Indian Institute of Technology Tirupati

CS4110: Computer System Design Laboratory
Credit: L-T-P-C : 0-0-3-2

1 About the Course

This course is a companion course of CS4100 - Computer System Design. The course consists a set of experiments which covers the digital design and processor system from hardware and then proceeds to perform design experiment on machine and assembly language leading to virtual machine and high level programming. The objective of this course is to learn the skills to design new computer system from the scratch.

2 Course Plan

The course consists of around 12 experiments, all of which can be performed in a desktop machine. The experiments make use of hardware simulator to check correctness of the design. Following is the list of proposed experiments to be carried out.

- Design 1 (5 Aug): Logic gates design using hardware descriptor language.
- Design 2 (19 Aug): Combinational Chips: Design of Arithmetic unit
- Design 3 (26 Aug): Sequential Chips: Flip-flop and register design and simulation
- Design 4 (30 Aug): Multi-port Memory design using registers
- Design 5 (9 Sep): Machine Language construction for a given n-bit processor
- Design 6 (16 Sep): Computer Architecture: n-bit processor system design
- Design 7 (23 Sep): Assembler (Design of assembler for given instruction for target system)
- Design 8 (30 Sep): Integration of hardware system and verification using assembly test cases.
- Design 9 (14 Sep): Virtual Machine: Stack Arithmetic
- Design 10(21 Sep): Translator for Virtual Machine
- Design 11(28 Sep): High-level Programming Language
- Design 12 (4 Nov): High-level Programming practice on the designed system.
- Final Design Test (18 Nov): To be announced.

3 Evaluation

All the experiments carry a 60 point where as the final test carry remaining 40 point. Each experiment has different level of difficult therefor the weightage for each experiment is different. Each experiment will be evaluated on 100 point scale. Weightage of each experiment will be intimated along with the design description (the problem statement of experiment).

4 Rules

The code of conduct as per the institute should be followed with due respect. The deadline should be respected for assignments. Plagiarism or any such activity are strictly discouraged.

Assessment: Each experiment will be evaluated on the same day. The problem statement will be given two days prior to the scheduled time (ie on Friday). Incomplete experiment will be given two more days to complete and will be evaluated on 70 points.

5 References

- Noam Nisan and Shimon Schocken, The Elements of Computing Systems: Building a Modern Computer from First Principle, The MIT Press, Cambridge, 2008. Link to course material: nand2teris.org.

6 Contacts and Resources

Instructor: Jaynarayan T Tudu [jtt@iittp.ac.in]
Teaching Asst: To be informed

The course news, description of experiments etc will be updated in the course page hosted in google classroom.