ME 58600
MICROPROCESSORS IN ELECTROMECHANICAL SYSTEMS

Course Outcomes

1. Introduce microprocessor architecture.
2. Discuss assembly language programming.
4. Introduce mixed-language programming (C and Assembly).
5. Review controller design.
6. Develop microprocessor-based control implementation.

Introduction (1 wk)
1. Number Systems
2. Registers & Memory

Microprocessor Architecture (1 wk)
1. Programming Model
2. Op Codes

Assembly Language Programming (1 1/2 wks)
1. Instruction Set
2. Addressing Modes
3. Control Structures
4. Subroutines & Stack

Interfacing (2 1/2 wks)
1. Digital I/O
2. Serial I/O
3. Interrupts & Timers
4. Analog I/O

Mixed-Language Programming (1 wk)
1. C Calling Conventions
2. C-callable Assembly Routines

Control Implementation (8 wks)
1. Control Design
2. Digital Control
3. Sampling & Aliasing
4. Actuators
5. Optical Encoders

Laboratory Experiments

1. PC Familiarization, Software Development Environment
2. Assembly Language Programming, Digital I/O
3. Keyboard & Console I/O Operations, Serial Communications
4. Interrupts: Application to Frequency Counting
5. Mixed-Language Programming
6. Digital-to-Analog and Analog-to-Digital Conversion
7. Digital Controller Implementation
8. Electromechanical Control Projects
9. Electromechanical Control Projects
1. **COURSE NUMBER AND NAME:** ME 58600  Microprocessors in Electromechanical Systems

2. **CREDITS AND CONTACT HOURS:** 3 credits  
   a. Lecture – 2 days per week at 50 minutes for 16 weeks

3. **COURSE COORDINATOR OR INSTRUCTOR:**  
   P.H. Meckl

4. **TEXTBOOK:**  

5. **SPECIFIC COURSE INFORMATION:**  
   a. **Catalog Description:** Architecture of microcomputers; I/O structure and interfacing; assembly language, manual assembly; software and hardware interrupts; data acquisition, serial and parallel communications; the role of high-level languages. Laboratory experiments on applications to electrical, mechanical and thermo-fluid systems. Typically offered in the fall.  
   b. **Prerequisites:**  
      First Semester Senior Standing or Higher  
   c. **Status:** Elective

6. **SPECIFIC GOALS FOR THE COURSE**
   a. **Course Outcomes:**
      1. Introduce *microprocessor architecture*.
      2. Discuss *assembly language programming*.
      4. Introduce *mixed-language programming* (C and Assembly).  
      5. Review *controller design*.  
      6. Develop *microprocessor-based control implementation*.

   b. **Related ME Program Outcomes:**
      
      | A1. Engineering Fundamentals; | B3. Prof/Ethical Responsibility; |
      | A3. Experimental Skills; | B5. Life-Long Learning; |
      | A4. Modern Engr Tools; | C1. Leadership; |
      | A5. Design Skills; | C2. Global Engineering Skills; |
      | A6. Impact of Engr Solns; | C3. Innovation; |
      | B1. Communication Skills; | C4. Entrepreneurship |
      | B2. Teamwork Skills |

7. **LIST OF TOPICS:** See following page.

**PREPARED BY:** P.H. Meckl  
**REVISION DATE:** August 3, 2012