Office of the Registrar
FORM 40 REV. 12/09

28-10

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

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
- ☑ 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:		EXISTING:	
Subject Abbreviation		Subject Abbreviation	ECE
Course Number		Course Number	25500

Long Title: Introduction to Electronic Analysis & Anaylsis

Short Title:

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

CREDIT TYPE
1. Fixed Credit: Cr. Hrs. 3
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	50/75	3/2	16	
Recitation				
Presentation				
Laboratory				
Lab Prep				
Studio				
Distance				
Clinic				
Experiential				
Research				
Ind. Study				
Pract/Observ				

Cross-Listed Courses

RECEIVED
2011 SEP 20 AM 9:14
OFFICE OF THE REGISTRAR

COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):

Class 3, Cr 3. Prerequisites: ECE 20100
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.

*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	Indianapolis School Dean	Date
North Central Faculty Senate Chair	9/27/11 Date	Vice Chancellor for Academic Affairs	9/27/11 Date
West Lafayette Department Head	Date	West Lafayette College/School Dean	Date
		West Lafayette Registrar	10/5/11 Date

OFFICE OF THE REGISTRAR

JS 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.

ECE 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..
Classification, 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.).

ECE 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.

ECE 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 testing of communication systems.

Office of the Registrar
FORM 40 REV. 11/09

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

Print Form

EFD 28-10

DEPARTMENT School of Electrical and Computer Engineering (EFD 28-10) EFFECTIVE SESSION Fall 2010

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
- [x] 10. Change in course requisites
- [ ] 11. Change in semesters offered (department head signature only)
- [ ] 12. Transfer from one department to another

PROPOSED:	EXISTING:
Subject Abbreviation	Subject Abbreviation ECE
Course Number	Course Number 25500
Long Title Introduction to Electronic Analysis and Design	
Short Title Intro to Elect Anal and Design	

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 [x] 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

ScheduleType	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 20100 Minimum Grade of C and (MA 26100 or MA 17400)

*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 3/31/10	Date	West Lafayette College/School Dean	Date
		West Lafayette Registrar 7/29/10	Date

OFFICE OF THE REGISTRAR

7/29/10

Office of the Registrar
FORM 40 REV. 11/09

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

Print Form

EFD 28-10

DEPARTMENT School of Electrical and Computer Engineering (EFD 28-10) EFFECTIVE SESSION Fall 2010

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
- [x] 10. Change in course requisites
- [ ] 11. Change in semesters offered (department head signature only)
- [ ] 12. Transfer from one department to another

PROPOSED:	EXISTING:
Subject Abbreviation	Subject Abbreviation ECE
Course Number	Course Number 25500
Long Title Introduction to Electronic Analysis and Design	
Short Title Intro to Elect Anal and Design	

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 [x] 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 [ ]

ScheduleType	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 20100 Minimum Grade of C and (MA 26100 or MA 17400)

*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
Lafayette Department Head 3/31/10	Date	West Lafayette College/School Dean	Date
		West Lafayette Registrar	Date

OFFICE OF THE REGISTRAR

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 25500, Introduction to Electronic Analysis and Design, 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 25500 Introduction to Electronic Analysis and Design
Sem. Fall, Spring; Cr. 3; Lecture 3.
Prerequisites: ECE 20100 and (MA 26100 or MA 17400)
Restrictions: Must be enrolled in one of the following: School of Electrical & Computer Engineering, School of Interdisciplinary Engineering
Description: 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.

To: ECE 25500 Introduction to Electronic Analysis and Design
Sem. Fall, Spring; Cr. 3; Lecture 3.
Prerequisites: ECE 20100 Minimum Grade of C and (MA 26100 or MA 17400)
Restrictions: Must be enrolled in one of the following: School of Electrical & Computer Engineering, School of Interdisciplinary Engineering
Description: 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.

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

ECC Minutes #24

Date 4/20/10

Chairman ECC R. Cipra

Reason: This course is part of the Core Curriculum for the BSEE and BSCmpE degrees. Subsets of Core Curriculum courses serve as prerequisites for most upper division ECE electives. In addition, a degree requirement for all ECE students is to achieve a GPA in all major-area (ECE) courses of at least a 2.0. Therefore, in order to ensure that ECE students are as well prepared as possible for upper division ECE courses, as well as to facilitate their achievement of the minimum major-area GPA of 2.0, a minimum grade requirement in the key ECE prerequisite course is being proposed.

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

School of Electrical and Computer Engineering (EFD 28-10)

Course Learning Outcomes:

i. The ability to identify and correctly utilize the external lead structure and basic electrical characteristics of common semiconductor devices (pn junctions, MOSFETs, and BJTs).
ii. The ability to analyze and design d.c. bias circuits.
iii. The ability to utilize d.c. and a.c. models of semiconductor devices in both analysis and design.
iv. The ability to analyze and design single and multistage amplifiers at low, mid and high frequencies.
v. The ability to use a CAD tool (e.g., SPICE) in circuit analysis and design.