**PURDUE UNIVERSITY**
REQUEST FOR ADDITION, EXPIRATION,
OR REVISION OF AN UNDERGRADUATE COURSE
(10000-40000 LEVEL)

**DEPARTMENT:** Engineering
**EFFECTIVE SESSION:** Fall 2014

**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
- [ ] Expiration of a course
- [ ] Change in course number
- [ ] Change in course title
- [ ] Change in course credit

**PROPOSED:**

<table>
<thead>
<tr>
<th>Subject Abbreviation</th>
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<tbody>
<tr>
<td>ENGR</td>
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<tr>
<th>Course Number</th>
<th>Long Title</th>
<th>Short Title</th>
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<tbody>
<tr>
<td>12800</td>
<td>Engineering Fundamentals II</td>
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**EXISTING:**

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**TERMS OFFERED:**

- [x] Fall
- [ ] Spring
- [x] Summer

**CAMPUS(ES) INVOLVED:**

- [ ] Calumet
- [ ] Cont Ed
- [x] Ft. Wayne
- [ ] Indianapolis
- [ ] N. Central
- [ ] Tech Statewide
- [ ] W. Lafayette

**CREDIT TYPE:**

<table>
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<tr>
<th>1. Fixed Credit: Cr. Hrs.</th>
<th>4</th>
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<tbody>
<tr>
<td>2. Variable Credit Range</td>
<td>Minimum Cr. Hrs.</td>
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<td>(Check One)</td>
<td>To Or</td>
</tr>
<tr>
<td>Maximum Cr. Hrs.</td>
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<tr>
<td>3. Equivalent Credit: Yes</td>
<td>No</td>
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**COURSE ATTRIBUTES:**

| 1. Pass/No Pass Only |                   |
| 2. Satisfactory/Unsatisfactory Only | |
| 3. Repeatable        |                   |
| 4. Credit by Examination |               |
| 5. Fee: Coop Lab Rate Request | |

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

This second course in engineering fundamentals continues the introduction to engineering applications, analysis, experimentation, and design with a focus on the application of mathematical analysis. The course’s project studio emphasizes learn work, project management, and communication with significant writing and speaking. A laboratory component introduces engineering computer tools for manipulation of data sets and structured programming. The course continues the overview of engineering majors and the engineering profession. Corequisite: MA 165, ENG WI131, COM 114. Prerequisite: ENGR 127: Engineering Fundamentals I

**COURSE LEARNING OUTCOMES:**

See Attached Department Syllabus

**Cross-Listed Courses:**

- [ ]
- [ ]
- [ ]
- [ ]

**SIGNATURES:**

- Calumet Department Head
- Calumet School Dean
- Calumet School Dean
- Ft. Wayne Department Head
- Ft. Wayne School Dean
- Ft. Wayne School Dean
- Indianapolis Department Head
- Indianapolis School Dean
- Indianapolis School Dean
- North Central Faculty Senate Chair
- Vice Chancellor for Academic Affairs
- West Lafayette Department Head
- West Lafayette College/School Dean
- West Lafayette Register
Course: ENGR 12800 – Engineering Fundamentals II

Type of Course: Required for all undergraduate engineering programs

Catalog Description: This second course in engineering fundamentals continues the introduction to engineering applications, analysis, experimentation, and design with a focus on the application of mathematical analysis. The course's project studio emphasizes team work, project management, and communication with significant writing and speaking. A laboratory component introduces engineering computer tools for manipulation of data sets and structured programming. The course continues the overview of engineering majors and the engineering profession.

Credits: 4

Contact Hours: 2 Lecture, 2.5 Project Studio, 2.5 Laboratory

Prerequisite Courses: ENGR 12700 Engineering Fundamentals I

Corequisite Courses: MA 165, ENG W131, COM 114

Prerequisites by Topics: Trigonometry
College entrance level of writing, speaking and critical reading
Application of algebra, trigonometry, disruptive statistics and simple derivatives in engineering
Preparation of graphs, charts, tables and memos for communication
Use of CAD and Spreadsheet software


Course Objectives: This course seeks to prepare students for the study of engineering through learning how to: 1) effectively approach the study of engineering, 2) rigorously apply of mathematical techniques in engineering particularly algebra, trigonometry, descriptive statistics, & simple derivatives, 3) carry out a disciplined engineering project, 4) prepare and use graphical objects (graphs, tables, drawings, charts) for technical communication, and 5) use spreadsheet and CAD software.
After successfully completing this course, students should be able to:

Lecture
1. formulate and solve engineering problems using complex numbers
2. formulate and solve engineering problems using sign waves & frequency
3. formulate and solve engineering problems using integration
4. formulate and solve engineering problems using Boolean Logic
5. formulate and solve engineering problems using (linear-in-parameters) empirical fitting
6. formulate and solve engineering problems using simple differential equations
7. solve and document the solution of problems involving new elements by using multiple approaches including visual problem solving and a problem solving formalisms
8. describe the broad nature of various engineering majors and the engineering profession and use this information to make appropriate career choices.

Studio
1. plan and carry out a disciplined design project following a systematic design process
2. Utilize appropriate analytical and computer tools in project work
3. write a precise and effective Technical Report Memo. Write clear Abstract, Methodology, Recommendations, and Conclusions sections
4. prepare and deliver an effective oral technical presentation
5. organize an effective team including setting ground rules, project planning, and task management; explain and utilize effective group processes

Laboratory
1. solve engineering problems using computer tools
2. apply arrays and array manipulations
3. use and explain files and data structures
4. write a function with multiple inputs and outputs at the command line
5. write a function that results in a non-numerical output
6. write programs using logical expressions and conditional statements
7. write programs using loop structures
8. fit data that follows linear, quadratic, or power law forms
9. properly communicate a solution based on computer calculation or program
Lecture Topics
1. Review of engineering analysis from ENGR 12700
2. Engineering applications of complex numbers
3. Engineering applications of sinusoids and waves
4. Engineering applications of simple integration
5. Engineering applications of Boolean Logic
6. Engineering applications of empirical modeling (linear-in-parameters)
7. Engineering applications of simple differential equations
8. Engineering majors & jobs

Studio Topics
1. Design process
2. Writing technical memo reports
3. Writing abstract, methodology, recommendations, and conclusions sections
4. Oral technical presentations
5. Teamwork

Laboratory Topics
1. Working with arrays and files in computer programs
2. Writing computer functions and sub-functions
3. Writing programs with branching
4. Writing programs with loops
5. Fitting simple empirical models
6. Documenting a computer problem solution

Computer Usage
High

Laboratory Experience
Low

Design Experience
High

Coordinator
S. Scott Moor, Ph.D., P.E., moors@ipfw.edu (260) 481-6020

Date
April 1, 2013