

**COURSE OUTLINE**

Course Prefix and Number	SYEN 3364
Course Title	Introduction to Control Systems Engineering
Credit	3 Hours
Semester and Year	Spring 2013
Instructor	Dr. Andrew Wright
Class Time	MWF 9:00-9:50
Class Location	EIT 224, ETAS 529 (lab)
Office Location	EIT 522
Telephone	569-8071
Email	abwright@ualr.edu

Prerequisite: MATH 3322

Course Description: Introduction to feedback digital control systems, PID control, continuous modeling of physical systems, application of integral transforms to control system design and analysis, transfer functions, block diagrams, control system characteristics, stability analysis, performance criteria, frequency response methods.

Learning Objectives:

1. Introduce the concepts of feedback control for digital systems
2. Control Models of physical systems, including motors
3. Proportional, Integral, Derivative controllers
4. Stability Analysis
5. Frequency response methods

Texts, Readings, and Instructional Resources

Required Text: Franklin, G. F., Powell, D. J., Workman, M. L., Digital Control of Dynamic Systems, 3rd Edition, Addison-Wesley, 1998.

Principal Source: <http://www.atlasbooks.com/marktplc/03009.htm>

Secondary Sources:

<http://www.abebooks.com/9780201820546/Digital-Control-Dynamic-Systems-Franklin-0201820544/plp>

<http://www.powells.com/biblio/9780979122606>

Assignments, Evaluation Procedures, and Grading Policy

The course requirements consist of:

1. **Homework:** Homework assignments will be given periodically to supplement the reading material and lectures. Assignments are graded pass/fail.
2. **Mid-Term:** a written exam at the mid-term of the semester will be given.
3. **Final Exam:** A written exam on the final exam date.
4. **System Identification and Control Exercises:** Brief reports summarizing experiments with the CASSY mobile robot system will be due throughout the semester. Reports will be graded pass/fail.

#### **XVI. Grading**

1.	Homework	10 points
2.	System Identification and Control Exercises	10 points
3.	Mid-term Exam	40 points
4.	Final Exam	40 points

**XVII. Grades:**  $A \geq 90 \text{ points} > B \geq 80 \text{ points} > C \geq 70 \text{ points} > D \geq 60 \text{ points} > F$

#### **XVIII. Prerequisite Testing**

Prerequisite for this course is introductory differential equations. Students should be extremely facile with solving first and second order ordinary differential equations. Students should have some familiarity with the Laplace transform.

A pass/fail prerequisite exam will be given early in the semester. Failure of this exam will require the student to complete a package of differential equations problems. Failure to deliver this package by the due date will result in 2 point penalty on the final grade.

#### **XIX. Policies**

**Bonus Points** are given based on superior performance on some task. These points are added onto the final score in determining grades.

**Attendance** will be taken periodically. If a student is absent for four times his/her final grade will be reduced by one letter grade (i.e., from A to B or B to C). Students who do not attend during the first eleven days of class may be administratively dropped from the course.

A student who misses more than six classes or labs will receive a final course grade of an F and may be administratively withdrawn prior to the end of the class at the discretion of the instructor.

**Tardiness** is disruptive, so please be respectful of your peers and instructor and get to class on time. If you are tardy, please come into the room quietly and sit in the nearest available seat to the door.

**Sickness or Emergency** is a legitimate excuse to make up a graded assignment (attendance or exam). However, to guarantee that no late penalties are applied, the student should notify the instructor in advance or provide an independent written excuse (e.g., a doctor's note) after the fact. Late penalties will not be applied to an excused absence.

**Cell phones** can be disruptive. Please turn off your cell phone (i.e. airplane mode) before class. If you forget and receive a call in class, please immediately disable your ringer/buzzer and terminate the call. Do NOT answer the call and have a conversation as this may be classified as disruptive behavior.

**Disruptive Behavior** may result in your being administratively dropped from the class, especially if it is persistent.

**Sickness or Emergency** is a legitimate excuse to make up a graded assignment (attendance or exam). However, to guarantee that no late penalties are applied, the student should notify the instructor in advance or provide an independent written excuse (e.g., a doctor's note) after the fact.

**Make up policy:** Exams may be made up on the date of the final exam provided that the student notifies the instructor in writing at least two weeks prior to the date of the final exam. There will be an 80% maximum for any exam for which a legitimate excuse was not provided for the absence. NOTE: there will not be a time extension for un-excused make-ups (i.e., you will have to take the make-up and the final in the same time period.) NOTE: exams for which the student scored poorly can be made up.

**Mid-Term Grades** will be assessed based on homework/lab to date (total points/total possible points \*44) and the midterm exam (total points/100\*56). Missed assignments will be entered as 0 points, although they may be made up at the end of the term. A mid-term grade of D or F should result in a consultation either with the instructor or an academic counsellor.

**Late assignments** are any homework or lab assignment that is turned in after the official due date. The assignment will receive a 20% deduction unless excused for some sickness/emergency. Any assignments turned in after the final exam will receive an additional, cumulative 10% per day deduction. No assignments will be taken after 5:00 the day before grades are due, unless prior permission has been given.

**Modifications to Syllabus** may be made to improve delivery of the course content. The instructor will provide an updated syllabus at least one week prior to any changes taking effect and no modifications will be done within two weeks of the final exam.

**Students with Disabilities:** Per academic policy 501.2, the following statement must be included in all syllabi (see <http://ualr.edu/policy/index.php/5012/>)

“Students with Disabilities: Your success in this class is important to me, and it is the policy and practice of the University of Arkansas at Little Rock to create inclusive learning environments consistent with federal and state law. If you have a documented disability (or need to have a disability documented), and need an accommodation, please contact me privately as soon as possible, so that we can discuss with the Disability Resource Center (DRC) how to meet your specific needs and the requirements of the course. The DRC offers resources and coordinates reasonable accommodations for students with disabilities. Reasonable accommodations are established through an interactive process among you, your instructor(s) and the DRC. Thus, if you have a disability, please contact me and/or the DRC, at 501-569-3143 (V/TTY) or 501-683-7629 (VP). For more information, please visit the DRC website.“

This statement has not been prepared by the instructor of this course, but is an academic policy, so please excuse the colloquial wording (use of first and second person).

**Student Handbook:** The UALR Student Handbook is available at <http://ualr.edu/deanofstudents/assets/archive/HANDBOOK.pdf>.