SFU Computing Science 97-1

CMPT 499-3 Special Topics in Computer Hardware

Instructor: R. Hobson

OBJECTIVE/DESCRIPTION:

This course will cover high performance computer architecture concepts from the perspective of VLSI systems design. First, an introduction to the design of VLSI circuits and systems using CMOS technology. Then, high performance computer architecture concepts and performance limiting factors.

TOPICS:

- principles of MOSFET theory, CMOS technology.
- circuit simulation using Hspice.
- circuit layout rules.
- combination logic (inverters, gates, programmable logic array's).
- sequential logic (registers, stacks, finite state machines).
- systems design: memories, arithmetic units, bussing.
- pipelining and parallel processing.
- design for testability, built-in self-test, testing.

CAD: Participants will have access to some UNIX based SUN workstations with color graphics and design software. Students will be shown how to use the CAD software but UNIX instruction is not provided. Proficiency in the C programming language is expected.

GRADING:

There will be a final exam (50%), 3 small assignments (15%), and a project (35%).

Students must attain an overall passing grade on the weighted average of exams in the course in order to obtain a clear pass (C or better).

TEXTBOOKS:

Neil Weste and Kamran Eshraghian, Principles of CMOS VLSI Design: A Systems Perspective, Addison Wesley, 2nd ed., 1993.

REFERENCES:

- Carver Mead and Lynn Conway, Introduction to VLSI Systems, Addison Wesley, 1980.
- Thomas E. Dillinger, VLSI Engineering, Prentice Hall, 1988.
- Paul H. Bardell, William H. McAnney, and Jacob Savir, Built-in Test for VLSI: Pseudorandom Techniques, John Wiley & Sons, 1987.
- Hspice User's Manual.
- Course notes.

PREREQUISITES:

Prerequisite: CMPT 390 with grade of B or better, and a minimum CGPA of 3.0.

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