessment practices under semesters**

For our assessment, we use a variety of direct and indirect methods, none of which depend upon whether the program is run under quarters or semesters. As a result, we do not anticipate any changes to our assessment practices under the semester system.

**15) Verification that assessment plan exists at OAA.**

We do have an assessment plan on file at OAA.

Appendix A: Sample program for the Engineering Physics Major under semesters.

Example Program for Engineering Physics Major						
Year	Autumn	Credit Hours	Comment	Spring	Credit Hours	Comment
<b>1</b>	Physics 1250	5	Intro	Physics 1251	5	Intro
	Math 1251	5	Calc	Math 1258	5	Calc
	Eng 1181	2	Eng Core	Eng 1182	2	Eng Core
	Eng 1100	1	Eng Core	CSE 1222	2	Prereq
	GEC	3		GEC	3	
	<b>Semester Sum</b>	<b>16</b>			<b>Semester Sum</b>	<b>17</b>
<b>2</b>	<b>Physics 2261</b>	<b>4</b>	<b>Interm Mech</b>	<b>Physics 2262</b>	<b>4</b>	<b>Interm Mech</b>
	<b>Physics 2295</b>	<b>1</b>	<b>Survey</b>	<b>Physics 3700</b>	<b>3</b>	<b>Data Ana Lab</b>
	<b>Math 2249</b>	<b>3</b>	<b>Calc III</b>	<b>Math 2431</b>	<b>3</b>	<b>DiffEq/LinAlg</b>
	<b>Eng Spec Elec</b>	<b>3</b>	<b>Specialization</b>	<b>Eng Spec Elec</b>	<b>3</b>	<b>Specialization</b>
	<b>Eng Spec Elec</b>	<b>3</b>	<b>Specialization</b>	GEC	3	
	GEC	3				
<b>Semester Sum</b>	<b>17</b>			<b>Semester Sum</b>	<b>16</b>	
<b>3</b>	<b>Physics 5500</b>	<b>4</b>	<b>Quantum Mech</b>	<b>Physics 4700</b>	<b>3</b>	<b>Elec Lab</b>
	<b>Physics 5400</b>	<b>4</b>	<b>E&amp;M</b>	<b>Eng Spec Elec</b>	<b>3</b>	<b>Specialization</b>
	<b>Eng Spec Elec</b>	<b>3</b>	<b>Specialization</b>	<b>Eng Spec Elec</b>	<b>3</b>	<b>Specialization</b>
	<b>Eng Spec Elec</b>	<b>3</b>	<b>Specialization</b>	<b>Eng/Phys Elec</b>	<b>3</b>	<b>Tech Elec</b>
	GEC	3		GEC	3	
	<b>Semester Sum</b>	<b>17</b>			<b>Semester Sum</b>	<b>15</b>
<b>4</b>	<b>Physics Elec</b>	<b>3</b>	<b>Required Elec</b>	<b>Physics 5700</b>	<b>3</b>	<b>Adv Lab</b>
	<b>Physics 5800</b>	<b>3</b>	<b>Capstone</b>	<b>Physics 5801</b>	<b>3</b>	<b>Capstone</b>
	<b>Eng Spec Elec</b>	<b>3</b>	<b>Specialization</b>	<b>Eng/Phys Elec</b>	<b>3</b>	<b>Tech Elec</b>
	<b>Eng/Phys Elec</b>	<b>3</b>	<b>Tech Elec</b>	<b>Eng/Phys Elec</b>	<b>3</b>	<b>Tech Elec</b>
	GEC	3		GEC	3	
	<b>Semester Sum</b>	<b>15</b>			<b>Semester Sum</b>	<b>15</b>
				<b>Total Hours:</b>	<b>128</b>	
<b>BOLD:</b> Required Advanced Math/Physics						
<b>BOLD:</b> Engineering Specialization Elective (24 hours required)						
<b>BOLD:</b> Required Physics/Engineering Elective (12 hours required)						

Appendix B: Quarter to Semester Advising Worksheet.

Topic Area	Course Name	Quarter/ Semester Planned	QCH = Quarter Credit Hours	CQH = 0.67*QCH	SCH = Semester Credit Hours	CQH+SCH	Minimum Required	Excess Over Minimum
Introductory Physics	Physics 131			0		0		
	Physics 132			0		0		
	Physics 133			0		0		
	Physics 1250					0		
	Physics 1251					0		
	Physics Bridge 1					0		
	Physics Bridge 2					0		
						SUM=	0	10
Intermediate Physics	Physics 261			0		0		
	Physics 262			0		0		
	Physics 263			0		0		
	Physics 2300					0		
	Physics 2301					0		
	Physics 295			0		0		
	Physics 2095					0		
						SUM=	0	8
Electricity and Magnetism	Physics 555			0		0		
	Physics 656			0		0		
	Physics 657			0		0		
	Physics 5400					0		
	Physics 5401					0		
						SUM=	0	2.6
Quantum Mechanics	Physics 631			0		0		
	Physics 632			0		0		
	Physics 633			0		0		
	Physics 5500					0		
	Physics 5501					0		
						SUM=	0	2.6
Labs	Physics 416			0		0		
	Physics 517			0		0		
	Physics 616			0		0		
	Physics 3700					0		
	Physics 4700					0		
	Physics 5700					0		
						SUM=	0	8
Capstone	Physics 780			0		0		

Topic Area	Course Name	Quarter/ Semester Planned	QCH = Quarter Credit Hours	CQH = 0.67*QCH	SCH = Semester Credit Hours	CQH+SCH	Minimum Required	Excess Over Minimum
	Physics 780			0		0		
	Physics 5800					0		
	Physics 5801					0		
					SUM=	0	5	
<b>Total Physics:</b>				<b>Total Physics Sum=</b>		0	42	
<b>Physics/Math/ Eng Electives</b>	Course:					0		
(List courses)	Course:					0		
	Course:					0		
	Course:					0		
	Course:					0		
	Course:					0		
					SUM=	0	15	
<b>Introductory Math</b>	Math 151			0		0		
	Math 152			0		0		
	Math 153			0		0		
<b>Advanced Math</b>	Math 254			0		0		
	Math 415			0		0		
	Math 568			0		0		
	Math 1251					0		
	Math 1258					0		
	Math 2249					0		
	Math 2431					0		
<b>&gt;=200/2000 Level Math</b>	Course:			0		0		
	Course:			0		0		
	Course:			0		0		
<b>Total Math:</b>				<b>Total Math Sum=</b>		0	16	
<b>Engineering Core:</b>	Eng 181			0		0		
	Eng 183			0		0		
	Eng 1181					0		
	Eng 1182					0		
				<b>Total Intro Eng=</b>		0	4	
<b>Survey</b>	Eng 100			0		0		
	Eng 1100					0		
				<b>Total Survey=</b>		0	1	
<b>Computing</b>	Eng Gr 167			0		0		
	CSE 202			0		0		
	CSE 1222					0		
				<b>Total Computing Sum=</b>		0	2	

Topic Area	Course Name	Quarter/ Semester Planned	QCH = Quarter Credit Hours	CQH = 0.67*QCH	SCH = Semester Credit Hours	CQH+SCH	Minimum Required	Excess Over Minimum
<b>Additional Engineering</b>	Chem 121			0		0		
	Chem 125			0		0		
	ME 410			0		0		
				<b>Total Additional Eng=</b>		0	0	
<b>Engineering Specialization</b>	Course:			0		0		
<b>(List courses)</b>	Course:			0		0		
	Course:			0		0		
	Course:			0		0		
	Course:			0		0		
	Course:			0		0		
	Course:			0		0		
	Course:			0		0		
	Course:			0		0		
	Course:			0		0		
	Course:			0		0		
	Course:			0		0		
	Course:			0		0		
	Course:			0		0		
	Course:			0		0		
	Course:			0		0		
	Course:			0		0		
				<b>Total Engineering Sum=</b>		0	24	
<b>GEC: Each Topic Area must be fulfilled:</b>								
GEC Writing 1	Course:			0		0	3	
GEC Writing 2	Course:			0		0	3	
GEC Soc Sci 1	Course:			0		0	3	
GEC Soc Sci 2	Course:			0		0	3	
GEC Hist Surv 1	Course:			0		0	3	
GEC Hist Surv 2	Course:			0		0	3	
GEC Literature	Course:			0		0	3	
GEC Humanities	Course:			0		0	3	
				<b>Total Credit Hour Sum=</b>		0	128	128