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

**DEPARTMENT** Computer Science  
**EFFECTIVE SESSION** 2016 Fall

**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/type
- [ ] 7. Change in course attributes (department head signature only)
- [X] 8. Change in instructional hours
- [ ] 9. Change in course description
- [ ] 10. Change in course requisites
- [ ] 11. Change in semesters offered (department head signature only)
- [ ] 12. Transfer from one department to another

**PROPOSED:**

<table>
<thead>
<tr>
<th>Subject Abbreviation</th>
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<th>Course Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS</td>
<td></td>
<td>22700</td>
</tr>
</tbody>
</table>

**EXISTING:**

<table>
<thead>
<tr>
<th>Long Title</th>
<th>Subject Abbreviation</th>
<th>Course Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to C Programming</td>
<td>CS</td>
<td>22700</td>
</tr>
</tbody>
</table>

**TERMS OFFERED:**

- [X] Fall  
- [X] Spring  
- [ ] Summer

**CAMPUS(ES) INVOLVED:**

- Calumet  
- N. Central  
- Ft. Wayne  
- Tech Statewide  
- Indianapolis  
- W. Lafayette

**CREDIT TYPE:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>1.</td>
<td>Fixed Credit: Cr. Hrs.</td>
</tr>
<tr>
<td>2.</td>
<td>2</td>
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</tbody>
</table>

**COURSE ATTRIBUTES:**

- [ ] Pass/Not Pass Only
- [ ] Satisfactory/Unsatisfactory Only
- [ ] Repeatable
- [X] Credit by Examination

**Rate Request**

- [ ] Lab
- [ ] Rate Request
- [ ] Include comment to explain fee

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

Pre-requisite: Engineering 12800 or consent of the instructor.
Introduction to programming in C to solve engineering problems. Topics covered include primitive data types, control structures, standard input/output, file input/output, mathematical library, procedural programming, problem-solving, user-defined functions, arrays, and pointers.

**COURSE LEARNING OUTCOMES:**

The goal of this course is to introduce programming in C to solve engineering problems. Specific learning outcomes are listed below. The letters in parenthesis refer to ABET Program Learning Outcomes. A student who successfully fulfills the course requirements will have demonstrated: 1. An ability to use C programming language to solve elementary engineering problems. (a,b,c,d) 2. An understanding of and an ability to use data types, variables, and arithmetic operators. (a,e) 3. An ability to use conditional statements and loops structures. (c,m,n) 4. An understanding of the use of arrays and pointers (a,k) 5. An ability to develop function-oriented programs. (c,a) 6. An understanding of the distinction for passing arguments among functions. (a,k) 7. An ability to use standard input/output and file input/output operations. (a,k)

**Cross-Listed Courses**

**Calumet Department Head**
Date: 4/1/2015

**Ft. Wayne School Dean**
Date: 4/1/2015

**Indianapolis School Dean**
Date: 4/1/2015

**North Central Faculty Senate Chair**
Date: 4/1/2015

**West Lafayette School Dean**
Date: 4/1/2015

**OFFICE OF THE REGISTRAR**
COURSE DESCRIPTION

Department and Course Number
CS 22700

Course Title
Introduction to C Programming

Course Coordinator
Beomjin Kim

Total Credits
2.0

Course Description

P: ENGR 12800 or consent of instructor. Introduction to programming in C to solve engineering problems. Topics covered include primitive data types, control structures, standard input/output, file input/output, mathematic library, procedural programming, problem-solving, user-defined functions, arrays, and pointers.

Textbook

Reference Books

Course Goals & Course Learning Outcomes

The goal of this course is to introduce to programming in C to solve engineering problems. Specific learning outcomes are listed below. The letters in parentheses refer to ABET Program Learning Outcomes. A student who successfully fulfills the course requirements will have demonstrated:

1. An ability to use C programming language to solve elementary engineering problems. (a, c, e, k)
2. An understanding of and an ability to use data types, variables, and arithmetic operators. (a, e)
3. An ability to use conditional statements and loops structures. (c, e, k)
4. An understanding of the use of arrays and pointers. (e, k)
5. An ability to develop function-oriented programs. (c, e, k)
6. An understanding of the distinction for passing arguments among functions. (c, e, k)
7. An ability to use standard input/output and file input/output operations. (c, k)
Course Learning Outcomes Assessment

Upon successful completion of the course requirements, a student should be able to:

1. The course has improved my ability to use C programming language to solve elementary engineering problems. (a, c, e, k)
2. The course has improved my understanding of and an ability to use data types, variables, and arithmetic operators. (a, e)
3. The course has improved my ability to use conditional statements and loops structures. (c, e, k)
4. The course has improved my understanding of the use of arrays and pointers. (e, k)
5. The course has improved my ability to develop function-oriented programs. (c, e, k)
6. The course has improved my understanding of the distinction for passing arguments among functions. (c, k)
7. The course has improved my ability to use standard input/output and file input/output operations. (e, k)

Relationship between Course Outcomes and Program Outcomes
The numbered Course Outcomes support the Program Outcomes as indicated in the following table, where the Program Outcomes (a-k) are listed below the table:

<table>
<thead>
<tr>
<th>Course Outcome</th>
<th>Program Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>a b c d e f g h i j k</td>
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<tr>
<td>2</td>
<td>° ° ° °</td>
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<td>7</td>
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</tbody>
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ABET Program Outcomes

Engineering programs must demonstrate that their graduates have:

(a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs
(d) an ability to function on multi-disciplinary teams
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively
(h) the broad education necessary to understand the impact of engineering solutions in a
global and societal context
(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for
engineering practice.

Major Topics Covered in the Course

Introduction to C Language .................................................. (2)
   C program structure,
   Data types and declarations,
   Constants and variables,
   Statements,
   Using Visual Studio.NET,
   Preprocessor directives

C fundamentals ................................................................. (2)
   Arithmetic operators,
   Standard Input/Output, I/O Formatting,
   Math Functions,
   Structured programming,
   Type casting

Decision and Iteration Structures ...................................... (2)
   Conditional expressions,
   Selection statements,
   Loop structures

File Input/Output, Procedural programming ....................... (2)

Functions and Recursion...................................................... (4)
   User-defined functions,
   Arguments passing among functions,
   Variable scope,
   Recursion

Arrays and matrices......................................................... (2)

Problem solving methodology, Pointers ............................ (2)

Software

We will be using Visual Studio 2012 as our default application development environments
for homework. Visual Studio 2012 is available at all the open IPFW Student-Access
Computing Labs. When you use other C/C++ programming environments, you should check the compatibility of your application with the above environment before submit it.

Assessment Plan for the Course

Each time the course is offered, the class is initially informed of the list of Course Outcomes, which are included in the syllabus. Then, at the end of the semester, an anonymous survey of the class is conducted. For each Course Outcome, each student is asked to judge how well the outcome was achieved. The choices available are the following: "Strongly agree", "Agree", "Neither agree nor disagree", "Disagree", and "Strongly Disagree". Subsequently, the results are converted to a 5-point scale and tabulated by the department, together with the average for each question. Once the data from the survey are tabulated, the results are returned to the instructor of the course. The instructor then analyzes the results of the survey and makes written recommendations for better achieving the Course Outcomes the next time the course is offered.

Credit Content

The course requires 2 credit hours for lectures per week (1 credit or academic hour is 50 minutes), making 30 hours per semester including an hour allocated for a midterm. There will be a Final exam before the end of semester.

Estimated Curriculum Category Content
Based upon the 2 credit hours for lectures, laboratory not included

<table>
<thead>
<tr>
<th>CORE</th>
<th>ADVANCED</th>
<th>CORE</th>
<th>ADVANCED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Structures 0.5 0</td>
<td>Computer Organization and Architecture 0 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Algorithms 0 0</td>
<td>Concepts of Programming Languages 1.5 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Software Design 0 0</td>
<td></td>
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</tbody>
</table>

Social and Ethical Issues

None.

Special Note
This course is designed and offered merely for engineering students.