Did you like building stuff when you were a kid? Maybe playing with Play-Doh, Legos, or Tinker Toys?

Did you like *PHYS 12411 Introduction to Computer Hardware*?
Did you experience the incredible joy when your counter actually counted, or the massive sense of failure when you put the chip in backward and watched it fry?

If the answer to these questions is "yes", have I got a deal for you!

You might want to consider taking

CS 45111/55111 Principles of Customized VLSI Design

with Prof. Robert Walker in the Spring 1998 semester.

This course will combine a broad overview of VLSI chip design with hands-on experience designing real FPLD-based chips.

What does this mean? Well, let's suppose that you need to design an electronic door entry system that uses a numeric keypad to open a locked door. You could specify the behavior of this digital system as a state machine, where each specific keypress takes the system into the next state. Wrong keypresses enter error states, which do nothing, and correct keypresses eventually reach the state which unlocks the door.

Once you specify this state machine, you have several alternatives. You could implement it using TTL logic, as described in PHYS 12411, but the result might be too large to fit into a small case beside the door. You could build a dedicated system using an Intel Pentium Pro, with a controlling program in ROM, but that would probably be overly expensive. You could contact your computer engineering friend, and have her design an **Application-Specific Integrated Circuit (ASIC)** (this is a fancy name for a customized VLSI chip), but that would take weeks, and cost thousands of dollars. Still — we'll examine these various options during the "broad overview" section of the course.

Or — you could design a system based on **Field-Programmable Logic Devices (FPLDs)**. If you remember hearing about PLAs or PALs in an earlier class, FPLDs are sort of like super-PLAs. Each one contains thousands of gates, connected together into regular structures that can be used to implement thousands of logic functions. And best of all, there are commercial tools that accept a set of Boolean equations (or a description of a state machine) and automatically connect the gates together for you.

In this course, you will use commercially-available **computer-aided design (CAD) tools** to specify and simulate your design, on either the MCS department workstations or your own Windows PC. Then, once the simulation shows that your design works correctly, you will download it into real FPLD on a test board that contains various LEDs, 7-segment displays, switches, etc., and see if it *really* works.

Fancy simulators, powerful hardware, and experience using real commercial CAD tools — what more could you want in a course?? Sign up for CS 45111/55111 Principles of Customized VLSI Design during Telephone Preregistration!

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