METROPOLITAN STATE UNIVERSITY OF DENVER
Office of Academic and Student Affairs

REGULAR COURSE SYLLABUS

College of: Professional Studies

Department: Engineering and Engineering Technology

Prefix & Course Number: SSE 4610   Crosslisted With*: 

Course Title: Capstone: Thesis in Sustainable Development

Banner course title (30 characters): Thesis in Sustainable Develop

Check All That Apply: Required for Major: X   Required for Minor:   Specified Elective: 
Required for Concentration:   Elective:   Service Course: 

To receive Title IV financial aid funds, all institutions of higher education must comply with the federal definition of a credit hour. The Higher Learning Commission requires institutions to maintain policies and procedures for verifying compliance with this definition.

Federal Credit Hour Definition: A credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally-established equivalency that reasonably approximates not less than:
(1) one hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or ten to twelve weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time; or (2) at least an equivalent amount of work as required in paragraph (1) of this definition for other activities as established by an institution, including laboratory work, internships, practica, studio work, and other academic work leading toward the award of credit hours. 34CFR 600.2 (11/1/2010)

Credit Hours: 3 (0+0+3)

Face-to-Face or Equivalent Hours per course:
Lecture 0   Lab 0   Internship 0   Practicum 0 (please specify type and hours): 45

Additional Student Work Hours per course: 90

Schedule Type:   Grade Mode:   

Variable topics umbrella course: No X Yes   If Yes, number of credit hours allowed 
Specified repeatable course: No X Yes 

APPROVED:   

Department Chair OR Program Director  Date

Dean OR Associate Dean   Date

Associate VP, Academic and Student Affairs Date

*If crosslisted, attach completed Course Crosslisting Agreement Form
Prefix and Course Number: SSE 4610

Prerequisite(s): Departmental Permission
Corequisite(s):
Prerequisite(s) or Corequisite(s):

Banner Enforced:
Prerequisite(s):
Corequisite(s):
Prerequisite(s) or Corequisite(s):

Registration restrictions: Level _____ Class _____ Program/Major _____ Student attribute Senior

Catalog Course Description:
Students in this course are going to write a thesis of an undergraduate research project. The project should reflect the growth of the development of engineering, technology and human society with regard to sustainability and to meet the needs of sustainable development of industry and the community. The senior thesis projects generally are selected by students and emerged from collaboration with faculty/advisor. The thesis should demonstrate the general understanding of concepts of sustainable system engineering, together with exposition that sets the work in a holistic and systemic approach to solving problems and move beyond the tradition of breaking designs down into disconnected parts (Senior Experience)

Required Reading and Other Materials will be equivalent to:

Specific, Measurable Student Behavioral Learning Objectives:
Upon completion of this course the students are required to demonstrate integrated skills in fundamental engineering, environmental sciences, political science, business management, and communication arts, etc. and students should be able to:
1. apply knowledge of mathematics, science, and engineering
2. design and conduct experiments, as well as to analyze and interpret data
3. 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
4. identify, formulate, and solve engineering problems
5. apply professional and ethical responsibility
6. communicate effectively within a multidisciplinary team environment
7. demonstrate knowledge of the impact of engineering solutions in a global, economic, environmental, and societal context
8. recognize the need for, and to engage in life-long learning
9. develop a knowledge of contemporary issues
Prefix and Course Number: SSE 4610

10. use the techniques, skills, and modern engineering tools necessary for engineering practice

**Detailed Outline of Course Content:**

I. Proposal of Research Project
   A. Project Selection and Project Description
   B. Theory and Technical Approach
   C. A Tentative Detailed Outline of the Thesis

II. Abstraction
   A. Description of Selected Research Project
   B. The Objectives
   C. Brief Conclusion of the Research

III. Literature Survey
   A. Historical Approaches to the Topic Related to Research Project
   B. Review Current Research Status and Central Issues Related to Research Project
   C. Comparison of Different Theory and Discussions of Their Advantages and Disadvantages

IV. Theories and Technical Approaches of Project
   A. A Discussion of the Applicable Theory and Technology Will Constitute a Major Research Topic
   B. Data Collection/Experiments
   C. Analytical Methodologies and Solutions of the Sustainable System Engineering Problems
   D. Research Results

V. Research Conclusions and Suggestions
   A. Conclusions
   B. Suggestions

VI. Oral Presentation and Questions/Answers

**Evaluation of Student Performance:**

1. Thesis Proposal
2. Draft
3. Final Paper
4. Final Presentation
REQUEST FOR NEW OR CONTINUED SENIOR EXPERIENCE DESIGNATION

(SENIOR EXPERIENCE)

(To accompany old and new regular syllabus form and Curriculum Change Proposal forms)

Date: September 1, 2015
College: Professional Studies
Department: Engineering and Engineering Technology

<table>
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<tr>
<th>Prefix</th>
<th>Course Number</th>
<th>Credit Hours</th>
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Title: Capstone: Thesis in Sustainable Development

Prerequisites: Departmental Permission

Corequisites: None

Recommended maximum enrollment per section: 25

Current Course Status (check all that apply)

- [x] New course
- [ ] Existing Senior Experience Course

Approvals:

[Signature] for Dr. Huang 10/12/15
Department Curriculum Committee / Date

[Signature] 10/12/2015
Department Chair OR Program Director/ Date

[Signature] 10/14/15
School Curriculum Committee / Date

[Signature] 10-14-15
Dean or Associate Dean / Date

[Signature] 10-26-15
Chair, Faculty Senate Curriculum Committee / Date

Associate Vice President, Academic and Student Affairs/Date
Criteria for Senior Experience

The following criteria must be addressed for all courses seeking Senior Experience designation. Please type on this form; it will expand to accommodate any length of text.

The Senior Experience must allow students to:

1. synthesize learning through critical analysis and logical thinking.

This project based course reflects the growth of the development of engineering, technology and human society with regard to sustainability and meets the needs of sustainable development of industry and the community. The following student outcomes proposed by ABET will be incorporated:

- ABET Student Outcome 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
- ABET Student Outcome E: an ability to identify, formulate, and solve engineering problems
- ABET Student Outcome F: an understanding of professional and ethical responsibility
- ABET Student Outcome I: a recognition of the need for, and an ability to engage in life-long learning
- ABET Student Outcome J: a knowledge of contemporary issues
- ABET Student Outcome K: an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

2. apply theoretical constructs to practical applications.

Students are required to apply knowledge of mathematics, science, and engineering, design and conduct experiments, as well as to analyze and interpret data. The following ABET criteria will apply:

- ABET Student Outcome A: an ability to apply knowledge of mathematics, science, and engineering
- ABET Student Outcome B: an ability to design and conduct experiments, as well as to analyze and interpret data
- ABET Student Outcome 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
- ABET Student Outcome E: an ability to identify, formulate, and solve engineering problems

3. critique philosophical tenets and current practices.

Students are required 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. The following ABET criteria will apply:

- ABET Student Outcome H: the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
ABET Student Outcome I: a recognition of the need for, and an ability to engage in life-long learning

ABET Student Outcome J: a knowledge of contemporary issues
ABET Student Outcome K: an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

4. integrate and refine oral and/or written communication skills.

Students are required to present their written report through oral presentation to the professional community. The following ABET criteria will apply:

ABET Student Outcome G: an ability to communicate effectively

5. verify their expertise.

In this course students use the techniques, skills, and modern engineering tools necessary for engineering practice

ABET Student Outcome 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

ABET Student Outcome E: an ability to identify, formulate, and solve engineering problems