REGULAR COURSE SYLLABUS

School of: Professional Studies

Department: Engineering Technology

Prefix & Course Number: EET 4730          Crosslisted With*: ______

Course Title: Robotics

Check All That Apply:  Required for Major: _____  Required for Minor: _____  Specified Elective: X
Required for Concentration: _____  Elective: X  Service Course: _____

Credit Hours: 3 (3+0)

Total Contact Hours per semester (assuming 15-16 week semester):
Lecture 45  Lab 0  Internship ______  Practicum ______  Other (please specify type and hours): ______

Schedule Type(s): L  Grading Mode(s): L

Variable Topics Courses (list restrictions, including the maximum number of hours that can be earned**):

** NOTE: This information must be included in the course description.

Restrictions (Variable Topics Course):

Prerequisite(s): (EET 2145 or EET 3010,) EET 3740, and MTH 2410, with grades of “C” or better.

Corequisite(s): ______

Prerequisite(s) or Corequisite(s): ______

Banner Enforced:
Prerequisite(s): (EET 2145 or EET 3010,) EET 3740, and MTH 2410, with grades of “C” or better.
Corequisite(s): ______
Prerequisite(s) or Corequisite(s): ______

Catalog Course Description:
This course covers the basics of design, analysis, modeling and control of robots. The topics covered include: robot kinematics, inverse kinematics, kinetics, sensors, actuators, and the industrial applications of robotics.

APPROVED:  Richard Pozzi

Department Chair OR Program Director

Date

Dean OR Associate Dean

Date

Associate VP, Academic Affairs

Date

*If crosslisted, attach completed Course Crosslisting Agreement Form
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. Analyze robots and robot subsystems.
2. Design basic electronics for robots.
3. Perform kinematic and inverse kinematics on robot manipulators.

Detailed Outline of Course Content (Major Topics and Subtopics) or Outline of Field Experience/Internship (experience, responsibilities and supervision):

I. Overview
   A. Introduction
   B. Terminology
   C. Manipulator Geometrics
   D. Types of Manipulators
   E. Components of System

II. Sensing Position and Velocity
    A. D/A
    B. A/D
    C. Analog Measurements
    D. Digital Measurements
    E. Direction Determination
    F. Design Alternatives

III. Noise (very brief)

IV. Actuators
    A. D.C. Motor
    B. Step Motor
    C. Hydraulic Actuators
    D. Pneumatic Actuators

V. Industrial Applications

VI. Coordinate Systems of Robot

VII. Kinematics
    A. Hand and Joint Relations
    B. Inverse Problem
    C. Arm Solution

VIII. Jacobian
    A. Differential Motion
    B. Jacobian
    C. Inverse Jacobian

IX. Path Control
    A. Recording
    B. Cartesian
    C. Joint Interpolated

X. Kinetics (brief)
    A. Deriving
    B. Forces and Torques
    C. Complexity
    D. Kinetic Equation Application

XI. Force Control and Compliance

XII. Sensors:
    A. Touch
    B. Proximity
    C. Ranging
    D. Others

XIII. Vision
    A. Fundamentals
    B. Image Acquisition
    C. Image Processing
    D. Segmentation
    E. Shape Descriptors
    F. Illumination

XIV. Robotic Computer Architecture (brief)
    A. Hardware Aspects
    B. Software Aspects
    C. Hierarchal Control

XV. Robot Programming Languages (very brief)

XVI. Artificial Intelligence (brief)

Evaluation of Student Performance:
1. Written exams
2. Homework
3. Presentations
4. Lab Reports