ENGN1640 Design of Computing Systems, Spring 2016

Instructor: Professor Sherief Reda (sherief_reda@brown.edu)

Prerequisites: ENGN1630 or student must pass digital logic quiz with a grade higher than 75 out of 100 to continue enrollment in the class.

Class Topics (30 lectures):

- Class logistics and overview
- Introduction
    - Computer design objectives, history, and trends
    - Basic computing concepts
- Lab Foundations
    - Programmable logic
    - CAD Tools
    - Verilog
- Arithmetic units
    - Floating point format
    - Floating point operation
- Processor Design
    - ISA
    - ISA and assembly language
    - Single cycle processors
    - Pipelining
    - Pipelining hazards and mitigation
    - Branch prediction
- Memory hierarchy design
    - Cache memory
    - Virtual Memory
    - DRAM and Flash
- Input/output
    - Interrupts
    - Direct memory transfer
- Contemporary issues:
    - Superscalar design
    - Multi-threaded
    - Multi-cores

Books

- Digital Design and Computer Architecture: ARM Edition
- Computer Organization and Design by D. Patterson and J. Hennessy, 5th edition.

Grading:

- Lab 50%
- Final 20%
- HW 20%
- Job interview quiz 10%

Laboratory guidelines: One student per lab assignment. Labs must be demoed and lab reports must be submitted to TAs by the due date, which will always be on Fridays. Lab assignments lose 15% of the grade for every late submission day.

Homeworks: Homeworks should be handed at the beginning of the class on the due date, which will always be on Wednesday. HW assignments lose 15% of the grade for every late submission day. Late HWs submitted after the solutions are posted get 0% credit.

Class web site: http://scale.engin.brown.edu/classes/EN164S16/