

ECE 251 – MICROPROCESSOR ARCHITECTURE & PROGRAMMING

Type (check one): Required: X Elective:

2005-2006 Catalog Data: ECE 251. Microprocessor Architecture & Programming. (Formerly EE 251) Eight-bit microcomputer architecture, instructions, addressing modes, registers, assembly language. Interfacing methods and devices. Current popular microprocessors with emphasis on the Motorola 68HCII. Two design projects will be required, one of which must include hardware. Prerequisite: ECE 250. Offered in the Spring semester. *One semester; three credits.*

Prerequisites: ECE 250 – Digital Design

Co-Requisites: None

Textbook: Spasov P., (2004) *Microcontroller Technology: The 68HC11 and 68HC12*, (5th Ed.) Upper Saddle River NJ: Prentice Hall.

Other Required Materials: None

Other References: 68HC11EVB Evaluation Board User's Manual, Motorola, 1986
68H11 Reference Manual, Motorola, 1990
MC68HC11A8 Programming Reference Guide, Motorola, 1990

Instructor: John Ventura, Assistant Professor

Course Objectives: This course is designed to give students a solid background in digital design techniques for producing workable, reliable, and efficient digital systems. Four projects, including analysis, synthesis, construction, test, evaluation, and cost analysis are required.

The course focuses on one very popular microcontroller — the Motorola 68HC11 — and lays the basic foundation needed to understand and use any 8-bit microcontroller. This course covers a wide range of topics, at a wide range of levels; it serves as a guide to real-time control software and interfacing and concentrates on applications throughout, encouraging hands-on practice using computer simulation or an evaluation board.

Prerequisites by Topics: Boolean Algebra, binary and heradecimal number systems and digital logic.

Topics: Class:
1. Introduction to Microprocessors and Microcontrollers
2. Assembly Language Programming
3. Program Design
4. Microcomputer Hardware
5. Interfacing Concepts
6. Parallel I/O
7. Serial Subsystems
8. A/D Subsystems
9. Case Studies

Class Schedule: Three 50-minute sessions per week for class and one 3-hour session per week for laboratory assignments.

Prepared by: John Ventura **Date:** October 2005

Professional Component:
ECE 251 – MICROPROCESSOR ARCHITECTURE & PROGRAMMING

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| Category (check one) | <input type="checkbox"/> Math/Basic Science <input checked="" type="checkbox"/> Engineering <input type="checkbox"/> General Education <input type="checkbox"/> Other |
| Design (check one) | <input checked="" type="checkbox"/> Significant <input type="checkbox"/> Some <input type="checkbox"/> None |
| Realistic Constraints (check all that apply) | <input type="checkbox"/> Economic <input type="checkbox"/> Environmental <input type="checkbox"/> Sustainability <input type="checkbox"/> Manufacturability <input type="checkbox"/> Ethical <input type="checkbox"/> Health & Safety <input type="checkbox"/> Social <input type="checkbox"/> Political |

Relationship to Program Outcomes:

Check all that apply:

- (a) an ability to apply knowledge of mathematics, science, and engineering
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data
- (c) an ability to design a system, component, or process to meet desired needs
- (d) an ability to function on multi-disciplinary teams
- (e) an ability to identify, formulate, and solve engineering problems
- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global and societal context
- (i) a recognition of the need for and an ability to engage in life-long learning
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice