Purdue University Request for Addition, Expiration, or Revision of an Undergraduate Course (10000-40000 Level)

Department: School of Chemical Engineering  Effective Session: Fall 2010  SY 2011

Instructions: Please check the items below which describe the purpose of this request:

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

Proposed:

<table>
<thead>
<tr>
<th>Subject Abbreviation</th>
<th>CHE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Number</td>
<td>46300</td>
</tr>
<tr>
<td>Long Title</td>
<td>Applications of Chemical Engineering Principles</td>
</tr>
<tr>
<td>Short Title</td>
<td>Applications of CHE Principles</td>
</tr>
</tbody>
</table>

Terms Offered:

- Summer (X)  Fall  Spring

Campus(es) Involved:
- Column
- Cont Ed
- Ft Wayne
- Indianapolis

Credit Type:

<table>
<thead>
<tr>
<th>1. Fixed Credit Cr. Hrs.</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Variable Credit Range:</td>
<td></td>
</tr>
<tr>
<td>Minimum Cr. Hrs</td>
<td></td>
</tr>
<tr>
<td>Maximum Cr. Hrs</td>
<td></td>
</tr>
<tr>
<td>3. Equivalent Credit</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Course Attributes:

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

Course Description (Include Requisites/Restrictions):
Team-based design projects in materials transport, heat transfer, mass transfer, separations, chemical reactors. Emphasis on team operation and decision-making. Consideration of current technical challenges, societal and economic issues. Prerequisite: CHE 37800

Course Learning Outcomes:
- Demonstrate ability to apply principles of chemical engineering to design practical systems. (1, 3, 5)
- Participate in team-based projects to understand team operation and decision-making. (4)
- Gain experience in and appreciation of the need for individual learning about new systems, equipment, etc. (9)
- Understand the role of the engineer in promoting safe operation and consideration of environmental issues in technical decisions. (6, 8)
- Develop an appreciation of current issues and challenges which you may well be addressing as professionals. (8)

Calumet Department Head: Date  Calumet School Dean: Date

Fort Wayne Department Head: Date  Fort Wayne School Dean: Date

Indianapolis Department Head: Date  Indianapolis School Dean: Date

North Central Faculty Senate Chair: Date  Vice Chancellor for Academic Affairs: Date

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

Office of the Registrar
PURDUE UNIVERSITY
REQUEST FOR ADDITION, EXPIRATION,
OR REVISION OF AN UNDERGRADUATE COURSE
(10000-40000 LEVEL)

DEPARTMENT | School of Chemical Engineering
EFFECTIVE SESSION | Fall 2010

INSTRUCTIONS: Please check the items below which describe the purpose of this request.
1. New course with supporting documents
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/length
7. Change in course attributes (department head signature only)
8. Change in instructional hours
9. Change in course description
10. Change in course requisites
11. Change in semester offered (department head signature only)
12. Transfer from one department to another

PROPOSED:
Subject Abbreviation: CHE
Course Number: 46300
Long Title: Applications of Chemical Engineering Principles
Short Title: Applications of Chemical Engineering Principles

EXISTING:
Subject Abbreviation:
Course Number:

TERMS OFFERED:
Check All That Apply:
Summer
Fall
Spring

CAMPUS(ES) INVOLVED:
Columnet
Cont Ed
Ft. Wayne
Indiana
Indianapolis

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

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

COURSE ATTRIBUTES: Check All That Apply
1. Pass/No Pass Only
2. Satisfactory/ Unsatisfactory Only
3. Repeatable
4. Credit by Examination
5. Special Fee
6. Registration Approval Type
   Department
   Instructor
7. Variable Title
8. Hours
9. Full Time Privilege
10. Off-Campus Experience

Schedule Type
Cross-Listed Courses
Minutes Per Mtg:
Meetings Per Week:
Weeks Offered:
% of Credit Allocated: 100
Lecture
Recitation
Presentation
Laboratory
Lab Prep
studio
dance
Experiential
Research
Ind. Study
Prac/Observer

COURSE DESCRIPTION (INCLUDE REQUIREMENTS/RESTRICTIONS):
Team-based design projects in materials transport, heat transfer, mass transfer, separations, chemical reactors. Emphasis on team operation and decision-making. Consideration of current technical challenges, societal and economic issues. Prerequisite: CHE 37800

COURSE LEARNING OUTCOMES
• Demonstrate ability to apply principles of chemical engineering to design practical systems. (1, 3, 5)
• Participate in team-based projects to understand team operation and decision-making. (4)
• Gain experience in and appreciation of the need for individual learning about new systems, equipment, etc. (9)
• Understand the role of the engineer in promoting safe operation and consideration of environmental issues in technical decisions. (6, 8)
• Develop an appreciation of current issues and challenges which you may well be addressing as professionals. (8)

Columnet Department Head Date
Federal Coordinator Date

Ft. Wayne Department Head Date
Ft. Wayne School Dean Date

Indiana Department Head Date
Indiana University School Dean Date

North Central Faculty Senate Chair Date
Vice Chancellor for Academic Affairs Date

Lafayette Department Head Date
West Lafayette College School Dean Date

OFFICE OF THE REGISTRAR
To: Faculty of the College of Engineering

From: Faculty of the School of Chemical Engineering

RE: New Undergraduate Course, CHE 46300, Applications of Chemical Engineering Principles

The faculty of the School of Chemical Engineering has approved the following new course. This action is now submitted to the Engineering Faculty with a recommendation for approval.

**CHE 46300:** Applications of Chemical Engineering Principles
Sem 1, cr. 3, LEC 3
Prerequisite: CHE 37800 or equivalent or permission of Instructor

**Description:** Team-based design projects in materials transport, heat transfer, mass transfer, separations, chemical reactors. Emphasis on team operation and decision-making. Consideration of current technical challenges, societal and economic issues.

**Reason:** The course has been taught as Applications of Chemical Engineering Principles, CHE 497B, in the spring semester of AY2007 with 21 students, in the fall semester of AY2008 with 42 students, and in the fall semester of 2009 with 47 students as CHE 49700. The course provides students planning an industrial career experience in the application of chemical engineering fundamentals to practical situations and decision-making.

\[Signature\]
A. Varma, Head
School of Chemical Engineering
Date: 2/22/10

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Approved for the Faculty of the Schools of Engineering by the Engineering Curriculum Committee

ECC Minutes #25
Date 4/27/10
Chairman ECC R. Cipis
Supporting Documentation – CHE 46300, Applications of Chemical Engineering Principles

Level: Undergraduate
Course Instructor: R. Neal Houze


Course Operation: Three or four person teams work on design projects of about three-week duration. Team membership changes three times during the semester to give students opportunities to work with a variety of individuals. Class sessions are utilized to review and/or introduce relevant topical materials and work through practice problems. Most class sessions also discuss a newsworthy issue – technical, political, regulatory, or safety – which has recently been reported in the press or technical literature. Problem-solving skills are emphasized and bases for technical decisions. Heuristics are presented and utilized in the design projects. Teams submit technical reports with technical memos which are the basis for the team’s grade. Each team member assesses the teamwork of the other members and this assessment is factored into the grade. Project topics are solicited from industrial contacts and students who have had significant practical work experiences during their academic tenure (Co-Op or internships).

Topics Covered in previous semesters:

- Design of piping system including pump selection, flow meter selection and calibration, control valve selection, and operability of system
- Design of heat exchange equipment (shell-and-tube exchanger, air-cooled fin-fan exchanger) and economic analysis of alternatives
- Design and/or certification of a forced-draft cooling tower
- Design of a continuous stirred-tank reactor (CSTR) based on mixing (mass transfer) limitations
- Design of a CSTR or a plug-flow reactor based on kinetic limitations
- Design of a filtration system to recover pharmaceutical grade particulate material
- Design of an absorber system to remove pollutants from a waste gas stream
- Conditioned air system design
- Process Troubleshooting
- Process Debottlenecking
- Process safety
- Grand Challenges for the 21st century
- Modern information retrieval
- Effective Communication
- Team Organization and Operation
**Course Objectives:** Develop abilities to apply chemical engineering principles to practical situations to design, analyze operations, or predict operability of systems.

**Course Outcomes:** (numbers in parentheses refer to related educational outcomes of our undergraduate chemical engineering program)

- Demonstrate ability to apply principles of chemical engineering to design practical systems. (1, 3, 5)
- Participate in team-based projects to understand team operation and decision-making. (4)
- Gain experience in and appreciation of the need for individual learning about new systems, equipment, etc. (9)
- Understand the role of the engineer in promoting safe operation and consideration of environmental issues in technical decisions. (6, 8)
- Develop an appreciation of current issues and challenges which you may well be addressing as professionals. (8)

**Assessment Methods for Outcomes:** The outcomes are assessed through the written project reports submitted by the teams, regular meetings with each of the teams, peer assessment of the team members, and oral presentations of project results.