**Department Contact Information:**

- **Start Date:** 17-SEP-2018
- **College:** A
- **Department:** PAPR
- **Initiator Name:** andro_mondala
- **Department Email:** andro_mondala@wmich.edu
- **Proposed Effective Term:** 201940
- **Does course need General Education approval?** N
- **Will course be used in teacher education?** N
- **If 5000 level course, prerequisites apply to:** B
  - New Course CHEG 5250
  - New course selected: This new course is not seeking approval as a general education course.

1. **Proposed course prefix and number:** CHEG 5250
2. **Proposed credit hours:** 3
3. **Proposed course title:** Sustainable Earth Resources Engineering
4. **Proposed course prerequisites:** CHEG 2611 and CHEG 2960 or instructor’s permission
5. **Proposed course corequisites:** None
6. **Proposed course prerequisites that may be taken concurrently (before or at the same time):** None
7. **Minimum grade for prerequisites (default grades are D for Undergrad and C for Grad):** D for Undergrad and C for Grad
8. **Major and/or minor restrictions:** Not Applicable
9. **List all the four-digit major and/or minor codes (from Banner) that are to be included or excluded:** None
10. **Classification restrictions:** Exclude
11. **List all the classifications (freshman, sophomore, junior, senior) that are to be included or excluded:** Not Applicable
12. **Level restriction:** Not Applicable
13. **List the level (undergraduate, graduate) that is to be included or excluded:** Not Applicable
14. **Do prerequisites and corequisites for 5000-level courses apply to undergraduates, graduates, or both?** Both
15. **Is this a multi-topic course?** No
16. **Proposed course title to be entered in Banner:** Sust Earth Resources Eng
18. Is this course mandatory credit/no credit?  
No

19. Select class type:  
Lecture

20. How many contact hours per week for this course?  
3

A. Please choose Yes or No to indicate if this class is a Teacher Education class:  
No

B. Please choose the applicable class level:  
Both

C. Please choose Yes or No to indicate if this class is a General Education class:  
No

D. Explain briefly and clearly the proposed improvement.  
Traditional environmental sustainability courses treat different resource systems as separate entities in their studies. This course will innovatively examine the interrelationships and interdependence of food, water, and energy resource systems and potential solutions for sustainability.

E. Rationale. Give your reason(s) for the proposed improvement. (If your proposal includes prerequisites, justify those, too.).  
This course will provide students with the interdisciplinary knowledge that are relevant to current and emerging environmental and resource sustainability issues.

F. List the student learning outcomes for the proposed course or the revised or proposed major, minor, or concentration. These are the outcomes that the department will use for future assessments of the course or program.  
Describe the current issues in food, energy, and water resource sustainability and their interdependence in the technical, geopolitical, and

| Department Curriculum Chair approver: Said Abubakr |
| Date: 26-SEP-2018 |
| Comment: |
| Chair approver: Kecheng Li |
| Date: 27-SEP-2018 |
| Comment: |

- Curriculum Committee Approval
  - [ ] Approve
  - [ ] Deny

Reason for denial:

- Comment:

Enter Proposal number only if approved:

- Proposal Number:

  - Complete
  - Save & Close
  - Cancel

Attachments

  - Attach File

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Course Syllabus

1. Course number and name: CHEG 5250 – Sustainable Earth Resources Engineering

2. Credits and contact hours: 3 credits, 3 contact hours per week

3. Instructor’s or course coordinator’s name: Dr. Andro Mondala

4. Text book, title, author, and year: None. Various materials will be used.

5. Specific course information
   a. Catalog description: As global population sources, the demand for food, water, and energy will likewise intensify while supplies are becoming increasingly scarce. This course will examine the state of the art and basic scientific and engineering principles that underlie food, energy and water production technologies with emphasis on their interdependence. Potential engineering solutions for enhancing efficiency and sustainability will be discussed. This course is intended for engineering students interested in topics of bioenergy, energy efficiency, and water resources engineering and sustainability.
   b. Prerequisites or co-requisites: Prerequisites - CHEG 2611 (Environmental Engineering I) and CHEG 2960 (Material and Energy Balance) and equivalent courses, or instructor’s permission
   c. Required course: No.

6. Specific goals for the course
    a. Specific outcomes of instruction: Upon completion of the course, the students should be able to:
       i. Describe the current issues in food, energy, and water resource sustainability and their interdependence in the technical, geopolitical, and social contexts.
       ii. Describe innovative solutions for solving said issues and explain the underlying theoretical, technical, and economic aspects.
   b. ABET Criterion 3 Outcomes addressed:
      i. (3e) An ability to identify, formulate, and solve engineering problems.
      ii. (3h) Broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and social context.
      iii. (3d) Knowledge of contemporary issues.

7. Brief list of topics to be covered:
   a) Basic principles of food-energy-water nexus sustainability
   b) Water, nutrient, and energy cycles and their interrelationships
c) Sustainability in water use strategies for energy and food production

d) Efficient energy use for water production

e) Energy use and impact on water resources