**PURDUE UNIVERSITY**
REQUEST FOR ADDITION, EXPIRATION, OR REVISION OF AN UNDERGRADUATE COURSE
(100-499 LEVEL)

**DEPARTMENT**: Engineering  
**EFFECTIVE SESSION**: Spring 2009

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

- [x] New course with supporting documents
- [ ] Add existing course offered at another campus
- [ ] Exploitation of a course
- [ ] Change in course number
- [ ] Change in course title
- [ ] Change in course credit type
- [x] Change in course attributes (department head signature only)
- [x] Change in instructional hours
- [ ] Change in course description
- [ ] Change in course requisites
- [ ] Change in semester offered (department head signature only)
- [x] Transfer from one department to another

<table>
<thead>
<tr>
<th>PROPOSED:</th>
<th>EXISTING:</th>
<th>TERMS OFFERED</th>
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<tbody>
<tr>
<td>Subject Abbreviation</td>
<td>CE</td>
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<tr>
<td>Course Number</td>
<td>418</td>
<td>Course Number</td>
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<tr>
<td>Long Title</td>
<td>Hydraulics Engineering</td>
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<td>Short Title</td>
<td>Hydraulics Engr.</td>
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**COURSE DESCRIPTION (INCLUDE REQUISITES):**

F: CE 318. Sources and distribution of water in urban environment, including surface reservoir requirements, utilization of groundwater, and distribution systems. Analysis of sewer systems and drainage courses for the disposal of both wastewater and storm water. Pumps and lift stations. Urban planning and storm drainage practice.

**CREDIT TYPE**

1. Fixed Credit: Cr. Hrs. [x] 3
2. Variable Credit Range: Minimum Cr. Hrs.
   - [ ] Or
   - [ ] No
   - [ ] Yes

**COURSE ATTRIBUTES**: Check All That Apply

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

**INSTRUCTIONAL TYPE**

- Lecture: Minutes Per Wk
- Recitation: Meetings Per Wk
- Laboratory:
- Lab Prep:
- Studio:
- Distance:
- Clinic:
- Experiential:
- Research:
- Ind. Study:
- Internship:

**DELIVERY METHOD**

- Delivery Medium (Audio, Internet, Live, Text-Based, Video)
- Delivery Method (Asyn., Or Syn.)

**OFFICE OF THE REGISTRAR**

[Signatures and dates for Purdue University officials]
Required Course: **CE 418 - Hydraulics Engineering**  
Offered each fall

**Catalog Data:**  
Class: 3. Credits: 3.  
Sources and distribution of water in urban environment, including surface reservoir requirements, utilization of groundwater, and distribution systems. Analysis of sewer systems and drainage courses for the disposal of both wastewater and storm water. Pumps and lift stations. Urban planning and storm drainage practice.

**Prerequisites:**  
CE 318 - Fluid Mechanics

**Corequisite:**  
None

**Required Textbook:**  

**Reference:**  
None

**Course Objectives:**  
Students will understand and be able to apply fundamental concepts and techniques of hydraulics and hydrology in the analysis, design, and operation of water resources systems.

**Schedule:**  
Two 75-minute classes per week.

**Lecture Topics:**

1. Introduction and review of conservation principles  
   2 classes
2. Flow in closed conduits: Networks and water distribution system design  
   6 classes
3. Pump system  
   2 classes
4. Flow in open channels: Design of channel and sanitary sewers  
   7 classes
5. Rainfall and runoff estimation  
   4 classes
6. Storm sewer system design  
   3 classes
7. Storm water storage and reservoir routing  
   4 classes
8. Quizzes/Exams  
   3 classes

**Course Outcomes:**  
Upon successful completion of this course, students shall be able to:

1. Become familiar with different water resources terminology like hydrology, ground water, hydraulics of pipelines and open channel [a (1)]
2. Understand and apply to use the energy and momentum equations [a (1)]
3. Analyze flow in closed pipes, and design and selection of pipes including sizes. [a (1), c (4), e (2)]
4. Understand pumps classification and be able to develop a system curve used in pump selection. [a (1), c (4), e (2)]
5. Design and select pumps (single or multiple) for different hydraulic applications. [a (1), c (4), e (2)]
6. Become familiar with open channel cross sections, hydrostatic pressure distribution and Manning's law. [a (1)]

7. Determine water surface profiles for gradually varied flow in open channels. [a (1), c (2)]

8. Familiar with drainage systems and wastewater sources and flow rates. [a (1)]

9. Analyze and design a sanitary sewer system using modern engineering software. [c (4), e (2), k (6)]

10. Understand precipitation processes, spatial and temporal distribution of rainfall, and conduct data analysis. [a (1), b (3)]

11. Understand factors affecting runoff, rational method, SCS Curve Number Method, and hydrographs. [a (1)]

12. Familiar with storm water storage facilities and able to computer storage volumes. [a (1), e (2)]

13. Understand routing process and conduct reservoir routing by Puls method. [a (1), e (2)]

14. Identify and use modern computer software such as KYpipe and HYDRAIN to analyze and design different water and wastewater systems. [i (9), k (6)]

15. Familiar with contemporary issues related to water recourses. [i (9), j (6)]

ABET category: Engineering science: 1 credit or 33%
Engineering design: 2 credits or 67%