UCSC Silicon Valley Extension’s VLSI (Very Large Scale Integration) Engineering certificate program is the most complete integrated circuit curriculum available in Silicon Valley. Students gain practical experience using the latest EDA tools on Linux in our state-of-the-art VLSI Lab. Our expert faculty teaches hardware specification, logic design, verification, synthesis, physical implementation, circuit design, and testing of integrated circuit products.

Who Should Attend?

- Those looking to acquire skills in different areas of VLSI Engineering which helps them grow expertise and advance in their careers
- Experienced technical professionals looking to fill in gaps of knowledge on their jobs or to expand their careers
- Entry-level engineers can acquire hands-on knowledge in VLSI development while networking with

Prerequisites

A degree in a technical field or equivalent knowledge acquired through training and experience in hardware design and development.

Curriculum

Certificate & OPT | 3 Quarters | 27 Units

Developing the Nanometer ASIC: From Spec to Silicon | 2 Units
This course covers each step in developing an ASIC, explaining key concepts such as transistor action, standard cells, RTL synthesis, meeting timing, functional coverage, formal equivalence, physical design, signal integrity, DFT and BIST, tape-out, IC fabrication, and emerging packaging trends. The course includes hands-on “quick tour” labs to familiarize you with the use of EDA tools. The focus is on mostly-digital ASICs with multiple IP cores, low-power goals, and on-chip RF-CMOS/analog blocks.

Practical Design with Xilinx FPGAs | 3 Units
The course places an architectural focus on the Virtex-7, Artix and Kintex families, as well as the Zynq programmable system on a chip. In-class demonstrations and student design projects will feature the Xilinx Vivado Webpack design software. By the end of the course, you should be able to complete practical designs with Xilinx FPGAs and understand design and timing reports. The course includes a student project with design tools; real device implementation or programming is optional.

Digital Logic Design Using Verilog | 3 Units
This course will prepare you to implement Verilog modeling of digital logic. You will learn Verilog constructs and hardware modeling techniques, Verilog language elements and data types. You will tackle key challenges and learn structural, dataflow and behavioral modeling in Verilog, including common constructs and coding considerations. The instructor includes coding and testing examples of combinational circuits (gates, mux/demux, encoders/decoders, and Boolean expression), sequential circuits (latches, flip-flops, shift registers, counters, RAMs and ROMs), and complex logic (flavors of ALU and FSM).

Linux, Introduction | 2.5 Units
This course introduces the Linux operating system. Linux is gaining popularity on personal computers, devices, embedded systems and enterprise servers. The course gives students an opportunity to use Linux for personal or professional purposes. Students will learn basic Linux administration, Linux file and directory structure, basic network configuration, shell programming and various utilities available in Linux.

Physical Design Flow from Netlist to GDS-II | 3 Units
This course is an introduction to ASIC physical design flow and tools from netlist to GDS-II. The course starts with floor planning and block pin assignment. The instructor then addresses placement and clocktree synthesis, followed by routing, and post-route optimization. You will learn RC extraction, static timing analysis, and physical verification. Upon completion of the course, you will possess the essential knowledge and hands-on
Courses in the certificate programs are subject to change based on schedule availability and/or student aptitude. Equivalent course substitutions will be made to accommodate.