

MECHATRONICS

Fall 2002

ME 499-01 Tuesday 4-6:50 PM Rm. 9-247 CRN 42622
ME 499L-10 Thursday 6-6:50 PM Rm. 17-1663 CRN 44654



Course Outline/Background:

Mechatronics is that branch of Mechanical Engineering dealing with the integration of electronic control engineering and mechanical systems. In this course we will study the fundamentals of sensors and transducers and signal conditioning interfaced with various actuation sub-systems such as hydraulics, pneumatics and electrical motors. In addition, the use of closed-feedback-loop control engineering utilizing digital logic and microprocessors will be studied in order to examine the computer science aspects required to realize and implement functioning Mechatronics hardware.

Course Objective/Mission:

The Mechatronics course will be a quarter long senior level design course using Combat Robots as the vehicle of instruction. Groups of students will team up and each team will engineer/design/fabricate/test and deliver a functioning Combat Robot to be placed in an arena based competition at the end of the Fall 2002 quarter.

Assessment:

Grades will be based upon weekly homework sets, final exam, design review milestones and final product/hardware competition. Homework sets will be assigned each week taken from the pertinent lectures. Weekly milestones will take place in the form of weekly IDRs (Industrial Design Reviews) & TIMs (Technical Interchange Meetings) in which each team has to successfully complete and communicate weekly AI's (Action Item's) in order to proceed to the next gate of the Combat Robot design stage. The design competition to be held at the end of the Fall 2002 quarter. The final exam will be based upon the homework sets.

Grade = 25% Homework + 10% Weekly AI's + 40% Competition + 25% Final Exam

Prerequisites:

Measurements ME 435 and Machine Design ME 325 are strongly suggested, although anyone interested and willing to engage in self-study is encouraged to enroll

Instructor:

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Textbooks (Required):

“Mechatronics”, 2nd Ed., W. Bolton, ISBN 0-582-35705-5, Addison-Wesley Longman, 1999

“Build Your Own Combat Robot”, Miles and Carroll, ISBN 0-07-219464-2, McGraw-Hill Osborne, 2002

Weekly Schedule:

Day	Date	Topic(s)	Reading	Action Item	Due Date
R	9/23	Introduction/ Course Design Project SOW		Select Team Members	9/24
T	9/24	Types of Combat Robots	M & C Ch 10	Select Robot Type	9/26
R	9/26	Motors and Controllers	Bolton Ch 7 M & C Ch4 M & C Ch 7	Research Motors	10/1
T	10/1	Motors and Controllers	Bolton Ch 7 M & C Ch4 M & C Ch 7	Specify Motors for Robot	10/3
R	10/3	Batteries	M & C Ch 5	Research Power Supplies	10/8
T	10/8	Batteries	M & C Ch 5	Select Batteries for Robot	10/10
R	10/10	Power Transmission	M & C Ch 6 Bolton Ch 6	Design Gear Train Reduction	10/15
T	10/15	Power Transmission	M & C Ch 6 Bolton Ch 6	Design Gear Box for Robot	10/17
R	10/17	R/C Electronics	M & C Ch 8	Research R/C Controllers	10/22
T	10/22	R/C Electronics	M & C Ch 8	Select R/C Controller	10/24
R	10/24	Hydraulics/Pneumatics	Bolton Ch 5	Research Actuation for Robot	10/31
T	10/29				
T	10/29	Hydraulics/Pneumatics	Bolton Ch 5	Select Actuators for Robot	11/5
R	10/31	Weaponry	M & C Ch 10	Design Weapon System	On going
T	11/5	Armor Materials Selection	M & C Ch 9	Fabrication	On going
R	11/7	Sensors/Transducers	Bolton Ch 2	Fabrication	On going
T	11/12	Sensors/Transducers	Bolton Ch 2	Fabrication	On going
R	11/14	Microprocessors	Bolton Ch 15 M & C Ch 12	Fabrication	On going
T	11/19	Microprocessors	Bolton Ch 15 M & C Ch 12	Fabrication	On going
R	11/21	Microprocessors	Bolton Ch 15 M & C Ch 12	Fabrication	On going
T	11/26	DESIGN COMPETITION	Location	Time	TBD
R	11/28	THANKSGIVING	HOLIDAY	CAMPUS	CLOSED
R	12/5	FINAL EXAM	3:50 – 5:50	Rm. 9-247	