### PURDUE UNIVERSITY

**REQUEST FOR ADDITION, EXPIRATION, OR REVISION OF A GRADUATE COURSE (50000-60000 LEVEL)**

**DEPARTMENT**: Agricultural and Biological Engineering  
**EFFECTIVE SESSION**: Spring 2011

**INSTRUCTIONS**: Please check the items below which describe the purpose of this request.

- New course with supporting documents (complete proposal form)  
- Add existing course offered at another campus  
- Expiration of a course  
- Change in course number  
- Change in course title  
- Change in course credit/type

**PROPOSED:**
- Subject Abbreviation: ABE
- Course Number: 52900
- Long Title: Nonpoint Source Pollution Engineering
- Short Title: NONPOINT SOURCE POLLUTION ENGR

**EXISTING:**
- Subject Abbreviation
- Course Number
- Long Title: Nonpoint Source Pollution Engineering
- Short Title: NONPOINT SOURCE POLLUTION ENGR

**PROPOSED**
- Abbreviated title will be entered by the Office of the Registrar if omitted. (30 CHARACTERS ONLY)

**CAMPUS(ES) INVOLVED**
- Calumet
- Cont Ed
- Fl. Wayne
- Tech Statewide
- Indianapolis
- N. Central
- W. Lafayette

**TERMS OFFERED**
- Check All That Apply
  - Summer
  - Fall
  - Spring

**CREDIT TYPE**
- 1. Fixed Credit: Cr. Hrs.
- 2. Variable Credit Range: Minimum Cr. Hrs. (Check One) To Maximum Cr. Hrs.
- 3. Equivalent Credit: Yes
- 4. Thesis Credit: Yes

**CREDIT TYPE**
- 1. Pass/Not Pass Only
- 2. Satisfactory/Unsatisfactory Only
- 3. Repeatable
- 4. Credit by Examination
- 5. Special Fees

**COURSE ATTRIBUTES**
- 6. Registration Approval Type
- 7. Variable Title
- 8. Honors
- 9. Full Time Privilege
- 10. Off Campus Experience

**COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):**

Prerequisite: ABE 32500 or AGRY 33700 or CE 54200 or Graduate Status. Engineering principles involved in assessment and management of nonpoint source (NPS) pollution. Effect of NPS pollution on ecosystem integrity. Use of GIS/mathematical models to quantify extent of pollution. Design/implementation of best management practices to reduce nonpoint source pollution and improve water quality. Discussion of total maximum daily load (TMDL) principles and processes.

Professor Chaubey.

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**OFFICE OF THE REGISTRAR**

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**PURDUE UNIVERSITY**

REQUEST FOR ADDITION, EXPIRATION, OR REVISION OF A GRADUATE COURSE (50000-60000 LEVEL)

**DEPARTMENT:** Agricultural and Biological Engineering  
**EFFECTIVE SESSION:** 2011-12  
**Effective Date:** 5-1-2012

**INSTRUCTIONS:** Please check the items below which describe the purpose of this request.

1. New course with supporting documents (complete proposal form)
2. Add existing course offered at another campus
3. Expiration of a course
4. Change in course number
5. Change in course title
6. Change in course credit type
7. Change in course attributes
8. Change in instructional hours
9. Change in course description
10. Change in course requisites
11. Change in semesters offered
12. Transfer from one department to another

**PROPOSED:**

- **Subject Abbreviation:** ABE  
- **Course Number:** 52900
- **Long Title:** Nonpoint Source Pollution Engineering  
- **Short Title:** NONPOINT SOURCE POLLUTION ENGR

**EXISTING:**

**TERMS OFFERED:**

- **Check All That Apply:**  
  - [ ] Summer  
  - [ ] Fall  
  - [X] Spring

**CAMPUS(ES) INVOLVED:**

- [ ] Calumet  
- [ ] Cont Ed  
- [ ] Tech Statewide  
- [ ] Ft. Wayne  
- [X] Indianapolis  
- [ ] W. Lafayette

**Abbreviated title will be entered by the Office of the Registrar if omitted. (20 CHARACTERS ONLY)**

**CREDIT TYPE:**

1. Fixed Credit: Cr. Hrs.
2. Variable Credit Range: Minimum Cr. Hrs.  
   - (Check One) To  
   - Maximum Cr. Hrs.
3. Equivalent Credit: Yes  
4. Thesis Credit: Yes

**COURSE ATTRIBUTES:**

1. Pass/Not Pass Only
2. Satisfactory/Unsatisfactory Only
3. Repeatable
4. Credit by Examination
5. Special Fees
6. Registration Approval Type  
   - Department  
   - Instructor
7. Variable Title
8. Honors
9. Full Time Privilege
10. Off Campus Experience

**Schedule Type:**

- Lecture
- Recitation
- Presentation
- Laboratory
- Lab Prep
- Studio
- Distance
- Clinic
- Experiential
- Research
- Ind. Study
- Pract/Ob/Shop

**Minutes Per Week:**

<table>
<thead>
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<th>Schedule Type</th>
<th>Minutes Per Week</th>
<th>Meetings Per Week</th>
<th>Weeks Offered</th>
<th>% of Credit Allocated</th>
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**COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):**

Prerequisite: ABE 32500 or AGRY 33700 or CE 54200 or Graduate Status. Engineering principles involved in assessment and management of nonpoint source (NPS) pollution. Effect of NPS pollution on ecosystem integrity. Use of GIS/mathematical models to quantify extent of pollution. Design/implementation of best management practices to reduce nonpoint source pollution and improve water quality. Discussion of total maximum daily load (TMDL) principles and processes.

**Signature:**

Calumet Department Head  
Calumet School Dean  
Calumet Undergrad Curriculum Committee

Fort Wayne Department Head  
Fort Wayne School Dean  
Fort Wayne Chancellor

Indianapolis Department Head  
Indianapolis School Dean  
Undergrad Curriculum Committee

North Central Faculty Senate Chair  
Vice Chancellor for Academic Affairs

West Lafayette Department Head  
West Lafayette College/School Dean  
West Lafayette Registrar

Graduate Area Committee Convener  
Graduate Dean  
Date Approved by Graduate Council  
Graduate Council Secretary  
Date

**OFFICE OF THE REGISTRAR**
TO: The Faculty of the College of Engineering
FROM: Department of Agricultural and Biological Engineering
RE: New Graduate Course, ABE 52900 Nonpoint Source Pollution Engineering

The faculty of the Department of Agricultural and Biological Engineering have approved the following new course. This action is now submitted to the Engineering Faculty with a recommendation for approval.

**ABE 52900 Nonpoint Source Pollution Engineering**
Term Offered: Spring, Lecture 3, Cr. 3
Prerequisites: ABE 32500 or AGRY 33700 or CE 54200

**Description:** Engineering principles involved in assessment and management of nonpoint source (NPS) pollution. Effect of NPS pollution on ecosystem integrity. Use of GIS/mathematical models to quantify extent of pollution. Design/implementation of best management practices to reduce nonpoint source pollution and improve water quality. Discussion of Total Maximum Daily Load (TMDL) principles and processes.

**Reason:** No such course is currently available at Purdue. This course will form one of the technical or design electives in ABE. In addition, the course will also be listed as one of the courses for DEEE, ESE, and ENRE students. Development of such a course will potentially attract high quality graduate and undergraduate students who are interested in a career in natural resources engineering, watershed management, and water quality. The skill sets developed in this course are currently in high demand by a number of state, federal, and local agencies, and private consulting firms. It should be noted that a number of other U.S. universities currently offer a similar course to their students.

The course was taught twice (Spring 2003 and Spring 2005) by the same instructor at the University of Arkansas. The average enrollment was 10 students. It is anticipated that approximately 50% of the students will be from ABE and remaining from other departments/programs, such as Forestry and Natural Resources, Civil Engineering, Earth and Atmospheric Sciences, Ecological Sciences and Engineering, and the Division of Environmental and Ecological Engineering.

Bernard A. Engel
Professor and Head
Agricultural and Biological Engineering Department

Date: April 5, 2010

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**APPROVED FOR THE FACULTY OF THE SCHOOLS OF ENGINEERING BY THE ENGINEERING CURRICULUM COMMITTEE**

ECC Minutes  
Date  
Chairman ECC

R. Cipsa
Supporting Document for a New Graduate Course

TO: Purdue University Graduate Council
FROM: Indrajit Chaubey  
Agricultural & Biological Engineering  
West Lafayette
DATE: April 5, 2010
SUBJECT: Proposal for New Graduate Course-Documentation  
Required by the Graduate Council to Accompany  
Registrar's Form 40G

Contact for information if questions arise:
Name: Indrajit Chaubey  
Phone Number: 45013  
Email: ichaubey@purdue.edu  
Campus address: ABE/ABE

Course Subject Abbreviation and Number: ABE 52900
Course Title: Nonpoint Source Pollution Engineering

A. Justification for the Course:

- No such course is currently available at Purdue. This course will be one of the technical or design electives in ABE. In addition, the course will also be listed as one of the courses that can be taken by DEEE, ESE, and ENRE students. Development of such a course will potentially attract high quality graduate and undergraduate students who are interested in a career in natural resources engineering, watershed management, and water quality. The skill sets developed in this course are currently in high demand by a number of state, federal, and local agencies, and private consulting firms. It should be noted that a number of other U.S. universities currently offer similar courses to their students.

- The course was taught twice (Spring 2003 and Spring 2005) by the same instructor at the University of Arkansas. The average enrollment was 10 students. It is anticipated that approximately 50% of the students will be from ABE and the remaining from other departments/programs, such as Forestry and Natural Resources, Civil Engineering, Earth and Atmospheric Sciences, Ecological Sciences and Engineering, and the Division of Environmental and Ecological Engineering.

B. Learning Outcomes and Method of Evaluation or Assessment:

- Course objectives:
  * Understand sources and nature of NPS pollution originating from agricultural and urban land use.
  * Link nature of diffuse pollution with physical, chemical and biological integrity of ecosystems and water usage.
o Quantify amount of diffuse pollution from a watershed using state-of-the-art methods and models.

o Design best management practices to minimize nonpoint source pollution from agricultural and urban land use.

o Understand TMDL issues, and processes involved in the developing TMDL plans.

o Understand basic monitoring and modeling principles.

o Apply engineering principles in developing a pollution prevention plan.

- Student learning outcomes that address the objectives:
  This course will prepare students (both undergraduate and graduate) to meet the following learning outcomes:

  o Professional Preparation
  o Technological literacy
  o Scientific Principles
  o Critical thinking and problem solving
  o Communication (oral, written)

- The grade for this course will be determined by the following activities:

  Homework and quizzes 40%
  Exams (2) 40%
  Term Project 20%
  Total 100%

The following scale will be used to determine the final letter grade:

A+, A = (93-100)%, A= (90-92.9)%, B+ = (87-89.9)%, B = (83-86.9)%, B- = (80-82.9)%, C+ = (77-79.9)%, C = (73-76.9)%, C- = (70-72.9)%, D+ = (67-69.9)%, D = (63-66.9)%, D- = (60-62.9)%, F = (59-0)%

C. Prerequisite(s):

  • Prerequisite courses: ABE 325 or AGRY 337 or CE 542

D. Course Instructor(s):

  • Dr. Indrajeet Chaubey, Associate Professor
    Agricultural & Biological Engineering

  • Instructor is currently a member of the Graduate Faculty
E. **Course Outline:**

<p>| | |</p>
<table>
<thead>
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</table>
| 1 | Introduction to N  
  PS pollution, history, types, current state-of-the-knowledge |
| 2 | Water quality issues. Effect of NPS pollution on ecosystem integrity, hydrologic considerations |
| 3 | Pollutant interactions with soil, sediment and water. |
| 4 | Erosion and sediment yield modeling: USLE, RUSLE, and WEPP |
| 5 | Stream flow measurement and sampling techniques to determine pollutant load. |
| 6 | Nutrient, pesticides and water quality impacts in agricultural watersheds |
| 7 | Best management practices (BMPs): concept, design, and implementation for nutrient and sediment control |
| 8 | BMPs, cont. EXAM 1 |
| 9 | Urban diffuse pollution |
| 10 | Design of BMPs to control urban NPS pollution |
| 11 | Design of detention-retention facilities and wetlands, |
| 12 | NPS pollution assessment – modeling |
| 13 | TMDL: concept, principle, and design |
| 14 | TMDL cont. |
| 15 | Use of GIS and NPS models to develop pollution prevention plan. Design of watershed monitoring plan to assess NPS pollution |
| 16 | Final Exam. Project written report due |

F. **Reading List (including course text):**

- Various handouts distributed throughout the semester.

G. **Library Resources:**

Students are required to work on a semester long project. They avail library resources needed to successfully complete their semester projects.

H. **Example of a Course Syllabus**
Course Outline
ABE591P
Nonpoint Source Pollution Engineering

Instructor: Dr. Indrajit Chaubey

320 ABE

e-mail: ichaubey@purdue.edu

Phone: 494-5013

Homepage: http://engineering.purdue.edu/ecohydrology

Hours: Open Door Policy

Class time: Tuesday, Thursday 12:00 pm to 1:15 PM

Course Description:

Engineering principles involved in assessment and management of nonpoint source (NPS) pollution. Effect of NPS pollution on ecosystem integrity. Use of GIS/mathematical models to quantify extent of pollution. Design/implementation of best management practices to improve water quality. Discussion of Total Maximum Daily Load (TMDL) principles and processes. Prerequisite: ABE325 or CE542 or AGRY399W.


Objectives: After the completion of this course, students should be able to:

1. Understand sources and nature of NPS pollution originating from agricultural and urban land use.
2. Link nature of diffuse pollution with physical, chemical and biological integrity of ecosystems and water usage.
3. Quantify amount of diffuse pollution from a watershed using state-of-the-art methods and models.
4. Design best management practices to minimize nonpoint source pollution from agricultural and urban land use.
5. Understand TMDL issues, and processes involved in developing TMDL plans
6. Understand basic monitoring and modeling principles
7. Apply engineering principles in developing pollution prevention plan

Class Procedures: Three lectures per week. Occasionally, there may be a field trip planned.
Homework:

1. Homework will be due at the beginning of the class period listed as the due date. A late homework will result in a score of 0 (zero). However, you must complete all the assignments to get a passing grade in the course.
2. Homework must be performed in standard engineering format. Because communication skills are extremely important for engineers, you should communicate your work effectively and clearly. All homework should be submitted on computer printouts.
3. You are encouraged to work together with other students in the class. However, the work you turn in should reflect your own effort rather than a substantial copy of another student’s work.
4. Students are expected to abide by academic honesty and ethics described in the Undergraduate Studies Catalog. Any academic dishonesty will automatically result in Grade F and will be reported to the Dean of Students.

Evaluation:

The grade for this course will be determined by the following activities:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentage</th>
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</thead>
<tbody>
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Attendance:

Attendance is optional. But it will affect your class participation and presentation component of the final grade. Excused absences such as illness, official trips as part of other courses and religious holidays will not count against class participation and deadlines. Please notify me of an expected absence or see me after an absence as soon as possible.
Announcements:

I will use both e-mail and a web-page designed for this class to post important announcements. Please visit the course web-page frequently. If you currently do not have an e-mail account, let me know and I will get one for you.

Students with disability: If you need an accommodation due to a disability, please make arrangements to discuss this with me during first two weeks of the semester.

Course Outline (tentative):

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