Office of the Registrar FORM 40 REV. 7/08

### PURDUE UNIVERSITY

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

Print Form

EAD 61-67

DEPARTMENT Electrical and Computer Engineering

EFFECTIVE SESSION Fall 2009

INSTRUCTIONS: Blace check the items below	tich deika the purpose of this			
INSTRUCTIONS: Please check the items below		request.		
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3. Expiration of a course		X 9. Change in course		
4. Change in course number		10. Change in course	•	
5. Change in course title				ment head signature only)
X 6. Change in course credit/type		12. Transfer from one	department to anot	her
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Short Title Digital Systems Sr Project		recommendation of the second o	Ft. Wayne	Tech Statewide  X W. Lafayette
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30200, 33700, 36200, 36400, 36600);				<del></del>
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Indianapolis Department Head Date	Indianapolis School Dean	Date		
North Central Department Head Date	North Central Chancellor	Date		~ ^ ~ ^
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West Lafayette Department Head Date	West Lafayette College/School Dean	- 1/1/1/ W	MONUE	3-4/2/XX
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Office of the Registrar FORM 40 REV. 7/08

#### PURDUE UNIVERSITY

REQUEST FOR ADDITION, EXPIRATION, OR REVISION OF AN UNDERGRADUATE COURSE (10000-40000 LEVEL) Print Form

EFD 61-07

**PEPARTMENT Electrical and Computer Engineering** 

EFFECTIVE SESSION Fall 2009

INSTRUCTIONS: Please check	k the items belo	w which describe the purpose of this	request.				
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Long Title Digital Systems Se	enior Project				Calumet Cont Ed	N. Centra Tech Stat	
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CREDIT TYPE							
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OFFICE OF THE REGISTE AR

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TO:

The Faculty of the College of Engineering

FROM:

The Faculty of the School of Electrical and Computer Engineering ECE 477, Changes in Credit, Description, Content, and Requisites

RE:

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 FAGULTY
OF THE SCHOOLS OF ENGINEERING
BY THE ENGINEERING
CURRICULUM COMMITTEE

ECC	Minutes	#11
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Chairman ECC R. Cipia

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# ECE 477 – Digital Systems Senior Project

Required Text(s): None

## **Course Outline**

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

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#### Lab Outline

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

**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:

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

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