The University Of Toledo

New Graduate Course Proposal

* denotes required fields

1. College*: College of Engineering

2. Contact Person*: Glenn Lipscomb Phone: 530-8088 (xxx-xxxx) Email: glenn.lipscomb@utoledo.edu

3. Alpha/Numeric Code (Subject area - number)*: CHEE - 8110

4. Proposed title*: Green Engineering Applic

5. Is the course cross-listed with another academic unit? [ ] Yes [ ] No

6. Credit hours*: Fixed: 3 or Variable: [ ] to [ ]

7. Delivery Mode:

   a. Activity Type *
      - Lecture

   b. Minimum Credit Hours *
      - 3

   Maximum Credit Hours *
      - 3

   c. Weekly Contact Hours *
      - 3

8. Terms offered: [ ] Fall [ ] Spring [ ] Summer

Date Added: 1/8/14
Council Approved: 1/21/14
To Provost: 2/7/14

9. Are students permitted to register for more than one section during a term?  
   ☐ No ☑ Yes

10. May the courses be repeated for credit?  
    ☐ No ☑ Yes

11. Prerequisites (must be taken before): i.e. C or higher in (BIOE 4500 or BIOE 5500) and C or higher in MATH 4200

   CHEE 8010 or Bachelor's Degree in Chemical Engineering

   PIN (Permission From Instructor)  ☑ PDP (Permission From Department)

12. Catalog Description* (75 words Maximum)
    Applications of green engineering principles in the chemical industry are discussed. Metrics for comparing process options are introduced along with common techniques for improving process performance.

13. Attach a syllabus and an electronic copy of a complete outline of the major topics covered. Click here for template.

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Course Approval:

Department Curriculum Authority: C.A. Schall  
Date 2013/04/17

Department Chairperson: Glenn Lipscomb  
Date 2013/04/18

CHEE 8110 Green Engineering Applications in Chemical Industries  
Department of Chemical and Environmental Engineering  
University of Toledo

Credit Hours: 3 (fixed)  
Contact Hours: 3 (fixed)  
Term Offered: Spring  
Grading: Normal Grading (A-F, PS/NC, PR, I)  
Prerequisites: CHEE 8010 or Bachelor’s Degree in Chemical Engineering

Catalog Entry
Applications of green engineering principles in the chemical industry are discussed. Metrics for comparing process options are introduced along with common techniques for improving process performance.

Text
Green Engineering: Environmentally Conscious Design of Chemical Processes  
David T. Allen and David R. Shonnard  
©2002 • Prentice Hall • Paper, 576 pp  
http://catalogue.pearsoned.co.uk/catalog/academic/product?ISBN=9780130619082#sthash.u785COH5.dpuf

Student Learning Outcomes
1. Apply green engineering principles in design, commercialization and use of processes and products.
2. Identify and evaluate sources of environmental, health and safety impacts in chemical processes and products.

Tentative Syllabus
1. Introduction to Green Engineering and Sustainability in Chemical Process Engineering
2. Environmental Health & Safety (EHS)
3. Metrics in EHS
4. Green Chemistry Metrics
5. Sources of Environmental Impacts
6. Waste Minimization in Reactors and Process Intensification
7. Waste Minimization in Separations
8. Environmental Impacts of Utilities
9. Mass and Heat Integration
10. Life Cycle Assessment

Assessment and Grading
Letter grades will be assigned based on the percentage of points accumulated using the scale: A, 100-90; B, 89-80; C, 79-70; D, 69-60; F, 59-. The point total will consist of a weighted sum of the following assessment items:
1. Homework
2. Quizzes and Exams
3. Design project
4. Submission of written report and oral presentation for design project