**SPRING 2014**

**ECE 353: Computer Architecture and Organization.**

**General information:** 3 credit hours. T: 11:30AM-12:55PM Th 1:0-2:55 PM. FMH 106

**Instructor:** Abdallah Khreishah, ECE 349, (973)-596-3528, Abdallah@njit.edu

**Office Hours:** T: 1:0-2:0 PM Th: 11:30AM-12:30PM or by appointment.

**Required Text:** Computer Systems Organization and Architecture, by John Carpinelli.

**References:** Computer System Architecture, by Morris Mano.

Computer Organization & Design, The Hardware/Software interface by David Patterson and John Hennesy

**Brief description of the content of the course (Catalog Description)**

This course emphasizes the hardware design of computer systems. Topics include register transfer logic, central processing unit design, microprogramming, ALU design, pipelining, vector processing, micro-coded arithmetic algorithms, I/O organization, memory organization and multiprocessing.

**Prerequisite**: ECE 252

This course is required for all Computer Engineering students.

**Specific goals for the course**

* The student should be able to design the instruction set for a specific computer requirements.
* The student should be able to understand the tradeoffs in choosing the appropriate instruction set.
* The student should be able to master the register transfer language.
* The student should be able to design a basic CPU given the instruction set and the available hardware.
* The student should be able to understand the memory hierarchy.
* The student should be able to understand the different I/O methods.

**List of topics to be covered**

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| **Week(s)** | **Chapter** | **Topic(s)** |
| 0 | 2 | Finite State Machines |
| 1 | 3 | Instruction Set Architectures |
| 2 | 4 | Basic Computer Organization |
| 3,4 | 5 | Register Transfer Languages |
| 4,5 | 6 | CPU Design - Hardwired Control |
| 6,7 | Test #1, 7 | Microsequencers |
| 8,9 | 8 | Computer Arithmetic |
| 10,11 | 9 | Memory Organization |
| 11,12 | Test #2, 10 | I/O Organization |
| 13 | 11 | RISC Processing |
| 14 | 12 | Parallel Processing |

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| **Grading Criteria:** | 5 HWs & class participation: | 20% |
|  | 2 tests @ 25%: | 50% |
|  | Final exam: | 30% |