
Embedded Processors and Architectures

ECE 594 - Online Offering – Fall

Course Information

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Over the years, components that a digital system designer puts together to implement a complete system have changed from simple gates of several decades ago to today's embedded processors and cores. While simple wires were used for interconnection of gates, in today's complex digital systems, predefined busses and switch fabrics are used to interconnect today's components.

The design of complex digital systems requires familiarity with design of cores, understanding embedded processor architectures, utilization of embedded interconnection mechanisms, using proper integrated design tools, and using proper design methods and core integration tools.

ECE 594 Embedded Processors and Architectures that is offered in the Fall semester prepares you for undertaking the task of designing complex digital systems required for today's electronic applications. After covering the basics and an introduction to the Verilog Hardware Description Language, this course continues with a comprehensive coverage of register-transfer level design for design of custom cores and utility components. We will then get into processor architectures and show several examples of processors that are used as components of embedded systems. Discussion of bussing and interconnection of cores will follow. The course wraps up all the concepts discussed by presenting Altera's embedded system design environment and Altera's embedded processor, NIOS II, and Avalon bus structure.

Course outline follows. Please send me email if you need more details and course syllabus.

1. Review
2. Embedded design
3. Arithmetic cores
4. Instruction set architecture
5. Processor architectures
6. Memory
7. Processor devices
8. Embedded processor design
 - Nios II processor
 - Avalon switch fabric
 - Hardware configuration tool: SOPC Builder
 - Software programming: IDE