REGULAR COURSE SYLLABUS

College of: Professional Studies

Department: Engineering and Engineering Technology

Prefix & Course Number: SSE 3730  Crosslisted With*: 

Course Title: Control Systems

Transcript course title (30 characters): CONTROL SYSTEMS

Check All That Apply:

Required for Major: X  Required for Minor:  Specified Elective: 

Required for Concentration:  Elective:  Service Course: 

To receive Title IV financial aid funds, all institutions of higher education must comply with the federal definition of a credit hour. The Higher Learning Commission requires institutions to maintain policies and procedures for verifying compliance with this definition.

**Federal Credit Hour Definition:** A credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally-established equivalency that reasonably approximates not less than:

(1) one hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or ten to twelve weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time; or (2) at least an equivalent amount of work as required in paragraph (1) of this definition for other activities as established by an institution, including laboratory work, internships, practica, studio work, and other academic work leading toward the award of credit hours. 34CFR 600.2 (11/1/2010)

Credit Hours: 2(1.5+1)

Face-to-Face or Equivalent Hours per course:

Lecture 22.5  Lab 15  Internship  Practicum  Other (please specify type and hours):

Additional Student Work Hours per course: 52.5

Schedule Type: B  Grade Mode: L

Variable topics umbrella course: No X Yes  If Yes, number of credit hours allowed 

Specified repeatable course: No X Yes 

APPROVED: 

Department Chair OR Program Director  Date 10/12/2011

Dean OR Associate Dean  Date 12/14/15

Associate VP, Academic and Student Affairs  Date

*If crosslisted, attach completed Course Crosslisting Agreement Form
Prefix and Course Number: SSE 3730

Prerequisite(s): SSE 2100 with a grade "C" or better, or permission of instructor

Corequisite(s): ___

Prerequisite(s) or Corequisite(s): ___

Banner Enforced:
  Prerequisite(s): SSE 2100 with a grade "C" or better
  Corequisite(s): ___
  Prerequisite(s) or Corequisite(s): ___

Registration restrictions: Level _____ Class _____ Program/Major _____ Student attribute _____

Catalog Course Description:
In this course students will study the applications of Proportional, Integral, & Derivative (PID) controllers in the process control industry. And the students will also structure of feedback, sensors, controllers, control valves, process dynamics, timing, piping and instrument drawing.

Specific Variable Topics Course Description (if applicable, umbrella course description included above):

Required Reading and Other Materials will be equivalent to:

Specific, Measurable Student Behavioral Learning Objectives:
Upon completion of this course the student should be able to:
1. Demonstrate understanding of process management and process controls in business environments.
2. Select PID controllers for business applications.
3. Design elementary process control systems.

Detailed Outline of Course Content:
  I. Introduction
     A. Manual Control
     B. Automatic Control
     C. Open-Loop
     D. Closed-Loop
  II. Structure of Feedback
     A. Block Diagrams
     B. Layout
  III. Sensors
     A. Measurement Basics
        1. Sensor Dynamics
        2. Sensor Selection
        3. Accuracy and Precision
        4. Rangeability & Turndown
        5. Uncertainty
        6. Transmission Systems
           a. Electrical
           b. Pneumatic
     B. Smart Sensors
     C. Types
        1. Pressure
        2. Flow
        3. Level
Prefix and Course Number: SSE 3730

4. Temperatures
5. Analytical

IV. Controllers
   A. On-Off Control
   B. Proportional, Integral, & Derivative (PID) Control
   C. PID Control

V. Control Valves
   A. Basic Operation
   B. Selection & Sizing
   C. Performance
   D. Fail Safe Operation

VI. Process Dynamics
   A. First Order
   B. High Order
   C. Dead Time
      1. Transmission Log
      2. Higher Order Approximation
   D. Closed-Loop vs. Open-Loop

VII. Tuning
    A. Performance Indexes
    B. Methods

VIII. Piping & Instrument Drawings

IX. Advanced Methods
   A. Ratio
   B. Cascade
   C. Feed Forward
   D. Multivariable (brief)

X. Process Management

Evaluation of Student Performance:
   1. Exams
   2. Assignments
   3. Lab Reports
   4. Presentations