Engineering Faculty Council
Meeting Agenda
November 22, 2016
11:00 a.m.
101F Hammond Building (large conference room in Dean’s Suite)

1. Approval of minutes for the meeting of October 25, 2016
2. Dean’s Report (Peter Butler for Amr Elnashai)
3. Updates from Undergraduate Studies Committee (Chris Giebink)
4. Updates from Graduate Studies Committee (Esther Gomez)
5. Updates from Engineering Technology Committee (Engr Tech Chair)
6. Updates from Faculty Senate (Engineering Senator)
7. Other Business
Engineering Faculty Council

Meeting Minutes
October 25, 2016
11:00 a.m.
101F Hammond Building (large conference room in Dean’s Suite)

Present: Butler, Flaska, Giebink, Gomez, Kulkarni, Lesieutre, Masters, Palacios, Parkinson, Stofels, Tan, Wolfe

1. Approval of minutes for the meeting of September 20, 2016
   - Minutes were revised to correct error neglecting attendance of Flaska, Kulkarni, and Stofels.
   - Unanimously approved.

2. Dean’s Report (Peter Butler)
   - Progress in Masters program revenue return; Dean’s office has worked out a formula for phasing in the money returned to departments up to 40% over the course of three years.
   - Recent hires: Priva Baboo, Director of Industry, Innovation, and Development, and Jennifer Wu, Director of Data Analysis and Assessment.
   - New tenure-track faculty hires: 2015-16 (22); 2016-17 (18); 38 ongoing departmental searches and 2 frontier faculty openings.
   - Comments received on recent entrance to major report. Report includes benchmarking of peer institutions and consideration of the impact resulting from potential changes in entrance to major process. Next steps are to revise plane and meet with Admissions director, VP of undergraduate education, and the provost.

3. Presentation on status of research initiatives (George Lesieutre)
   - Overview of research dean activities shared between George and Chris Rahn.
   - OERA is extremely busy; 150 proposals in queue as of mid-Oct. Moving forward, need to balance making things easy for faculty, building in resilience to personnel changes/peak workload times, and satisfy compliance requirements.
   - Soon, faculty should begin to prepare their own draft SIMS budgets to help in streamlining proposal prep.
   - Innovation Gateway set up to increase industry relations and outreach.
   - Starting FA17, Grad School will require minimum grade 12 for AR offers; post-doc minimum increases to $47,476 on Dec. 1, 2016.
   - Provided breakdown of F&A rates.
   - New online resources at OVPR to find funding; Pivot changed to Scival.
   - Slides from George's presentation are available on the EFC Box website.

4. Updates from Undergraduate Studies Committee (Chris Giebink)
   - Unanimously approved two course additions and three course changes: AE463, AE468, AE472, CE435, and ENGR 460.

5. Updates from Graduate Studies Committees (Esther Gomez)
   - Unanimously approved two program changes to the Engineering Leadership and Management (ELIM) Program and the Human Factors Engineering and Ergonomics Program.
6. Updates from Engineering Technology Committee (Engr Tech Chair)
   • None.

7. Updates from Faculty Senate (Doug Wolfe)
   Updates from meeting on Oct. 18; next meeting is Dec. 6.
   Items of discussion:
   • Continuing discussion on proposal by UPUA for smoke-free University Park Campus.
   • Susan Basso, VP for Human Resources, presented health plan option changes for 2017.
   • Discussion from Admissions on the enrollment fluctuation last year.
   • Presentation by Michael Zeman on Eberly's 'Science U' as a model for delivering academic science content to K-12.

8. Other Business
   • Parkinson brought up current status of the Graduate School proposal to revise the definitions between 500 and 800-level courses (distinction between courses for research and professional degrees). Currently much disagreement on this issue; more to come after upcoming meeting of the Graduate Council Joint Curricular Committee.
# Undergraduate Studies Curricular Review Committee

## Summary Report for

**Engineering Faculty Council Meeting November 22, 2016**

<table>
<thead>
<tr>
<th>Type and Description of Change</th>
<th>Description or Rationale for Curricular Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADD: New course</td>
<td>Course prepares students for understanding, analysis, evaluation, and design of the most commonly used shallow foundation systems to support buildings. All structural loads on buildings, most notably gravity loads and win/seismic lateral loads, are transferred to the soil supporting the building. In order for the building to safely deliver these loads to the soil and avoid settlement issues and soil failure, a proper foundation system must be designed. Design of foundation systems is a function of soil material properties, foundation material, and the selected foundation system. This course educates the student on the basics of soil mechanics for foundation design, and educates the student on how to select and design the most commonly used types of foundation systems. Course is intended to provide students with the knowledge, tools, and understanding of material properties, analysis and design principles, and methods necessary for successful construction of foundation systems within the framework of quality control, code compliance, economic consideration and safety, while minimizing failure risks. The course is required for Architectural Engineering students, but Civil and Environmental Engineering students, as well as, Biological Engineering students can also take this course. A permanent course number is being requested for this course as it has been offered as a special topics course, AE 397A, for the structural option in Architectural Engineering for the past 20 years.</td>
</tr>
</tbody>
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AE 405 - Geotechnical Engineering

Submitted by: M. Parfitt
<table>
<thead>
<tr>
<th>Course</th>
<th>Change</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 340 – Structural Analysis</td>
<td>CHANGE: Prerequisite change</td>
<td>CE 340 is an introductory course on the analysis of structural elements and systems. The focus of this course is the introduction of basic theories (e.g. equilibrium and compatibility) and solution of analysis problems via hand calculations. Problem sizes are typically limited to only a few degrees of freedom and/or few member forces (unknowns) and therefore do not require computer programming to solve these problems. Because the focus is on small problems, which can be done with hand calculations, the computer science prerequisite has been removed. Larger problems with larger number of degrees of freedom are the scope of CE 447 “Matrix Methods”.</td>
</tr>
<tr>
<td>CE 410 – Sustainable Residential Land Development</td>
<td>CHANGE: Removal of writing component</td>
<td>The proposed change is to remove the writing component of this course and the capstone design project. The other capstones courses in Civil Engineering are associated with a focus area and have at least one technical prerequisite course. There are no fundamental or introductory courses in land development offered so there is no foundational knowledge for the basis of the capstone project. The proposed course will provide the foundation in land development design without the semester long design project and associated writing/presentation of a capstone.</td>
</tr>
<tr>
<td>CE 434 – Geotechnical Engineering design</td>
<td>ADD: New course</td>
<td>This is an advanced design course in geotechnical engineering, offered to undergraduate senior and graduate students in civil engineering. This course covers fundamental engineering geology, subsurface exploration including geophysical techniques, principles of shallow and deep foundation designs, slope stability, geosynthetics design, groundwater and drainage, and geotechnical earthquake engineering. The course is delivered in lecture format and concentrates on practice-oriented design problems in geotechnical engineering.</td>
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<tr>
<td>Course</td>
<td>Change: Prerequisite change</td>
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<tr>
<td>NUCE 301 – Fundamentals of Reactor Physics</td>
<td>The proposed change is being requested for two reasons. The first is to respond to changes in the entrance to major process for engineering students. We found that too many students are now unable to begin the nuclear curriculum in their junior year for lack of successfully completing the third calculus class. This is a result of swapping the recommended order in which students take Calc III and Differential Equations. The nuclear engineering faculty have adjusted the order in which material is covered in NUC E 301 so that students may take Calc III (multi-variable and vector calc) concurrently with NUC E 301 and NUC E 309. The second motivation for this request is to accommodate NUC E/M E concurrent major students who often take Calculus III in its two, 2-credit version (Math 231 and 232) instead of the 4-credit version (Math 230).</td>
<td></td>
</tr>
<tr>
<td>NUCE 309 - Analytical Techniques for Nuclear Concept Cross-Listed</td>
<td>The proposed change is being requested for two reasons. The first is to respond to changes in the entrance to major process for engineering students. We found that too many students are now unable to begin the nuclear curriculum in their junior year for lack of successfully completing the third calculus class. This is a result of swapping the recommended order in which students take Calc III and Differential Equations. The nuclear engineering faculty have adjusted the order in which material is covered in NUC E 309 so that students may take Calc III (multi-variable and vector calc) concurrently with NUC E 301 and NUC E 309. The second motivation for this request is to accommodate NUC E/M E concurrent major students who often take Calculus III in its two, 2-credit version (Math 231 and 232) instead of the 4-credit version (Math 230).</td>
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<tr>
<td>Service Enterprise Engineering Minor</td>
<td>CHANGE: Expand the minor to include Health and Human Development</td>
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Educational objective of the industrial engineering program is to have graduates, within a few years, participate in and lead cross-functionally defined project teams, designing, implementing, and improving processes and systems in a variety of industries of which the service industry in an important one. Over the last several years, courses and cases studies have been developed to enhance the service enterprise engineering content in the curriculum. These are all consistent with the objectives of the college and university. About 80% of the graduates are employed in the service industry, and adding this minor would help graduates in their profession.

The revised SEE Minor has courses from Engineering and HHD – this revision has been made in close collaboration between IE and HHD with full cognizance of course pre-requisites. Non-IE students may take MATH 484 instead of IE 405.
SENATE COMMITTEE ON CURRICULAR AFFAIRS
COURSE SUBMISSION AND CONSULTATION FORM

Principal Faculty Member(s) Proposing Course

<table>
<thead>
<tr>
<th>Name</th>
<th>User ID</th>
<th>College</th>
<th>Department</th>
</tr>
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<tbody>
<tr>
<td>M PARFITT</td>
<td>mkp</td>
<td>Engineering (EN)</td>
<td>Not Available</td>
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</table>

College with curricular responsibility: Engineering (EN)
Type of Proposal: [ ] Add  [ ] Change  [ ] Drop

Course Designation
(AE 405) Geotechnical Engineering

Course Information

Special categories for Undergraduate (001-499) courses

Foundations
- [ ] Writing/Speaking (GWS)
- [ ] Quantification (GQ)

Knowledge Domains
- [ ] Health & Physical Activity Wellness (GHA) GHW
- [ ] Natural Sciences (GN)
- [ ] Arts (GA)
- [ ] Humanities (GH)
- [ ] Social and Behavioral Sciences (GS)

Additional Requirements Designations
- [ ] Bachelor of Arts
- [ ] International Cultures (IL)
- [ ] United States Cultures (US)
- [ ] Honors Course
  - [ ] One-Semester Course
    - [ ] Common course number - x94, x95, x96, x97, x99
- [ ] Writing Across the Curriculum

First-Year Engagement Program
- [ ] First-Year Seminar

Miscellaneous
- [ ] Common Course

GE Learning Objectives
- [ ] GenEd Learning Objective: Effective Communication
- [ ] GenEd Learning Objective: Creative Thinking
- [ ] GenEd Learning Objective: Crit & Analytical Think
- [ ] GenEd Learning Objective: Global Learning
- [ ] GenEd Learning Objective: Integrative Thinking
- [ ] GenEd Learning Objective: Key Literacies
- [ ] GenEd Learning Objective: Soc Resp & Ethic Reason
Cross-Listed Courses:

Prerequisites:
AE 3086R OR CE 340 AND AE 4029R OR EE 344 OR AE 404

Corequisites:

Concurrents:

Recommended Preparations:

Abbreviated Title: geotech engr

Bulletin Listing

Minimum Credits: 4
Maximum Credits: 4
Repeatable: NO

Department with Curricular Responsibility: Architectural Engineering (UPEN_AE)

Effective Semester: Upon Approval
Travel Component: NO

Course Outline

A brief outline or overview of the course content:
1. Engineering Properties of Soil
2. Basic Soil Mechanics
3. Determination of Bearing Capacity
4. Stress in Soils
5. Excavation Stability
6. Compaction
7. Review of Basic Concrete Design as it relates to Foundations
8. Concrete Footing Principles
9. Spread Footing Design
10. Spread Footing Design with Overturning Moment
11. Introduction to Deep Foundation Systems
12. Lateral Earth Pressure, Active, at Rest, and Passive
13. Concrete Retaining Wall Design
14. Introduction to Segmental Retaining Walls

A listing of the major topics to be covered with an approximate length of time allotted for their discussion:
Numbers in parentheses refer to hours

Engineering Properties of Soil (3)
Basic Soil Mechanics (6)
Determination of Bearing Capacity (2-3)
Stress in Soils (3)
Excavation Stability (2-3)
Compaction (2-3)
Basic Concrete Design as it relates to Foundations (2-3)
Concrete Footing Design Principles (2-4)
Spread Footing Design (2-5)
Deep Foundation Systems (2-7)
Lateral Earth Pressure (2-4)
Concrete Retaining Wall Design (2-5)
Segmental Retaining Walls (3-4)

Course Description:
Course prepares students for understanding, analysis, evaluation, and design of the most commonly used shallow foundation systems to support buildings. All structural loads on buildings, most notably gravity loads and win/seismic lateral loads, are transferred to the soil supporting the building, and in order to be the building to safely deliver these loads to the soil and avoid settlement issues and soil failure, a proper foundation system must be designed. Design of foundation systems is a function of soil material properties, foundation material, and the selected foundation system selected. This course educates the student on the basics of soil mechanics for foundation design, and educates the student how to select and design the most commonly used types of foundation systems.

Course is intended to provide students with the tools, and understanding of material properties and...
analysis and design principles, and methods necessary for successful construction of foundation systems within the framework of quality control, code compliance, economic consideration and safety, while minimizing failure risks. The course is required for Architectural Engineering students, but Civil and Environmental Engineering students, as well as, Biological Engineering students can also take this course.

A permanent course number is being requested for this course as it has been offered as a special topics course for the structural option in Architectural Engineering for the past 20 years.

The name(s) of the faculty member(s) responsible for the development of the course:

- Name: M PARFIT( mkp)
- Title: PROFESSOR ARCH ENGR
- Phone: +1 814 863 3244
- Address: 104 ENGINEERING UNIT A
- Campus:
- City:
- Fax:

Course Justification

Instructional, Educational, and Course Objectives:
This section should define what the student is expected to learn and what skills the student will develop.
Upon completion of this course, students will be able to:

- Analyze shallow foundation systems to support buildings
- Evaluate soil mechanics for foundation design
- Design common types of foundation systems
- Construct foundation systems
- Understand the role of quality control in foundation systems
- Demonstrate an understanding of the economic and safety considerations of foundation systems
- Analyze failure risks of foundation systems
- Examine foundation systems for code compliance

Evaluation Methods:
Include a statement that explains how the achievement of the educational objective identified above will be assessed. The procedures for determining students' grades should be specifically identified.

AE 405 will rely upon a variety of methods (Written homework; formal exams; and quizzes) to assess and evaluate student learning.

Relationship/Linkage of Course to Other Courses:
This statement should relate the course to existing or proposed new courses. It should provide a rationale for the level of instruction, for any prerequisites that may be specified, or for the course's role as a prerequisite for other courses.

AE 308 or CE 340 and AE 402 or AE 404 are desired prerequisites for this course. Architectural Engineering students in the Structural option learn design of buildings and/or other structures in separate courses depending on the type of material used for the superstructure construction. For example, for concrete design, students take AE 402, AE 431, and CE 341; for steel design, they take AE 401, AE 403, and CE 342; for masonry design, AE 432; and for wood design, BE 462 (see prerequisite courses).

Regardless of the type of material the building is made from (i.e., concrete, masonry, wood), what is common for all buildings is that they must be supported mainly on concrete foundation, which is either spread footing, mat foundation, combined footing, or pile for gravity load bearing. If the building is located on a slope and is subjected to lateral loads, the retaining wall type foundation may be needed as well. This course provides the system at the interface of the superstructure and the soil to safely transfer the building loads to the soil.

Relationship of Course to Major, Option, Minor, or General Education:
This statement should explain how the course will contribute to the major, option, or minor and indicate how it may function as a service course for other departments.

This course is required for Architectural Engineering students in the Structural and Construction Management options, but it could also be taken by Civil and Environmental Engineering and Biological Engineering students as well.

A description of any special facilities:
No special facilities are needed for this course.

Frequency of Offering and Enrollment:
This course has been offered as CE 397A for 20 years. The course responsibility is being transferred to Architectural Engineering since the target audience is mainly AE students. The course is currently offered once a year and the enrollment varies from 40 to 70 students.

General Education Designation Requirements
Curricular Information
Blue Sheet Item #: 
Review Date:

SCRID Numbers
(AE 405):

Review History (not subject to comparison)
This section represents all consultation history that has occurred on this proposal

Legend

Approve  Rejected  Waiting Review  User Action Required

Pending Action(s)  Moved to Rejected Status  Approved  (#) - Review Order Sequence Number

Consultation

Recipient Name: MEHRDAD HADIGHI  Department: Architecture
Position: Consultation  Campus: UNIVERSITY PARK CAMPUS
Title: CHAIR, INTEGRATIVE DESIGN

(2)  Request sent: 7/1/2016 at 9:33 AM
Concur: Yes  Comments: 
Reviewed On: 7/5/2016 at 11:47 AM

Recipient Name: PATRICK FOX  Department: Civil And Environmental Engineering
Position: Consultation  Campus: UNIVERSITY PARK CAMPUS
Title: PROF AND DEPT HEAD

(1)  Request sent: 7/1/2016 at 9:33 AM
Concur: Yes  Comments: 
Reviewed On: 7/1/2016 at 9:53 AM

Recipient Name: PAUL HEINEMANN  Department: Agricultural And Biological Engineering
Position: Consultation  Campus: UNIVERSITY PARK CAMPUS
Title: DEPT HD/PROF AG & BIO ENG

(3)  Request sent: 7/11/2016 at 7:30 AM
Concur: Yes  Comments:
SCCA Review

Recipient Name: KADI CORTER
Position: SCCA Subcommittee Review
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Recipient Name: KADI CORTER
Position: SCCA Subcommittee Review
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

SCC Review

Recipient Name: CORTNEY SMITH
Position: SCCA Review
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Recipient Name: CYNTHIA ZOOK
Position: SCCA Review
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Recipient Name: KADI CORTER
Position: SCCA Review
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Faculty Senate Review
SENATE COMMITTEE ON CURRICULAR AFFAIRS
COURSE SUBMISSION AND CONSULTATION FORM

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<tr>
<td>GORDON WARN</td>
<td>gpw1</td>
<td>Engineering (EN)</td>
<td>Not Available</td>
</tr>
<tr>
<td>KONSTANTINOS PAPAKONSTANTINOU</td>
<td>kup31</td>
<td>Engineering (EN)</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

College with curricular responsibility: Engineering (EN)

Type of Proposal: [ ] Add  [x] Change  [ ] Drop

Current Bulletin Listing

Abbreviation:  C E
Number:  340

[ ] I am requesting recertification of this course for the new Gen Ed and/or University Requirements Guidelines?

Course Designation

(C E C 340) Structural Analysis

Course Information

Special categories for Undergraduate (001-499) courses

Foundations

[ ] Writing/Speaking (GWS)
[ ] Quantification (GQ)

Knowledge Domains

[ ] Health and Wellness (GHW)
[ ] Natural Sciences (GN)
[ ] Arts (GA)
[ ] Humanities (GH)
[ ] Social and Behavioral Sciences (GS)  [ ] Honors (H)  [ ] Writing Intensive Permanent (WF)  [ ] Writing Intensive One Semester

Additional Designations

[ ] Bachelor of Arts
[ ] International Cultures (WFV)IL
[ ] United States Cultures (US)  [ ] International Cultures (IL)  [ ] Bachelor Of Arts (BA)  [ ] Bachelor Of Arts (BA)
[ ] Honors Course
[ ] Common course number - x94, x95, x96, x97, x99
Writing Across the Curriculum
First-Year Engagement Program

First-Year Seminar

Miscellaneous

Common Course

GE Learning Objectives

GenEd Learning Objective: Effective Communication
GenEd Learning Objective: Creative Thinking
GenEd Learning Objective: Crit & Analytical Think
GenEd Learning Objective: Global Learning
GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Key Literacies
GenEd Learning Objective: Soc Resp & Ethic Reason

Cross-Listed Courses:

Prerequisites:

EMCH

EMCH 213 : Prerequisite or concurrent: CMPSC 201; CMPSC 202

Corequisites:

Concurrents:

Recommended Preparations:

Abbreviated Title: STRUCTURAL ANALYSIS

Bulletin Listing

Minimum Credits: 3
Maximum Credits: 3
Repeatable: NO

Department with Curricular Responsibility: ()

Effective Semester: 200708SP Upon Approval

Travel Component: NO

Course Outline

A brief outline or overview of the course content:
Analysis of statically determinate and indeterminate trusses, beams and frames: calculating support reactions, internal member forces (i.e., axial force, shear force and bending moment) and deflection.

A listing of the major topics to be covered with an approximate length of time allotted for their discussion:
Topics
Introduction to structural analysis
• Types of structural elements, structures, and loads
  • Structural design procedures
  Basic concepts for structural analysis
  • Simplification for analysis
    o Supports or boundary conditions and connections
    o Idealization of structures
    o Loading and tributary area
  • Principle of Superposition
  • Free body diagrams and equilibrium equations
  • Statically determinate and indeterminate structures
  • Stability
 Analysis of Statically Determinate Trusses
  • Types of trusses
  • Stability and determinacy
  • Sign convention and force representation
  • Method of joints
  • Zero-force members
  • Method of section
 Internal Forces in Structural Members
  • Internal forces and sign convention
  • Load, shear and bending moment relationships
  • Axial, shear and moment diagrams for beams and frames
 Deflections
  • Principle of virtual work
  • Axial force-deformation relationships
  • Truss deflections by complementary virtual work
  • Beam and frame deflections by complementary virtual work
  • Elastic beam theory and double integration method
  • Moment area method 8 and 9
 Analysis of Statically Indeterminate Structures: Force Method
  • Advantages and disadvantages of statically indeterminate structures
  • Types of analysis
  • Force method of analysis
    • Analysis of beams
    • Analysis of frames
    • Analysis of trusses
 Analysis of Statically Indeterminate Structures: Slope-Deflection Method
  • Displacement method of analysis
  • Slope-deflection equations
    • Analysis of beams
    • Analysis of frames
    o No sidesway
    o Sidesway
 Analysis of Statically Indeterminate Structures: Moment Distribution Method
  • Definitions
  • Moment distribution for beams
  • Modified stiffnesses
  • Moment distribution for frames
    o No sideways Influence Lines
    • Description of influence lines
    • Constructing influence lines for beams
- Qualitative influence lines (Müller-Breslau principle)

Course Description:
The course includes an introduction to structural systems and basic analysis methods for beams, frames, and trusses. Topics covered include the analysis of statically determinate and indeterminate structures, deflection calculations, influence lines, and an introduction to the stiffness method and a software package for structural analysis.

The name(s) of the faculty member(s) responsible for the development of the course:

- Name: GORDON WARN (gpw1)
- Title: ASSOC PROF CIVIL ENGINEER
- Phone: +1 814 863 2786
- Address: 0213C SACKETT BUILDING

Course Justification

Instructional, Educational, and Course Objectives:
This section should define what the student is expected to learn and what skills the student will develop.
After completing CE 340, students will be able to:

- develop simplified models of basic types of structural systems and draw free-body diagrams and use them to formulate structural analysis problems in a systematic way,
- identify and apply an efficient method to analyze simple determinate/indeterminate structures without using a specialized analysis software,
- calculate reaction forces at supports and internal member forces (i.e., axial and shear forces and bending moment) using the physics-based methods and draw shear force and bending moment diagrams,
- calculate deflection at any given location of the structure

Evaluation Methods:
Include a statement that explains how the achievement of the educational objective identified above will be assessed. The procedures for determining students’ grades should be specifically identified.
A variety of assessment tools will be used including exams, quizzes, homework assignments and computer software exercises.

The breakdown of each assessment:

- Exam 1 30%
- Exam 2 25%
- Quiz 33%
- Homework 10%
- SAP Tutorial 2%

Relationship/Linkage of Course to Other Courses:
This statement should relate the course to existing or proposed new courses. It should provide a rationale for the level of instruction, for any prerequisites that may be specified, or for the course’s role as a prerequisite for other courses.

CE 340 is a prerequisite course for other structures courses in the major.

Relationship of Course to Major, Option, Minor, or General Education:
This statement should explain how the course will contribute to the major, option, or minor and indicate how it may
function as a service course for other departments.

CE 340 is a prescribed course for all civil engineering students.

A description of any special facilities:

Frequency of Offering and Enrollment:
Each fall and spring semester with approximately 60 students per section.

Justification for Changing The Proposal:
Include a justification for each change to the course. Particular attention should be paid to the effects of the course change within the discipline and in other disciplines where the course may be required within a major or used as a service course. When a unit submits several course changes, with or without new course proposals, a general statement covering the programmatic effects of the changes should be submitted.

General Education Designation Requirements

Campuses That Have Offered (CE 340) Over is an introductory course on the analysis of structural elements and systems. The Past 4 Years

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<th>Semester</th>
<th>Campus</th>
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focus of this course is the introduction of basic theories (e.g., equilibrium and compatibility) and solution of analysis problems via hand calculations. Problem sizes are typically limited to only a few degrees of freedom and/or few member forces (unknowns) and therefore do not require computer programming to solve these problems. Because the focus is on small problems, the computer science prerequisite has been removed. Larger problems with larger number of degrees of freedom are the scope of CE 447 "Matrix Methods".

General Education Designation Requirements

Curricular Information
Blue Sheet Item #:
Review Date:

SCRID Numbers

Review History (not subject to comparison)
This section represents all consultation history that has occurred on this proposal

Legend

Approved  Rejected  Waiting Review  User Action Required
Pending Action(s)  Moved to Rejected Status  Approved  (#) - Review Order Sequence Number

Consultation

Recipient Name: ALEKSANDRA Z RADLINSKA
Department: CIVIL AND ENVIRONMENTAL ENGINEERING
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: ASST PROF CIVIL ENGR

Request sent: 2/5/2016 at 3:56 PM
Concur: Yes
Comments:
Reviewed On: 2/9/2016 at 4:44 PM

Recipient Name: ALFONSO IGNACIO MEJIA
Department: (Not Available)
Position: Consultation
Campus: (Not Available)
Title: ASST PROF CIVIL ENGR

Request sent: 2/15/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 2/20/2016 at 7:15 AM

Recipient Name: ALI MEMARI
Department: CIVIL AND ENVIRONMENTAL ENGINEERING
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: HANKIN PROF/DIR PHRC

Request sent: 2/15/2016 at 7:30 AM
Concur: Yes
Comments:
Reviewed On: 2/15/2016 at 11:24 AM

Recipient Name: BRUCE ERNEST LOGAN
Department: CIVIL AND ENVIRONMENTAL ENGINEERING
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: EVAN PUGH/KAPPE PROF

Request sent: 2/15/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 2/20/2016 at 7:15 AM

Recipient Name: CHAOPENG SHEN
Department: (Not Available)
Position: Consultation  
Campus: (Not Available)

Title: ASST PROF CIVIL ENGR

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(17) Request sent: 2/15/2016 at 7:30 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 2/20/2016 at 7:15 AM

Recipient Name: CHRISTOPHER AARON GORSKI  
Department: (Not Available)

Position: Consultation  
Campus: (Not Available)

Title: ASST PROF CIVIL ENGR

---

(18) Request sent: 2/15/2016 at 7:30 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 2/20/2016 at 7:15 AM

Recipient Name: CHRISTOPHER J DUFFY  
Department: (Not Available)

Position: Consultation  
Campus: (Not Available)

Title: PROF CIVIL ENGR

---

(19) Request sent: 2/15/2016 at 7:30 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 2/20/2016 at 7:15 AM

Recipient Name: ERIC TODD DONNELL  
Department: CIVIL AND ENVIRONMENTAL ENGINEERING

Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS

Title: PROFESSOR CIVIL&ENVIR

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(6) Request sent: 2/5/2016 at 3:56 PM  
Concur: Yes  
Comments: 
Reviewed On: 2/8/2016 at 8:55 AM
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<tr>
<td>FRED SCOTT CANNON</td>
<td>CIVIL AND ENVIRONMENTAL ENGINEERING</td>
<td>Consultation</td>
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<tr>
<td>JEFFREY A LAMAN</td>
<td>CIVIL AND ENVIRONMENTAL ENGINEERING</td>
<td>Consultation</td>
<td>UNIVERSITY PARK CAMPUS</td>
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Recipient Name: JOHN MICHAEL REGAN  
Department: CIVIL AND ENVIRONMENTAL ENGINEERING  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: PROFESSOR CIVL & ENV ENGR

Request sent: 2/5/2016 at 3:56 PM
Concur: Yes
Comments: 
Reviewed On: 2/8/2016 at 11:18 AM

Recipient Name: KONSTANTINOS PAPAKONSTANTINOU  
Department: CIVIL AND ENVIRONMENTAL ENGINEERING  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: ASST PROF ASST PROFESSOR

Request sent: 2/5/2016 at 3:56 PM
Concur: Yes
Comments: 
Reviewed On: 2/14/2016 at 6:12 PM

Recipient Name: MARTIN T PIETRUCHA  
Department: (Not Available)  
Position: Consultation  
Campus: (Not Available)  
Title: PROF CEE/DIRECTOR OF LTI

Request sent: 2/15/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 2/20/2016 at 7:15 AM

Recipient Name: MING XIAO  
Department: CIVIL AND ENVIRONMENTAL ENGINEERING  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: ASSOCIATE PROFESSOR

Request sent: 2/5/2016 at 3:56 PM
Concur: Yes
Comments: 
Recipient Name: NATHANIEL RICHARD  Department: (Not Available)
WARNER  
Position: Consultation  Campus: (Not Available)  
Title: ASST PROF ASST PROFESSOR

Request sent: 2/15/2016 at 7:30 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 2/20/2016 at 7:15 AM

Recipient Name: PARISA SHOKOUHI  Department: CIVIL AND ENVIRONMENTAL ENGINEERING  
Position: Consultation  Campus: UNIVERSITY PARK CAMPUS  
Title: ASSOCIATE PROFESSOR

Request sent: 2/15/2016 at 7:30 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 2/20/2016 at 7:15 AM

Recipient Name: PATRICK JOSEPH FOX  Department: CIVIL AND ENVIRONMENTAL ENGINEERING  
Position: Consultation  Campus: UNIVERSITY PARK CAMPUS  
Title: PROF AND DEPT HEAD

Request sent: 2/15/2016 at 7:30 AM  
Concur: Yes  
Comments:  
Reviewed On: 2/16/2016 at 1:06 AM

Recipient Name: PEGGY JOHNSON  Department: CIVIL AND ENVIRONMENTAL ENGINEERING  
Position: Consultation  Campus: UNIVERSITY PARK CAMPUS  
Title: Professor Civil Engineering

Request sent: 2/5/2016 at 3:56 PM  
Concur: Yes
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<td>RACHEL ALICE BRENNAN</td>
<td>CIVIL AND ENVIRONMENTAL ENGINEERING</td>
<td>ASSOC PROF ENVIRONMENTAL ENGR</td>
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<td>SHELLLEY MARIE STOFFELS</td>
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<td>PROFESSOR CIVIL &amp; ENV</td>
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<td>2/11/2016 at 9:56 AM</td>
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</table>
Recipient Name: VENKATARAMAN SHANKAR
Department: (Not Available)
Position: Consultation
Campus: (Not Available)
Title: PROFESSOR CIVIL ENGINEER

Recipient Name: VIKASH GAYAH
Department: (Not Available)
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: ASST PROF CIVIL ENGR

Recipient Name: WILLIAM D BURGOS
Department: (Not Available)
Position: Consultation
Campus: (Not Available)
Title: PROFESSOR CIVIL & ENV EN

Recipient Name: XIAOFENG LIU
Department: CIVIL AND ENVIRONMENTAL ENGINEERING
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: ASSISTANT PROFESSOR OF CE
Recipient Name: JOSEPH CECERE
Department: SCIENCE, ENGINEERING AND TECHNOLOGY
Position: Consultation
Campus: (Not Available)
Title: ASSOC PROF ENGR

Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 2/20/2016 at 7:15 AM

Recpetent Name: SEROJ MACKERTICH-SENGERDY
Department: Science, Engineering And Technology
Position: Consultation
Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE
Title: ASSOC PROF ENGR

Concur: Yes
Comments: The computer programming course is not critical
Reviewed On: 2/16/2016 at 10:13 AM

Recpetent Name: SEROJ MACKERTICH-SENGERDY
Department: Science, Engineering And Technology
Position: Consultation
Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE
Title: ASSOC PROF ENGR

Concur: No, this proposal needs significant changes
Comments: I reject this proposal for CE 340 for the following reasons
1. Covering too many topics for one semester. Not allocating enough time to cover each topics thoroughly.
2. CE 340 is an introduction to analysis course and it should remain as introduction course. If a student wants to take advance course in structural analysis they can take CE 445 which cover advanced topics in structural analysis.
Reviewed On: 5/9/2016 at 9:18 AM

Initiator Comments: The course change proposal for CE 340 (Structural Analysis) is to remove prerequisite or concurrent of CMPSC 201 or CMPSC 202 (Computer Science Programming for Engineers).

The justification for the change is that CE 340 is an introductory course on the analysis of structural elements and systems. The focus of this course is the introduction of basic theories (e.g. equilibrium and compatibility) and solution of analysis problems via hand calculations. Problem sizes are typically limited to only a few degrees of freedom and/or few member forces (unknowns) and therefore do not require computer programming to solve these problem.

As such, analysis by matrix methods (requiring knowledge of linear algebra and/or programming) has been removed from the course outline.

Concur: Yes
Comments: I support proposed removal of prerequisite or concurrent of CMPSC 201 or CMPSC 202 from CE 340
Reviewed On: 5/10/2016 at 1:30 PM

(14) Request sent: 2/15/2016 at 7:30 AM

(30) Request sent: 5/6/2016 at 8:16 AM

(31) Request sent: 5/10/2016 at 1:30 PM
Recipient Name: JUNGWOO RYOO
Position: Consultation
Title: ASSOC PROF INFOSCI/TECH
Department: Business And Engineering
Campus: ALTOONA CAMPUS
Request sent: 5/16/2016 at 7:30 AM
Concur: Yes
Comments:
Reviewed On: 5/18/2016 at 5:38 PM

Head of Department
Recipient Name: PATRICK JOSEPH FOX
Position: Head of Department
Title:
Department: (Not Available)
Campus: UNIVERSITY PARK CAMPUS
Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

College Representative
Recipient Name: ROBERT MELTON
Position: College Representative
Title:
Department: (Not Available)
Campus: UNIVERSITY PARK CAMPUS
Request sent: 9/29/2016 at 10:30 AM
Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Dean of the College
Recipient Name: PETER BUTLER
Position: Dean of the College
Title:
Department: (Not Available)
Campus: UNIVERSITY PARK CAMPUS
Position: Vice President Of The Commonwealth Campuses  
Campus: PENN STATE ERIE, THE BEHREND COLLEGE

Concur: [Not Yet Reviewed]  
Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]

Recipient Name: DAVID CHRISTIANSEN  
Department: (Not Available)

Position: Vice President Of The Commonwealth Campuses  
Campus: PENN STATE ERIE, THE BEHREND COLLEGE

Concur: [Not Yet Reviewed]  
Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]

Final Approval

Recipient Name: KADI CORTER  
Department: (Not Available)

Position: Final Approval  
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]  
Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]

Recipient Name: CORTNEY SMITH  
Department: (Not Available)

Position: Final Approval  
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]  
Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]
SENATE COMMITTEE ON CURRICULAR AFFAIRS
COURSE SUBMISSION AND CONSULTATION FORM

Principal Faculty Member(s) Proposing Course

<table>
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<tr>
<th>Name</th>
<th>User ID</th>
<th>College</th>
<th>Department</th>
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<tbody>
<tr>
<td>ALI MEMARI</td>
<td>AMM7</td>
<td>Engineering (EN)</td>
<td>Not Available</td>
</tr>
<tr>
<td>KATHERINE BLANSETT</td>
<td>kxb281</td>
<td>Engineering (EN)</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

College with curricular responsibility: Engineering (EN)

Type of Proposal:  □ Add  [X] Change  □ Drop

[X] I am requesting recertification of this course for the new Gen Ed and/or University Requirements Guidelines?

Course Designation

(CE 410) Sustainable Residential Subdivision Design Land Development

Course Information

Special categories for Undergraduate (001-499) courses

Foundations

☐ Writing/Speaking (GWS)
☐ Quantification (GQ)

Knowledge Domains

☐ Health & Physical Activity Wellness (GHA) GHW
☐ Natural Sciences (GN)
☐ Arts (GA)
☐ Humanities (GH)
☐ Social and Behavioral Sciences (GS)

Additional Requirements Designations

☐ Bachelor of Arts
☐ International Cultures (IL)
☐ United States Cultures (US)
☐ Honors Course
☐ One-Semester Course
☐ Common course number - x94, x95, x96, x97, x99
☐ Writing Across the Curriculum

First-Year Engagement Program

☐ First-Year Seminar
A brief outline or overview of the course content:

CE 410 provides students with a working knowledge of the residential land development design process including conservation and green design approaches; site assessment; grading and earthwork; utility design and layout; and stormwater management.

A listing of the major topics to be covered with an approximate length of time allotted for their discussion:

Topic & # weeks allocated to each topic:

I. Development process rooted in Zoning & Subdivision Ordinances 1
II. Conservation and sustainable design 1.5
III. Site assessment 0.5
IV. Engineering drawings 0.5
V. Grading, drainage and earthwork 2.5
Course Description:
CE 410 provides students with a working knowledge of the residential land development design process including conservation and green design approaches; site assessment; grading and earthwork; utility design and layout; and stormwater management. The course covers the subdivision and land development regulatory process, zoning issues, and the elements of civil infrastructure design required in the residential land development process. Conservation design and sustainable development techniques are emphasized throughout the course. The course focuses on practice-oriented design problems and a real piece of land (either University owned or privately held) will be used throughout the semester for demonstration of design approaches for homework assignments and in-class examples. The course is an elective for students in the Civil Engineering major and an elective in the Residential Construction Minor.

The name(s) of the faculty member(s) responsible for the development of the course:
1. Name: ALI MEMARI (AMM7)
   Title: HANKIN PROF/DIR PHRC
   Phone: +1 814 863 9788
   Address: 0219 SACKETT BUILDING
   Campus:
   City:
   Fax:
2. Name: KATHERINE BLANSETT (kxb281)
   Title: RESEARCH ASSISTANT
   Phone:
   Address: 219 Sackett Bldg
   Campus:
   City:
   Fax:

Course Justification

Instructional, Educational, and Course Objectives:
This section should define what the student is expected to learn and what skills the student will develop.
The purpose of this course is to introduce students to the residential land development design process including conservation and green design approaches, site assessment, grading and earthwork, utility design and layout, and stormwater management. At the conclusion of the course, the students should be able to:
Describe sustainable development approaches.
Describe how to use local ordinances to define the design rules for a particular site.
Conduct a site assessment and describe site constraints and opportunities.
Design a horizontal and vertical road curve.
Calculate stormwater runoff volume and rate for a pre- and post-development condition.

Evaluation Methods:
Include a statement that explains how the achievement of the educational objective identified above will be assessed.
The procedures for determining students’ grades should be specifically identified.
The course will be assessed through homework and in-class activities (60%), and two exams (20% each). There will be no comprehensive final exam.

Relationship/Linkage of Course to Other Courses:
This statement should relate the course to existing or proposed new courses. It should provide a rationale for the level of instruction, for any prerequisites that may be specified, or for the course’s role as a prerequisite for other courses.
The course is a possible choice for a technical elective for students in the Civil Engineering major or students in the Residential Construction Minor. It is not a prerequisite for any other courses.

Relationship of Course to Major, Option, Minor, or General Education:
This statement should explain how the course will contribute to the major, option, or minor and indicate how it may function as a service course for other departments.
The course is a possible choice for a technical elective for students in the Civil Engineering major or students in the Residential Construction Minor.

A description of any special facilities:
None.

Frequency of Offering and Enrollment:
Every fall semester with an expected enrollment of 35.

Justification for Changing The Proposal:
Include a justification for each change to the course. Particular attention should be paid to the effects of the course change within the discipline and in other disciplines where the course may be required within a major or used as a service course. When a unit submits several course changes, with or without new course proposals, a general statement covering the programmatic effects of the changes should be submitted.

General Education Designation Requirements

Writing Across the Curriculum (W,M,X,Y course suffixes)

A copy of the course syllabus:

2. A concise explanation of how the
The proposed course will fulfill each of the following criteria:
(a) Both informal and formal writing assignments should relate clearly change is to the course objectives and should serve as effective instruments for learning remove the subject matter writing component of the this course : instructors should communicate to students and the requirements of formal; graded writing assignments in writing: not just orally capstone design project. In writing-intensive The other capstones courses ; writing assignments are characteristically designed to help students investigate the course subject matter; gain experience in interpreting data or the results of research; shape writing to a particular audience; or practice the type of writing Civil Engineering are associated with a given profession or discipline. Much of the writing may be informal and ungraded; yet meaningful; so students are encouraged to think focus area and discover through a process in which mistakes are a natural part of learning. Examples of such writing include one-minute papers have at the beginning; middle; or end of class; reactions to lectures; labs; and readings; journals; logs; and notebooks of observations; readings; and other experimental activities; letters to classmates; weekly digests; e-mail dialogues; records of peer group discussions; and stories of one’s thinking on a problem.

(b) Students will be afforded opportunities to practice writing throughout the semester: with emphasis given to writing as a process that develops through several iterations: least one technical prerequisite course. Typically, writing-intensive courses require multiple writing assignments; a sequence of preparatory writings (outline; formulation of
thesis, first draft) leading to a final product. There are no fundamental or informational writing assignments (e.g., regular journal entries; field notes; short in-class papers; revision of first draft) that aid students introductory courses in developing other written documents. Experimentation with assignments land development offered so there is encouraged.

(e) Opportunities no foundational knowledge for students to receive written feedback from the instructor and to apply the instructor's feedback to their future writing will be built into basis of the course capstone project. The instructor will clearly identify and explain the type of writing required in the proposed course and will provide guidance as needed. A writing-intensive course may also include peer review of written work; tutorial assistance; instructor conferences; group writing projects; the use of writing or learning centers; teaching assistant feedback; and classroom discussions of assigned readings about writing. The use of diverse feedback mechanisms is encouraged; but none of these mechanisms should substitute for the instructor as the principal source of written feedback to the student.

(d) Writing will be evaluated by the instructor; and writing quality will be a factor foundation in determining each student's final grade. Before students begin writing, instructors will communicate to students the criteria by which their writing will be evaluated. Sound criteria for assessing writing quality include; but are not limited to; the writer's ability to direct the material to an intended audience; the employment of organizational strategies; the land development of both content and reasoning; adherence to conventions of a particular discipline; accuracy of design without the information presented; citation and integration of sources; grammar; diction and syntax, semester long design project and spelling. Writing assignments should be worth at least 25 percent of each student's final grade.

One or two examples associated writing/presentation of the actual writing assignment sheets the instructor plans to use in the course capstone.

General Education Designation Requirements

Campuses That Have Offered (CE 410) Over The Past 4 Years

| Fall 2016 | UNIVERSITY PARK CAMPUS |

Curricular Information

Blue Sheet Item #:
Review Date:

SCRID Numbers

(CE 410):

Review History (not subject to comparison)

This section represents all consultation history that has occurred on this proposal

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Consultation
Recipient Name: ALEKSANDRA Z RADLINSKA  
Position: Consultation  
Title: ASST PROF CIVIL ENGR  
Department: Civil And Environmental Engineering  
Campus: UNIVERSITY PARK CAMPUS  
Request sent: 9/29/2016 at 12:51 PM  
Concur: Yes  
Comments:  
Reviewed On: 10/3/2016 at 10:20 PM

Recipient Name: ALFONSO IGNACIO MEJIA  
Position: Consultation  
Title: ASST PROF CIVIL ENGR  
Department: (Not Available)  
Campus: (Not Available)  
Request sent: 10/10/2016 at 7:30 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 10/14/2016 at 7:15 AM

Recipient Name: ALI MEMARI  
Position: Consultation  
Title: HANKIN PROF/DIR PHRC  
Department: Civil And Environmental Engineering  
Campus: UNIVERSITY PARK CAMPUS  
Request sent: 9/29/2016 at 12:51 PM  
Concur: Yes  
Comments:  
Reviewed On: 9/29/2016 at 5:46 PM

Recipient Name: BRUCE ERNEST LOGAN  
Position: Consultation  
Title: EVAN PUGH/KAPPE PROF  
Department: Civil And Environmental Engineering  
Campus: UNIVERSITY PARK CAMPUS  
Request sent: 9/29/2016 at 12:51 PM  
Concur: Yes  
Comments:  
Reviewed On: 10/2/2016 at 9:21 AM
Recipient Name: CHAOPENG SHEN
Department: (Not Available)
Position: Consultation
Campus: (Not Available)
Title: ASST PROF CIVIL ENGR

Request sent: 10/10/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 10/14/2016 at 7:15 AM

Recipient Name: CHRISTOPHER AARON GORSKI
Department: (Not Available)
Position: Consultation
Campus: (Not Available)
Title: ASST PROF CIVIL ENGR

Request sent: 10/10/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
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Recipient Name: CHRISTOPHER J DUFFY
Department: (Not Available)
Position: Consultation
Campus: (Not Available)
Title: PROF CIVIL ENGR

Request sent: 10/10/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 10/14/2016 at 7:15 AM

Recipient Name: ERIC TODD DONNELL
Department: Civil And Environmental Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: PROFESSOR CIVIL&ENVIR

Request sent: 10/10/2016 at 7:30 AM
Concur: Yes
Comments:
Reviewed On: 10/10/2016 at 8:46 AM
Recipient Name: FARSHAD RAJABIPOUR  
Department: Civil And Environmental Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: ASSOC PROF CIVIL ENGINEER

Request sent: 10/10/2016 at 7:30 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 10/14/2016 at 7:15 AM

Recipient Name: FRED SCOTT CANNON  
Department: Civil And Environmental Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: PROF CIVIL & ENV EN

Request sent: 10/10/2016 at 7:30 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 10/14/2016 at 7:15 AM

Recipient Name: GORDON PATRICK WARN  
Department: (Not Available)  
Position: Consultation  
Campus: (Not Available)  
Title: ASSOC PROF CIVIL ENGINEER

Request sent: 10/10/2016 at 7:30 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 10/14/2016 at 7:15 AM

Recipient Name: JEFFREY A LAMAN  
Department: Civil And Environmental Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: PROF CIVIL & ENVIR ENGR

Request sent: 10/10/2016 at 7:30 AM  
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 10/14/2016 at 7:15 AM

Recipient Name: JOHN MICHAEL REGAN
Department: Civil And Environmental Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: PROFESSOR CIVL & ENV ENGR

Request sent: 10/10/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 10/14/2016 at 7:15 AM

Recipient Name: KONSTANTINOS PAPAKONSTANTINO
Department: Civil And Environmental Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: ASST PROF ASST PROFESSOR

Request sent: 10/10/2016 at 7:30 AM
Concur: Yes
Comments:
Reviewed On: 10/10/2016 at 2:07 PM

Recipient Name: LI LI
Department: Civil And Environmental Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: ASSOC PROF

Request sent: 10/10/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 10/14/2016 at 7:15 AM

Recipient Name: MARTIN T PIETRUCHA
Department: (Not Available)
Position: Consultation
Campus: (Not Available)
Title: PROF CEE/DIRECTOR OF LTI

Request sent: 10/10/2016 at 7:30 AM
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<td>Yes</td>
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<td>10/14/2016 at 7:15 AM</td>
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</tbody>
</table>

**Recipient Name:** MICHAEL CHARLES HILLMAN  
**Department:** Civil And Environmental Engineering  
**Position:** Consultation  
**Campus:** UNIVERSITY PARK CAMPUS  
**Title:** ASST PROFESSOR

**Recipient Name:** MING XIAO  
**Department:** Civil And Environmental Engineering  
**Position:** Consultation  
**Campus:** UNIVERSITY PARK CAMPUS  
**Title:** ASSOCIATE PROFESSOR

**Recipient Name:** NATHANIEL RICHARD WARNER  
**Department:** (Not Available)  
**Position:** Consultation  
**Campus:** (Not Available)  
**Title:** ASST PROF ASST PROFESSOR

**Recipient Name:** PARISA SHOKOUHI  
**Department:** Civil And Environmental Engineering  
**Position:** Consultation  
**Campus:** UNIVERSITY PARK CAMPUS  
**Title:** ASSOCIATE PROFESSOR
(25) Request sent: 9/29/2016 at 12:51 PM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 10/14/2016 at 7:15 AM

Recipient Name: PATRICK JOSEPH FOX
Position: Consultation
Title: PROF AND DEPT HEAD
Department: Civil And Environmental Engineering
Campus: UNIVERSITY PARK CAMPUS

(26) Request sent: 10/3/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 10/14/2016 at 7:15 AM

Recipient Name: PEGGY JOHNSON
Position: Consultation
Title: Professor Civil Engineering
Department: Civil And Environmental Engineering
Campus: UNIVERSITY PARK CAMPUS

(3) Request sent: 9/29/2016 at 12:51 PM
Concur: Yes
Comments:
Reviewed On: 9/29/2016 at 1:40 PM

Recipient Name: RACHEL ALICE BRENNAN
Position: Consultation
Title: ASSOC PROF ENVIRONMENTAL ENGR
Department: Civil And Environmental Engineering
Campus: UNIVERSITY PARK CAMPUS

(9) Request sent: 9/29/2016 at 12:51 PM
Concur: Yes
Comments:
Reviewed On: 10/7/2016 at 5:11 PM

Recipient Name: SHELLEY MARIE STOFFELS
Position: Consultation
Title: PROFESSOR CIVIL & ENV
Department: (Not Available)
Campus: (Not Available)
Recipient Name: SUKRAN ILGIN GULER
Department: Civil And Environmental Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: ASST PROF CIVIL ENGINEER

Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 10/14/2016 at 7:15 AM

Recipient Name: TONG QIU
Department: Civil And Environmental Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: ASSOC PROF CIVIL ENGR

Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 9/29/2016 at 3:55 PM

Recipient Name: VENKATARAMAN SHANKAR
Department: Civil And Environmental Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: PROFESSOR CIVIL ENGINEER

Concur: Yes
Comments: Excellent course. Some minor comments: Site assessment and drawings might need an extra period - especially in terms of assessing special cases such as survey interpretations concordant with grandfathered titles, easements etc. Second, some time allocated for variance analysis in zoning might be helpful, I assume the instructors have factored this in, making it explicit the students to pay extra attention to these contemporary matters. The above mentioned issues are suggested in light of modern day demands on land use planning as a whole. Finally, the implications of site related improvements for concurrent growth management might be a useful topic. This will get students to think beyond improvements on the site frontage alone.
Reviewed On: 9/29/2016 at 1:53 PM
Recipient Name: VIKASH GAYAH  
Department: Civil Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: ASST PROF CIVIL ENGR  

Request sent: 9/29/2016 at 12:51 PM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 10/14/2016 at 7:15 AM

Recipient Name: WILLIAM D BURGOS  
Department: Civil And Environmental Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: PROFESSOR CIVIL & ENV EN  

Request sent: 9/29/2016 at 12:51 PM  
Concur: Yes  
Comments:  
Reviewed On: 9/29/2016 at 1:25 PM

Recipient Name: XIAOFENG LIU  
Department: Civil And Environmental Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: ASSISTANT PROFESSOR OF CE  

Request sent: 9/29/2016 at 12:51 PM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 10/14/2016 at 7:15 AM

Recipient Name: JOSEPH CECERE  
Department: Science, Engineering And Technology  
Position: Consultation  
Campus: PENN STATE HARRISBURG, THE CAPITAL COLLEGE  
Title: ASSOC PROF ENGR  

Request sent: 10/10/2016 at 7:30 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 10/14/2016 at 7:15 AM
Head of Department

Recipient Name: PATRICK FOX
Position: Head of Department
Campus: UNIVERSITY PARK CAMPUS

SCCA Representative

Recipient Name: ROBERT MELTON
Position: SCCA Representative
Campus: UNIVERSITY PARK CAMPUS

Dean of the College

Recipient Name: PETER BUTLER
Position: Dean of the College
Campus: UNIVERSITY PARK CAMPUS

SCCA Subcommittee Review

Recipient Name: CORTNEY SMITH
Position: SCCA Subcommittee Review
Campus: UNIVERSITY PARK CAMPUS
SCCA Review

Recipient Name: CYNTHIA ZOOK  Department: (Not Available)
Position: SCCA Subcommittee Review  Campus: UNIVERSITY PARK CAMPUS
Title: 

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Recipient Name: KADI CORTER  Department: (Not Available)
Position: SCCA Subcommittee Review  Campus: UNIVERSITY PARK CAMPUS
Title: 

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

SCCA Review

Recipient Name: CORTNEY SMITH  Department: (Not Available)
Position: SCCA Review  Campus: UNIVERSITY PARK CAMPUS
Title: 

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Recipient Name: CYNTHIA ZOOK  Department: (Not Available)
Position: SCCA Review  Campus: UNIVERSITY PARK CAMPUS
Title: 

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]
Recipient Name: KADI CORTER
Position: SCCA Review
Campus: UNIVERSITY PARK CAMPUS
Title:

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Recipient Name: CORTNEY SMITH
Position: Faculty Senate Review
Campus: UNIVERSITY PARK CAMPUS
Title:

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Recipient Name: KADI CORTER
Position: Faculty Senate Review
Campus: UNIVERSITY PARK CAMPUS
Title:

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]
SENATE COMMITTEE ON CURRICULAR AFFAIRS
COURSE SUBMISSION AND CONSULTATION FORM

Principal Faculty Member(s) Proposing Course

<table>
<thead>
<tr>
<th>Name</th>
<th>User ID</th>
<th>College</th>
<th>Department</th>
</tr>
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<tbody>
<tr>
<td>MING XIAO</td>
<td>mzx102</td>
<td>Engineering (EN)</td>
<td>Not Available</td>
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</tbody>
</table>

College with curricular responsibility: Engineering (EN)

Type of Proposal: [ ] Add  [ ] Change  [ ] Drop

Course Designation

(G E CE 434) Geotechnical Engineering Design

Course Information

Special categories for Undergraduate (001-499) courses

Foundations

[ ] Writing/Speaking (GWS)
[ ] Quantification (GQ)

Knowledge Domains

[ ] Health and Wellness (GHW)
[ ] Natural Science Sciences (GN)
[ ] Arts (GA)
[ ] Humanities (GH)
[ ] Social and Behavioral Sciences (GS)  [ ] Honors (H)  [ ] Writing Intensive Permanent (WF)  [ ] Writing Intensive One Semester

Additional Designations

[ ] Bachelor of Arts
[ ] International Cultures (WFV)IL
[ ] United States Cultures (US)  [ ] International Cultures (IL)  [ ] Bachelor Of Arts (BA)  [ ] Bachelor Of Arts (BA)
[ ] Honors Course
[ ] Common course number - x94, x95, x96, x97, x99
[ ] Writing Across the Curriculum

First-Year Engagement Program

[ ] First-Year Seminar

Miscellaneous

[ ] Common Course
GE Learning Objectives

- GenEd Learning Objective: Effective Communication
- GenEd Learning Objective: Creative Thinking
- GenEd Learning Objective: Crit & Analytical Think
- GenEd Learning Objective: Global Learning
- GenEd Learning Objective: Integrative Thinking
- GenEd Learning Objective: Key Literacies
- GenEd Learning Objective: Soc Resp & Ethic Reason

Course Outline

Prerequisites:

CEE 335

Corequisites:

Concurrents:

Recommended Preparations:

Abbreviated Title: Geotech Eng Design

Bulletin Listing

Minimum Credits: 3
Maximum Credits: 3
Repeatable: NO
Department with Curricular Responsibility: 
Effective Semester: Upon Approval
Travel Component: NO

A brief outline or overview of the course content:

A 3-unit 3-credit course. Course lectures occur twice a week and each is 75-min in duration. Prerequisite: CEE 335. This is an advanced design course in geotechnical engineering, offered to undergraduate senior and graduate students in civil engineering. This course covers fundamental engineering geology, subsurface exploration including geophysical techniques, principles of shallow and deep foundation designs, slope stability, geosynthetics design, groundwater and drainage, and geotechnical earthquake engineering. The course is delivered in lecture format and concentrates on practice-oriented design problems in geotechnical engineering.

A listing of the major topics to be covered with an approximate length of time allotted for their discussion:

<table>
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<tr>
<th>Date</th>
<th>Lecture #</th>
<th>Topics</th>
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</thead>
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<td>Introduction to Engineering Geology(†)</td>
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<td>01/12</td>
<td>2</td>
<td>Introduction to Engineering Geology (†)</td>
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<tr>
<td>01/17</td>
<td>3</td>
<td>Subsurface Explorations (†)</td>
</tr>
<tr>
<td>01/19</td>
<td>4</td>
<td>Subsurface Explorations(†)</td>
</tr>
</tbody>
</table>
Course Description:
This is an advanced design course in geotechnical engineering, offered to undergraduate senior and graduate students in civil engineering. This course covers fundamental engineering geology, subsurface exploration including geophysical techniques, principles of shallow and deep foundation designs, slope stability, geosynthetics design, groundwater and drainage, and geotechnical earthquake engineering. The course is delivered in lecture format and concentrates on practice-oriented design problems in geotechnical engineering.

The name(s) of the faculty member(s) responsible for the development of the course:

- Name: MING XIAO (mzx102)
- Title: ASSOCIATE PROFESSOR
- Phone: +1 814 867 0044
- Address: 0212 SACKETT BUILDING
- Campus:
- City:
Course Justification

Instructional, Educational, and Course Objectives:
This section should define what the student is expected to learn and what skills the student will develop. Currently, there is only one elective technical course in geotechnical engineering in the CEE Department, i.e., CE435 Foundation Engineering. Other important and common topics in geotechnical engineering such as engineering geology, slope stability, geosynthetics design, drainage and filtration, and geotechnical earthquake engineering are not currently taught in the CE undergrad and graduate curricula. As a result, CE graduates who will work in geotechnical field may be less equipped with the knowledge when entering the profession.

The purpose of this course is to introduce senior undergraduate students and graduate students in civil engineering to the concepts and design of general geotechnical engineering issues. At the conclusion of this course, the student should be able to:
- Describe the basic concepts in engineering geology, such as major rock and soil types and their formation.
- Describe field drilling and sampling techniques and procedures and field testing.
- Perform shallow and deep foundation designs in the context of geotechnical engineering.
- Perform advanced slope stability analysis.
- Describe geosynthetics and conduct geosynthetic application designs, including retaining walls, reinforced slopes, and filtration and drainage systems.
- Design soil retaining structures.
- Describe the basic characteristics in geotechnical earthquake engineering.
- Perform seismic design in geotechnical engineering applications such as slope stability and liquefaction.

Evaluation Methods:
Include a statement that explains how the achievement of the educational objective identified above will be assessed. The procedures for determining students' grades should be specifically identified.

The attainment of course objectives is assessed based on homework and projects (40%), one midterm (36% each; 30%), and one final comprehensive exam (30%).

Relationship/Linkage of Course to Other Courses:
This statement should relate the course to existing or proposed new courses. It should provide a rationale for the level of instruction, for any prerequisites that may be specified, or for the course's role as a prerequisite for other courses.

This proposed new course complements the current CE curricula (particularly the geotechnical courses), and does not overlap with any existing courses. This new course will use one lecture on the principles of shallow foundation design and two lectures on deep foundation design. It is noted that shallow and deep foundations are covered in the electives CE435 “Foundation Engineering” and CE441 “Structural Design of Foundations” on the geotechnical and structural aspects, respectively. Students taking CE434 may have never taken CE435 and CE441. Therefore, this course will spend limited time to present the principles of the shallow and deep foundation designs to introduce and strengthen students understanding of foundation design.

Relationship of Course to Major, Option, Minor, or General Education:
This statement should explain how the course will contribute to the major, option, or minor and indicate how it may function as a service course for other departments.

CE 335 Engineering Mechanics of Soils is the prerequisite to the proposed course.

A description of any special facilities:
A typical smart classroom that is equipped with computer, audio/video, and projector is sufficient. No lab component.

Frequency of Offering and Enrollment:
Every spring semester; expected enrollment is 20 to 40 per class.

General Education Designation Requirements

Curricular Information
Blue Sheet Item #: 
Review Date:

**SCRID Numbers**
(G E CE 434):

**Review History (not subject to comparison)**
This section represents all consultation history that has occurred on this proposal

**Legend**
- **Approve**
- **Rejected**
- **Waiting Review**
- **User Action Required**
- **Pending Action(s)**
- **Moved to Rejected Status**
- **Approved**
- **(#) - Review Order Sequence Number**

**Consultation**

- **Recipient Name:** ALEKSANDRA Z RADLINSKA
  - Department: Civil And Environmental Engineering
  - Position: Consultation
  - Campus: UNIVERSITY PARK CAMPUS
  - Title: ASST PROF CIVIL ENGR

  (9) Request sent: 9/29/2016 at 12:40 PM
  - Concur: Yes
  - Comments:
  - Reviewed On: 10/3/2016 at 10:22 PM

- **Recipient Name:** ALFONSO IGNACIO MEJIA
  - Department: (Not Available)
  - Position: Consultation
  - Campus: (Not Available)
  - Title: ASST PROF CIVIL ENGR

  (15) Request sent: 10/10/2016 at 7:30 AM
  - Concur: Yes
  - Comments: (Completed By Default - Exceeded Time Limit)
  - Reviewed On: 10/14/2016 at 7:15 AM

- **Recipient Name:** ALI MEMARI
  - Department: Civil And Environmental Engineering
  - Position: Consultation
  - Campus: UNIVERSITY PARK CAMPUS
Concur: Yes

Comments: Comments:
1. Relationship to some other courses such as CE 435 can be elaborated further. In particular, it would be useful to point out common topics discussed in both courses and how the coverage in the proposed course will be different.
2. The statement "Perform shallow and deep foundation designs in the context of geotechnical engineering" under course justification is not clear. Please elaborate what is meant by geotechnical engineering design of these systems. Does this mean the structural design aspects (e.g., design of concrete and reinforcement for footing or structural design of steel piles or sheet piles) will not be covered? Are these covered on CE 435?

Reviewed On: 9/29/2016 at 6:15 PM

Recipient Name: BRUCE ERNEST LOGAN
Department: Civil And Environmental Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: EVAN PUGH/KAPPE PROF

Concur: Yes
Comments:
Reviewed On: 10/2/2016 at 9:21 AM

Recipient Name: CHAOPENG SHEN
Department: (Not Available)
Position: Consultation
Campus: (Not Available)
Title: ASST PROF CIVIL ENGR

Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 10/14/2016 at 7:15 AM

Recipient Name: CHRISTOPHER AARON GORSKI
Department: (Not Available)
Position: Consultation
Campus: (Not Available)
Title: ASST PROF CIVIL ENGR

Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 10/14/2016 at 7:15 AM
Recipient Name: CHRISTOPHER J DUFFY  
Department: (Not Available)  
Position: Consultation  
Campus: (Not Available)  
Title: PROF CIVIL ENGR

Request sent: 10/10/2016 at 7:30 AM  
Concur: Yes  
Comments: (Completed By Default - Exceeded Time Limit)  
Reviewed On: 10/14/2016 at 7:15 AM

Recipient Name: ERIC TODD DONNELL  
Department: Civil And Environmental Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: PROFESSOR CIVIL&ENVIR

Request sent: 9/29/2016 at 12:40 PM  
Concur: No, this proposal needs significant changes  
Comments: The proposal looks good, but I have a couple of minor suggestions. First, it would be helpful to clearly articulate the difference between CE 435, CE 441, and the proposed CE 434 courses in the "Link to Other Courses" section of the proposal. For example, Weeks 7 and 8 in the proposed course includes shallow and deep foundations. It appears that these same two topics may also cover the same two topics. In the evaluation criteria section, consider deleting "each" in reference to the proportion of the grade from the midterm exam (assuming there is only one such midterm). Hope this helps!  
Reviewed On: 10/5/2016 at 3:24 PM

Initiator Comments: Hi, Eric:  
Thank you for your advice and suggestions. I agree with them. To address your comments, I will ask Heather to make the following revisions.  
Under "Relationship/Linkage of Course to Other Courses:" I will revise it to:  
"This proposed new course complements the current CE curricula (particularly the geotechnical courses), and does not overlap with any existing courses. This new course will use one lecture on the principles of shallow foundation design and two lectures on deep foundation design. It is noted that shallow and deep foundations are covered in the electives CE435 "Foundation Engineering" and CE441 "Structural Design of Foundations" on the geotechnical and structural aspects, respectively. Students taking CE434 may have never taken CE435 and CE441. Therefore, this course will spend limited time to present the principles of the shallow and deep foundation designs to introduce and strengthen students understanding of foundation design."
  
In the Evaluation Methods: I will delete "each." This was an error. Thank you for pointing it out. Please let me know if the above revision is
sufficient or raises new issues. Thank you!

Ming

(12) Request sent: 10/10/2016 at 7:30 AM
Concur: Yes
Comments:
Reviewed On: 10/10/2016 at 8:48 AM

Recipient Name: FARSHAD RAJABIPOUR
Department: Civil And Environmental Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: ASSOC PROF CIVIL ENGINEER

(19) Request sent: 10/10/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 10/14/2016 at 7:15 AM

Recipient Name: FRED SCOTT CANNON
Department: Civil And Environmental Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: PROF CIVIL & ENV EN

(20) Request sent: 10/10/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 10/14/2016 at 7:15 AM

Recipient Name: GORDON PATRICK WARN
Department: (Not Available)
Position: Consultation
Campus: (Not Available)
Title: ASSOC PROF CIVIL ENGINEER

(21) Request sent: 10/10/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 10/14/2016 at 7:15 AM

Recipient Name: JEFFREY A LAMAN
Department: Civil And Environmental Engineering
Request sent: 9/29/2016 at 12:40 PM

Concur: No, this proposal needs significant changes

Comments: I have concerns about Week 10 Soil Retaining Structure - Lateral earth pressure review; Conventional retaining wall design. This topic is redundant with CE441 and in the past has been covered in CE435 also. Are retaining walls intended to be covered in CE435? The presentation of retaining walls in CE435 in the past has not followed the current ACI provisions and has been superficial. 5 lectures are required to adequately cover retaining wall structural design by ACI. It appears that less than 3 are allocated. Also, the title of the course is odd. Engineering Design? Why not Geotechnical Design? Why add the two, somewhat redundant terms of engineering and design?

Reviewed On: 9/29/2016 at 3:00 PM

Initiator Comments: Hi, Jeff: Thank you for your comments and advice. Conventional (gravity, semi-gravity, cantilever) retaining wall design is covered in CE435. The same topic is covered (in one week) in the new course is to provide the needed background for MSE wall design, which is not covered in CE435, considering many students in this new course may have not taken CE435 and may not have knowledge of conventional retaining wall design. Regarding ACI code, the conventional and MSE wall designs in CE435 and CE434, respectively, focus on external stability (overturning, sliding, and bearing capacity) on the geotechnical side. The students are reminded that reinforcement design is covered in CE441. For MSE wall design, geosynthetics reinforcement design is covered in CE434. Regarding the title, geotechnical engineering means to refer to the sub-discipline of CE, and CE434 is about the design of various aspect soil structures in this sub-discipline. So, I used the current title. If the major of the faculty prefer "Geotechnical Design," I can revise it too.

Ming

Request sent: 10/17/2016 at 7:30 AM

Concur: Yes

Comments: (Completed By Default - Exceeded Time Limit)

Reviewed On: 10/18/2016 at 7:15 AM

Recipient Name: JOHN MICHAEL REGAN

Department: Civil And Environmental Engineering

Position: Consultation

Campus: UNIVERSITY PARK CAMPUS

Title: PROFESSOR CIVL & ENV ENGR

Request sent: 10/10/2016 at 7:30 AM

Concur: Yes

Comments: (Completed By Default - Exceeded Time Limit)

Reviewed On: 10/14/2016 at 7:15 AM
Recipient Name: KONSTANTINOS PAPAKONSTANTINOU
Department: Civil And Environmental Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: ASST PROF ASST PROFESSOR

Request sent: 10/10/2016 at 7:30 AM
Concur: Yes
Comments:
Reviewed On: 10/10/2016 at 2:13 PM

Recipient Name: LI LI
Department: Civil And Environmental Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: ASSOC PROF

Request sent: 10/10/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 10/14/2016 at 7:15 AM

Recipient Name: MARTIN T PIETRUCHA
Department: (Not Available)
Position: Consultation
Campus: (Not Available)
Title: PROF CEE/DIRECTOR OF LTI

Request sent: 10/10/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 10/14/2016 at 7:15 AM

Recipient Name: MICHAEL CHARLES HILLMAN
Department: Civil And Environmental Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: KIMBALL ASST PROFESSOR

Request sent: 10/10/2016 at 7:30 AM
Concur: Yes
Comments: This course covers many topics which are not covered currently in the CEE curriculum as far as I can tell. It is valuable information to those who may pursue a career in geotechnical engineering and also valuable to those who decide to continue on to a masters in geotech. I recommend the addition of this course.

Reviewed On: 10/12/2016 at 2:22 PM

Recipient Name: MING XIAO
Department: Civil And Environmental Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: ASSOCIATE PROFESSOR

(1) Request sent: 9/29/2016 at 12:40 PM
Concur: Yes
Comments:
Reviewed On: 9/29/2016 at 12:42 PM

Recipient Name: NATHANIEL RICHARD WARNER
Department: (Not Available)
Position: Consultation
Campus: (Not Available)
Title: ASST PROF ASST PROFESSOR

(25) Request sent: 10/10/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 10/14/2016 at 7:15 AM

Recipient Name: PARISA SHOKOUHI
Department: Civil And Environmental Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: ASSOCIATE PROFESSOR

(26) Request sent: 9/29/2016 at 12:40 PM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 10/14/2016 at 7:15 AM

Recipient Name: PATRICK JOSEPH FOX
Department: Civil And Environmental Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: PROF AND DEPT HEAD
(27) Request sent: 10/3/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 10/14/2016 at 7:15 AM

Recipient Name: Peggy Johnson
Department: Civil And Environmental Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: Professor Civil Engineering

(3) Request sent: 9/29/2016 at 12:40 PM
Concur: Yes
Comments:
Reviewed On: 9/29/2016 at 1:40 PM

Recipient Name: Rachel Alice Brennan
Department: Civil And Environmental Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: ASSOC PROF ENVIRONMENTAL ENGR

(11) Request sent: 9/29/2016 at 12:40 PM
Concur: Yes
Comments:
Reviewed On: 10/7/2016 at 5:12 PM

Recipient Name: Shelley Marie Stoffels
Department: (Not Available)
Position: Consultation
Campus: (Not Available)
Title: PROFESSOR CIVIL & ENV

(28) Request sent: 9/29/2016 at 12:40 PM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 10/14/2016 at 7:15 AM

Recipient Name: Sukran Ilgin Guler
Department: Civil And Environmental Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: ASST PROF CIVIL ENGINEER
Request sent: 9/29/2016 at 12:40 PM
Concur: Yes
Comments:
Reviewed On: 9/29/2016 at 3:55 PM

Recipient Name: TONG QIU
Department: Civil And Environmental Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: ASSOC PROF CIVIL ENGR

Request sent: 9/29/2016 at 12:40 PM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 10/14/2016 at 7:15 AM

Recipient Name: VENKATARAMAN SHANKAR
Department: Civil And Environmental Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: PROFESSOR CIVIL ENGINEER

Request sent: 9/29/2016 at 12:40 PM
Concur: Yes
Comments: Great course! Packed with information on multiple facets of geotech. My comments therefore should be taken as a "is it possible to add these topics?". a) Some localized discussion of karst geology specific to the mid-atlantic? b) I love the fact that three lectures to geotechnical earthquake engineering. Some research material on prediction of ground motion might plant an early seed in some students for pursuit of the field at the graduate level. The same motivation holds for the karst geology part too. A final comment: a grad course sequel that picks special topics out of this list that attracts students from the geological sciences would be awesome...if Ming wants to find a way to do this. Fantastic contribution to the UG curriculum. Thanks.
Reviewed On: 9/29/2016 at 2:01 PM

Recipient Name: VIKASH GAYAH
Department: Civil Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: ASST PROF CIVIL ENGR

Request sent: 9/29/2016 at 12:40 PM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 10/14/2016 at 7:15 AM
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### SCCA Representative

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Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]

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### Dean of the College

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<th>PETER BUTLER</th>
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Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]

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### SCCA Subcommittee Review

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<th>KADI CORTER</th>
<th>Department: (Not Available)</th>
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Concur: [Not Yet Reviewed]  
Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]

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<th>Department: (Not Available)</th>
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Concur: [Not Yet Reviewed]  
Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]
SCCA Review

Recipient Name: CYNTHIA ZOOK  Department: (Not Available)
Position: SCCA Subcommittee Review  Campus: UNIVERSITY PARK CAMPUS
Title:

Request sent: 6/21/2016 at 3:05 PM
Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

SCCA Review

Recipient Name: CORTNEY SMITH  Department: (Not Available)
Position: SCCA Review  Campus: UNIVERSITY PARK CAMPUS
Title:

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Recipient Name: KADI CORTER  Department: (Not Available)
Position: SCCA Review  Campus: UNIVERSITY PARK CAMPUS
Title:

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Recipient Name: CYNTHIA ZOOK  Department: (Not Available)
Position: SCCA Review  Campus: UNIVERSITY PARK CAMPUS
Title:
Faculty Senate Review

Recipient Name: CORTNEY SMITH  Department: (Not Available)
Position: Faculty Senate Review  Campus: UNIVERSITY PARK CAMPUS
Title:  


Recipient Name: KADI CORTER  Department: (Not Available)
Position: Faculty Senate Review  Campus: UNIVERSITY PARK CAMPUS
Title:  

SENATE COMMITTEE ON CURRICULAR AFFAIRS

COURSE SUBMISSION AND CONSULTATION FORM

Principal Faculty Member(s) Proposing Course

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<th>Name</th>
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<tr>
<td>ERIC MARSH</td>
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<td>Engineering</td>
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College with curricular responsibility: Engineering (EN)

Type of Proposal:  Add  Change  Drop  

Add  I am requesting recertification of this course for the new Gen Ed and/or University Requirements Guidelines?

Course Designation

(NUCE 301) Fundamentals of Reactor Physics

Course Information

Special categories for Undergraduate (001-499) courses

Foundations

- Writing/Speaking (GWS)
- Quantification (GQ)

Knowledge Domains

- Health & Wellness (GHW)
- Natural Sciences (GN)
- Arts (GA)
- Humanities (GH)
- Social and Behavioral Sciences (GS)

Additional Requirements Designations

- Bachelor of Arts
- International Cultures (IL)
- United States Cultures (US)
- Honors Course

One-Semester Course

- Common course number: x94, x95, x96, x97, x99

Writing Across the Curriculum

First-Year Engagement Program

- First-Year Seminar

Miscellaneous

- Common Course

GE Learning Objectives

- GenEd Learning Objective: Effective Communication
- GenEd Learning Objective: Creative Thinking
- GenEd Learning Objective: Crit & Analytical Think
- GenEd Learning Objective: Global Learning
- GenEd Learning Objective: Integrative Thinking
GenEd Learning Objective: Key Literacies

GenEd Learning Objective: Soc Resp & Ethic Reason

Cross-Listed Courses:

Prerequisites:
MATH 251

Corequisites:

Concurrents:
MATH 230; MATH 232, PHYS 214

Recommended Preparations:

Abbreviated Title: Reactor Physics

Bulletin Listing

| Minimum Credits: | 4 |
| Maximum Credits: | 4 |
| Repeatable: | NO |
| Department with Curricular Responsibility: | () |
| Effective Semester: | 201617FA | Upon Approval |
| Travel Component: | NO |

Course Outline

A brief outline or overview of the course content:

A listing of the major topics to be covered with an approximate length of time allotted for their discussion:

Course Description:
Nuclear reactions and interactions relevant to nuclear engineering including fission, cross-sections, reaction rate calculations, energy depositions rates, and radioactive decay. This course is designed to acquaint junior-level undergraduate students with knowledge essential to the reactor physics and nuclear reactor systems.

Students will learn nuclear reactions including radioactive decay, fission and fusion, reaction rates, energy deposition rates, various nuclear systems, and introductory diffusion theory.

The name(s) of the faculty member(s) responsible for the development of the course:

Name: ARTHUR MOTTA (ATM2)
Title: PROF & CHAIR OF NUCL ENGR
Phone: +1 814 865 0036
Address: 0227 REBER BUILDING
Campus:
City: University Park
Fax:

Course Justification

Instructional, Educational, and Course Objectives:
This section should define what the student is expected to learn and what skills the student will develop.

Evaluation Methods:
Include a statement that explains how the achievement of the educational objective identified above will be assessed. The procedures for determining students' grades should be specifically identified.

Relationship/Linkage of Course to Other Courses:
This statement should relate the course to existing or proposed new courses. It should provide a rationale for the level of instruction, for any prerequisites that may be specified, or for the course's role as a prerequisite for other courses.
Relationship of Course to Major, Option, Minor, or General Education:
This statement should explain how the course will contribute to the major, option, or minor and indicate how it may function as a service course for other departments.

A description of any special facilities:

Frequency of Offering and Enrollment:

Justification for Changing The Proposal:
Include a justification for each change to the course. Particular attention should be paid to the effects of the course change within the discipline and in other disciplines where the course may be required within a major or used as a service course. When a unit submits several course changes, with or without new course proposals, a general statement covering the programmatic effects of the changes should be submitted.

The proposed change is being requested for two reasons. The first is to respond to changes in the entrance to major process for engineering students. We found that too many students are now unable to begin the nuclear curriculum in their junior year for lack of successfully completing the third calculus class. This is a result of swapping the recommended order in which students take Calc III and Differential Equations. The nuclear engineering faculty have adjusted the order in which material is covered in NUC E 301 so that students may take Calc II (multi-variable and vector calc) concurrently with NUC E 301 and NUC E 309. The second motivation for this request is to accommodate NUC E/M E concurrent major students who often take Calculus III in its two, 2-credit version (Math 231 and 232) instead of the 4-credit version (Math 230).

General Education Designation Requirements

<table>
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<th>Campuses That Have Offered (NUCE 301) Over The Past 4 Years</th>
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Curricular Information
Blue Sheet Item #:
Review Date:

SCRID Numbers
(NUCE 301):

Review History (not subject to comparison)
This section represents all consultation history that has occurred on this proposal

Legend

- Approve
- Rejected
- Waiting Review
- User Action Required
- Pending Action(s)
- Moved to Rejected Status
- Approved
- (#) - Review Order Sequence Number

Head of Department

Recipient Name: KAREN THOLE
Department: (Not Available)
Position: Head of Department
Campus: UNIVERSITY PARK CAMPUS
Title:
SCCA Representative

Recipient Name: ROBERT MELTON
Position: SCCA Representative
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Dean of the College

Recipient Name: PETER BUTLER
Position: Dean of the College
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

SCCA Subcommittee Review

Recipient Name: CORTNEY SMITH
Position: SCCA Subcommittee Review
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Recipient Name: CYNTHIA ZOOK
Position: SCCA Subcommittee Review
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Recipient Name: KADI CORTER
Position: SCCA Subcommittee Review
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]
### SCCA Review

**Recipient Name:** CORTNEY SMITH  
**Position:** SCCA Review  
**Department:** (Not Available)  
**Campus:** UNIVERSITY PARK CAMPUS

**Concur:** [Not Yet Reviewed]  
**Comments:** [Not Yet Reviewed]  
**Reviewed On:** [Not Yet Reviewed]

**Recipient Name:** CYNTHIA ZOOK  
**Position:** SCCA Review  
**Department:** (Not Available)  
**Campus:** UNIVERSITY PARK CAMPUS

**Concur:** [Not Yet Reviewed]  
**Comments:** [Not Yet Reviewed]  
**Reviewed On:** [Not Yet Reviewed]

**Recipient Name:** KADI CORTER  
**Position:** SCCA Review  
**Department:** (Not Available)  
**Campus:** UNIVERSITY PARK CAMPUS

**Concur:** [Not Yet Reviewed]  
**Comments:** [Not Yet Reviewed]  
**Reviewed On:** [Not Yet Reviewed]

### Faculty Senate Review

**Recipient Name:** CORTNEY SMITH  
**Position:** Faculty Senate Review  
**Department:** (Not Available)  
**Campus:** UNIVERSITY PARK CAMPUS

**Concur:** [Not Yet Reviewed]  
**Comments:** [Not Yet Reviewed]  
**Reviewed On:** [Not Yet Reviewed]

**Recipient Name:** KADI CORTER  
**Department:** (Not Available)
Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]
SENATE COMMITTEE ON CURRICULAR AFFAIRS
COURSE SUBMISSION AND CONSULTATION FORM

Principal Faculty Member(s) Proposing Course

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College with curricular responsibility: Engineering (EN)

Type of Proposal: [ ] Add  [X] Change  [ ] Drop

[X] I am requesting recertification of this course for the new Gen Ed and/or University Requirements Guidelines?

Course Designation
(NUCE 309) Analytical Techniques for Nuclear Concept

Course Information

Special categories for Undergraduate (001-499) courses

Foundations

[ ] Writing/Speaking (GWS)
[ ] Quantification (GQ)

Knowledge Domains

[ ] Health & Wellness (GHW)
[ ] Natural Sciences (GN)
[ ] Arts (GA)
[ ] Humanities (GH)
[ ] Social and Behavioral Sciences (GS)

Additional Requirements Designations

[ ] Bachelor of Arts
[ ] International Cultures (IL)
[ ] United States Cultures (US)
[ ] Honors Course
[ ] One-Semester Course
[ ] Common course number - x94, x95, x96, x97, x99
[ ] Writing Across the Curriculum

First-Year Engagement Program

[ ] First-Year Seminar

Miscellaneous
Common Course

**GE Learning Objectives**

- GenEd Learning Objective: Effective Communication
- GenEd Learning Objective: Creative Thinking
- GenEd Learning Objective: Crit & Analytical Think
- GenEd Learning Objective: Global Learning
- GenEd Learning Objective: Integrative Thinking
- GenEd Learning Objective: Key Literacies
- GenEd Learning Objective: Soc Resp & Ethic Reason

Cross-Listed Courses:

**Prerequisites:**

MATH 251

**Corequisites:**

**Concurrents:**

MATH 230; MATH 232

**Recommended Preparations:**

**Abbreviated Title:** Nuc E Anly Tech

**Bulletin Listing**

- Minimum Credits: 3
- Maximum Credits: 3
- Repeatable: NO
- Department with Curricular Responsibility: Nuclear Engineering ([UPEN_NUCE]

**Effective Semester:** 201617FA  
**Travel Component:** NO

**Course Outline**

**A brief outline or overview of the course content:**

This course provides a background on the types of materials used in nuclear reactors and their response to the reactor environment. Many of the desirable material properties designed for nuclear reactor materials may degrade with exposure to the reactor environment. The objective of the course is to give nuclear engineering students a background in materials and to discuss the unique changes that occur in these materials under irradiation, so students understand the limitations put on reactor operations and design by materials performance.

**A listing of the major topics to be covered with an approximate length of time allotted for their discussion:**

**1 Why Nuclear Materials matters**
- Introduction to materials science
- Crystal structure

**2 Unit Cell/Miller Indices**
Course Description:
This course is an introduction structured to many of provide students with the necessary analytical techniques used in the and terminology for radiation science, nuclear engineering discipline, reactor design, and power system simulation. Students will be taught the basic mathematical methods needed for such topics as simplified reactor physics, fluid mechanics, heat and mass transfer, control theory, shielding, radiation detection, fission product decay, and risk assessment. The course will cover four general mathematical areas: partial differential equations, linear algebra, systems of ordinary differential equations, and probability and statistics. Linear ordinary differential equations are solved using Reduction to Separable Form, Superposition of Solutions, Laplace Transforms, and Numerical Methods. Linear partial differential equations are solved using Separation of Variables. Linear algebra is used to solve sets of linear equations, Least Squares Fit, and Finite Difference Methods. Eigenvalues and Eigenvectors found for a matrix are used to rotate a function to principle coordinates and to solve systems of ordinary differential equations. Probability and statistics includes sampling, permutations and combinations, binomial, Poisson, hypergeometric, and normal distributions. These statistical methods are then applied to radiation counting statistics.

The name(s) of the faculty member(s) responsible for the development of the course:

Name: MICHAEL TONKS (mnt5296)
Title: ASST PROF NUCL & MECH ENG
Course Justification

Instructional, Educational, and Course Objectives:
This section should define what the student is expected to learn and what skills the student will develop.

Evaluation Methods:
Include a statement that explains how the achievement of the educational objective identified above will be assessed. The procedures for determining students’ grades should be specifically identified.

Relationship/Linkage of Course to Other Courses:
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Relationship of Course to Major, Option, Minor, or General Education:
This statement should explain how the course will contribute to the major, option, or minor and indicate how it may function as a service course for other departments.
NUCE 309 is taken only by students in the Nuclear Engineering major; therefore no additional consultation has been requested.

A description of any special facilities:

Frequency of Offering and Enrollment:

Justification for Changing The Proposal:
Include a justification for each change to the course. Particular attention should be paid to the effects of the course change within the discipline and in other disciplines where the course may be required within a major or used as a service course. When a unit submits several course changes, with or without new course proposals, a general statement covering the programmatic effects of the changes should be submitted.

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General Education Designation Requirements

Campuses That Have Offered (NUCE 309) Over The Past 4 Years

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Blue Sheet Item #: 
Review Date: 

SCRID Numbers
(NUCE 309): 

Review History (not subject to comparison)
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Head of Department

Recipient Name: KAREN THOLE
Department: (Not Available)
Position: Head of Department
Campus: UNIVERSITY PARK CAMPUS
Title: 
Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

SCCA Representative

Recipient Name: ROBERT MELTON
Department: (Not Available)
Position: SCCA Representative
Campus: UNIVERSITY PARK CAMPUS
Title: 
Concur: [Not Yet Reviewed]
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<td>CORTNEY SMITH</td>
<td>(Not Available)</td>
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<td>CYNTHIA ZOOK</td>
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<td>KADI CORTER</td>
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SCCA Review

Recipient Name: CORTNEY SMITH  
Position: SCCA Review  
Department: (Not Available)  
Campus: UNIVERSITY PARK CAMPUS  
Title:  
Concur: [Not Yet Reviewed]  
Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]

Recipient Name: CYNTHIA ZOOK  
Position: SCCA Review  
Department: (Not Available)  
Campus: UNIVERSITY PARK CAMPUS  
Title:  
Concur: [Not Yet Reviewed]  
Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]

Recipient Name: KADI CORTER  
Position: SCCA Review  
Department: (Not Available)  
Campus: UNIVERSITY PARK CAMPUS  
Title:  
Concur: [Not Yet Reviewed]  
Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]

Faculty Senate Review

Recipient Name: CORTNEY SMITH  
Position: Faculty Senate Review  
Department: (Not Available)  
Campus: UNIVERSITY PARK CAMPUS  
Title:  
Concur: [Not Yet Reviewed]  
Comments: [Not Yet Reviewed]
Recipient Name: KADI CORTER
Position: Faculty Senate Review
Department: (Not Available)
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]
Proposal Designation: Service Enterprise Engineering
This is a proposed Add to Undergraduate Stand Alone Minor

Initiators

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<tr>
<th>Name</th>
<th>User ID</th>
<th>College</th>
<th>Department</th>
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<tr>
<td>Vittaldas Prabhu</td>
<td>vxp7</td>
<td>Engineering (EN)</td>
<td>Not Available</td>
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<tr>
<td>Arunachalam Ravindran</td>
<td>axr32</td>
<td>Engineering (EN)</td>
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</tr>
</tbody>
</table>

College with curricular responsibility: Engineering (EN)

Program Definition

Effective Semester: Upon Approval

Offering College(s)

- **ENGINEERING**
- Engineering
- Health and Human Development
Objectives and Justification

Objectives:

Service sector represents over 80% of the economy and represents over 70% of jobs in the U.S. Service enterprises constitute a wide range in terms of labor intensity, information intensity, and prevailing productivity. Examples of service enterprises include hospitals, retailers, banks, financial institutions, energy, and airlines. This minor is designed for students interested in learning about applying industrial engineering techniques to service enterprises. Students completing this minor will gain an understanding of applying industrial engineering and operations research tools for modeling, analysis, design and control of service enterprises. A grade of C or better is required for all courses in the minor.

Justification:

Educational objective of the industrial engineering program is to have graduates, within a few years, participate in and lead cross-functionally defined project teams, designing, implementing, and improving processes and systems in a variety of industries of which the service industry in an important one. Over the last several years courses and cases studies have been developed to enhance the service enterprise engineering content in the curriculum. These are all consistent with the objectives of the college and university. About 40% of the graduates are employed in the service industry, and adding this minor would help graduates in their profession.

The revised SEE Minor has courses from Engineering and HHD – this revision has been made in close collaboration between IE and HHD with full cognizance of course pre-requisites. Non-IE students may take MATH 484 instead of IE 405.

As per Penn State’s policy:

• A minor program may consist of course work in a single area or from several disciplines
• Entrance to some minors may require the completion of a number of prerequisite courses that are not included in the total requirements for the minor.

Source: http://senate.psu.edu/curriculum/guide-to-curricular-procedures/baccalaureate-degree-curriculum/#minors

Proposal Outline

CIP Code: 143501

Faculty Member(s) in Charge:

Name: VITTALDAS PRABHU (VXP7)
Title: PROFESSOR INDUSTRIAL ENGR
Phone: +1 814 863 3212
Address: 0310 LEONHARD BUILDING
Campus: UP
City:
Fax:

Program Description:

Service sector represents over 80% of the economy and represents over 70% of jobs in the U.S. Service enterprises constitute a wide range in terms of labor intensity, information intensity, and prevailing productivity. Examples of service enterprises include hospitals, retailers, banks, financial institutions, and airlines. This minor is designed for students interested in learning about applying industrial engineering techniques to service enterprises. Students completing this minor will gain an understanding of applying industrial engineering and operations research tools for modeling, analysis, design and control of service enterprises.

In addition to the stated courses for the minor, students in IE pursuing this minor may require HPA 301 or HDFS 129. Students in HPA, HDFS and any other major will require MATH 220 as a pre-requisite for IE 405. IE 405 and IE 322 (or an equivalent course in probability and statistics) are pre-requisites for IE460.

For a MINOR in Service Enterprise Engineering a minimum of 18 credits are required.

Scheduling Recommendation by Semester Standing Given Like (Sem: 1-2)
Academic Outline

REQUIREMENTS FOR THE MINOR:
A minimum of 18 credits are required

COMMON REQUIREMENTS FOR THE Minor: (9 18 Credits)

PRESCRIBED COURSES (18 6 Credits)
IE 302 [1]
IE 460 (3), IE 478 (3)

ADDITIONAL COURSES (12 Credits) [1]

Select a 6-credits from Engineering Cluster (Sem: 5-8)
IE 322 (3), IE 3 (Sem: 5-8)
IE 323 (3) (Sem: 5-8)
IE 330 (3) (Sem: 5-8)
IE 402 (3) (Sem: 5-8)
IE 405 (3); MATH 484 (3)
IE 424 (3) (Sem: 5-8)
IE 467 (3) (Sem: 5-8)
IE 468 (3) (Sem: 5-8)
IE 480 WAC3 (Sem: 5-8)

Select a 6-credits from the Service Cluster (Sem: 5-8)
HPA 332 (3), HPA 466 HPA 433 (3), HPA 478 HPA 442 (3), HPA 475 (3), HDFS 311 (3), HDFS 455 (3)

Courses modified by this proposal
MATH 484 (3)

Academic Program Costing Analysis Form
Anticipated Costs:
Costs are anticipated but will be covered with existing departmental funds.

Curricular Information
Blue Sheet Item #:
Review Date:

Program Codes
ENGINEERING

Engineering:
Health and Human Development:

Option Codes
Service Enterprise Engineering:

UPLOADED DOCUMENTS:
Review History *(not subject to comparison)*

This section represents all consultation history that has occurred on this proposal

Legend

- Approve
- Rejected
- Waiting Review
- User Action Required
- Pending Action(s)
- Moved to Rejected Status
- Approved
- (#) - Review Order Sequence Number

Consultation

**Recipient Name:** DAVID BRADLEY SPENCER - AEROSP

**Department:** AEROSPAC ENGINEERING

**Position:** Consultation

**Campus:** UNIVERSITY PARK CAMPUS

**Title:** PROFESSOR AEROSPAC ENGR

(5) **Request sent:** 2/29/2016 at 9:32 AM

**Concur:** No, this proposal needs significant changes

**Comments:** I agree with Dave Salvia. Is this a minor that anyone in the COE can get, or is it just IE students. This needs to be clearer.

**Reviewed On:** 3/3/2016 at 3:06 PM

**Initiator Comments:** Thank you for your feedback. I was on travel hence the tardy response. While the SEE Minor is primarily targeted at IE students it is open to any students. Over time our intent is to grow this not only beyond IE but also beyond engineering. HHD has some interest; Smeal and IST may be interested on the long run. We feel it is prudent to start modestly, show success before trying something too big, especially given the potential resource crunch we all may face. There is
very strong alumni support for this which may be useful source of resources down the road.

(14) Request sent: 4/4/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 4/11/2016 at 7:15 AM

Recipient Name: DAVID SALVIA - E E  Department: Electrical Engineering
Position: Consultation  Campus: UNIVERSITY PARK CAMPUS
Title: ASST PROF ELECT. ENGR.

(4) Request sent: 2/29/2016 at 9:32 AM
Concur: No, this proposal needs significant changes
Comments: This minor appears to be ONLY for IE students. Aren't minors supposed to be for the university population as a whole? If this minor IS intended for other students, will the controls on the IE courses be such that other students can get into the courses?
Reviewed On: 3/1/2016 at 10:56 AM
Initiator Comments: Thank you for your feedback. I was on travel hence the tardy response. While the SEE Minor is primarily targeted at IE students it is open to any students. Over time our intent is to grow this not only beyond IE but also beyond engineering. HHD has some interest; Smeal and IST may be interested on the long run. We feel it is prudent to start modestly, show success before trying something too big, especially given the potential resource crunch we all may face. There is very strong alumni support for this which may be useful source of resources down the road.

(12) Request sent: 4/4/2016 at 7:30 AM
Concur: No, this proposal needs significant changes
Comments: As others and I have previously noted, this is clearly not a minor for the university population. It is really an option within IE and should be proposed as such. If the intent is really to make this minor accessible to others in the future, then the number of "hidden prerequisites" needs to be lower. In addition to the courses listed for the minor, the following IE courses are hidden prerequisites -- effectively limiting this minor to IE students: IE 405, IE 330.
Initiator Comments: The SEE Minor proposal has been revised in collaboration with College of Health and Human Development to include 6 credits from HHD called "Service Cluster", 6 credits of "Engineering Cluster" and 6 credits of required courses. Details are included below.

Service Enterprise Engineering Minor
University Park, College of Engineering
[Brief motivation and description 100 words]
Service sector represents over 80% of the economy and represents over 70% of jobs in the U.S. Service enterprises constitute a wide range in terms of labor intensity, information intensity, and prevailing productivity. Examples of service enterprises include hospitals, retailers, banks, financial institutions, and airlines. This minor is designed for students
interested in learning about applying industrial engineering techniques to service enterprises. Students completing this minor will gain an understanding of applying industrial engineering and operations research tools for modeling, analysis, design and control of service enterprises. A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits
PREScribed COURSES (6 credits)
I E 460 (3), I E 478 (3) (Sem: 7-8)
ADDITIONAL COURSES (12 credits)
Select 6 credits from the engineering cluster AND select 6 credits from any one of the services cluster (Sem: 5-8)

Engineering Cluster (6 credits)

Services Cluster (6 credits)
Health Policy Administration
HPA332 Health Systems Management
HPA433 Administration of Hospital & Health Services
HPA442 Long-term Care
HPA475 Health Care Quality Human Development and Family Studies
HDFS311 Intro to Human Dev & Family Studies Interventions
HDFS455 Development & Administration of Human Services Programs

Request sent: 9/30/2016 at 4:36 PM
Concur: No, this proposal needs significant changes
Comments: Although I appreciate your efforts in addressing my concerns, I don't think that these changes addressed my main concern that this minor can realistically be completed ONLY by IE students. IE 460 (a required course in this minor) has IE 322 and IE 405 as prerequisites. IE 478 (another required course in the minor) has IE 330 as a prerequisite. This minor is still an IE-exclusive minor and should really be cast as an option within the IE major, not as a minor.

Reviewed On: 9/30/2016 at 9:28 PM
Initiator Comments: Two departments in HHD, HPA and HDFS, have approved it for their students as per the current version of the proposal. The Associate Dean of HHD has worked closely in revising this proposal and is highly supportive of this. So your position that "this minor is still an IE-exclusive minor" does not hold (as noted earlier there is nothing wrong with an "IE only minor" per Penn State’s policy)..

Request sent: 10/6/2016 at 4:50 PM
Concur: Yes
Comments: I still have some concerns about this minor not having a wide appeal because the prerequisite string is quite long, but I am ok with the proposal now.
Reviewed On: 10/6/2016 at 5:01 PM
Title: INSTR

(8) Request sent: 3/14/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/15/2016 at 7:15 AM

Recipient Name: ERIC MARSH - M E and NUC E
Department: MECHANICAL ENGINEERING
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: PROFESSOR OF MECH ENGR

(2) Request sent: 2/29/2016 at 9:32 AM
Concur: Yes
Comments:
Reviewed On: 2/29/2016 at 10:14 AM

Recipient Name: JOHN JOSEPH HANNAN - C S E
Department: COMPUTER SCIENCE AND ENGINEERING
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: INTRM ASC HEAD CMPSCI&ENG

(3) Request sent: 2/29/2016 at 9:32 AM
Concur: Yes
Comments:
Reviewed On: 2/29/2016 at 11:55 AM

Recipient Name: LUCAS JAY PASSMORE - E S M
Department: ENGINEERING SCIENCE AND MECHANICS
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: Assistant Professor

(9) Request sent: 3/14/2016 at 7:30 AM
Concur: Yes
Comments: (Completed By Default - Exceeded Time Limit)
Reviewed On: 3/15/2016 at 7:15 AM

Recipient Name: MARGARET SLATTERY - BME
Department: BIOMEDICAL ENGINEERING
(1) **Request sent:** 2/29/2016 at 9:32 AM

**Concur:** Yes

**Comments:** In theory I concur with the objectives and goals of the minor, but there are a couple things that need to be addressed. Wearing my hat of chair of Curricular Affairs for the University - you MUST update the program description to list all the prerequisites a student would need to take before they can take the prescribed courses. This is so if any student who is not an IE major is interested in the minor they are fully aware of the prerequisites required for them to be prepared to start the minor. For example, I know that at the ACUE review HHD was interested in this minor/area, but their students would likely not be prepared to take this minor without several semesters of prerequisites. Since this minor is apparently only intended for IE students - it will be helpful to have a statement why this is a minor, not an option or track within the major. Wearing my hat as Director of the Learning Factory - Is there a process in place to make sure that students who need the "service-sector" design project will be assigned such a project. All of the IE capstone projects are run through the learning factory and as new strategies are being discussed w.r.t. assigning students to teams in light of rising enrollments, special requests are harder (but not impossible) to accomplish. It would be useful to have consultation from Mike Immel to address this.

**Reviewed On:** 2/29/2016 at 9:52 AM

(6) **Request sent:** 2/29/2016 at 9:32 AM

**Concur:** No, this proposal needs significant changes

**Comments:** Given that all the prescribed courses are IE and there are not courses from other departments that can even be used as selections, Service Enterprise Engineering seems more like an option within the IE major as opposed to a minor. A better justification of this focus as a minor is needed (why not just create options within IE?).

**Reviewed On:** 3/3/2016 at 3:59 PM

**Initiator Comments:** Thank you for your feedback. I was on travel hence the tardy response. While the SEE Minor is primarily targeted at IE students it is open to any students. Over time our intent is to grow this not only beyond IE but also beyond engineering. HHD has some interest; Smeal and IST may be interested on the long run. We feel it is prudent to start modestly, show success before trying something too big, especially given the potential resource crunch we all may face. There is very strong alumni support for this which may be useful source of resources down the road.

(13) **Request sent:** 4/4/2016 at 7:30 AM

**Concur:** No, this proposal needs significant changes

**Comments:** I don't feel the proposal has adequately addressed the previous comments (such as providing a justification for SEE as a minor instead of an option). If the goal is to have a minor that engages IST, Smeal, and HHD, it seems to me that all parties should be involved in the development of the minor.

**Reviewed On:** 4/5/2016 at 6:35 PM

**Initiator Comments:** The SEE Minor proposal has been revised in collaboration with College of Health
and Human Development to include 6 credits from
HHD called "Service Cluster", 6 credits of
"Engineering Cluster" and 6 credits of required
courses. Details are included below.

Engineering

Service Enterprise Engineering Minor
University Park, College of Engineering

[Brief motivation and description 100 words]

Service sector represents over 80% of the economy
and represents over 70% of jobs in the U.S. Service
enterprises constitute a wide range in terms of labor
intensity, information intensity, and prevailing
productivity. Examples of service enterprises include
hospitals, retailers, banks, financial institutions, and
airlines. This minor is designed for students
interested in learning about applying industrial
engineering techniques to service enterprises.

Students completing this minor will gain an
understanding of applying industrial engineering and
operations research tools for modeling, analysis,
design and control of service enterprises.

A grade of C or better is required for all courses in
the minor.

Scheduling Recommendation by Semester Standing
given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (6 credits)
I E 460 (3), I E 478 (3) (Sem: 7-8)

ADDITIONAL COURSES (12 credits)
Select 6 credits from the engineering cluster AND
select 6 credits from any one of the services cluster
(Sem: 5-8)

Engineering Cluster (6 credits)
I E 302 (3), I E 322 (3), I E 323 (3), IE 330 (3), IE 402
(3), I E 405 (3) or MATH 484 (3), I E 424 (3), I E 467 (3),
IE 468(3), IE480W (3)

Services Cluster (6 credits)
Health Policy Administration
HPA332 Health Systems Management
HPA433 Administration of Hospital & Health
Services
HPA442 Long-term Care
HPA475 Health Care Quality

Human Development and Family Studies
HDFS311 Intro to Human Dev & Family Studies

Interventions
HDFS455 Development & Administration of Human
Services Programs

Request sent: 10/10/2016 at 7:30 AM

Concur: Yes

Comments: I think someone from HPA and HDFS should be included on the formal consultation of this proposal to show their support for this minor.

Reviewed On: 10/14/2016 at 5:21 PM
Head of Department

Recipient Name: JANIS TERPENNY
Position: Head of Department
Department: (Not Available)
Campus: UNIVERSITY PARK CAMPUS
Title:

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

SCCA Representative

Recipient Name: ROBERT MELTON
Position: SCCA Representative
Department: (Not Available)
Campus: UNIVERSITY PARK CAMPUS
### Dean of the College

<table>
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<tr>
<th>Recipient Name:</th>
<th>PETER BUTLER</th>
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<tr>
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<td>Dean of the College</td>
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### SCCA Subcommittee Review

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Title:

Request sent: 6/21/2016 at 3:05 PM
Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

SCCA Review

Recipient Name: CORTNEY SMITH
Department: (Not Available)
Position: SCCA Review
Campus: UNIVERSITY PARK CAMPUS
Title:

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Recipient Name: KADI CORTER
Department: (Not Available)
Position: SCCA Review
Campus: UNIVERSITY PARK CAMPUS
Title:

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Recipient Name: CYNTHIA ZOOK
Department: (Not Available)
Position: SCCA Review
Campus: UNIVERSITY PARK CAMPUS
Title:

Faculty Senate Review

Recipient Name: CORTNEY SMITH
Department: (Not Available)
Position: Faculty Senate Review
Campus: UNIVERSITY PARK CAMPUS
Title:

Request sent: 6/21/2016 at 3:05 PM
Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]
Recipient Name: KADI CORTER  Department: (Not Available)
Position: Faculty Senate Review  Campus: UNIVERSITY PARK CAMPUS
UPLOADED DOCUMENTS FOLLOW:
Engineering
Service Enterprise Engineering Minor
University Park, College of Engineering

[Brief motivation and description 100 words]

Service sector represents over 80% of the economy and represents over 70% of jobs in the U.S. Service enterprises constitute a wide range in terms of labor intensity, information intensity, and prevailing productivity. Examples of service enterprises include hospitals, retailers, banks, financial institutions, and airlines. This minor is designed for students interested in learning about applying industrial engineering techniques to service enterprises. Students completing this minor will gain an understanding of applying industrial engineering and operations research tools for modeling, analysis, design and control of service enterprises.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (18 credits)
I E 302 (3), I E 322 (3), I E 323 (3) (Sem: 5-6)
I E 460 (3), I E 478 (3) (Sem: 7-8)

ADDITIONAL COURSES (3 credits)

Select a 3-credit senior capstone design project in service engineering in IE480 W, as approved by the coordinator (Sem: 7-8)

OR

Select a 3-credit CoOp or Internship in service engineering, as approved by the coordinator (Sem: 5-8)

OR

IE 402 (3), IE 467 (3), IE 468(3) (Sem: 7-8)
DATE: February 9, 2016

FROM: Jacqueline Edmondson

TO: Peter J. Butler

Thank you for the submission of your P-1 prospectus to add the new Service Enterprise Engineering Minor. The ACUE Prospectus Committee has reviewed your prospectus. In line with AAPPM P-1 criteria and consultation, you may now move to the formal P-1 submission process.

cc: David J. Christiansen
    Kadi K. Corter
    Anna M. Griswold
    Daniel R. Hagen
    Tracy S. Hoover
    Robert N. Pangborn
    Margaret J. Slattery
Engineering

Service Enterprise Engineering Minor
University Park, College of Engineering

[Brief motivation and description 100 words]

Service sector represents over 80% of the economy and represents over 70% of jobs in the U.S. Service enterprises constitute a wide range in terms of labor intensity, information intensity, and prevailing productivity. Examples of service enterprises include hospitals, retailers, banks, financial institutions, and airlines. This minor is designed for students interested in learning about applying industrial engineering techniques to service enterprises. Students completing this minor will gain an understanding of applying industrial engineering and operations research tools for modeling, analysis, design and control of service enterprises.

A grade of C or better is required for all courses in the minor.

Scheduling Recommendation by Semester Standing given like (Sem: 1-2)

REQUIREMENTS FOR THE MINOR: 18 credits

PRESCRIBED COURSES (6 credits)
I E 460 (3), I E 478 (3) (Sem: 7-8)

ADDITIONAL COURSES (12 credits)

Select 6 credits from the engineering cluster AND select 6 credits from any one of the services cluster (Sem: 5-8)

Engineering Cluster (6 credits)
I E 302 (3), I E 322 (3), I E 323 (3), IE 330 (3), IE 402 (3), IE05 (3) or MATH 484 (3), IE 424 (3), IE 467 (3), IE 468 (3), IE480W (3)

Services Cluster (6 credits)

Health Policy Administration
HPA332 Health Systems Management
HPA433 Administration of Hospital & Health Services
HPA442 Long-term Care
HPA475 Health Care Quality

Human Development and Family Studies
HDFS311 Intro to Human Dev & Family Studies Interventions
HDFS455 Development & Administration of Human Services Programs
Dear Vittal:

Many thanks for including the Department of Health Policy and Administration (HPA) in the development of the Service Enterprise Engineering Minor. We believe the minor will fill an important gap in the health care sector. The HPA courses that are a part of the minor HPA332 Health Systems Management, HPA433 Administration of Hospital & Health Services, HPA442 Long-term Care and HPA475 Health Care Quality will all benefit with the addition of students having an engineering focus. HPA 433, 442, and 475 all have HPA 332 as a prerequisite. HPA 332 has HPA 211 Financial Decisions in Health Care Organizations and HPA 101 Introduction to Health Care Organizations. HPA is willing to waive the HPA 211 prerequisite (which has a prerequisite of HPA 210 Health Care Payment) to facilitate student enrollment in this minor. While HPA 210 and 211 are important to students majoring in HPA they are less so for students enrolling in the Service Enterprise Engineering Minor (students in this minor will receive exposure to the concepts in HPA 210 and 211 in HPA 101).

HPA is very excited about the Service Enterprise Engineering Minor and are happy to support its development and implementation.

Best regards,

Mark Sciegaj, Ph.D., MPH  
Professor of Health Policy and Administration  
Professor-in-Charge, Bachelor of Science Degree in Health Policy and Administration  
College of Health and Human Development  
(814) 863-2861  e-mail: mxs838@psu.edu

cc: Dennis Shea, Ph.D.
November 4, 2016

Vittal Prabhu, Ph.D.
College of Engineering
The Pennsylvania State University

Dear Vittal:

Thank you for reaching out to Human Development and Family Studies about the possibility of our participation in the Service Enterprise Engineering Minor. The proposed minor would be an excellent complement for HDFS majors, many of whom are entering human services professions where standards of evidence-based management and decision-making are increasingly influential. In addition, we would welcome engineering students taking HDFS classes where they can gain a useful perspective on how engineering principles could be applied in the context of human services systems. I look forward to providing whatever support I can as you pursue the proposal for this new minor, and to supporting the first cohorts of minors in the coming years.

Sincerely,

Scott D. Gest, Ph.D.
Professor, Human Development & Family Studies
Professor-in-Charge, HDFS Undergraduate Program
gest@psu.edu
814-865-3464
November 4, 2016

Vittal Prabhu, Ph.D.
College of Engineering
The Pennsylvania State University

Dear Vittal:

It’s been great working with you to include the College of Health and Human Development in the Service Enterprise Engineering Minor. I believe the minor will give our students in Health Policy and Administration and Human Development and Family Studies an outstanding minor to complement their major, as many employers are looking for individuals skilled in bringing engineering principles into health and human services organizations. In addition, engineering students can gain a great perspective on the unique challenges for the application of engineering in the services fields by taking courses in HPA and HDFS. I am looking forward to seeing the collaborative opportunities for students and faculty that I think this minor will spur.

Sincerely,

Dennis G. Shea, Ph.D.
Associate Dean of Undergraduate and Outreach Programs
Graduate Faculty Nominations:
   Category R - Approved
   • Timothy Eden
   • Catherine Berdanier

Program Proposals:
   Approved:
   • Removal of Integrated BS-MS degree in ME - Approved

Course Proposals:
   Returned to Proposer for Changes
   • ACS 525_Add - Nonlinear Acoustics
   • ME 532_Change-Turbulent and Two-Phase Combustion

   Approved
   • ESC 545_Add - Scientific and Engineering Foundations of Additive Manufacturing: Approved
   • IE 527_Add - Introduction to Additive Manufacturing
   • IE 573_Add - Manufacturing with Materials
# EFC Proposal Report

**Recommendation of Proposal Actions**

from the GS&R Committee

**Prepared for November 22, 2016 EFC Meeting**

## Proposals Submitted to EFC

<table>
<thead>
<tr>
<th>Proposal Type</th>
<th>Title</th>
<th>Mnemonic</th>
<th>One Year Masters (OYMM)</th>
<th>Number or Degree</th>
<th>Action Requested (Add/Change/Drop)</th>
<th>Vote</th>
<th>Justification (Why/What for)</th>
<th>Summary of Discussion Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course</td>
<td>Scientific and Engineering Foundations of Additive Manufacturing</td>
<td>ESC 545</td>
<td>Add</td>
<td>Approve</td>
<td>The institutional objectives of this course are to integrate the physics of energy-material interactions with thermal modeling and microstructural development during three-dimensional build processes to develop novel additively manufactured constructs and components with a broad spectrum of engineering applications. The educational objectives will relate the impact of additive manufacturing to products, services, and society. Students will be required to employ engineering and scientific journal articles in the readings and homework for this course. The course objective is to develop engineers who will positively impact societal change by creating additively manufactured, customized, near-net shaped parts and components that conserve materials and minimize waste compared to traditionally machined products. After successfully completing this course, students will be able to: (1) recommend appropriate materials, processes, and systems for additively manufactured builds, complex shapes, parts and full-scale components; (2) integrate analytical, quantitative and modeling approaches with experimental validation; (3) designate appropriate post-processing, finishing, and mechanical property evaluation methods for optimizing component properties and dimensions; and (4) translate this knowledge to a broad spectrum of additive manufacturing technologies.</td>
<td>Topics to be covered appear in two sections. Is this necessary? Other than the course looks fine to me. Would recommend an additional course objective to correspond to the written review of assigned papers (e.g. &quot;critically evaluate relevant literature&quot; or similar).</td>
<td></td>
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<tr>
<td>Course</td>
<td>Manufacturing with Materials</td>
<td>IE 675</td>
<td>Add</td>
<td>Approve</td>
<td>As manufacturing engineer or supply chain professional can do their job effectively without a knowledge of the material and manufacturing process decisions that impact supply chain components and supply chain stability. The purpose of this course is to introduce you to critical material and manufacturing process relationships that drive the availability, cost and lead time of both internally manufactured and critical supply chain components. In this course, we will examine the complex interaction between the design of a component and the selection of the best material and manufacturing process sequence to make that component. Under a brief outline or overview of the course content there is a listing of learning objectives or course outcomes. This should be a narrative that gives the snapshot of the course. Is this mention of UPEN_IME under Department with Curricular responsibility a typo? Its own page 1 close to the top. Other than these two things the course looks fine to me.</td>
<td></td>
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<tr>
<td>Course</td>
<td>Introduction to Additive Manufacturing</td>
<td>IE 627</td>
<td>Add</td>
<td>Approve</td>
<td>Learn the basic process steps of the Digital Work Flow from Design to Manufactured AM parts • Understand the various software tools, processes and techniques that enable advanced/additive manufacturing • Learn the fundamentals of various additive manufacturing (AM) processes using polymers, metals, and other material and understand the operating principles, capabilities, and limitations of AM processes • Gain hands-on experience with AM machines and understand the complete process steps through design, fabrication, and measurement of example parts. • Study the range of applications of AM across the spectrum of industries (e.g. aerospace/automotive, medical devices, and consumer products) while developing the understanding of the requirements, constraints, and business case for the applications. • Be able to evaluate and select appropriate AM technologies for specific applications • AM's role in the future of manufacturing and digital transformation of manufacturing All members who commented were in favor of this proposal.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Program</td>
<td>Integrated BS and MS in Mechanical Engineering</td>
<td>IE 85</td>
<td>Drop</td>
<td>Approve</td>
<td>The Department of Mechanical &amp; Nuclear Engineering proposes dropping the Integrated BS-MS degree in Mechanical Engineering for the following reasons: 1. There has been very little student participation in the Integrated BS-MS degree program. Over the past ten years, only four students have completed the degree, with a fifth student entering the program but not completing the MSME degree. 2. Following the BSME degree, it is difficult for students to finish the requirements for the MSME degree in only one year. The coursework and research components of the MSME degree typically require two years. 3. It is difficult for students to find an MS advisor to support them in thesis research since they are a graduate student for only one year. This change does not affect other units, therefore no consultation has been done. All members who commented were in support of this proposal.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Graduate Council Subcommittee On New And Revised Programs and Courses

COURSE SUBMISSION AND CONSULTATION FORM

Principal Faculty Member(s) Proposing Course

<table>
<thead>
<tr>
<th>Name</th>
<th>User ID</th>
<th>College</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>RICHARD MARTUKANITZ</td>
<td>rxm44</td>
<td>(XX)</td>
<td>Not Available</td>
</tr>
<tr>
<td>EDWARD WILLIAM REUTZEL</td>
<td>ewr101</td>
<td>(XX)</td>
<td>Not Available</td>
</tr>
<tr>
<td>ABDALLA RAMADAN NASSAR</td>
<td>arn5000</td>
<td>(XX)</td>
<td>Not Available</td>
</tr>
<tr>
<td>JUDITH TODD</td>
<td>JAT20</td>
<td>Engineering (EN)</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

College with curricular responsibility: Engineering (EN)

Type of Proposal: [ ] Add [ ] Change [ ] Drop

Course Designation

(E SC 545) Scientific and Engineering Foundations of Additive Manufacturing

Course Information

Cross-Listed Courses:
None

Prerequisites:
None

Corequisites:
None

Concurrents:
None

Recommended Preparations:
E MCH 315, E SC 414M, E SC 404H Or equivalent or consent of instructor

Abbreviated Title: Sci Eng AM

This course will be delivered:
- [x] in residence
- [x] off-site
- [x] online

Bulletin Listing

Minimum Credits: 4
Maximum Credits: 4
Repeatable: NO
Department with Curricular Responsibility: Engineering Science And Mechanics (UPEN_ESCM)
Effective Semester: FA 2017
Course Outline

A brief outline or overview of the course content:
This course addresses the scientific and engineering foundations of emerging topics in additive manufacturing (AM). Analytical, quantitative and modeling approaches are integrated with experimental validation.

Topics will include:
1. fundamentals of AM systems and subsystems
   • energy sources, optics and optical modeling, delivery systems, scanning and material feed systems, control systems, among others;
2. physics of energy-materials interactions;
3. materials’ response to process variables;
   • energy and mass transport during additive manufacturing
   • impact of process parameters on the build
   • overview of thermal models for single track, multi-track, and multi-layer builds;
   • characterization of microstructures and properties of selected material builds;
   • optimization of deposition parameters to minimize defects and residual stress in builds;
4. in-process sensing, monitoring and feedback controls for build optimization;
5. post-processing (finishing, heat treatment, inspection, defect analyses);
6. optimization of component properties and dimensions; and
7. applications and impacts of additive manufacturing technologies

A listing of the major topics to be covered with an approximate length of time allotted for their discussion:
1. Fundamentals of AM systems and subsystems (3 weeks)
   a. energy sources for additive,
   b. Propagation and manipulation of energy sources
   c. Mass transport of precursor materials
   d. Optics fundamentals and optical modeling
   e. System components and design
   f. System and subsystems controls
2. physics of energy-materials interactions (3 weeks)
   a. energy materials interactions
   b. energy-feedstock interactions (powder feed/powder bed/particulate/wire)
   1. polymer/metal/ceramic interactions
   c. energy coupling during heating, sintering, melting, vaporization, plasma interactions
3. materials’ response to process variables (3 weeks)
   a. energy and mass transport during additive manufacturing
   b. impact of process parameters
   c. overview of thermal models for single track, multi-track, and multi-layer builds;
   d. characterization of microstructures and properties of selected material builds;
   e. mechanical property characterization
   f. optimization of deposition parameters to minimize defects and residual stress in builds;
4. in-process sensing, monitoring and feedback controls for build optimization (2 weeks)
   a. physical characteristics of AM processes
   b. sensing technologies
   c. assessment of build quality
   d. sensor feedback for process control
5. post-processing for geometry, micro/macrostructure, residual stress control (2 weeks)
   a. finishing (machining, batch finishing)
   b. annealing and heat treatment
   c. hot isostatic pressing (HIPing)
   d. defect inspection and analyses, NDE
6. optimization of component properties and dimensions (1 week)
7. applications and impacts of additive manufacturing technologies (1 week)

Course Description:
In additive manufacturing (AM), components are fabricated via sequential joining using a bonding agent, curing, sintering, or fusing. AM fabrication of metals, ceramics, polymers, and organics have been demonstrated and are actively being used in industry and academia. E SC 545 explores these processes with a focus on the fundamentals of sintering and fusion of metals, ceramics and polymers. The topic is multi-disciplinary, requiring examination of individual AM system components, the physics of energy-material interactions, and the materials science at play during heat-reheat cycles. Opportunities for process sensing and real-time control are explored, as well as and the role of post-process technologies in realizing serviceable components. These topics will lead to a discussion of methods and strategies to optimize component properties and characteristics. Current and potential
impacts of AM on society are also covered.

The name(s) of the faculty member(s) responsible for the development of the course:

- Name: RICHARD MARTUKANITZ (rxm44)
  Title: SR RES ASC
  Phone: +1 814 863 7282
  Address: 4400D APPLIED SCIENCE BLDG
  Campus: UP
  City: 
  Fax: 

- Name: EDWARD REUTZEL (ewr101)
  Title: RESEARCH ASSOCIATE
  Phone: +1 814 863 9891
  Address: 4420D APPLIED SCIENCE BLDG
  Campus: UP
  City: 
  Fax: 

- Name: ABDALLA NASSAR (arn5000)
  Title: RES ASSOC ENGR SCI & ME
  Phone: +1 814 863 7140
  Address: 4420M THE 230 BUILDING
  Campus: UP
  City: 
  Fax: 

- Name: JUDITH TODD (JAT20)
  Title: HEAD/PROF ESM
  Phone: +1 814 863 0771
  Address: 0212 EARTH & ENGR SCIENCES
  Campus: UP
  City: 
  Fax: 

CIP Code: 141301

Course Justification

Instructional, Educational, and Course Objectives:
This section should define what the student is expected to learn and what skills the student will develop.
The instructional objectives of this course are to integrate the physics of energy-material interactions with thermal modeling and microstructural development during three-dimensional build processes to develop novel additively manufactured constructs and components with a broad spectrum of engineering applications.

The educational objectives will relate the impact of additive manufacturing to products, services, and society. Students will be required to employ engineering and scientific journal articles in the readings and homework for this course.

The course objective is to develop engineers who will positively impact societal change by creating additively manufactured, customized, near-net shaped parts and components that conserve materials and minimize waste compared to traditionally machined products.

After successfully completing this course, students will be able to:
(1) recommend appropriate materials, processes, and systems for additively manufactured builds, complex shapes, parts and full-scale components;
(2) integrate analytical, quantitative and modeling approaches with experimental validation;
(3) designate appropriate post-processing, finishing, and mechanical property evaluation methods for optimizing component properties and dimensions; and
(4) translate this knowledge to a broad spectrum of additive manufacturing technologies

Evaluation Methods:
Include a statement that explains how the achievement of the educational objective identified above will be assessed. The procedures for determining students’ grades should be specifically identified.
The course evaluation methods will include homework assignments, which may include written review of assigned papers (20% of the grade), a midterm examination (30% of the grade), and a term project (50% of the grade).

Relationship/Linkage of Course to Other Courses:
This statement should relate the course to existing or proposed new courses. It should provide a rationale for the level of instruction, for any prerequisites that may be specified, or for the course’s role as a prerequisite for other courses.
E SC 545 is one of five core courses proposed for the new Master of Science degree in Additive Manufacturing and Design.
The other four courses are:
EDSGN 562 Design for Additive Manufacturing
IE 587 Additive Manufacturing Processes
MatSE 567 Additive Manufacturing of Metallic Materials
ME 566 Additive Manufacturing Laboratory

Relationship of Course to Major, Option, Minor, or General Education:
This statement should explain how the course will contribute to the major, option, or minor and indicate how it may function as a service course for other departments.
E SC 545 is a required core course for the proposed Master of Science degree in Additive Manufacturing and Design.

A description of any special facilities:
Experimental facilities in the Center for Innovative Materials processing by Direct Digital Deposition (CIMP-3D) and lasers in the Laboratory for Multiscale Wave-Materials Interactions may be used for demonstrations for this course.

Frequency of Offering and Enrollment:
It is anticipated that this course will be offered every Fall. At steady state enrollment of over 25 students/offering are anticipated.

Review History
This section represents all consultation history that has occurred on this proposal

**Legend**
- **✓** Approve
- **×** Rejected
- **??** Waiting Review
- **User Action Required**
- **!!** Pending Action(s)
- **→** Moved to Rejected Status
- **👍** Approved
- **(#)** - Review Order Sequence Number

**Consultation**
- **Recipient Name:** ALLISON MICHELLE BEESE
- **Department:** Materials Science And Engineering
- **Position:** Consultation
- **Campus:** UNIVERSITY PARK CAMPUS
- **Title:** Assistant professor
Recipient Name: CHENG DONG  
Department: Biomedical Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: DEPT HEAD/DIST. PROF BIO

Recipient Name: JANIS TERPENNY  
Department: Industrial And Manufacturing Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: DEPT HEAD & PROF INDUSTL

Recipient Name: KAREN THOLE  
Department: Mechanical Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: DEPT HEAD MNE

Recipient Name: PHILIP JOHN MORRIS  
Department: Aerospace Engineering  
Position: Consultation  
Campus: UNIVERSITY PARK CAMPUS  
Title: BOEING PROFESSOR OF AERSP
<table>
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<tr>
<th>Request</th>
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<th>Concur</th>
<th>Comments</th>
<th>Reviewed On</th>
<th>Title</th>
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<td>5</td>
<td>9/7/2016</td>
<td>Yes</td>
<td></td>
<td>9/8/2016</td>
<td>PROF/DEPT HEAD CHEM ENGR</td>
<td>PHILLIP SAVAGE</td>
<td>Chemical Engineering</td>
<td>UNIVERSITY PARK CAMPUS</td>
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<tr>
<td>11</td>
<td>9/19/2016</td>
<td>Yes</td>
<td>(Completed By Default - Exceeded Time Limit)</td>
<td>9/22/2016</td>
<td>ASSOC PROF ENGR SCI MECH</td>
<td>REGINALD FELIX HAMILTON</td>
<td>Engineering Science And Mechanics</td>
<td>UNIVERSITY PARK CAMPUS</td>
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<td>7</td>
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<td>Yes</td>
<td></td>
<td>9/19/2016</td>
<td>PROFESSOR I &amp; MSE</td>
<td>SANJAY JOSHI</td>
<td>Industrial And Manufacturing Engineering</td>
<td>UNIVERSITY PARK CAMPUS</td>
</tr>
<tr>
<td>2</td>
<td>9/7/2016</td>
<td>Yes</td>
<td></td>
<td>9/7/2016</td>
<td>Professor and Department Head</td>
<td>SUSAN SINNOTT</td>
<td>Materials Science And Engineering</td>
<td>UNIVERSITY PARK CAMPUS</td>
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</table>
(6) Request sent: 9/7/2016 at 12:12 PM  
Concur: Yes  
Comments: Just a quick thing to update, degree is "Master of Science degree in Additive Manufacturing and Design" so please designate as such in the proposal.  
Reviewed On: 9/7/2016 at 2:26 PM  
Initiator Comments: Update made as requested. Thank you!!

Recipient Name: SVEN BILEN  
Department: School of Engr Design, Technology and Prof Prgrms  
Position: Consultation  
Title: DEPT HEAD/SEDTAPP  
Campus: UNIVERSITY PARK CAMPUS

(4) Request sent: 9/7/2016 at 12:12 PM  
Concur: Yes  
Comments: Just a quick thing to update, degree is "Master of Science degree in Additive Manufacturing and Design" so please designate as such in the proposal.  
Reviewed On: 9/7/2016 at 2:26 PM  
Initiator Comments: Update made as requested. Thank you!!

Recipient Name: TIMOTHY WILLIAM SIMPSON  
Department: Mechanical Engineering  
Position: Consultation  
Title: PROF ME & IE  
Campus: UNIVERSITY PARK CAMPUS

(12) Request sent: 9/22/2016 at 9:46 AM  
Concur: Yes  
Comments:  
Reviewed On: 9/22/2016 at 10:42 AM

Recipient Name: JAMES A NEMES  
Department: Data Analytics  
Position: Consultation  
Title: PROFESSOR & DAA  
Campus: PENN STATE GREAT VALLEY

(9) Request sent: 9/19/2016 at 7:30 AM  
Concur: Yes  
Comments: Great outline and a very unique course offering. Thanks for proposing it!  
Reviewed On: 9/21/2016 at 8:43 PM

Recipient Name: JAMES A NEMES  
Department: Data Analytics  
Position: Consultation  
Title: PROFESSOR & DAA  
Campus: PENN STATE GREAT VALLEY

(13) Request sent: 10/5/2016 at 4:40 PM  
Concur: Yes  
Comments:
Head of Department

Recipient Name: JUDITH TODD
Position: Head of Department

Authorized By: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

SCCA Representative

Recipient Name: MATTHEW PARKINSON
Position: SCCA Representative

Authorized By: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Dean of the College

Recipient Name: PETER BUTLER
Position: Dean of the College

Authorized By: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Review on Behalf of the Dean of the Graduate School

Recipient Name: VICKI HEWITT
Position: Review on Behalf of the Dean of the Graduate School

Authorized By: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]
Feedback from the Graduate Council Joint Curricular Committee

Recipient Name: ROBERT BANNON  
Position: Feedback from the Graduate Council Joint Curricular Committee  
Department: (Not Available)  
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]  
Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]

Publication in the Senate Curricular Report

Recipient Name: CORTNEY SMITH  
Position: Publication in the Senate Curricular Report  
Department: (Not Available)  
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]  
Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]

Recipient Name: KADI CORTER  
Position: Publication in the Senate Curricular Report  
Department: (Not Available)  
Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]  
Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]
Curricular Information

Blue Sheet Item #:
Review Date:

**SCRID Numbers**

(E SC 545):

():
Graduate Council Subcommittee On New And Revised Programs and Courses

COURSE SUBMISSION AND CONSULTATION FORM

Principal Faculty Member(s) Proposing Course

<table>
<thead>
<tr>
<th>Name</th>
<th>User ID</th>
<th>College</th>
<th>Department</th>
<th></th>
</tr>
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<tbody>
<tr>
<td>SANJAY JOSHI</td>
<td>sbj4</td>
<td>Engineering (EN)</td>
<td>Not Available</td>
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</tbody>
</table>

College with curricular responsibility: Engineering (EN)

Type of Proposal: [ ] Add [ ] Change [ ] Drop

Course Designation

(IE 527) Introduction to Additive Manufacturing

Course Information

Cross-Listed Courses:

Prerequisites:
IE 463

Corequisites:

Concurrents:

Recommended Preparations:

Abbreviated Title: Intro to Add Manf

This course will be delivered:

[ ] in residence

[ ] off-site

[ ] online

Bulletin Listing

Minimum Credits: 3
Maximum Credits: 4
Repeatable: NO

Department with Curricular Responsibility: Industrial And Manufacturing Engineering (UPEN_IME)

Effective Semester: FA 2017
Travel Component: NO

Course Outline

A brief outline or overview of the course content:
This will be a comprehensive survey of the various Additive Manufacturing processes, with focus on the process characteristics,
process variables and models, and practical applications.

A listing of the major topics to be covered with an approximate length of time allotted for their discussion:
Digital Work Flow for AM (3 weeks)
Reverse Engineering (2 weeks)
Design for Additive Manufacturing (1 week)
Energy Sources, Materials, and Material Interactions (2 weeks)
Additive Manufacturing Processes, Characteristics and Capability (6 weeks)
Applications and Case Studies (1 week)

4 credit version will require additional reading assignments and expanded course project.

Course Description:
The course will cover the basics of Additive Manufacturing (AM) processes. During the course the students will learn the basic process steps of the Digital Work Flow from Design to Manufactured AM parts. They will understand the various software tools, processes and techniques that enable advanced/additive manufacturing, learn the fundamentals of various additive manufacturing (AM) processes using polymers, metals, and other material and they will understand the operating principles, capabilities, and limitations of AM processes. In addition to theoretical knowledge, the students will gain hands-on experience with AM machines and understand the complete process steps through design, fabrication, and measurement of example parts. The students will study the range of applications of AM across the spectrum of industries (e.g. aerospace/automotive, medical devices, and consumer products) while developing the understanding of the requirements, constraints, and business case for the applications. The students will be able to evaluate and select appropriate AM technologies for specific applications and learn the role of AM in the future of manufacturing and digital transformation of manufacturing.

The name(s) of the faculty member(s) responsible for the development of the course:
Name: SANJAY B JOSHI (sbj4)
Title: PROFESSOR I & MSE
Phone: +1 814 865 2108
Address: 0310 LEONHARD BUILDING UNIVERSITY PARK UNIVERSITY PARK, PA 16802

Course Justification

Instructional, Educational, and Course Objectives:
This section should define what the student is expected to learn and what skills the student will develop.
Learning Objectives:
• Learn the basic process steps of the Digital Work Flow from Design to Manufactured AM parts
• Understand the various software tools, processes and techniques that enable advanced/additive manufacturing
• Learn the fundamentals of various additive manufacturing (AM) processes using polymers, metals, and other material and understand the operating principles, capabilities, and limitations of AM processes
• Gain hands-on experience with AM machines and understand the complete process steps through design, fabrication, and measurement of example parts.
• Study the range of applications of AM across the spectrum of industries (e.g. aerospace/automotive, medical devices, and consumer products) while developing the understanding of the requirements, constraints, and business case for the applications.
• Be able to evaluate and select appropriate AM technologies for specific applications
• AM role in the future of manufacturing and digital transformation of manufacturing

Evaluation Methods:
Include a statement that explains how the achievement of the educational objective identified above will be assessed.
The procedures for determining students’ grades should be specifically identified.
Exams (2) 40%
Homework&Quizzes 30%
Final Project 30%

Relationship/Linkage of Course to Other Courses:
This statement should relate the course to existing or proposed new courses. It should provide a rationale for the level
of instruction, for any prerequisites that may be specified, or for the course's role as a prerequisite for other courses. This course will be of interest to graduate students (and advanced undergraduate students) in IE interested in manufacturing process and satisfy the requirements for a domain course in manufacturing required for the manufacturing option. Additionally it will be of interest to other graduate students interested in manufacturing and additive manufacturing.

Additionally the course will be of interest to other degree programs being proposed in Additive Manufacturing.

Relationship of Course to Major, Option, Minor, or General Education:
This statement should explain how the course will contribute to the major, option, or minor and indicate how it may function as a service course for other departments. This course will be of interest to graduate students (and advanced undergraduate students) in IE interested in manufacturing process and satisfy the requirements for a domain course in manufacturing required for the manufacturing option. Additionally it will be of interest to other graduate students interested in manufacturing and additive manufacturing.

A description of any special facilities:
Students will be working in the IE department's Additive Manufacturing and Reverse Engineering Lab.

Frequency of Offering and Enrollment:
The course has currently been offered twice as IE597J with an enrollment of about 15-20 students.

The course will be offered once a year in Fall.

Review History
This section represents all consultation history that has occurred on this proposal

Legend
Approve  Reject  Waiting Review  User Action Required
Pending Action(s)  Moved to Rejected Status  Approved
(#) - Review Order Sequence Number

Consultation
Recipient Name: JUDITH TODD
Position: Consultation
Title: HEAD/PROF ESM

Request sent: 10/31/2016 at 7:30 AM
Concur: Yes
Comments:
Reviewed On: 11/1/2016 at 4:06 PM

Recipient Name: KAREN THOLE
Position: Consultation
Department: Mechanical Engineering
Campus: UNIVERSITY PARK CAMPUS
Title: DEPT HEAD MNE

(1) Request sent: 10/24/2016 at 5:01 PM
   Concur: Yes
   Comments:
   Reviewed On: 10/24/2016 at 7:46 PM

Recipient Name: RICHARD MARTUKANITZ
Department: Industrial And Manufacturing Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: SR RES ASC

(4) Request sent: 11/7/2016 at 7:30 AM
   Concur: Yes
   Comments:
   Reviewed On: 11/7/2016 at 4:47 PM

Recipient Name: TIMOTHY SIMPSON
Department: Mechanical Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: PROF ME & IE

(5) Request sent: 11/7/2016 at 7:30 AM
   Concur: Yes
   Comments: Looks good!
   Reviewed On: 11/7/2016 at 9:32 PM

Recipient Name: TODD PALMER
Department: Materials Science And Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: SR RES ASC MAT SCI & ENG

(2) Request sent: 10/24/2016 at 5:01 PM
   Concur: Yes
   Comments:
   Reviewed On: 10/24/2016 at 10:29 PM

Head of Department

Recipient Name: JANIS P TERPENNY
Department: (Not Available)
<table>
<thead>
<tr>
<th>Position</th>
<th>Campus</th>
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<tbody>
<tr>
<td>Head of Department</td>
<td>UNIVERSITY PARK CAMPUS</td>
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<td>Reviewed On: [Not Yet Reviewed]</td>
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<th>Recipient Name: MATTHEW PARKINSON</th>
<th>Department: (Not Available)</th>
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<td>Position: College/School Representative to the Graduate Council Subcommittee on New and Revised Programs and Courses</td>
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Feedback from the Graduate Council Joint Curricular Committee

Recipient Name: ROBERT BANNON  
Position: Feedback from the Graduate Council Joint Curricular Committee  
Department: (Not Available)  
Campus: UNIVERSITY PARK CAMPUS  
Title:  
Concur: [Not Yet Reviewed]  
Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]

Final Confirmation

Recipient Name: CORTNEY SMITH  
Position: Final Confirmation  
Department: (Not Available)  
Campus: UNIVERSITY PARK CAMPUS  
Title:  
Concur: [Not Yet Reviewed]  
Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]

Recipient Name: KADI CORTER  
Position: Final Confirmation  
Department: (Not Available)  
Campus: UNIVERSITY PARK CAMPUS  
Title:  
Concur: [Not Yet Reviewed]  
Comments: [Not Yet Reviewed]  
Reviewed On: [Not Yet Reviewed]

Curricular Information
Blue Sheet Item #:  
Review Date:  
SCRID Numbers
(IE 527):
Graduate Council Subcommittee On New And Revised Programs and Courses

COURSE SUBMISSION AND CONSULTATION FORM

Principal Faculty Member(s) Proposing Course

<table>
<thead>
<tr>
<th>Name</th>
<th>User ID</th>
<th>College</th>
<th>Department</th>
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<tbody>
<tr>
<td>(rcv2) ROBERT VOIGT</td>
<td>rcv2</td>
<td>Engineering (EN)</td>
<td>Not Available</td>
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</table>

College with curricular responsibility: Engineering (EN)

Type of Proposal: [ ] Add [ ] Change [ ] Drop

Course Designation

(IE 573) Manufacturing with Materials

Course Information

Cross-Listed Courses:

Prerequisites:

Corequisites:

Concurrents:

Recommended Preparations:

Abbreviated Title: MANU WITH MATLS

This course will be delivered:

[ ] in residence

[ ] off-site

[ ] online

Bulletin Listing

Minimum Credits: 4

Maximum Credits: 4

Repeatable: NO

Department with Curricular Responsibility: Industrial And Manufacturing Engineering (UPEN_IME)

Effective Semester: Upon Approval

Travel Component: NO

Course Outline

A brief outline or overview of the course content:

Material Performance
Introduction to Material Property/Processing Relationships
Development of Structure Sensitive Material Properties
Manufacturing Process Capabilities and Control
Cost and Capability Assessment of Manufacturing Processes
Material and Process Section Interactions
Manufacturability Concepts
Castability and Castable Materials
Formability and Formable Materials
Machinability and Machinable Materials
Weldability and Weldable Materials
Powder Processing of Metals and Ceramics
Polymer Processing Issues
Manufacturability Readiness Assessment (2 weeks)
Manufacturing Process Readiness Assessments for Advanced Materials and Processes
Supplier Quality Auditing
Final Project Presentations

A listing of the major topics to be covered with an approximate length of time allotted for their discussion:
Module 0: Course Introduction (1 week)
Module 1: Material Performance (3 weeks)
Lesson 1: Development of Structure Sensitive Material Properties
Module 2: Manufacturing Process Capabilities and Control (2 weeks)
Lesson 1: Cost and Capability Assessment of Manufacturing Processes
Lesson 2: Material and Process Section Interactions
Module 3: Manufacturability Concepts (6 weeks)
Lesson 1: Castability and Castable Materials
Lesson 2: Formability and Formable Materials
Lesson 3: Machinability and Machinable Materials
Lesson 4: Weldability and Weldable Materials
Lesson 5: Powder Processing of Metals and Ceramics
Lesson 6: Polymer Processing Issues
Module 4: Manufacturability Readiness Assessment (2 weeks)
Lesson 1 Manufacturing Process Readiness Assessments for Advanced Materials and Processes
Lesson 2: Supplier Quality Auditing

Course Description:
No supply chain professional can do their job effectively without a knowledge of the material and manufacturing process decisions that impact supply chain components and supply chain stability. The purpose of this course is to introduce you to critical material and manufacturing process relationships that drive the availability, cost and lead time of both internally manufactured and critical supply chain components. Over the course of the semester, we will examine the complex interaction between the design of a component and the selection of the best material and manufacturing process sequence to make that component.

Initially we will look at the material properties and of commonly specified engineering materials and understand reasons why manufacturing operation both intentionally and inadvertently improve or degrade the properties of materials. Our focus will be on understanding how both alloy composition an alloy processing control the properties of engineering materials.

We will then examine the fundamental changes that our key manufacturing processes have on the structure and properties of engineering materials. We will explore the economics and science of material processing for key shape-making processes. The fundamentals of formability, castability, machinability, and weldability will be highlighted along with manufacturing process control requirements influencing manufacturing quality.

Finally we will develop an integrated understanding of materials and manufacturing process selection and improvement. Case studies and class projects will help you to develop a critical understanding of material processing and material selection for processing. Upon completion of the course students, are expected to have a fundamental understanding of common manufacturing processes and manufacturing process control, the material performance factors controlling manufacturability, and the appropriate selection of engineering materials for common manufacturing methods.

The name(s) of the faculty member(s) responsible for the development of the course:

Name: ROBERT VOIGT (rcv2)
Title: Professor IE
Phone: +1 814 863 7290
Course Justification

Instructional, Educational, and Course Objectives:
This section should define what the student is expected to learn and what skills the student will develop.
No manufacturing engineer or supply chain professional can do their job effectively without a knowledge of the material and manufacturing process decisions that impact supply chain components and supply chain stability. The purpose of this course is to introduce you to critical material and manufacturing process relationships that drive the availability, cost and lead time of both internally manufactured and critical supply chain components. In this course, we will examine the complex interaction between the design of a component and the selection of the best material and manufacturing process sequence to make that component.

Evaluation Methods:
Include a statement that explains how the achievement of the educational objective identified above will be assessed. The procedures for determining students' grades should be specifically identified.
The method of instruction will include lecture and interactive case study discussions on material selection for manufacturability and process control requirements for manufacturability. Laboratory demonstrations will be included. Students will work in teams on a final project selected by the student and approved by the instructor.
12 homework assignments - individual; graded by the instructor (30%)
3 case studies - team; graded by instructor (15%)
3 team peer evaluations; graded by peers (5%)
2 examinations - individual; graded by instructor (20%)
1 team final project; presentation graded by peers and instructor (30%)

Relationship/Linkage of Course to Other Courses:
This statement should relate the course to existing or proposed new courses. It should provide a rationale for the level of instruction, for any prerequisites that may be specified, or for the course's role as a prerequisite for other courses.
This on-line course is designed to integrate completely with other on-line IE courses (IE 574 and IE 587) and SCM courses that are part of the Professional Supply Chain Management Program master's program delivered by the Smeal College of Business for engineering professionals. It will also serve as an introductory graduate level on-line course for MS and PhD. students in Industrial Engineering.

Relationship of Course to Major, Option, Minor, or General Education:
This statement should explain how the course will contribute to the major, option, or minor and indicate how it may function as a service course for other departments.
This course is an elective graduate course designed for both master's level and PhD. students in Industrial Engineering and is a required course in the manufacturing option of the Professional Supply Chain Management master's degree offered by the Smeal College of Business. It is anticipated that the course will also be of interest to other graduate students in the College of Engineering and in the College of Earth and Mineral Sciences.

A description of any special facilities:
none

Frequency of Offering and Enrollment:
On-line World Campus course offered each year

Review History
This section represents all consultation history that has occurred on this proposal

Legend
- Approve
- Rejected
- Waiting Review
- User Action Required
Consultation

Recipient Name: GARY GITTINGS
Department: Supply Chain And Information Systems
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: DIR, MPS/SCM PROGRAM

Request sent: 10/10/2016 at 7:30 AM
Concur: Yes
Comments:
Reviewed On: 10/10/2016 at 1:25 PM

Recipient Name: MICHAEL GILPATRICK
Department: Business Administration
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: Director of Planning and Institutional Assessment

Request sent: 9/27/2016 at 2:42 PM
Concur: Yes
Comments:
Reviewed On: 10/3/2016 at 12:42 PM

Recipient Name: GARY GITTINGS
Department: Supply Chain And Information Systems
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: DIR, MPS/SCM PROGRAM

Request sent: 10/10/2016 at 7:30 AM
Concur: Yes
Comments:
Reviewed On: 10/10/2016 at 1:23 PM

Recipient Name: KAREN THOLE
Department: Mechanical Engineering
Position: Consultation
Campus: UNIVERSITY PARK CAMPUS
Title: DEPT HEAD MNE

(1) Request sent: 9/27/2016 at 2:42 PM
Concur: Yes
Comments:
Reviewed On: 9/27/2016 at 10:30 PM

- **Recipient Name:** MICHAEL GILPATRICK
- **Department:** Business Administration
- **Position:** Consultation
- **Campus:** UNIVERSITY PARK CAMPUS
- **Title:** Director of Planning and Institutional Assessment

(3) Request sent: 9/27/2016 at 2:42 PM
Concur: Yes
Comments:
Reviewed On: 10/3/2016 at 12:42 PM

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**Head of Department**

- **Recipient Name:** JANIS TERPENNY
- **Department:** (Not Available)
- **Position:** Head of Department
- **Campus:** UNIVERSITY PARK CAMPUS
- **Title:**

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

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**SCCA Representative**

- **Recipient Name:** MATTHEW PARKINSON
- **Department:** (Not Available)
- **Position:** SCCA Representative
- **Campus:** UNIVERSITY PARK CAMPUS
- **Title:**

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]
Review on Behalf of the Dean of the Graduate School

Recipient Name: PETER BUTLER

Position: Dean of the College

Department: (Not Available)

Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]

Comments: [Not Yet Reviewed]

Reviewed On: [Not Yet Reviewed]

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Review on Behalf of the Dean of the Graduate School

Recipient Name: VICKI HEWITT

Position: Review on Behalf of the Dean of the Graduate School

Department: (Not Available)

Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]

Comments: [Not Yet Reviewed]

Reviewed On: [Not Yet Reviewed]

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Feedback from the Graduate Council Joint Curricular Committee

Recipient Name: ROBERT BANNON

Position: Feedback from the Graduate Council Joint Curricular Committee

Department: (Not Available)

Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]

Comments: [Not Yet Reviewed]

Reviewed On: [Not Yet Reviewed]

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Publication in the Senate Curricular Report

Recipient Name: CORTNEY SMITH

Position: Publication in the Senate Curricular Report

Department: (Not Available)

Campus: UNIVERSITY PARK CAMPUS

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Recipient Name: KADI CORTER

Position: Publication in the Senate Curricular Report

Campus: UNIVERSITY PARK CAMPUS

Title:

Concur: [Not Yet Reviewed]
Comments: [Not Yet Reviewed]
Reviewed On: [Not Yet Reviewed]

Curricular Information

Blue Sheet Item #:
Review Date:

SCRID Numbers

(IE 573):
Graduate Council  
Program, Option, or Minor Proposal Form

Submit 1 original, signed Graduate Council proposal form and 2 hardcopies of the graduate program proposal document, with a copy of the signed proposal form attached to each proposal copy, to the Curriculum Coordinator, University Faculty Senate, 101 Kerr Graduate Building, University Park. The proposals will be transmitted to the Office of the Dean of the Graduate School for entry into the Graduate Council curricular review process; for more information about the process, see the Overview of the Graduate Council Curricular Review Process.

The Program Proposal Procedures provide guidance for the development of a graduate program proposal. If you have questions regarding the preparation of a graduate program proposal or how to complete this Graduate Council proposal form, contact the Office of the Dean of the Graduate School.

College/School: Engineering  
Department or Instructional Area: Mechanical and Nuclear Engineering

New Graduate Program, Option, or Minor: □ Add
Designation of new graduate program:
Classification of Instructional Programs (CIP) Code:
Designation of new graduate option:
Designation of new graduate minor:
Indicate effective semester:
□ First semester following approval  
□ Second semester following approval

Existing Graduate Program Option, or Minor: □ Change  □ Drop
Current designation of graduate program: B.S./M.S. IUG program
Current designation of graduate option:
Current designation of graduate minor:
New designation of existing graduate program (if changing):
New designation of existing graduate option (if changing):
New designation of existing graduate minor (if changing):
Brief description of the change (if not noted above):
Indicate effective semester:
□ First semester following approval  
□ Second semester following approval

Submitted by Graduate Program Head
Mary L. Frecker  
Printed name  
Signature  
Date: 10/26/16

Noted by College/School Representative to Graduate Council Subcommittee on New and Revised Programs and Courses:
Matthew Parkinson  
Printed name  
Signature  
Date: 10/27/16

Approved by College/School Dean/Chancellor (or Designee):
Peter J. Butler  
Printed name  
Signature  
Date:
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**Recommended by Chair, Graduate Council Subcommittee on New and Revised Programs and Courses:**

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**Recommended by Chair, Graduate Council Committee on Programs and Courses:**

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**Noted by Dean of the Graduate School:**

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DATE: October 3, 2016

FROM: Mary Frecker

TO: The Graduate Council and University Faculty Senate

SUBJ: Removal of Integrated BS-MS degree in Mechanical Engineering

The Department of Mechanical & Nuclear Engineering proposes dropping the Integrated BS-MS degree in Mechanical Engineering for the following reasons:

1. There has been very little student participation in the Integrated BS-MS degree program. Over the past ten years, only four students have completed the degree, with a fifth student entering the program but not completing the MSME degree.

2. Following the BSME degree, it is difficult for students to finish the requirements for the MSME degree in only one year. The coursework and research components of the MSME degree typically require two years.

3. It is difficult for students to find an MS advisor to support them in thesis research since they are a graduate student for only one year.

This change does not affect other units, therefore no consultation has been done.
University Bulletin
Undergraduate Degree Programs

Mechanical Engineering

*University Park, College of Engineering (ME)*

PROFESSOR KAREN A. THOLE, *Head, Department of Mechanical and Nuclear Engineering*

Mechanical Engineering is one of the broadest engineering disciplines and is central in many new technological developments. Mechanical engineers create things that help improve the health, happiness and safety of our everyday lives such as biomedical devices, aircraft propulsion, and ways to store renewable energies. Mechanical engineering is divided into two broad areas: mechanical systems and thermal systems. Mechanical systems include the design of mechanisms and the analysis of the strength and wear of materials. Thermal systems include methods of energy conversions, heat transfer and fluid flow.

Program Educational Objectives:

Three to five years after graduation, Mechanical Engineering graduates will be:

1. Working in industry and government including computer-aided design, simulation and analysis of products or systems, experimentation and testing, manufacturing, and technical sales.
2. Assuming increasing levels of responsibility in project, personnel, and budget management.
4. Communicating effectively and recognizing the global, social and ethical contexts of their work.
5. Entering into graduate and professional studies.

Program Outcomes (Student Outcomes):

The Program outcomes are knowledge, skills, and/or behavior that are derived from the program educational objectives.

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.

The program offers a balance of engineering applications and theory with an emphasis on design from the first year through the industry-based capstone design experience in the senior year. In
addition, mechanical engineering students find it easy to incorporate co-operative educational experiences as well as many minors into their program.

ENTRANCE TO MAJOR -- In addition to the minimum grade point average (GPA) requirements described in the University Policies, all College of Engineering entrance to major course requirements must also be completed with a minimum grade of C: CHEM 110 (GN), MATH 140 (GQ), MATH 141 (GQ), MATH 250 or MATH 251, PHYS 211 (GN) and PHYS 212 (GN). All of these courses must be completed by the end of the semester during which the admission to major process is carried out.

*In the event that the major is under enrollment control, a higher minimum cumulative grade-point average is likely to be needed and students must be enrolled in the College of Engineering or Division of Undergraduate Studies at the time of confirming their major choice.

For the B.S. degree in Mechanical Engineering, a minimum of 131 credits is required. This baccalaureate program in Mechanical Engineering is accredited by the Engineering Accreditation Commission of ABET, Inc., www.abet.org.

Scheduling Recommendation by Semester Standing given like (Sem:1-2)

GENERAL EDUCATION: 45 credits
(27 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)
(See description of General Education in front of Bulletin.)

FIRST-YEAR SEMINAR:
(Included in REQUIREMENTS FOR THE MAJOR)

UNITED STATES CULTURES AND INTERNATIONAL CULTURES:
(Included in GENERAL EDUCATION course selection)

WRITING ACROSS THE CURRICULUM:
(Included in REQUIREMENTS FOR THE MAJOR)

REQUIREMENTS FOR THE MAJOR: 113 credits
(This includes 27 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.)

PRESCRIBED COURSES (83 credits)
CHEM 110 GN(3)[1], EDSGN 100(3), MATH 140 GQ(4)[1], MATH 141 GQ(4)[1], PHYS 211 GN(4)[1] (Sem: 1-2)
CMPS 200 GQ(3), E MCH 211(3)[1], E MCH 212(3)[1], E MCH 213(3)[1], M E 300(3)[1], MATH 220 GQ(2-3), MATH 231(2), MATH 251(4)[1], PHYS 212 GN(4)[1], PHYS 214 GN(2) (Sem: 3-4)
E E 212(3), E MCH 315(2), ENGL 202C GWS(3), M E 320(3)[1], M E 340(3)[1], M E 345(4)[1], M E 360(3)[1], M E 370(3)[1], M E 410(3)[1], MATSE 259(3) (Sem: 5-6)
I E 312(3), M E 450(3)[1] (Sem: 7-8)

ADDITIONAL COURSES (18 credits)
Select 1 credit of First-Year Seminar (Sem: 1-2)
CHEM 112 GN(3), or BIOL 141 GN(3) (Sem: 1-2)
ENGL 015 GWS(3) or ENGL 030 GWS(3) (Sem: 1-2)
ECON 102 GS(3), ECON 104 GS(3), ECON 014 GS(3), or ENNEC 100 GS(3) (Sem: 1-2)
CAS 100A GWS(3) or CAS 100B GWS(3) (Sem: 3-4)
M E 440W(3) or M E 441W(3) (Sem: 7-8)
Select 2 credits from M E 325(1), M E 315(1), M E 375(1), M E 355(1), or E MCH 316(1) (Sem: 7-8)

SUPPORTING COURSES AND RELATED AREAS (12 credits)
Select 3 credits in a 400-level M E Technical Elective course excluding M E 410(3), M E 440W(3), M
E 441W(3), M E 450(3), M E 494(1-9), and M E 496(1-18) (Sem: 5-8)
Select 6 credits in Engineering Technical Elective courses, any 400-level courses in the College of Engineering not required for a B.S. in M.E. (Sem: 5-8)
Select 3 credits in General Technical Elective courses from department list (Sem: 7-8)
(Students who complete Basic ROTC may substitute 6 of the ROTC credits for 3 credits of GTE and 3 credits of GHA.)
Three rotations of Engr Co-op (ENGR 295, ENGR 395, and ENGR 495) can be used as 3 credits of GTE.

**Integrated B.S. and M.S. in Mechanical Engineering**

A limited number of undergraduate students in the B.S.M.E. program will be considered for admission to the integrated undergraduate/graduate program leading to the B.S.M.E. and the M.S.M.E. degrees. Students with a junior standing in the B.S.M.E. degree program may be admitted to the integrated B.S.M.E./M.S.M.E. program, following a positive review of an application specific to this program by the faculty committee on graduate admissions. Students must have attained a GPA of at least 3.0. Students admitted to the integrated program must maintain a GPA in all classes used toward the M.S.M.E. degree of at least 3.0.

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Summer Session 2010

Blue Sheet Item #: 38-05-038

Review Date: 02/23/2010

R & T: Approved 5/24/2013

UCA Revision #1: 8/9/05
UCA Revision #2: 7/30/07

Comments

EN