

CSI 3710: Computer Hardware Design

**Credits Hours:** 4 credits, 3.57 contact hours/week.

**Instructor:** R. E. Haskell, Ph.D.

**Text book:**

1. Learning By Example Using VHDL – Basic Digital Design With a BASYS FPGA Board, by Richard E. Haskell and Darrin M. Hanna, LBE Books, 2008 (free copies will be lent to students).
2. Learning By Example Using VHDL – Advanced Digital Design With a NEXYS2 FPGA Board, by Richard E. Haskell and Darrin M. Hanna, LBE Books, 2008

**Specific course information**

Development of components and techniques needed to design basic digital circuits and systems for computers, communication and related applications. Design and analysis of combinational and sequential logic circuits using a hardware description language such as VHDL. Design of a small digital computer and its implementation in an FPGA.

**Prerequisites:** EGR 2400 and major standing

**Elective course**

**Course Objectives:** Upon successful completion of this course, students should be able to

- Design combinational circuits using VHDL [ABET CS: (a, b, c, k)]
- Design sequential circuits using VHDL [ABET CS: (a, b, c, k)]
- Simulate VHDL designs using Aldec Active HDL [ABET CS: (i)]
- Synthesize VHDL designs to Xilinx FPGAs [ABET CS: (a, i)]
- Design special-purpose processors using VHDL and synthesize them to a Xilinx FPGA [ABET CS: (a, b, c, k)]

**List of Topics:**

- Design of basic digital circuits
- Systems for computers
- Communication and related applications
- Design and analysis of combinational and sequential logic circuits using hardware
- Description languages
- Design of a small digital computer
- Implementation in an FPGA.