

DEPARTMENT: MECHANICAL ENGINEERING

COURSE #: EML 4321 3 credits Course Web Delivery System		COURSE TITLE: Manufacturing Processes Control
TYPE COURSE: Technical Elective		TERMS OFFERED: Spring
CATALOG DESCRIPTION: Automation and control of manufacturing processes have been vigorously pursued in modern manufacturing to cope with the demand of increased productivity and quality. This trend toward computerization and integration leads to a demand for appropriately trained engineers. The purpose of this course is to introduce essential knowledge in the control of manufacturing systems and processes.		PREREQUISITES: EML 3234. Materials Science and Engineering; EML 3012C. Mechanics and Materials II CO-REQUISITES: EML4312 Design & Analysis of Control Systems
AREA COORDINATOR: Dr. Jonathan Clark RESPONSIBLE FACULTY: Dr. Jonathan Clark INSTRUCTOR OF RECORD: Dr. Cheryl Xu Building, Office room number COE A213 (850) 410-6588 cxu@fsu.edu Office Hours: after class or by appointment DATE OF PREPARATION: 08/05/2016		CLASS SCHEDULE: Class: Two times weekly for 1 hr. and 15 min. Lab: Yes
TEXTBOOKS/REQUIRED MATERIAL: “Manufacturing Automation: Metal Cutting Mechanics, Machine Tool Vibrations, and CNC Design”, by Yusuf Altintas References, Additional Resources: <ul style="list-style-type: none"> • Computer Control of Machines and Processes. by J. Bollinger and N. Duffie, Addison Wesley • Computer Control of Manufacturing Systems. by Y. Koren, McGraw-Hill • Microcomputer Applications in Manufacturing, by A. G. Ulsoy and W. R. DeVries, John Wiley & Sons 		SCIENCE/DESIGN (%): 50% / 50% CONTRIBUTION TO MEETING THE PROFESSIONAL COMPONENT: 50% engineering science 50% engineering design
COURSE TOPICS: The topics to be covered includes (not necessarily in the order shown) <ol style="list-style-type: none"> 1. Introduction on manufacturing and automation 2. Computer Numerical Control and Part programming 3. Computers and CNC architecture 4. Logics and Programmable Logic Controllers 5. Command generation for motion control 		ASSESSMENT TOOLS: Undergraduate: <ol style="list-style-type: none"> 1. Class interaction (10%) 2. Lab (30%) 3. Exam I (30%) 4. Exam II (30%)
Student Learning Objectives for FSU Curriculum File Syllabus	At the end of the course the student should be able: <ol style="list-style-type: none"> 1. to apply automation theory to actual engineering problems. 2. to formulate a problem mathematically and integrate technical capability through 	

	<p>design and programming.</p> <p>3. to practice professional presentation skills as an individual and as a group.</p>
Justification for addition or change	Course is needed in order that students to understand the mechatronics data communication and automation techniques used in manufacturing industry.
Level of computer usage: Modes of Instruction: Core Curriculum Course: Availability to other Majors:	None <input type="checkbox"/> Elementary <input type="checkbox"/> Intermediate <input checked="" type="checkbox"/> Advanced <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> DIS <input type="checkbox"/> Discussion <input type="checkbox"/> Other <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
ME COURSE OBJECTIVES* [related to ABET Student Outcomes]	<p>(Numbers shown in brackets refer to department Student Outcomes) http://www.eng.fsu.edu/me/about_us/accred-info.html</p> <ol style="list-style-type: none"> to teach the theory of manufacturing automation and techniques in mechatronic data communication which are widely used in industry [1, 2, 3]. To teach programming and the use of software tools to design appropriate controller to meet the desired system performance [2, 3, 5]. to practice professional documentation and presentation skills as an individual and as a group [6, 7, 8, 9]. <p>Numbers refer to Departmental Student Outcomes, e.g. for course object 1, [1, 5] refers to student outcomes 1 and 5.</p>
ME COURSE OUTCOMES* [related to ME Course Objective] = FSU Student Learning Objectives	<p>*(Numbers shown in brackets are links to Course Objectives above) By the end of the course, a student should be able to:</p> <ol style="list-style-type: none"> be able to use control theory into laboratory experiment and be able to implement through simulation and programming [1, 2, 3]. be able to formulate a problem mathematically, and integrate design and programming capability in problem solving [1, 2]. be able to professionally communicate technical findings to the scientific community by and large [4].

ASSESSMENT TOOL DETAILS

GRADING/ EVALUATION:

Grades will be based on the following breakdown of graded work:

Undergraduate:
1. Class interaction (10%)
2. Lab (30%)
3. Exam I (30%)
4. Exam II (30%)

*Since this course is offered as a 4000 and 5000 level course, the exams and project will be commensurate with the level of the course.

Letter grades will be assigned equivalent to the following:

Undergraduate Grading Scale	
Numerical Score	Letter Grade
90 - 100	A
80 - 89	B
70 - 79	C
60 - 69	D
0 - 59	F

Departmental policy is that a grade of C or better is required to pass this course.

College of Engineering Undergraduate Policy:

1. It is the policy of the College not to assign “plus and minus (+/-)” grades for undergraduate engineering courses. <http://www.eng.fsu.edu/current/undergraduate/guide.html>, see Grading Policies.
2. Students are required to be familiar with Academic Policies and Requirements as outlined in the COE Student Handbook <http://www.eng.fsu.edu/current/undergraduate/guide.html> page 11

ASSIGNMENTS/RESPONSIBILITIES:

Student Responsibilities

- Participation Attendance
- Homework
- Projects, including information on group processes
- Tests/Exams

Students will be held responsible for knowledge of all scheduling and policy announcements made in class.

Students are responsible for all announcements, assignments, etc., made during lectures, including changes in the scheduling of lecture topics, homework assignments, and exams. Class absence is not a valid excuse for being unprepared.

Assessment Tools:

1. Homework
2. Exams
3. In-class problems
4. Homework
5. Lab
6. Quizzes (Quizzes will not be announced ahead of time)

Examinations:

The date of all tests/exams will be announced in advance.

Instructional Method(s)

The primary instructional method is a traditional in-class lecture. There will also be extensive use of the Course Web Delivery System for distribution of course assignments and other materials. Course materials available from the textbook publisher may also be used. The use of online instructional techniques will be introduced.

COURSE POLICIES:

Attendance Policy:

- Attendance in class is expected. If one has a conflict with the scheduled office hours, he/she should make an appointment with the instructor/TA(s) as needed. If one has a documented and excusable absence for a sustained period (> 1 week), please contact the professor to make any special arrangements.

First day attendance is mandatory for FSU students, and first week attendance is mandatory for FAMU students. Students not in class during the first day (FSU) or first week (FAMU) are to be dropped from the course.

Excused Absences: Absence for participation in recognized university activities, properly certified personal illness, or recognized emergencies may be excused by the Dean's office. Please note that the College of Engineering has a restrictive interpretation of what is considered a valid excuse for an absence. If an absence is to be excused, make sure you check beforehand. In case of excused absence, the instructor will work with you to help you make up for missed time and catch up.

Excused Absences: Excused absences include documented illness, deaths in the immediate family and other documented crises, call to active military duty or jury duty, religious holy days, and official University activities. These absences will be accommodated in a way that does not arbitrarily penalize students who have a valid excuse. Consideration will also be given to students whose dependent children experience serious illness.

Please note that the College of Engineering has a restrictive interpretation of what is considered a valid excuse for an absence. See: <http://www.eng.fsu.edu/current/undergraduate/guide.html> p. 5. If an absence is to be excused, make sure you check beforehand. In case of excused absence, the instructor will work with you to help you make up for missed time and catch up.

Unexcused Absences: A student having more than four unexcused absences will be dropped from the course and assigned the grade F. No exceptions. Tests and exams missed because of unexcused absence receive the grade 0. No exceptions.

Other projects and activities missed completely receive the grade 0 for those projects or activities. No exceptions.

Other Regulations

Note that the penalties for copying work may result in a failing grade for the course. If you are uncertain, please check with the instructor who assigned the work. Working together is encouraged in this course, but blatant copying is not.

Homework policies

Homework assignments, homework solutions, class handouts, sample exam and other course-related postings will be available on Sakai. Any changes in the schedule or assignments will also be announced on Sakai. Check the update on the website before every class and monitor your Sakai-related mailbox regularly. Solutions to homework will be posted on the website on the next day after they are due.

- Homework must be on any type 8.5" × 11" paper and show your efforts and all major steps. Multiple sheets must be stapled in a proper order. Homework must have the homework assignment number, your name, your assigned sorting number (to be given on Sakai) and the date of submission in the upper right corner of the first page.
- Homework must have the page number in the bottom right corner of every page.
- Homework is due in class exactly a week from the assignment date (unless announced otherwise). Homework should be submitted to the instructor at the start of class on the due date. In general, late homework or e-copy will not be accepted.

- Working in groups is permitted and encouraged. However, copying homework is NOT permitted. Use of solution manuals to complete homework is considered cheating and a violation of the honor policy, and it will be fully enforced.

Exam policies

- All exams will be held in the regular classroom. The first two exams will be held during the regular class periods. The final exam will be held at the time assigned by the Registrar.
- A scientific calculator is required for exams. Calculators with communications capabilities will not be allowed.
- **All exams will be closed book and notes. Use of 8.5" × 11" formula sheet(s) (one-sided, one for each midterm and two for the final exam) is permitted for the exams.** Note: You are not allowed to have verbose descriptions/explanations and figures on the formula sheet(s). Only equations and definitions of variables appearing in the equations and velocity/force diagrams are allowed.
- It is the students' responsibility to demonstrate their knowledge on exams with all work shown. Partial credit may be given for work that can be followed and where the nature and magnitude of the mistake can be identified. No credit will be given for correct answers with insufficient indication of how they were obtained.
- Absence from a scheduled exam without prior consent of the instructor will result in zero credit for that exam. In the event of a last minute emergency, you need submit appropriate official documentation of the emergency (e.g., illness, accident, etc.) as soon as possible.
- Other projects and activities missed completely receive the grade 0 for those projects or activities. No exceptions.

Departmental Policy:

The Department's Policy is clearly outlined at the following web location:

<http://www.eng.fsu.edu/me/ugradpro/classes/policy/index.html>

It is highly recommended that you read it carefully. Ignorance is not an excuse. Note that the penalties for copying work may result in a failing grade for the course. If you are uncertain, please check with the instructor who assigned the work. Working together is encouraged in this course, but blatant copying is not.

A student may continue in the B.S. in ME degree program unless one or more of the following conditions arise;

- a. A grade below C in the second attempt of the same engineering course
http://www.eng.fsu.edu/me/resources/pdf/ME_Prerequisite_Policy.pdf
- b. More than three (3) repeat attempts in engineering courses.
http://www.eng.fsu.edu/me/resources/pdf/ME_Excessive_Repeat_Policy.pdf
- c. Violation of academic honor code as defined in university bulletin or catalog
- d. Use of grade forgiveness (currently available for FAMU students only) in more than two (2) courses.

Make-up Assignments

Re-grading Policy

Any re-grade requests must be communicated with the instructor within one week after return of the graded paper. If needed, a written request may be requested to explain in detail what you want the grader to do and where you believe he/she has made a mistake in grading. The request must have a date on the top of the first page, your name, sorting number, and e-mail address.

Make-up Exam Policy

The dates and times for the exams are announced in advance. Except for valid medical reasons, no make-up exams will be given. Please schedule your other activities accordingly.

A make-up examination may be granted to students with a valid excused absence. However, you **must** notify me in advance if your absence involves a planned event or observance of a religious holy day. If an emergency prevents you from attending a scheduled examination, you must notified me at your earliest opportunity. You

must obtain a valid excused absence for the emergency to be eligible for a make-up examination. Students with a valid excused absence will not be arbitrarily penalized for missing an assignment. Students without a valid excused absence are not entitled to a make-up examination. However, certain class assignments may be accepted late, with penalty, without a valid excused absence.

DEPARTMENTAL STUDENT OUTCOMES

The department's student outcomes can be found at
http://www.eng.fsu.edu/about/accreditation/program_outcome.html?ID=215&agency=ABET

Program Outcomes/Student Learning Outcomes

Student learning outcomes for students majoring in engineering may be found at
<http://www.eng.fsu.edu/outcomes>

Location of Academic Learning Compacts (ALC)

COE: http://www.eng.fsu.edu/about/accreditation/program_outcome.html?ID=217&agency=ALC
FAMU: <http://www.famu.edu/index.cfm?Assessment&CurrentALCs#engineering>
FSU: <http://learningforlife.caped.fsu.edu/smalcs/learningCompact.cfm?smalcId=62534>

ACADEMIC HONOR POLICY

Students are expected to uphold the University Student Code of Conduct and/or University Academic Honor Code

The Florida A&M University is committed to academic honesty and its core values which include scholarship, excellence, accountability, integrity, fairness, respect, and ethics. These core values are integrated into its academic honesty policy. Being unaware of the Academic Honesty Policy is not a defense to violations of academic honesty. Academic Honesty Policy violations shall be reported and appropriate actions taken by the Department Chair and Associate Dean for Student Affairs and curriculum. The complete Florida A&M Student Code of Conduct - Regulation 2.012 (8a) can be found on (p. 5)

http://www.famu.edu/judicialAffairs/Regulation%202_012%20Student%20Code%20of%20Conduct.pdf
and in the Student Handbook "The Fang" p. 61
<http://www.famu.edu/Students/STUDENT%20HANDBOOK%20%28FANG%29%202012-2014.Updated%208.22.13.pdf> p 61

The Florida State University Academic Honor Policy outlines the University's expectations for the integrity of students' academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process. Students are responsible for reading the Academic Honor Policy and for living up to their pledge to ". . . be honest and truthful and . . . [to] strive for personal and institutional integrity at Florida State University." (Florida State University Academic Honor Policy, found at <http://fda.fsu.edu/Academics/Academic-Honor-Policy>.)

AMERICANS WITH DISABILITIES ACT

During the first week of class students with disabilities needing academic accommodation should:

- 1) register with and provide documentation to the FAMU **LDEC** or FSU **SDRC**; and
- 2) bring a letter to the instructor indicating the need for accommodation and what type.

Please note that instructors are not allowed to provide classroom accommodation to a student until appropriate verification from the Student Disability Resource Center has been provided.

For more information about services available to FAMU students with disabilities, contact **The Learning Development and Evaluation Center (LDEC)**

677 Ardelia Court Florida A&M University Tallahassee, FL 32310 Nathaniel Holmes, Director Donna Shell, Asst. Director	599-3180 (phone) 561-2512 (fax) 561-2783 (TDD) http://www.famu.edu/index.cfm?a=EOP&p=ADA
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For more information about services available to FSU students with disabilities, contact the:
Student Disability Resource Center (SDRC)

874 Traditions Way 108 Student Services Building Florida State University Tallahassee, FL 32306-4167	(850) 644-9566 (voice) (850) 644-8504 (TDD) sdrc@admin.fsu.edu http://www.disabilitycenter.fsu.edu/
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This syllabus and other class materials are available in alternative format upon request.

UNIVERSITY'S NON-DISCRIMINATION POLICY STATEMENT

FAMU: <http://www.famu.edu/index.cfm?EOP&NON-DISCRIMINATIONPOLICYSTATEMENT>

FSU: http://www.hr.fsu.edu/PDF/Publications/diversity/EEO_Statement.pdf

SYLLABUS CHANGE POLICY:

Modifications to this syllabus may be required during the semester. Any changes to the syllabus will be posted on the course web site and announced in class.

Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advanced notice.

SOFTWARE USE:

All faculty, staff, and students 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 Florida State University community, pledge to