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)
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: Subject Abbreviation ECE

<table>
<thead>
<tr>
<th>Course Number</th>
<th>47700</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long Title</td>
<td>Digital Systems Senior Project</td>
</tr>
<tr>
<td>Short Title</td>
<td>Digital Systems Sr Project</td>
</tr>
</tbody>
</table>

EXISTING: Subject Abbreviation ECE

| Course Number | 47700 |

TERMS OFFERED

| Summer | Fall | Spring |

CAMPUS(ES) INVOLVED

- N. Central
- Cont Ed
- Tech Statewide
- Ft. Wayne
- Indianapolis
- W. Lafayette

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

CREDIT TYPE

<table>
<thead>
<tr>
<th>1. Fixed Credit Cr. Hrs.</th>
<th>8</th>
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</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: Yes or No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

COURSE ATTRIBUTES: Check All That Apply

| 1. Pass/No Pass Only |
| 2. Satisfactory/Unsatisfactory Only |
| 3. Repeatable |
| 4. Credit by Examination |
| 5. Special Fees |
| 6. Registration Approval Type |
| 7. Variable Title |
| 8. Honors |
| 9. Full Time Privilege |
| 10. Off Campus Experience |

COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):

A structured approach to the development and integration of embedded microcontroller hardware and software that provides senior-level students with significant design experience applying microcontrollers to a wide range of embedded systems (e.g., instrumentation, process control, telecommunications, and intelligent devices). The primary objective is to provide practical experience developing integrated hardware and software for embedded microcontroller systems in an environment that models one which students will most likely encounter in industry.

Prerequisites: [ECE 20100, 20200, 20700, 20800, 25500, 27000, 30100, 30200, 31100, 38200] or [ECE 20100, 20200, 20700, 20800, 25500, 26400, 27000, 30100, 30200, 33700, 36200, 36400, 38800]

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 Department Head Date
North Central Chancellor Date

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

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

DEPARTMENT Electrical and Computer Engineering
EFFECTIVE SESSION Fall 2009

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
- [X] 6. Change in course credit type
- [ ] 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 semesters offered (department head signature only)
- [ ] 12. Transfer from one department to another

PROPOSED:
Subject Abbreviation: ECE
Course Number: 47700
Long Title: Digital Systems Senior Project
Short Title: Digital Systems Sr Project

EXISTING:
Subject Abbreviation: ECE
Course Number: 47700

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

CAMPUS(ES) INVOLVED:
- [X] Calumet
- [ ] Cont Ed
- [ ] Ft. Wayne
- [X] Indianapolis
- [ ] N. Central
- [ ] Tech Statewide
- [ ] W. Lafayette

Abbreviated title will be entered by the Office of the Registrar if omitted (max 20 characters only)

CREDIT TYPE
1. Fixed Credit Credit Hrs: 4
2. Variable Credit Range:
   Minimum Cr. Hrs (Check One) To
   Maximum Cr. Hrs
3. Equivalent Credit: Yes [X] No

COURSE ATTRIBUTES:
Check All That Apply

- [ ] 1. Pass/Not Pass Only
- [ ] 2. Satisfactory/Ununsatisfactory Only
- [ ] 3. Repeatable
- [ ] 4. Credit by Examination
- [ ] 5. Special Fees
- [X] 6. Registration Approval Type
  Department [X] Instructor

Schedule Type
- [X] Lecture 100 2 15 50
- [ ] Recitation
- [ ] Presentation
- [ ] Laboratory 200 2 15 50
- [ ] Lab Prep
- [ ] Studio
- [ ] Distance
- [ ] Clinic
- [ ] Experiential
- [ ] Research
- [ ] Ind. Study
- [ ] Pract/Observe

Cross-Listed Courses

COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):
A structured approach to the development and integration of embedded microcontroller hardware and software that provides senior-level students with significant design experience applying microcontrollers to a wide range of embedded systems (e.g., instrumentation, process control, telecommunications, and intelligent devices). The primary objective is to provide practical experience developing integrated hardware and software for embedded microcontroller systems in an environment that models one which students will most likely encounter in industry.

Prerequisites: [(ECE 20100, 20200, 20700, 20800, 25500, 27000, 30100, 30200, 31100, 36200) or (ECE 20100, 20200, 20700, 20800, 25500, 26400, 27000, 30100, 30200, 33700, 36200, 36400, 36900)]

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 Department Head Date

North Central Chancellor Date

West Lafayette Department Head Date

West Lafayette College School Dean Date

West Lafayette Registrar Date

OFFICE OF THE REGISTRAR
The Faculty of the College of Engineering
The Faculty of the School of Electrical and Computer Engineering
ECE 477, Changes in Credit, Description, Content, and Requisites

The faculty of the School of Electrical and Computer Engineering has approved the following changes to the undergraduate level course, ECE 477. This action is now submitted to the Engineering Faculty with a recommendation for approval.

From: ECE 477 Digital Systems Senior Project
Sem. 1 and 2. Class 2, Lab 2, Cr. 3.
Prerequisite: ECE 362. Authorized equivalent courses or consent of instructor may be used in satisfying course pre- and co-requisites.

A structured approach to the development and integration of embedded microcontroller hardware and software that provides senior-level students with significant design experience applying microcontrollers to a wide range of embedded systems (e.g., instrumentation, process control, telecommunications, intelligent devices, etc.). The primary objective is to provide practical experience developing integrated hardware and software for embedded microcontroller systems in an environment that models one which students will most likely encounter in industry.

To: ECE 477 Digital Systems Senior Project
Sem. 1 and 2. Class 2, Lab 4, Cr. 4.
Prerequisite: [(ECE 201, 202, 207, 208, 255, 270, 301, 302, 311, 362) or (ECE 201, 202, 207, 208, 255, 264, 270, 301, 302, 337, 362, 364, 368)] and consent of instructor.

A structured approach to the development and integration of embedded microcontroller hardware and software that provides senior-level students with significant design experience applying microcontrollers to a wide range of embedded systems (e.g., instrumentation, process control, telecommunications, and intelligent devices). The primary objective is to provide practical experience developing integrated hardware and software for embedded microcontroller systems in an environment that models one which students will most likely encounter in industry.

Reason: The course description, content, credit hours, and requisites have been changed to reflect the updated content of the course. The course has been offered in this form as ECE 495C since Fall 2007.

M. J. T. Smith, Head
School of Electrical and Computer Engineering

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

ECC Minutes #11
Date 11-12-08
Chairman ECC R. Cipia
ECE 477 – Digital Systems Senior Project

**Required Text(s):** None

**Course Outline**

<table>
<thead>
<tr>
<th>Lectures</th>
<th>Principal Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>project proposal guidelines and documentation requirements</td>
</tr>
<tr>
<td>1</td>
<td>digital system design considerations</td>
</tr>
<tr>
<td>2</td>
<td>printed circuit board layout basics</td>
</tr>
<tr>
<td>1</td>
<td>embedded system design constraints</td>
</tr>
<tr>
<td>1</td>
<td>product packaging considerations</td>
</tr>
<tr>
<td>1</td>
<td>survey of alternative microcontrollers for embedded applications</td>
</tr>
<tr>
<td>3</td>
<td>embedded system interfacing: switching D.C. loads, optical isolation, keypads, RPGs, PWM, position control, steppers, A.C. loads</td>
</tr>
<tr>
<td>2</td>
<td>power supply design</td>
</tr>
<tr>
<td>2</td>
<td>passive component selection guidelines</td>
</tr>
<tr>
<td>1</td>
<td>patent infringement liability</td>
</tr>
<tr>
<td>2</td>
<td>design for reliability, maintainability, and safety; failure mode and risk analysis</td>
</tr>
<tr>
<td>2</td>
<td>board assembly, soldering techniques, and debugging</td>
</tr>
<tr>
<td>1</td>
<td>embedded software development</td>
</tr>
<tr>
<td>1</td>
<td>ethical/social/political/environmental product lifecycle impact analysis</td>
</tr>
<tr>
<td>2</td>
<td>formal design reviews</td>
</tr>
<tr>
<td>1</td>
<td>project success criteria demos</td>
</tr>
</tbody>
</table>
Lab Outline

<table>
<thead>
<tr>
<th>Weeks</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Learning how to use various CAD/CAE tools: schematic capture and PCB layout software.</td>
</tr>
<tr>
<td>3</td>
<td>Learning how to use various hardware/software development tools: target microcontroller assembler, compiler, linker; target microcontroller debug monitor; target microcontroller evaluation board; logic analyzer (timing and state analysis); in-circuit flash programmer.</td>
</tr>
<tr>
<td>3</td>
<td>Designing and testing target microcontroller system hardware and interface circuitry.</td>
</tr>
<tr>
<td>3</td>
<td>Designing and testing application software for target microcontroller system hardware.</td>
</tr>
<tr>
<td>3</td>
<td>Integrating system hardware and software along with packaging the final product.</td>
</tr>
<tr>
<td>1</td>
<td>Demonstrating the final product.</td>
</tr>
</tbody>
</table>

Course Outcomes: The BSEE and BSCmpE Program Attributes and Objectives are listed on-line at the URL:

https://engineering.purdue.edu/ECE/Academics/Undergraduates/ProgramObjectivesandOutcomes

A student who successfully fulfills the course requirements will have demonstrated:

i) an ability to apply knowledge obtained in earlier coursework and to obtain new knowledge necessary to design and test a microcontroller-based digital system [1,2,3,4,5; a,b,c,e,i,j,k]

ii) an understanding of the engineering design process [4,6,7; b,c,e,f,h]

iii) an ability to function on a multidisciplinary team [6,7; d,h,j]

iv) an awareness of professional and ethical responsibility [6,7; f,h,j]

v) an ability to communicate effectively, in both oral and written form [6; g]