# Add 4000/6000 Course

000156

## Course Attributes

| | | | |
|---|---|---|---|
| **Subject Abbreviation:** | EES-Env Engr and Science | **Catalog Title:** | Radioecology **Additional Fee?** |
| **Course Number:** | 4140 / 6140 | **Transcript Title:** | Radioecology Justification |
| **Effective Term:** | Spring 2016 | **Cross-reference(s):** | |
| **College:** | Engineering and Science | **Grade Mode:** | Standard Letter |
| **Department:** | Environmental Engr & Earth Sci | | |

**Form**

**User ID:** nmarti3 **Name:** Nicole Martinez
**Date:** 09/05/2015 **Number:** 8829

**Hours**

**Fixed Credit Course**

| Credit Hrs | Contact Hrs |
|---|---|
| 3 | 3 |

**Variable Credit Course**

| Credit Hrs | | Contact Hrs | |
|---|---|---|---|
| **Min** | **Max** | **Min** | **Max** |

**Rationale for Add Course**

- Strengthen Program Requirement(s)
- Alignment of Student Learning Outcomes
- Alternative Delivery of Content
- Improve Time to Degree
- ✓ Evolution of the Discipline
- Changing Prerequisites
- Address DWF Rates
- General Education Modifications
- Other (Please specify.)

**Schedule Types**

- Field Course
- Independent Study
- Internship
- Lab No Fee
- Lab With Fee
- ◉ Lecture
- Other
- Seminar
- Studio
- Tutorial

**Projected Enrollment**

**Year 1:** 8
**Year 2:** 10
**Year 3:** 12
**Year 4:** 15

**Evaluation**

4000

| | | | |
|---|---|---|---|
| **A** | 90 | - | 100 |
| **B** | 80 | - | 89 |
| **C** | 70 | - | 79 |
| **D** | 60 | - | 69 |
| **F** | < | | 60 |

Weighted percentages of assignments (quizzes 20%, midterm exam 25%, final exam 35%, homework 10%, participation 10%). Final grades will be ~~truncated~~ vice rounded.

6000 VICE

| | | | |
|---|---|---|---|
| **A** | 90 | - | 100 |
| **B** | 80 | - | 89 |
| **C** | 70 | - | 79 |
| **F** | < | | 70 |

Weighted percentages of assignments (quizzes 15%, midterm exam 20%, final exam 35%, homework 5%, participation 5%, project 20%) Final grades will be truncated vice rounded.

**Catalog Description**

An introduction to the relationships between ionizing radiation or radioactive substances and the environment. Topics include sources of

environmental radioactivity; transport processes and bioavailability; impacts of ionizing radiation on various subunits within the biosphere; and methods and techniques related to risk assessment and decision making.

**Prerequisite(s)** **Corequisite(s)**

MATH 1060 or MATH 1070; CH 1020 or CH 1060; BIOL 1030 or BIOL 1110; PHYS 2080 or 2210

**Statement of need and justification based on assessment of student learning outcomes**

Over the past decade or so, public interest in nuclear energy and the scientific challenges associated with the nuclear fuel cycle has increased, leading to a renewed interest in radioecology, or the study of the relationships between ionizing radiation and the environment. Concurrently, however, educational opportunities in radioecology have steadily declined with many leading experts approaching retirement, resulting in the worldwide need for radioecological expertise. This unique course is designed to complement the existing graduate programs in environmental health physics and radiochemistry by filling existing student knowledge gaps related to radiation in the biosphere as well as to provide supplementary knowledge for graduate and upper-division undergraduate students in a variety of related disciplines, such as environmental health, natural resources, toxicology, biology, and risk analysis. This course is intended to be an elective in later revisions of the environmental engineering major, the nuclear engineering minor, and the ABET accredited health physics graduate program.

**Textbook(s)**

None required. Selected readings will be assigned from various sources, including: Whicker FW and Schultz V. Radioecology: Nuclear Energy and the Environment. Boca Raton, FL: CRC Press, 1982. Eisenbud M and Gesell TF. Environmental Radioactivity from Natural, Industrial & Military Sources, 4th Edition. San Diego, CA: Academic Press, 1997. Oughton D and Hansson SO, eds. Social and Ethical Aspects of Radiation Risk Management. Oxford, UK: Elsevier, 2013. Choppin G, Liljenzin J, Rydberg J, and Ekberg C. Radiochemistry and Nuclear Chemistry, 4th Edition. Oxford, UK: Academic Press, 2013. Gilbert RO. Statistical Methods for Environmental Pollution Monitoring. New York, NY: John Wiley & Sons, 1987.

**Learning Objectives**

Upon successful completion of this course students will be able to: • Describe both natural and anthropogenic sources of environmental radioactivity • Understand the transport, fate, and effects of environmental radioactivity and perform related calculations • Apply the principles of radiation protection in an environmental context • Critically evaluate methodology in radioecological studies • Discuss the social and ethical dimensions of environmental radiation protection

**Topical Outline**

1. Introduction and historical perspective 2. Ecological principles applied to radioecology 2.1. Ecosystem concept 2.2. Structure and organization in ecosystems 2.3. Functional relationships within ecosystems 3. Radiological principles 3.1. Radiation and radioactivity 3.2. Interaction of radiation with matter 3.3. Radiation measurement 4. Environmental radioactivity 4.1. Natural sources of radiation 4.2. Anthropogenic sources of radiation 5. Radionuclide behavior in ecosystems 5.1. General concepts 5.2. Behavior of specific groups of radionuclides 5.3. Behavior of radionuclides in specific environments 6. Quantitative aspects of radionuclide transport 6.1. Transport processes 6.2. Kinetics of compartment systems 6.3. Radionuclide transport modeling 7. Effects of ionizing radiation within the biosphere 7.1. Biological mechanisms 7.2. Acute irradiation 7.3. Chronic irradiation 8. Radioecological techniques 8.1. Study design 8.2. Statistical methods 8.3. Sampling techniques 9. Radiation dosimetry 9.1. External 9.2. Internal 10. Ethical aspects of ecological risk from radiation 10.1. Ecocentrism 10.2. Biocentrism 10.3. Anthropocentricism 11. Applications and consequences 11.1. Impact assessment 11.2. Remediation

**Add course requirements for 6000-level courses**

Graduate students will be required to complete an independent project and also give a 10 minute presentation based on this project. For this project, graduate students will apply radioecological concepts to an organism of their choice. That is, students will research the organism's ecology and determine how radionuclide(s) may transfer to said organism, including potential sources of radiological contamination, whether natural or anthropogenic. The report will also discuss the corresponding impacts (or potential impacts) on the individual, population, community, and ecosystem as appropriate. Finally, the student will pose a question (or questions) not answered in the literature and propose a study design for researching this knowledge gap. Reports will be graded based on demonstration of the ability to think independently and apply topics learned in this course to new situations, with consideration given to spelling, grammar, and punctuation. Sections should typically include an abstract, introduction, technical details, discussion/conclusions, and references (at minimum 10 peer-reviewed sources, at least 5 of which are outside of those provided in class). In addition to the above project and corresponding presentation, certain problems in the homework (1 problem per homework) and on the exams (2 problems per exam) will be separated by course level (with EES 6140 being assigned more challenging problems).

**Syllabus**

Upload File: EES 4140 6140 Syllabus-20150905130702.docx

**Description:** Syllabus

9/11/2015

Chair, Department Curriculum Committee Date

David L. Freedman 9/11/15

Department Chair Date

9/21/15

000158

Chair, College Curriculum Committee

Date 9/23/15

College Dean

Date

Director, Calhoun Honors College

Date

Chair, Undergraduate Curriculum Committee

10/2/2015

Date

Chair, Graduate Curriculum Committee

Date

Provost

10/4/2015

Date

President

Date

# Add Undergraduate Course

## Course Attributes

**Subject Abbreviation:** MSE-Materials Sci and Eng
**Course Number:** 4810
**Effective Term:** Spring 2016
**College:** Engineering and Science
**Department:** Materials Science & Enginering

**Catalog Title:** Undergraduate Research Fundamentals ☐ **Additional Fee?**
**Transcript Title:** Undergraduate Research Fundame Justification
**Cross-reference(s):**
**Grade Mode:** Standard Letter

### Form

**User ID:** mefford **Name:** Olin Mefford
**Date:** 09/24/2015 **Number:** 10922

### Hours

**Fixed Credit Course**

| Credit Hrs | Contact Hrs |
|---|---|
| 1 | 1 |

**Variable Credit Course**

| Credit Hrs | | Contact Hrs | |
|---|---|---|---|
| Min | Max | Min | Max |

### Rationale for Add Course

- ☑ Strengthen Program Requirement(s)
- ☑ Alignment of Student Learning Outcomes
- ☐ Alternative Delivery of Content
- ☐ Improve Time to Degree
- ☑ Evolution of the Discipline
- ☐ Changing Prerequisites
- ☐ Address DWF Rates
- ☐ General Education Modifications
- ☐ Other (Please specify.)

### Schedule Types

- ☐ Field Course
- ☐ Independent Study
- ☐ Internship
- ☐ Lab No Fee
- ☐ Lab With Fee
- ◉ Lecture
- ☐ Other
- ☐ Seminar
- ☐ Studio
- ☐ Tutorial

### Projected Enrollment

**Year 1:** 35
**Year 2:** 35
**Year 3:** 35
**Year 4:** 35

### Evaluation

Undergraduate

| | | | |
|---|---|---|---|
| A | 90 | - | 100 |
| B | 80 | - | 89 |
| C | 70 | - | 79 |
| D | 60 | - | 69 |
| F | < | | 60 |

The course will consist of 12 modules with work given equal credit.

## Catalog Description

Investigation of skills needed to become a successful, safety conscious and ethical researcher. This course will review most safety training required by Clemson University, ethical decision making and important skills like writing skills and record keeping to be a successful researcher.

☑ **Prerequisite(s)** ☐ **Corequisite(s)**

MSE 3270 OR consent of the instructor.

## Statement of need and justification based on assessment of student learning outcomes

Currently all undergraduates within the Department of Materials Science and Engineering are required to take three credits of MSE 4910 before graduation. Most faculty members offer a section of this course, allowing two to three students to work on projects within their laboratories. Undergraduates are also joining Creative Inquiry groups offered by faculty within our department. There is a need to standardize the safety, ethical and professional training students are obtaining. Using our prior experience, we have developed a list of needed modules, but will also seek additional input

from Robert Clark, the Biological Safety Officer from the Clemson University Office of Research Safety and also Dan Wueste, the director, Robert J. Rutland Institute for Ethics. Both have been contacted prior to the submission of this proposal.

## Textbook(s)

None required

## Learning Objectives

• Categorize laboratory organization, roles, and responsibilities • Demonstrate good notebook skills, record keeping, and documentation methodology • Apply and analyze the chemical hygiene and safety • Review and develop appreciation for the proposal submission, funding, and reporting process • Outline and interpret the publication process, and critique the peer review process. • Research and analyze ethical issues within scientific research • Establish short-term and long-term goals, tactics to reach these goals, as well as devising metrics for the evaluating the performance and timing of goals.

## Topical Outline

Times that follow are based on a 15 week semester and are approximate: • Students will be able to identify their responsibilities over the course of the term based on the number of credits they are earning and their prior course work. (1/2 Week) • Students will establish a research connection with a faculty member and be able to describe their role within that group.(1/2 Week) • Before beginning the project, students will submit their research title, abstract and responsibilities. (1/2 Week) • Students will write a brief literature review on a topic of their choosing, while focusing on standards for their field and demonstrate proper data management skills including notebook documentation.(1/2 Week) • Students will complete training require by the University for access to the laboratory.(1/2 Week) • Students will explore the various mechanisms for supporting research, and the requirements for each. (1/2 Week) • The class will explore the peer-review process, types of publications, meeting and conference types, and abstract submission.(1/2 Week) • Students will complete the National Science Foundation's Responsible Conduct of Research (RCR) training.(1/2 Week) • Students will establish research goals, tactics, and metrics for the project they are starting(1 Week) • Students will conducted mentored research and present an oral presentation at the end of the semester along with a paper. (remaining 10 weeks)

**Syllabus**

Upload File: 1_Syllabus_MSE4810_proposed-20150924163427.pdf

**Description:** proposed syllabus

**Form Number:** 8318

**Approval**

000160

| | | | |
|---|---|---|---|
| | | John D. Griffin | 10/2/2015 |
| Chair, Department Curriculum Committee | Date | Chair, Undergraduate Curriculum Committee | Date |
| | 8/21/2015 | | |
| Department Chair | Date | Chair, Graduate Curriculum Committee | Date |
| | 8/25/15 | Robert T. Jones | 10/4/2015 |
| Chair, College Curriculum Committee | Date | Provost | Date |
| | 9/21/15 | | |
| College Dean | Date | President | Date |
| | 9/22/15 | | |
| Director, Calhoun Honors College | Date | | |
| | | | |

## Change Major

Major Name: Physics

Degree: Bachelor of Science

Effective Catalog Year: 2016-2017

- [ ] Change Major Name to: PHYS
- [ ] Change Degree to: Bachelor of Science
- [ ] Change Curriculum Requirements
- [ ] Change General Education Requirements
- [ ] Add, Change, or Delete Concentration(s)
- [x] Add, Change, or Delete Emphasis Area(s)

Curriculum Map: BS-MS program 150901gl-20150924160957.docx

Description: BS/MS plan

Additional Information:

Description:

### Summary/Explanation

This proposal adds a BS/MS plan to the physics program. The BS portion of the sample program is only minimally changed. 3 hours of emphasis area requirement and 3 hours of Senior thesis are replaced by 6 hours of senior level research (PHYS 4990) in preparation for MS level research. Year 5 adds 30 hours of graduate level courses and research (6000, 8000, and 9000 level) to fulfill the MS requirement. The total program comprises 150 hours (120 + 30).

## Rationale for Change Major

- [ ] Strengthen Program Requirement(s)
- [ ] Alignment of Student Learning Outcomes
- [ ] Alternative Delivery of Content
- [x] Improve Time to Degree
- [ ] Evolution of the Discipline
- [ ] Changing Prerequisites
- [ ] Address DWF Rates
- [ ] General Education Modifications
- [x] Other (Please specify.)

Add BS/MS Plan to Physics Options

## Form

User ID: glehmac Name: Gerald Lehmacher

Date: 09/24/2015 Number:

PHYSICS
**Combined Bachelor's/Master's Plan**

Under this plan, students may reduce the time necessary to earn both degrees by applying graduate credits to both undergraduate and graduate program requirements. Students are encouraged to obtain the specific requirements for pursuing the dual degree from the Department of Physics and Astronomy (*www.physics.clemson.edu*) as early as possible in their undergraduate program. Enrollment guidelines and procedures can be found under *Academic Regulations* in this catalog.

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**Details**

**Departmental Guidelines (adapted from Mathematics) and Sample Curriculum**

Status: 9/1/2015
Contact: G. Lehmacher, S. Brittain

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Clemson students may begin the Master's program in **Physics** while completing their undergraduate degree, subject to the following conditions:

1. Undergraduate students must have an overall GPR of at least 3.4 and must have completed a minimum of 90 semester hours.

2. In order to be admitted to the Master's program, students are required to complete the GS6BSMS form, which is available from the Graduate School. Each application requires at least two letters of recommendation.

3. Students accepted into the combined Bachelor's/Master's program are conditionally admitted to the Graduate School. Removal of the conditional status requires completion of a Bachelor's degree. Students who have been conditionally admitted are not eligible for graduate assistantships until the conditional status has been removed.

4. Students will complete their BS and MS requirements by taking at least 30 hours of courses at the 6000-level or above, **excluding** the 6000-level counterparts of courses that are required in the BS curriculum (3210, 3220, 4410, 4420, 4550, 4560, 4650). At least 18 credit hours must be at the 8000-level or above, e.g., **8110, 8150, 8210, 8410, 9510, 9520**, including up to 6 credits of master's level research **8900 or 8910**, plus other courses as approved by the Graduate Coordinator. Both thesis and non-thesis options are available (minimum 30 and 36 graduate credit hours, respectively) as described in graduate announcements.

5. The Graduate Coordinator will serve as first-year graduate advisor for all students in the program and will be responsible for approving their graduate plans of study.

Students interested in this program should discuss it with the department's Undergraduate Coordinator and Graduate Coordinator. Application for this program would normally be made by the end of the junior year, although it can be made any time during the junior year up to the start of the final semester prior to graduation.

As an alternative to entering the combined Bachelor's/Master's program, undergraduate students are still able to take graduate courses by completing the GS6 form. However, any courses taken in this fashion cannot count simultaneously for both the Bachelor's degree and any subsequent graduate degree at Clemson.

Refer to the undergraduate announcements under academic regulations for further explanation.

## BS/MS - Thesis Option (Example)

### Freshman Year

**First Semester**
4- CH 1010 General Chemistry[0]
3- ENGL 1030 Accelerated Composition[0]
4- MATH 1060 Calculus of One Variable I[0]
3- PHYS 1220 Physics with Calculus I[0]
1- PHYS 1240 Physics Lab I
15

**Second Semester**
4- CH 1020 General Chemistry[0]
4- MATH 1080 Calculus of One Variable II[0]
3- PHYS 2210 Physics with Calculus II[0]
1- PHYS 2230 Physics Lab. II
3- Arts and Humanities (Non-Lit.) Requirement[0, 1]
15

### Sophomore Year

**First Semester**
4- MATH 2060 Calculus of Several Variables

3- PHYS 2220 Physics with Calculus III
2- PHYS 3000 Introduction to Research
3- PHYS 3250 Experimental Physics I
4- Foreign Language Requirement[0, 2]
16

**Second Semester**
4- MATH 2080 Intro. to Ordinary Diff. Equations
3- PHYS 3110 Intro. to Meth. of Theoretical Phys.
3- PHYS 3260 Experimental Physics II
4- Foreign Language Requirement[0, 2]
14

## Junior Year

**First Semester**
3- PHYS 3120 Methods to Theoretical Physics II
3- PHYS 3150 Intro. to Computational Physics
3- PHYS 3210 Mechanics I[6]
3- Oral Communications Requirement[4]
3- Social Science Requirement[1]
15

**Second Semester**
3- PHYS 3220 Mechanics II
3- PHYS 4650 Thermodynamics and Statistical Mechanics
3- Emphasis Area Requirement[3]
3- Physics Writing Requirement[4]
3- Science Requirement[5]
15

## Senior Year

**First Semester**
3- PHYS 4990 - Creative Inquiry
3- PHYS 4410 Electromagnetics I
3- PHYS 4550 Quantum Physics I
3- Arts and Humanities (Literature) Requirement[0, 1]
3- Emphasis Area Requirement[3]
15

**Second Semester**
3- PHYS 4990 - Creative Inquiry
3- HIST 1720 The West and the World I *or*
3 - HIST 1730 The West and the World II[0]
3- PHYS 4420 Electromagnetics II
3- PHYS 4560 Quantum Physics II
3- Emphasis Area Requirement[3]
15

## Fifth Year[7]

**First Semester**
3- PHYS 8910 Master's Thesis Research
3- PHYS 8110 Methods of Theoretical Physics I
3- PHYS 8210 Classical Mechanics I
6- Emphasis/Master's level requirement[6]
15

**Second Semester**
3- PHYS 8910 Master's Thesis
3- PHYS 8410 Electrodynamics I
3-PHYS 8150 Statistical Thermodynamics I
6- Emphasis/Master's level requirement[6]
15

150 Total Semester Hours

[0]Students may be able to substitute AP/Dual Enrollment credit for these courses.
[1]See General Education Requirements. Three of these credit hours must also satisfy the Science and Technology in Society Requirement.
[2]Two semesters (through 1020) in the same modern foreign language are required.
[3]See advisor. Select from the following emphasis areas: Chemistry, Computer Science, Engineering, Environmental Engineering, Geology, Mathematical Sciences, or Physics and Astronomy. Twelve credit hours in one of these areas, with at least six at the 3000-4000 level, are required. *Note*: Requirements for a minor in one of these areas might be satisfied with three additional credits at the 3000-4000 level. PHYS 6170, 6200, 6320, 6450, 6460, 6520, and 6750 may also be used. Credit will not be given for the equivalent 4000 and 6000 level course. Students intending to complete a Master's Thesis are strongly encouraged to meet six hours of their Emphasis Area Requirement with research credits.
[4]ENGL 3040, 3120, 3140, 3150, 3160, 3450, 3460, 3480, ML 4020, or THEA (ENGL) 3470
[5]Any 2000-4000-level science course
[6]Up to 12 credit hours may be counted towards both the BS and MS degrees. May be used in same emphasis area. Must be 6000-level or above. See also footnote 7.
[7]This is an example curriculum for students intending to pursue graduate work in Physics. Any 18 credit hours of PHYS or ASTR at the 8000-9000 level can be used to satisfy the degree requirement. Students must meet with the Graduate Program Coordinator to develop their plan of study.

Chair, Department Curriculum Committee — Date: 9-7-2015

Department Chair — Date: 8 Sep 2015

Chair, College Curriculum Committee — Date: 9/21/15

College Dean — Date: 9/23/15

Director, Calhoun Honors College — Date

Chair, Undergraduate Curriculum Committee — Date: 10/2/2015

Chair, Graduate Curriculum Committee — Date

Provost — Date: 10/4/2015

000169

President — Date

# Change Undergraduate Course

000170

## Change a Course

**Subject:** PHYS-Physics

**Number:** 1220

**Effective Term:** Fall 2016

**Title:** Physics with Calculus I

Honors Course:

☐ Add Honors Course:

**Last Term Course was taught:** 201505

**Brief Statement of Change Based on Assessment Results:**
In the past students have dropped the concurrent math course and remained enrolled in the physics course. Therefore, we want to make the math course a strict prerequisite and remove the option of concurrent enrollment.

## Rationale for Changing a Course

- ☐ **Strengthen Program Requirement(s)**
- ☐ **Alignment of Student Learning Outcomes**
- ☐ **Alternative Delivery of Content**
- ☐ **Improve Time to Degree**
- ☐ **Evolution of the Discipline**
- ☑ **Changing Prerequisites**
- ☐ **Address DWF Rates**
- ☐ **General Education Modifications**
- ☐ **Other (Please specify.)**

## ☑ Change Prerequisite(s) / Corequisite(s)

**From** Preq or concurrent enrollment: MATH 1060 or MATH 1070.

**To** Preq: MATH 1060 or MATH 1070.

## Form

**User ID:** glehmac **Name:** Gerald Lehmacher

**Date:** 09/07/2015 **Number:** 9121

Gerald Adams — 9-7-15

Chair, Department Curriculum Committee — Date

Mark D. Lewis — 7 Sep 2015

Department Chair — Date

B.N. D — 9/21/15

Chair, College Curriculum Committee — Date

Karen A Hill — 7/23/15

College Dean — Date

Director, Calhoun Honors College — Date

John D. Griffin — 10/2/2015

Chair, Undergraduate Curriculum Committee — Date

Chair, Graduate Curriculum Committee — Date

Robert T. Jones — 10/4/2015

Provost — Date

000171

President — Date

# Change Undergraduate Course

000172

## Change a Course

**Subject:** PHYS-Physics

**Number:** 2070

**Effective Term:** Fall 2016

**Title:** General Physics I

Honors Course:

☐ Add Honors Course:

**Last Term Course was taught:** 201505

**Brief Statement of Change Based on Assessment Results:**
Students can take course with various math preparation and we add MATH 1070 to the list. However, in the past students have dropped math courses and remained enrolled in PHYS 2070. Therefore, we want to make a math course a strict prerequisite.

## Rationale for Changing a Course

- ☐ **Strengthen Program Requirement(s)**
- ☐ **Alignment of Student Learning Outcomes**
- ☐ **Alternative Delivery of Content**
- ☐ **Improve Time to Degree**
- ☐ **Evolution of the Discipline**
- ☑ **Changing Prerequisites**
- ☐ **Address DWF Rates**
- ☐ **General Education Modifications**
- ☐ **Other (Please specify.)**

## ☑ Change Prerequisite(s) / Corequisite(s)

**From** Preq or concurrent enrollment: MATH 1020 or MATH 1040 or MATH 1050.

**To** Preq: MATH 1020 or MATH 1040 or MATH 1050 or MATH 1070. or MATH 1060

New version.

## Form

**User ID:** glehmac **Name:** Gerald Lehmacher

**Date:** 09/07/2015 **Number:** 9115

Chair, Department Curriculum Committee — Date: 9-7-2015

Department Chair — Date: 7 Sep 2015

Chair, College Curriculum Committee — Date: 9/21/15

College Dean — Date: 9/23/15

Director, Calhoun Honors College — Date

Chair, Undergraduate Curriculum Committee — Date: 10/2/2015

Chair, Graduate Curriculum Committee — Date

Provost — Date: 10/4/2015

President — Date

000173

# Change Undergraduate Course

000174

## Change a Course

**Subject:** PHYS-Physics

**Number:** 2210

**Effective Term:** Fall 2016

**Title:** Physics with Calculus II

Honors Course:

☐ Add Honors Course:

**Last Term Course was taught:** 201505

**Brief Statement of Change Based on Assessment Results:**
In the past students have dropped the concurrent math course and remained enrolled in the physics course. Therefore, we want to make the math course a strict prerequisite and remove the option of concurrent enrollment.

## Rationale for Changing a Course

- ☐ **Strengthen Program Requirement(s)**
- ☐ **Alignment of Student Learning Outcomes**
- ☐ **Alternative Delivery of Content**
- ☐ **Improve Time to Degree**
- ☐ **Evolution of the Discipline**
- ☑ **Changing Prerequisites**
- ☐ **Address DWF Rates**
- ☐ **General Education Modifications**
- ☐ **Other (Please specify.)**

## ☑ Change Prerequisite(s) / Corequisite(s)

**From** Preq or concurrent enrollment: MATH 1080 or MATH 1110.

**To** Preq: MATH 1080 or MATH 1110.

## Form

**User ID:** glehmac **Name:** Gerald Lehmacher

**Date:** 09/07/2015 **Number:** 9122

Chair, Department Curriculum Committee — 9-7-2015 (Date)

Department Chair — 7 Sep 2015 (Date)

Chair, College Curriculum Committee — 9/21/15 (Date)

College Dean — 9/22/15 (Date)

Director, Calhoun Honors College — Date

Chair, Undergraduate Curriculum Committee — 10/2/2015 (Date)

Chair, Graduate Curriculum Committee — Date

Provost — 10/14/2015 (Date)

President — Date

000175

# Change 4000/6000 Course

000176

## Change a Course

**Subject:** PHYS-Physics

**Number:** 4450/6450

**Effective Term:** Fall 2016

**Title:**

Honors Course:

☑ Add Honors Course:

**Last Term Course was taught:** 201408

**Brief Statement of Change Based on Assessment Results:**
PHYS 4450 and 4460 are a 2-semester course on introductory solid state physics. PHYS 4460 includes Honors sections, and PHYS 4450 should also have this option. This was an omission when the course was added. The same requirements apply as for PHYS 4460. Honors student submit an Honors paper as described in the attached syllabus.

## Rationale for Changing a Course

- ☐ Strengthen Program Requirement(s)
- ☐ Alignment of Student Learning Outcomes
- ☐ Alternative Delivery of Content
- ☐ Improve Time to Degree
- ☐ Evolution of the Discipline
- ☐ Changing Prerequisites
- ☐ Address DWF Rates
- ☐ General Education Modifications
- ☑ Other (Please specify.)

Add Honor section.

## Honors

- ☐ Honors Students Only?
- ☑ Honors sections allowed to be offered?

## ☑ Change Catalog Description

**From** .

**To** Includes Honors sections.

## Learning Objectives

no change

## Topical Outline

no change

## Add course requirements for honors courses (if applicable)

In order to receive honors credit for the course each honors student will be required to write a final report of 10-12 pages (Font size Times New Roman #12, double spaced) (with references & figures) on one of the various techniques used in material's characterization, solid-state physics experiments or solid-state synthesis techniques. A suggested list of topics will be given to the students and the choice of subject discussed with the instructor. The student will compile an outline and detailed abstract by mid-semester. A List of Suggested Topics is available as an appendix to the syllabus. (Other possible topics are to be discussed with the instructor well in advanced and receive his approval.)

## Add course requirements for 6000-level courses

no change

## Evaluation

| 4000 | | | 6000 | | |
|---|---|---|---|---|---|
| **A** | 90 - | 100 | **A** | 90 - | 100 |
| **B** | 80 - | 89 | **B** | 80 - | 89 |
| **C** | 70 - | 79 | **C** | 70 - | 79 |
| **D** | 60 - | 69 | **F** | < | 70 |
| **F** | < | 60 | no change | | |

no change

## Syllabus

Upload File: PHYS 4460 ttritt44304spring2015-20150907130304.pdf

000177

**Form**

| | | | |
|---|---|---|---|
| **User ID:** | glehmac | **Name:** | Gerald Lehmacher |
| **Date:** | 09/07/2015 | **Number:** | 9619 |

Chair, Department Curriculum Committee — Date: 9-7-2015

Department Chair — Date: 7 Sep 2015

Chair, College Curriculum Committee — Date: 9/21/15

College Dean — Date: 9/23/15

Director, Calhoun Honors College — Date

Chair, Undergraduate Curriculum Committee — Date: 10/2/2015

Chair, Graduate Curriculum Committee — Date

Provost — Date: 10/4/2015

President — Date

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