ABE 6005
Applied Control for Automation and Robotics

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Credits: (3)

Course Description: *Prereq.: EML 5311, equivalent, or consent*. Introduction to industrial controls, programmable logic controllers, and manipulator application programming in agricultural and biological engineering. Kinematics, dynamics and control strategies for serial link manipulators in agricultural applications.

Course Objectives: To introduce students to common industrial control equipment and practices for agriculture, and food production automation applications. To provide students with a solid theoretical background in robot kinematics, dynamics and controls. To provide students with practical laboratory exercises in PLC programming, robot programming, and relay logic based controls.

Course Meeting Schedule: Rogers Hall Room 283
Lecture: Monday 5rd and 6th period
Lecture or Lab: Wednesday 5rd and 6th period (Laboratory in 214 or 145)

Required Text:
Robot Modeling and Control, M.W. Spong, S. Hutchinson, and M. Vidyasagar, John Wiley and Sons, Hoboken, NJ, 2006.

Recommended or SupplementalText:
Robotics for Bioproduction Systems, N. Kondo, and K.C. Ting, ASAE, St. Joseph, MI. 1998.
Mastering Simulink, J. B. Dabney, Pearson Prentice Hall, Upper Saddle River, NJ. 2004.
Electrical Motor Controls, G. Rockis, ATP, Homewood, IL. 2001

Grading Criteria:
Homework 40%
Research Presentation I (cover topic in literature) 10%
Research Presentation II (cover topic relevant to student's research) 10%
Technical Projects 40%,

1) There will be approximately 8 homework assignments from the text.
2) Each student will give a 15 to 20 minute class presentation on a controls topic relevant to the class.
3) Each student will give a 15 to 20 minute class presentation on a controls topic relevant to

their research interest.

4) The student will work on several potential projects during the semester, such as listed.
   a) Programmable Logic Controller (PLC) application
   b). Fanuc Manipulator programming
   c) Robotics Toolbox Simulation Project
   d) MATLAB & Simulink modeling of Robot control
   e) Robot Pic and Place Problem

Grading Scale: **A** (94-100%), **A-** (90-93%), **B+** (87-89%), **B** (80-86%), **C+** (77-79%), **C** (70-76%), **D** (60-69%), **E** (< 60%)

Honesty Policy: All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others.

Accommodation for Students with Disabilities: Students Requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.

UF Counseling Services: Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:

- University Counseling Center, 301 Peabody Hall, 392-1575, Personal and Career Counseling.
- SHCC mental Health, Student Health Care Center, 392-1171, Personal and Counseling.
- Center for Sexual Assault/Abuse Recovery and Education (CARE), Student Health Care Center, 392-1161, sexual assault counseling.
- Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.

Software Use: All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.