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

DEPARTMENT: 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
☐ 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: ME
Course Number: 333
Long Title: AUTOMATIC CONTROL SYSTEMS

EXISTING:

Subject Abbreviation
Course Number
Long Title: AUTOMATIC CONTROL SYSTEMS

TERMS OFFERED

Check All That Apply:
☐ Summer ☑ Fall ☑ Spring

CAMPUS(ES) INVOLVED

☑ Calumet
VICES Ed
☐ Ft. Wayne
☑ Tech Statewide
☑ Indianapolis
W. Lafayette

Abbreviated title will be entered by the Office of the Registrar if omitted. (60 CHARACTERS ONLY)

CREDIT TYPE

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

COURSE ATTRIBUTES: Check All That Apply

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

Cross-Listed Courses

ECE 333

COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):
P: ME 331
Cr. 3
Analysis and design of control systems, from modeling and computer solutions to stability and performance issues with an orientation toward electrical and mechanical systems. Classical control system concepts are emphasized but an introduction to modern techniques is also provided.

Calumet Department Head
Date

Calumet School Dean
Date

Ft. Wayne Department Head
Date

Ft. 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
NEW COURSE PROPOSAL

ME333 AUTOMATIC CONTROL SYSTEMS

Credit Hours: 3

Course Description:
Analysis and design of control systems, from modeling and computer solutions to stability and performance issues with an orientation toward electrical and mechanical systems. Classical control system concepts are emphasized but an introduction to modern techniques is also provided.

Prerequisite:
ME331 System Dynamics

Prerequisite by Topic:
Calculus, ordinary differential equations, Laplace transforms, transfer functions, elementary complex variables, elementary linear algebra, and elementary dynamics

Offering: Fall and Spring

Textbook:
* Professor of Electrical Engineering
** Professor of Aerospace Engineering and Engineering Mechanics

Course Objectives:
This is an introductory course in control systems. The aim is to provide both ME and EE students with the background needed to model and design automatic control systems for electrical, mechanical, and electromechanical systems using the classical concepts of root locus, Bode plots, and Nyquist diagrams, and to assess the stability and performance of such systems. An introduction to the state-space techniques is also provided. Matlab and Simulink are used as the primary computer aided design tools for control systems. Multidisciplinary team projects will be assigned.

Topics To be Covered:
1. Signals, systems, and response
2. Laplace transform and partial fraction expansion
3. Block diagrams and signal flow graphs
4. Stability and Routh-Hurwitz criterion
5. Modeling electrical and mechanical systems
6. Modeling electromechanical systems
7. Time-domain specifications, performance measures, simulations
8. State-space modeling and response
9. Steady-state error and internal model principle
10. Sensitivity in feedback systems
11. Disturbance attenuation
12. Root locus analysis and design
13. Bode analysis and design
14. Nyquist analysis
15. Nichols chart analysis and design
16. Stability and Lyapunov functions
17. Controllability and observability
18. Properties of state feedback and state feedback design

Prepared by Hossein Oloomi (EE) and Bongsu Kang (ME), February 2009.