Catalog Data:  EEC 483 Computer Organization (3-0-3).

Pre-requisite: EEC 384, CIS 265

Illustration of basic architecture concepts and control circuit implementation. Topics include basic computer organization, central processor organization, instruction set design, arithmetic logic unit design, datapath and control, and memory organization.


Coordinator:  Dr. Chansu Yu,
Professor of Electrical Engineering and Computer Science

Course objectives:  To provide a comprehensive overview of the modern microprocessor organization. Students study instruction set design based on MIPS architecture and example programs written in MIPS assembly language. Datapath and control circuit implementation and memory organization

Expected Outcomes:  Upon completion of this course, students should be able to
(i) Understand the importance of instruction set design of modern microprocessors,
(ii) Design a simple microprocessor including datapath, control circuit for controlling datapath, and
(iii) Implement the design using PLA, ROM and microprogramming techniques.

Fulfillment of EE and CE Program Objectives and Outcomes:

Objectives:  (1) Practice computer engineering,
(2) Define and diagnose problems, and provide and implement computer engineering solutions in an industrial environment,
(5) Collaborate with others as a member or as a leader in an engineering team.
**Outcomes:**
(a) knowledge of mathematics, science, and engineering
(c) ability to design a system, component, or process
(e) ability to identify, formulate, and solve computer engineering problems
(k) ability to use the techniques, skills, and modern engineering tools

**Contribution of Course to Meeting the Professional Component:**
- Math & Basic Science: 0.5 credits;
- Engineering Topics: 2.5 credits;
- General Education: 0 credits

**Prerequisites by Topic:**
1. Digital circuits
2. System programming
3. Assembly program

**Topics:**
1. Introduction to computer organization  3
2. The role of performance  3
3. MIPS instruction set architecture  6
4. Representing instructions  6
5. Arithmetic with binary numbers  6
6. Datapath and Control  9
7. Memory organization  6
8. Review and Exam  6

Total  45

**Computer Usage:**
Architecture simulator software is used to do assembly programming.

**Design Projects:**
Students are expected to design and implement a simple CPU using Verilog

**Estimated ABET Category Content:**
- Engineering Topics 3 credits or 100%

**Prepared by:** Dr. Chansu Yu
**Date:** August 2013