

Office of the Registrar
FORM 40 REV. 5/11

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

Print Form
EFD 1-14

DEPARTMENT School of Electrical and Computer Engineering (EFD 1-14) EFFECTIVE SESSION Fall 2013

201430

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 *LM*
- 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 46300

Long Title Fundamentals of Nanoelectronics

Short Title _____

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

TERMS OFFERED
Check All That Apply:

Fall Spring Summer

CAMPUS(ES) INVOLVED

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

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. Fees: Coop Lab Rate Request
6. Registration Approval Type
 Department Instructor
7. Variable Title
8. Honors
9. Full Time Privilege
10. Off Campus Experience
- Include comment to explain fee

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	_____	_____	_____	_____
Prac/Observ	_____	_____	_____	_____

RECEIVED

FEB 21 2014

OFFICE OF THE REGISTRAR

COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):

SEE ATTACHED.

*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 _____ Date _____ Vice Chancellor for Academic Affairs _____ Date _____

West Lafayette Department Head _____ Date 12/18/13 _____ West Lafayette College/School Dean _____ Date 2/19/14 _____

West Lafayette Registrar _____ Date 3/3/14 _____

TO: The Faculty of the College of Engineering

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

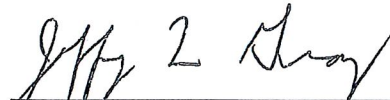
RE: Change to Existing Undergraduate Course: ECE 45300, Fundamentals of Nanoelectronics, change in prerequisite and course description.

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 45300 Fundamentals of Nanoelectronics
Sem. Fall; Cr. 3; Lecture 3.
Prerequisites: ECE 30500 and MA 26600 or MA 26200
Restrictions: Must be enrolled in one of the following: School of Electrical & Computer Engineering
Description: The development of nanotechnology has made it possible to engineer materials and devices on a length scale as small as several nanometers. The properties of such nanostructures cannot be described in terms of macroscopic parameters like mobility or diffusion coefficient and a microscopic, or atomistic, viewpoint is called for. The purpose of this course is to convey the conceptual framework that underlies this microscopic viewpoint using examples related to the emerging field of nanoelectronics.

To: ECE 45300 Fundamentals of Nanoelectronics
Sem. Fall; Cr. 3; Lecture 3.
Prerequisites: MA 26600 and MA 26500 or MA 26200
Restrictions: None
Description: Nanoelectronic devices are an integral part of our life, including the billion-plus transistors in every smartphone, each of which has an active region that is only a few hundred atoms long. This course is designed to convey the key concepts developed in the last 25 years which constitute the fundamentals of nanoelectronics and mesoscopic physics, assuming a minimal set of prerequisites. Topics covered include the new Ohm's law, conductance quantization, the nanotransistor, spin valves, thermoelectricity, quantum systems and the non-equilibrium Green's function (NEGF) method.

Reason: The faculty in ECE has determined that knowledge of semiconductor devices is not essential for the course. In addition the course description has been updated to reflect the evolution of the field over the last few years.


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

2/18/14

Date

2/18/14

Chairman ECC



School of Electrical and Computer Engineering (EFD 1-14)

Course Description: Nanoelectronic devices are an integral part of our life, including the billion-plus transistors in every smartphone, each of which has an active region that is only a few hundred atoms long. This course is designed to convey the key concepts developed in the last 25 years which constitute the fundamentals of nanoelectronics and mesoscopic physics, assuming a minimal set of prerequisites. Topics covered include the new Ohm's law, conductance quantization, the nanotransistor, spin valves, thermoelectricity, quantum systems and the non-equilibrium Green's function (NEGF) method.

Prerequisite: MA 26600 and MA 26500 or MA 26200

Restrictions: None

School of Electrical and Computer Engineering (EFD 1-14)

Course Learning Outcomes:

- i) Ability to perform semiclassical analysis of charge flow in nanoelectronic devices.
- ii) Ability to perform semiclassical analysis of spin flow and heat flow in nanoelectronic devices.
- iii) Ability to perform quantum analysis of nanoelectronic devices.