ME 6405

Introduction to Mechatronics

Fall 2005

Instructor: Professor I. Charles Ume

LECTURE 2
**Director:**
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Website: [http://www.me.gatech.edu/mechatronics_lab](http://www.me.gatech.edu/mechatronics_lab)

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**Mechatronics Courses:**
ME 4447: Microprocessors in Mechanical Systems
Website: [http://www.me.gatech.edu/mechatronics_course](http://www.me.gatech.edu/mechatronics_course)
ME 6403: Digital Controls
ME 6405: Introduction to Mechatronics
Website: [http://www.me.gatech.edu/mechatronics_course](http://www.me.gatech.edu/mechatronics_course)
Vision Statements

Prepare Mechanical Engineering Graduates:

• To be able to design and build electro-mechanical systems and products.
• For industrial positions.
• To succeed as researchers in graduate schools.

How Are Vision Statements Accomplished?

• Class lectures
• Lab assignments
• Final group projects
• Oral presentations
• Report writings
• Collaborative learning (working in teams)
Course Format

• In-class lectures
  • Class meets 3 hours per week
  • Lecturing is done by instructor
  • Students can participate in lecturing (optional)

• Laboratory Experience
  • Done by individual students, and in groups of 3 to 4 students
  • Each group spends at least 4 hours per week in the lab
  • Laboratory assignments
    • Electronic exercises 1, 2 and 3 done individually
    • Interfacing host computer with MC68HC11 and sequencing light emitting diodes.
• Strain gage data acquisition using A/D conversion
• DC motor control using interrupts and pulse width modulation (real-time control)
  • Each lab assignment is demonstrated and lab report turned in

• Final Group Projects
  • Done in groups of 3 or 4 students
  • Each group conceives their own project (instructor helps to refine it)
  • Project design and implementation guidelines are given out early in the semester
  • Projects are presented (every group member must present)
  • Reports are turned in
TYPICAL STUDENT PROJECTS
Automated Parking

Objective
To automate the parallel parking process.
The George W. Woodruff School of Mechanical Engineering
Money Dispenser (Cash-O-Matic)

Objective
To create a machine that provides an exact amount of dollar bills and change specified by the user.
The George W. Woodruff School of Mechanical Engineering
Guitar Player (Crazy-J)

**Objective**
To create a stand-alone self-playing guitar that synchronizes and plays streaming MIDI files.
Vault Security in Bank

Objective
To create a system to monitor a vault in a bank.
Fish Feeder and Lighting Control

**Objective**
To create an automated system to care for fish without any supervision.
Mobile Carpet Cleaner

Objective
To create an intelligent, automatic cleaner that is capable of moving around the floor, detecting the dirty area and then cleaning the dirt.
Hobbyist’s 3-Axis Mill

**Objective**
To build a three-axis milling machine directed by a computer interface.
Objective
To create a cake decorating machine.
Stand Alone Machine Vision Servoing System

Objective
To sort steel parts based on shape and size.
Pitch and Roll Control of Radio Controlled Model Aircraft

**Objective**
Pitch and roll control for straight and level flight for a remote controlled aircraft.
**Hoverball**

**Objective**
To create an exciting fast-paced game where the goal is to score as many baskets as possible before time runs out.
Sun Chaser

**Objective**
To create an assembly that can track the sun and adjust its solar panels in order to maximize the solar energy collected by the cells.
Objective
An autonomous vehicle capable of tracking an ultrasonic source while avoiding obstacles.
Trackstar: Automated Infrared Tracking System

**Objective**
A camera that will automatically track a person for use in video conferencing.
Automatic Drink Mixer

Objective
To be able to dispense a mixed drink when a user inserts a cup and makes a selection.
Automated Camera Man

**Objective**
To create a system to enable a video camera to follow a target.
Hot Dog Cooker

Objective
To create a machine to cook hot dogs, dispense them and apply condiments on demand.
Brewer’s Assistant

**Objective**
To create a system to measure out the correct amount and type of brewing grains depending on the type of beer chosen by the user.
Other Projects

- Automated Coffee Bean Selector
- Intelligent Baby Monitor
- Smart Alarm for a House
- Simulation of Hybrid Electric Vehicle’s Control
- Remote Access Home Controller
- Two Dimensional Laser Imaging System
- An Automated Card Dealer
- Semi-Automated Shift System for GT Motorsports
QUESTIONS???