EML 5808
CONTROL TECHNOLOGY FOR ROBOTIC SYSTEMS
Fall 2016
Instructor: Dr. Sabri Tosunoglu
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Course Description:
Modeling of robots that include parallel and serial architectures. Motion control, controller design, and kinematic robot design. Computer-based open-ended projects to study robot performance and kinematic robot design.

Lectures:
Tuesday and Thursday 11:00 am-12:15 pm, EC 1115.

Office Hours:
Instructor Office Hours: R 2:00-3:00 pm. For other times, by appointment via e-mail.
TA Office Hours: TBA. For other times, by appointment via e-mail.

Reference Books (Students are not required to purchase these books):


• Handouts will be provided for the robotics section.

Course Outline:

• Introduction to mechanisms and robotics.

• Position, velocity, acceleration analysis of mechanisms.

• Planar linkage design.

• Introduction to multi degree-of-freedom systems, robotic arms, and mobile platforms.

• Kinematic analysis of robotic arms. The Jacobian matrix. Position, velocity and acceleration analysis.

• Computed-torque method to control robots.

• Team-based project and video presentation.

Course Objectives:

• Introduction to mechanisms and robotics.

• Kinematic analysis of mechanisms and robotic arms including position, velocity and acceleration analysis.

• Computer-assisted mechanism and robot motion analysis and design.

Grading:

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<tr>
<th>Activity</th>
<th>Percent</th>
<th>Description</th>
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<tbody>
<tr>
<td>Attendance</td>
<td>10%</td>
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</tr>
<tr>
<td>Quizzes</td>
<td>10%</td>
<td>Online and in-class quizzes and assignments.</td>
</tr>
<tr>
<td>Exam 1</td>
<td>10%</td>
<td>Closed book &amp; notes*. 1 page of formula sheet.</td>
</tr>
<tr>
<td>Exam 2</td>
<td>10%</td>
<td>Closed book &amp; notes*. 1 page of formula sheet.</td>
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<tr>
<td>Projects</td>
<td>40%</td>
<td>One individual, two team-based projects.</td>
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*As needed, access to eBooks will be allowed during exams.
Exam and Quiz Policy:

During the exams and quizzes, a personal calculator may be used. See the calculator policy below.

Laptops, computers, tablets, phones, mp3 players or any electronic device will not be allowed.

Lecture notes, PowerPoint files and problem solutions will not be allowed.

No material or calculator may be shared by students.

Individually-prepared letter-size sheet of formulas will allowed in each midterm exam, and three sheets in the final exam.

Calculator Policy:

Only the following calculators will be allowed during exams and quizzes:

- Casio: All fx-115 models. Any Casio calculator must contain fx-115 in its model name.
- Hewlett Packard: HP 33s and HP 35s models, but no others.
- Texas Instruments: All TI-30X and TI-36X models. Any Texas Instruments calculator must contain either TI-30X or TI-36X in its model name.

Students can use only their own calculator. No calculator can be shared by students.

In-Class Quizzes and Online Assignments:

Unannounced in-class quizzes and online assignments will be given throughout the semester. Under no circumstances make-up quizzes or deadline extension on assignments will be offered. In case you miss a class, be prepared to receive a grade of zero for the quiz. Similarly, if an assignment is not submitted by the deadline, you will receive a grade of zero. No excuse will be accepted for missing quizzes or assignments. At the end of the semester, the lowest quiz grade will be dropped.

Bonus Quiz Grade:

Certain social media outlets provide a basis for professional networking and many of our students have gained new professional contacts through these accounts. Hence, our presence in professional community improves our department’s profile and allows new opportunities to our students.
Students who create accounts at the following social media sites and connect with departmental account and Dr. Tosunoglu’s account as indicated below will receive a full quiz grade which will be considered as an extra quiz.

LinkedIn:
https://www.linkedin.com/grp/home?gid=8392213
https://www.linkedin.com/in/sabritosunoglu
(continued)

Facebook:
https://www.facebook.com/FIUMME/
https://www.facebook.com/sabri.tosunoglu

Instagram:
https://www.instagram.com/fiumme/

Twitter:
https://twitter.com/fiumecheng

Make-up Exams:

Make-up exams will be allowed only after the student provides a medical doctor’s original report describing the problem and a statement that it was an emergency. The report must include the doctor’s address and phone number. The Department will contact and verify the situation before a test day is scheduled.

Project Due Dates:

Project due dates will vary between one to several weeks depending on the amount of work required. However, the due dates will be announced in class as the projects are distributed. Exam dates will be announced at least one week earlier than the exam date. It is the student’s responsibility to follow announcements closely.

Late Projects:

Project due dates will be strictly enforced. Late project submissions will not receive full credit, and the following policy will apply: Submissions after the class hour on due date or the following day will lose 10 points out of 100. Submissions on the second or third day after the due date will lose 10 additional points each day.

Correspondence via E-mail:

Each student is required to provide a reliable e-mail address for correspondence. Various announcements and reminders will be sent via e-mail throughout the semester.
Students are expected to check their e-mail regularly and make sure their inboxes are not full as the bounced mail messages will not be sent again.

**Attendance:**

Attendance will be monitored throughout the semester.

**Policy on Incomplete Grades:**

A grade of “incomplete” will not be assigned to replace an unwanted grade. In order to be eligible to receive “incomplete,” only a single component of the entire coursework needs to be missing. The reason for failure to fulfill the requirement in time must be officially proved by the student (e.g., a medical doctor’s official letter), and verified by the Department in order to receive an “incomplete” grade.

**Ethics:**

All work prepared and submitted in this course in the form of projects, presentations, problem solutions in quizzes and exams are expected to be original and produced by the submitting student.

Any portion that may have been borrowed from a previous work must be clearly identified and referenced to indicate the original author along with the title of the work, and where and when it appeared. It is extremely important to realize that not doing so may result in an accusation of plagiarism.

Projects must contain the following statement and include student’s signature:

**Ethics Statement**

The work submitted in this project is solely prepared by NAME LASTNAME 1, NAME LASTNAME 2, and NAME LASTNAME 3, and it is original. Excerpts from others’ work have been clearly identified and listed in the list of references.

All of the engineering drawings, computer programs, formulations and related files submitted on the accompanying CD are also original and prepared by NAME LASTNAME 1, NAME LASTNAME 2, and NAME LASTNAME 3.

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<thead>
<tr>
<th>Signature1</th>
<th>Signature2</th>
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<tr>
<td>Member1</td>
<td>Member2</td>
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**Academic Misconduct:**

Academic dishonesty is a serious offense and will be treated according to the University policy as outlined below.

Florida International University is a community dedicated to generating and imparting knowledge through excellent teaching and research, rigorous and respectful exchange of ideas, and community service.

All students should respect the right of others to have an equitable opportunity to learn and honestly to demonstrate the quality of their learning. Therefore, all students are expected to adhere to a standard of academic conduct, which demonstrates respect for themselves, their fellow students, and the educational mission of the University.

All students are deemed by the University to understand that if they are found responsible for academic misconduct, they will be subject to the Academic Misconduct procedures and sanctions, as outlined in the Student Handbook.