The University Of Toledo

New Graduate Course Proposal

* denotes required fields

1. College*: College of Engineering

   Department*: Chemical and Envrnrmtl Engnrng

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

3. Alpha/Numeric Code (Subject area - number)*: CHEE 8010

4. Proposed title*: Green Engineering Princi
   Proposed effective term*: 201340  (e.g. 201140 for 2011 Fall)

5. Is the course cross-listed with another academic unit?

   Approval of other academic unit (signature and title)

   Is the course offered at more than one level?

If yes, an undergraduate course proposal form must also be submitted. If the undergraduate course is new, complete the New Undergraduate Course Proposal; if the undergraduate course is existing, submit an Undergraduate Course Modification Proposal.

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

7. Delivery Mode:
   a. Activity Type *
      Primary* Lecture

       Secondary --SelectType--

       Tertiary --SelectType--

   b. Minimum Credit Hours *

   Maximum Credit Hours *

   c. Weekly Contact Hours *

8. Terms offered: ☑ Fall ☐ Spring ☐ Summer
   Date Added: 1-8-14
   Council Approved: 1-21-14
   To Provost: 2-7-14

Years offered:  
- Every Year  
- Alternate Years

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

May the courses be repeated for credit?  
- No  
- Yes

10. Grading System*:  
- Normal Grading (A-F, PS/NC, PR, I)  
- Passing Grade/No Credit (A-C, NC)  
- Credit/No Credit  
- Grade Only (A-F, PR, I)  
- Audit Only  
- No Grade

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

- Admission to Doctoral Program in Engineering or Natural Sciences

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

Co-requisites (must be taken **together**):

12. Catalog Description* (**75 words Maximum**)

The principles of chemical process analysis and design are introduced for the development of green engineering processes. Common components of chemical processes are reviewed and quantitative analyses of process performance and economics developed. The impact of design variables on materials and energy usage is demonstrated.


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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 8010 Green Engineering Principles for Chemical Processes
Department of Chemical and Environmental Engineering
University of Toledo

Credit Hours: 3 (fixed)
Contact Hours: 3 (fixed)
Term Offered: Fall
Grading: Normal Grading (A-F, PS/NC, PR, I)
Prerequisites: Admission to Doctoral Program in Engineering or Natural Sciences

Catalog Entry
The principles of chemical process analysis and design are introduced for the development of green engineering processes. Common components of chemical processes are reviewed and quantitative analyses of process performance and economics developed. The impact of design variables on materials and energy usage is demonstrated.

Text
Principles of Chemical Engineering Practice
George DeLancey
Wiley • 456 pages

Handbook of Chemical Engineering Calculations
Nicholas Chopy
McGraw Hill • 800 pp

Student Learning Outcomes
1. Identify different types and the components of chemical process diagrams
2. Perform mass and energy balances for chemical processes
3. Identify different types of fluid flow, heat transfer, separation, and reactor equipment and determine required size
4. Determine process economic analysis and profitability

Tentative Syllabus
2. Mass Balances
3. Energy Balances
4. Thermodynamics
5. Pumps and Compressors
6. Heat Transfer
7. Chemical Separations
8. Reactor Design
9. Engineering Economic Analysis: Capital and Operating Costs
10. Profitability Analysis
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
3. Tests
4. Design project
5. Submission of written report and oral presentation for design project