### INSTRUCTIONS:

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

- [x] 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**: 331
- **Long Title**: System Dynamics
- **Short Title**: System Dynamics

### EXISTING:

- **Subject Abbreviation**: 
- **Course Number**: 

### TERMS OFFERED

Check All That Apply:
- [x] Summer
- [x] Fall
- [] Spring

### CAMPUS(ES) INVOLVED

- [ ] Calumet
- [x] Cont Ed
- [x] Ft. Wayne
- [ ] Indianapolis
- [ ] N. Central
- [ ] Tech Statewide
- [ ] W. Lafayette

### CREDIT TYPE

1. **Fixed Credit**: Cr. Hrs. 3

### COURSE ATTRIBUTES

1. **Pass/No Pass Only**
2. **Satisfactory/Unsatisfactory Only**
3. **Repeatable**
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**

### COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):

P: MA 363, ME 251
Cr. 3

Mathematical modeling and response analysis of dynamic systems with mechanical, electrical, fluid/thermal, and electromechanical components used in modern control systems. Concepts of analogous systems; transfer function and block diagram; state-space formulation; time-domain and frequency-domain analysis.

### SIGNATURES

- **Calumet Department Head**: Donald E. Hinkle [Signature]
  Date: 2-20-09
- **Calumet School Dean**: [Signature]
  Date: 2-25-09
- **Fort Wayne Department Head**: [Signature]
  Date: 
- **Fort Wayne School Dean**: [Signature]
  Date: 
- **Indianapolis Department Head**: [Signature]
  Date: 
- **Indianapolis School Dean**: [Signature]
  Date: 
- **North Central Department Head**: [Signature]
  Date: 
- **North Central Chancellor**: [Signature]
  Date: 
- **West Lafayette Department Head**: [Signature]
  Date: 
- **West Lafayette College/School Dean**: [Signature]
  Date: 
- **West Lafayette Registrar**: [Signature]
  Date: 

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OFFICE OF THE REGISTRAR
NEW COURSE PROPOSAL
ME331 SYSTEM DYNAMICS

Credit Hours: 3

Course Description:
Mathematical modeling and response analysis of dynamic systems with mechanical, electrical, fluid/thermal, and electromechanical components used in modern control systems. Concepts of analogous systems; transfer function and block diagram; state-space formulation; time-domain and frequency-domain analysis.

Prerequisite:
ME251 Dynamics and MA363 Differential Equations

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

Offering: Fall


Course Objectives:
To provide students with mathematical and computational tools for modeling and analysis of linear dynamic systems in various engineering disciplines. Application of Matlab and Simulink package as a analysis tool.

Topics To be Covered:
1. Mathematics preliminary; complex functions and ordinary differential equations
2. Laplace transforms
3. Modeling of mechanical systems
4. Modeling of electrical systems
5. Modeling of fluid/thermal systems
6. Modeling of combined systems
7. State-Space Analysis
8. Transfer functions
9. Block diagrams
10. Response analysis in time-domain
11. Response analysis in frequency-domain

Application of Matlab and Simulink