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

5-12

DEPARTMENT	Engineering Technology	EFFECTIVE SESSION	Spring 2012

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

☐	1. New course with supporting documents	☐ 7. Change in course attributes (department head signature only)
☑	2. Add existing course offered at another campus	☐ 8. Change in instructional hours
☐	3. Expiration of a course	☐ 9. Change in course description
☐	4. Change in course number	☐ 10. Change in course requisites
☐	5. Change in course title	☐ 11. Change in semesters offered (department head signature only)
☐	6. Change in course credit/type	☐ 12. Transfer from one department to another

PROPOSED:

Subject Abbreviation

Course Number

Long Title: Microprocessor Systems and Interfacing

Short Title:

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

EXISTING:

Subject Abbreviation: ECE

Course Number: 36200

TERMS OFFERED

Check All That Apply:

☐ Summer   ☑ Fall   ☑ Spring

CAMPUS(ES) INVOLVED

☐ Calumet   ☑ N. Central
☐ Cont Ed   ☐ Tech Statewide
☑ Ft. Wayne   ☑ W. Lafayette
☑ Indianapolis

CREDIT TYPE

1. Fixed Credit: Cr. Hrs. **4**
2. Variable Credit Range:
   Minimum Cr. Hrs
   (Check One) To ☐ Or ☐
   Maximum Cr. Hrs
3. Equivalent Credit: Yes ☐ No ☐

COURSE ATTRIBUTES: Check All That Apply

1. Pass/Not Pass Only ☐
2. Satisfactory/Unsatisfactory Only ☐
3. Repeatable ☐
   Maximum Repeatable Credit: ☐
4. Credit by Examination ☐
5. Fees ☐ Coop ☐ Lab ☐ Rate Request
   Include comment to explain fee

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

Schedule Type	Minutes Per Mtg	Meetings Per Week	Weeks Offered	% of Credit Allocated
Lecture	50	3	16	
Recitation				
Presentation				
Laboratory	150	1	16	
Lab Prep				
Studio				
Distance				
Clinic				
Experiential				
Research				
Ind. Study				
Pract/Observ				

Cross-Listed Courses

COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):

Class 3, Lab. 3, Cr. 4. Prerequisites: ECE 26400 & ECE 27000.
An introduction to microcontroller instruction sets, assembly language programming, microcontroller interfacing, microcontroller peripherals, and embedded system design.

*COURSE LEARNING OUTCOMES

Calumet Department Head	Date	Calumet School Dean	Date
Fort Wayne Department Head	Date	Fort Wayne School Dean	Date
Indianapolis Department Head	Date 9/27/11	Indianapolis School Dean	Date 9/27/11
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 10/5/11	Date

OFFICE OF THE REGISTRAR

10/3/11

Purdue North Central Curriculum Document

Submission Date: (Date sent to College Curr Comm)	Nov 18, 2008	Document No: (Leave blank)	08-C-11	
Proposed Effective Date: (Semester, Year)	Fall 2009	Submitting Dept: (Name of dept/pgm)	Engineering	
Reviewed by College: (Date reviewed by College CC)	Jan 9, 2009	Contact Person: (Name & Title)	Larryl Matthews, Dean, College of Engineering & Technology	
Name(s) of Library Staff Consulted: (N/A if not required.)	N/A	Will New Library Resources Used?	☐ Yes ☒ No	Double-click to check Yes / No.
Approval by Curriculum Committee: (Leave blank)	Jan 30, 2009	Form 40 Needed? (Double-click one box.)	☒ Yes	New courses or any course change, check YES.
Approval by Faculty Senate: (Leave blank)	March 20, 2009	Send Form 40 to PNC Registrar after Senate approval of document.	☐ No	For all other curriculum matters, check NO.

Subject. (Brief description of proposed change, addition or deletion.)

New Bachelor of Science degree in Electrical & Computer Engineering (BS ECE).

Justification. (Briefly list main reasons for proposed change, addition or deletion.)

The freshman engineering program has existed at PNC for many years. Since being approved two years ago, the BS Mechanical Engineering degree, with a Minor in Electrical Engineering, has experienced strong enrollment. Currently, engineering students seeking to major in Electrical & Computer Engineering (ECE) must transfer to West Lafayette or Calumet. The proposed BS ECE Degree will retain many students who would otherwise transfer, thus increasing our enrollment and helping the students to lower the cost of their education.

Use the **Current** and **Proposed** spaces below for course changes only. Otherwise, mark "N/A".

Current: (Course changes: present catalog info.)	**Proposed:** (Course changes: new catalog information.)
N/A. (New program.)	See following pages for sample plan of study and list of West Lafayette courses that will be brought to PNC.

Course Objectives. (For new courses only. List main learning objectives. If lengthy, attach as separate page.)

Students successfully completing this program will:
(1) Have a well rounded, quality undergraduate engineering education.
(2) Be able to apply applications of modern sciences and technologies.
(3) Provide engineering or internship services to local industry.
(4) Have been involved in undergraduate research activities.
(5) Have been involved in undergraduate engineering competitions and participate in local engineering societies.

Impact on Students. (State "N/A" if proposal will not greatly affect students.)

Sunstantial savings, compared to the cost of transfering to West Lafayette or commuting to Calumet.

Impact on University Resources. (State "N/A" if proposal will not require new resources, faculty or funds.)

Program will utilize the existing ECET laboratories and current full- and part-time engineering faculty.

Impact on other Academic Units. (State "N/A" if proposal will not affect other units.)

This new degree will help increase enrollment in several areas: Math, Physics, Chemistry and Humanities and Social Sciences.

Sample Plan of Study for BS-ECE Degree.

SEMESTER 1	CR	SEMESTER 2	CR
MA 167 Plane Analytic Geometry & Callculas I	5	MA 169 Plane Analytic Geometry & Calculas II	5
CHM 115 General Chemistry	4	CHM 116 General Chemistry	4
ENGL 101 English Composition I	3	PHYS 152 Mechanics	4
ENGR 171 Engineering FundamentalsI	5	ENGR 181 Engineering FundamentalsII	5
CREDIT HOURS	**17**	**CREDIT HOURS**	**18**
SEMESTER 3	**CR**	**SEMESTER 4**	**CR**
ECE 201 Linear Circuit Analysis I	3	ECE 202 Linear Circuit Analysis II	3
ECE 207 Electronic Measurement Techniques	1	ECE 255 Intro. to Electronics Analysis & Design	3
PHYS 261 Electricity and Optics	4	ECE 208 Electronic Design & Dev. Lab	1
MA 261 Multivariate Calculas	4	MA 262 Linear Algebra & Diff. Eqs.	4
ME 270 Basic Mechanics I	3	ECE 270 Intro. to Digital Sys. Design	4
Humanities/Social Science Elective	3	Humanities/Social Science Elective	3
CREDIT HOURS	**18**	**CREDIT HOURS**	**18**
SEMESTER 5	**CR**	**SEMESTER 6**	**CR**
ECE 264 Advanced C programming	2	ECE 311 Electric and Magnetic Fields	3
ECE 321 Electromech. Mot. Devices	3	ECE 382 Feedback System Analysis	3
ECE 323 Electro. & Motion Dev.Lab.	1	ECE 308 Systems Simulation and Control Lab	1
ECE 301 Signals and Systems	3	ECE 362 Microprocessor Systems & Interfacing	3
ECE 302 Prob. Methods in Elect. Engineering	3	Humanities/Social Science Elective	3
Humanities/Social Science Elective	3		
CREDIT HOURS	**15**	**CREDIT HOURS**	**13**
SEMESTER 7	**C**	**SEMESTER 8**	**CR**
ECE 402 EE Design Projects	3	ENGR 461 Engineering Design Exp.	3
ECE 440 Transmission of Information	4	ECE 438 Digital Signal Processing	4
ENGR Elective	3	ENGR Elective	3
Humanities/Social Science Elective	3	Humanities/Social Science Elective	3
CREDIT HOURS	**13**	**CREDIT HOURS**	**13**

TOTAL CREDIT HOURS FOR DEGREE: 124

Courses to Be Brought from West Lafayette.

¿E 208 Electronic Devices and Design Laboratory
Lab. 3. Cr. 1. Prerequisite: ECE 207. Corequisites: ECE 255.
Laboratory experiments in the measurement of electronic device characteristics. Design of biasing networks, small signal amplifiers and switching circuits.

✓ ECE 255 Electronic Circuit analysis and Design
Class 3, Cr 3. Prerequisites: ECE 201.
Diode, bipolar transistor and FET circuit models for the design and analysis of electronic circuits. Single and multistage analysis and design; introduction to digital circuits. Computer aided design calculations, amplifier operating point design, and frequency response of single and multistage amplifiers. High frequency and low frequency designs are emphasized.

✓ECE 264 Advanced C Programming
Class 2, Cr. 2. Prerequisite: ENGR 181 or ENGR 195E.
Continuation of a first programming course. Topics include files, structures, pointers, and the proper use of dynamic data structures.

✓ECE 270 Introduction to Digital System Design
Class 3, Lab. 3. Cr. 4. Prerequisites: ECE 201 and ECE 207.
An introduction to digital system design, with an emphasis on practical design techniques and circuit implementation.

✓ ECE 301 Signals and Systems
Class 3, Cr. 3. Prerequisite: ECE 202..
   ⌐assification, analysis and design of systems in both the time- and frequency-domains. Continuous-time linear systems: Fourier Series, Fourier Transform, bilateral Laplace Transform. Discrete-time linear systems: difference equations, Discrete-Time Fourier Transform, bilateral z-Transform. Sampling, quantization, and discrete-time processing of continuous-time signals. Discrete-time nonlinear systems: median-type filters, threshold decomposition. System design examples such as the compact disc player and AM radio.

✓ECE 302 Probabilistic Methods in Electrical and Computer Engineering
Class 3, Cr. 3. Prerequisite: MA 262.. Corequisite: ECE 301.
An introductory treatment of probability theory including distribution and density functions, moments and random variables. Applications of normal and exponential distributions. Estimation of means, variances. Correlation and spectral density functions. Random processes and response of linear systems to random inputs.

ECE 308 Systems Simulation and Control Laboratory
Class 3, Cr. 1. Prerequisite: ECE 207. Corequisite: ECE 382
Instruction and laboratory exercises in the solution of differential equations that arise in the modeling of physical systems. Instruction in the principles of operation and design of linear control systems.

✓ECE 311 Electric and Magnetic Fields
Class 3, Cr. 3. Prerequisites: ECE 201, PHYS 261 & MA 262.
Continued study of vector calculus, electrostatics, magnetostatics, and Maxwell's Equations. Introduction to electromagnetic waves, transmission lines, and radiation from antennas.

Courses to Be Brought from West Lafayette (cont.).

ɔE 321 Electromechanical Motion Devices
Class 3, Cr. 3. Prerequisite: ECE 202 or ECE 255.

The general theory of electromechanical motion devices relating electric variables and electromagnetic forces. The basic concepts and operational behavior of dc, induction, brushless dc, and stepper motors used in control applications are presented.

ECE 323 Electromechanical Motion Devices and Systems Laboratory
Lab. 3, Cr. 1. Corequisite: ECE 321.

Experiments closely coordinated with EE 321 involving measurement of fundamental parameters of various electromechanical devices using modern instrumentation techniques. Computer simulation is used to predict steady-state and dynamic operating characteristics. Comparison of predicted and measured performance is emphasized.

✓ECE 362 Microprocessor Systems and Interfacing
Class: 3, Cr. Lab. 3, Cr. 4. Prerequisites: ECE 264 & ECE 270.

An introduction to microcontroller instruction sets, assembly language programming, microcontroller interfacing, microcontroller peripherals, and embedded system design.

ECE 382 Feedback System Analysis and Design
Class 3, Cr. 3. Prerequisite: ECE 202. Corequisite: ECE 308.

In this course classical concepts of feedback system analysis and associated compensation techniques are presented. In particular, the root locus, Bode diagram and Nyquist plot are used as determinants of stability.

ɔE 402 EE Design Projects
Class 1, Lab. 6, Cr. 3. Prerequisite: Senior standing.

Lecture sessions provide the student with background information on the design and management of projects. Formal lectures cover, for example, design for manufacturability, design for quality, test and evaluation, reliability and ethics, patents and copyrights, plus case studies. During the laboratory sessions the students work in teams on a challenging open-ended electrical engineering project that draws on previous course work. Projects routinely involve standard design facets (such as consideration of alternative solutions, feasibility considerations and detailed system descriptions) and include a number of realistic constraints (such as cost, safety, reliability, and aesthetics).

✓ECE 438 Digital Signal Processing with Applications
Class 3, Lab. 3, Cr. 4. Prerequisites: ECE 301 & ECE 302.

The course is presented in three units. Foundations: the review of continuous-time and discrete-time signals, and spectral analysis; design of finite impulse response and infinite impulse response digital filters; processing of random signals. Speech processing: vocal tract models and characteristics of the speech waveform; short-time spectral analysis and synthesis ; linear predictive coding. Image processing: two dimensional signals, systems, and spectral analysis; image enhancement; image coding; image reconstruction. The laboratory experiments are closely coordinated with each unit. Throughout the course, the integration of digital signal processing concepts in a design environment is emphasized.

✓ECE 440 Transmission of Information
Class 3, Lab: 3, Cr.: 4. Prerequisites: ECE 301 & ECE 302.

Analysis and design of Analog and Digital Communication Systems. Emphasis on engineering applications of theory to communication system design. The laboratory introduces the use of advanced engineering workstations in the design and ɔting of communication systems.

Office of the Registrar
FORM 40 REV. 11/09

EFD 5-12

DEPARTMENT School of Electrical and Computer Engineering (EFD 5-12)   EFFECTIVE SESSION Spring 2012

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

☐	1.	New course with supporting documents	☐ 7.	Change in course attributes (department head signature only)
☐	2.	Add existing course offered at another campus	☐ 8.	Change in instructional hours
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☐	6.	Change in course credit/type	☐ 12.	Transfer from one department to another

PROPOSED:

Subject Abbreviation _____

Course Number _____

Long Title Microprocessor Systems and Interfacing

Short Title Microprocessor Systems and Int

EXISTING:

Subject Abbreviation ECE

Course Number 36200

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

TERMS OFFERED
Check All That Apply:
☐ Summer   ☒ Fall   ☒ Spring

CAMPUS(ES) INVOLVED
☐ Calumet   ☐ N. Central
☐ Cont Ed   ☐ Tech Statewide
☐ Ft. Wayne   ☒ W. Lafayette
☐ Indianapolis

CREDIT TYPE

1. Fixed Credit: Cr. Hrs. _____
2. Variable Credit Range:
   Minimum Cr. Hrs _____
   (Check One)   To ☐   Or ☐
   Maximum Cr. Hrs. _____
3. Equivalent Credit: Yes ☐   No ☐

COURSE ATTRIBUTES: Check All That Apply

1. Pass/Not Pass Only ☐
2. Satisfactory/Unsatisfactory Only ☐
3. Repeatable ☐
   Maximum Repeatable Credit: ☐
4. Credit by Examination ☐
5. Special Fees ☐

6. Registration Approval Type
   Department ☐   Instructor ☐
7. Variable Title ☐
8. Honors ☐
9. Full Time Privilege ☐
10. Off Campus Experience ☐

Schedule Type	Minutes Per Mtg	Meetings Per Week	Weeks Offered	% of Credit Allocated
Lecture	___	___	___	___
Recitation	___	___	___	___
Presentation	___	___	___	___
Laboratory	___	___	___	___
Lab Prep	___	___	___	___
Studio	___	___	___	___
Distance	___	___	___	___
Clinic	___	___	___	___
Experiential	___	___	___	___
Research	___	___	___	___
Ind. Study	___	___	___	___
Pract/Observ	___	___	___	___

Cross-Listed Courses

COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):
Prerequisites: ECE 27000 and (CS 15900 or ENGR 11700)
Restrictions: Must be enrolled in: School of Electrical & Computer Engineering

*COURSE LEARNING OUTCOMES:
See attachment.

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	8/30/11 Date	West Lafayette College/School Dean	10/24/11 Date
		West Lafayette Registrar	10/30/11 Date

OFFICE OF THE REGISTRAR

UD 10/27/11

ECE 36200

TO: The Faculty of the College of Engineering

FROM: The Faculty of the School of Electrical and Computer Engineering

RE: Change to Existing Undergraduate Course: ECE 36200, Microprocessor Systems and Interfacing, change in requisites.

The faculty of the School of Electrical and Computer Engineering has approved the following changes to an existing course. This action is now submitted to the Engineering Faculty with a recommendation for approval.

From: ECE 36200 Microprocessor Systems and Interfacing
Sem. Fall and Spring; Cr. 4; Lecture 3.
Prerequisites: ECE 27000 and (Undergraduate level CS 15900 or Undergraduate level ENGR 11700) and Undergraduate level ECE 25500 [may be taken concurrently].
Restrictions: Must be enrolled in one of the following: School of Electrical & Computer Engineering
Description: An introduction to microcontroller instruction sets, assembly language programming, microcontroller interfacing, microcontroller peripherals, and embedded system design.

To: ECE 36200 Microprocessor Systems and Interfacing
Sem. Fall and Spring; Cr. 4; Lecture 3.
Prerequisites: ECE 27000 and (CS 15900 or ENGR 11700)
Restrictions: Must be enrolled in: School of Electrical & Computer Engineering
Description: An introduction to microcontroller instruction sets, assembly language programming, microcontroller interfacing, microcontroller peripherals, and embedded system design.

Reason: The Computer Engineering faculty in ECE has determined that ECE 2700 and CS 15900 are sufficient as the only prerequisites for ECE 36200.

on behalf of V. Balakrishnan, Head
School of Electrical and Computer Engineering

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

ECC Minutes _____#5_____

Date _____10/17/11_____

Chairman ECC _____R. Cipra_____

ECE 36200

School of Electrical and Computer Engineering (EFD 5-12)

Course Learning Outcomes:

i.   an ability to write programs for a microcontroller in assembly language. [1,4; e,k]
ii. an ability to interface a microcontroller to various devices. [1,3,4; a,b,c,e,k]
iii. an ability to effectively utilize microcontroller peripherals. [3,4; j,k]
iv. an ability to design and implement a microcontroller-based embedded system. [3,4,5; a,c,d,e,g,k]