The University Of Toledo

New Graduate Course Proposal

* denotes required fields

1. College*: College of Engineering

Department*: Chemical and Envrnmntl Engnrng

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

3. Alpha/Numeric Code (Subject area - number)*: CHEE - 6120

4. Proposed title*: Biofuels

Proposed effective term*: 201410 (e.g. 201140 for 2011 Fall)

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

Yes ☐ No ☑

Approval of other academic unit (signature and title)

Is the course offered at more than one level?

Yes ☐ No ☑

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 *

Lecture

Primary* Secondary Tertiary

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

   Maximum Hours

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 Masters Program in Engineering or Natural Sciences

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

12. Catalog Description* (75 words Maximum)
   The technical, economic, social, and political issues associated with energy consumption are discussed. The potential for biofuels to replace current energy sources is examined based on the historical evolution of the industry and current research activity.

13. Attach a syllabus and an electronic copy of a complete outline of the major topics covered. Click here for the 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 6120 Biofuels
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: Admission to Masters Program in Engineering or Natural Sciences

Catalog Entry
The technical, economic, social, and political issues associated with energy consumption are discussed. The potential for biofuels to replace current energy sources is examined based on the historical evolution of the industry and current research activity.

Text
No formal text is required. Students will be assigned selected readings from the literature and Internet resources.

Student Learning Outcomes
1. Be able to use tools for analyzing energy consumption and production
2. Identify where our energy comes from and how we use it
3. Perform technical and economic analyses of current processes for biofuel production
4. Identify challenges and proposed processes for ethanol production from ligno-cellulosic biomass
5. Discuss the factors that affect the sustainability of ethanol production
6. Identify alternatives to ethanol production by fermentation
7. Identify alternative biomass sources
8. Describe the integration of fuel and product production in a biorefinery
9. Critique recent literature on biofuels

Tentative Syllabus
1. What is energy? Why should we be concerned?
2. Where does our energy come from?
3. What defines sustainability?
4. Alternatives to fossil fuels
5. Biofuels history
6. 1st generation bioethanol
7. 2nd generation bioethanol
8. Sustainability of bioethanol production
9. Alternatives to ethanol
10. Alternatives to fermentation
11. Alternative biomass sources
12. Biorefineries
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. Written critique and of recent contribution to the biofuels literature