

**ECE 4623 –Computer Hardware Design
Spring 2003**

Catalog Data: **4623 Computer Hardware Design (Slashlisted with 5623).** Prerequisite: 3223. Design of modern digital computing circuits, computer arithmetic, number systems, state machines, control units, data transfer, bus interfacing, VHDL language elements and usage, circuit simulation. No student may earn credit for both 4623 and 5623. (F)

Prerequisite: ECE 3223

Textbook: Digital Systems Design Using VHDL, C.H. Roth, PWS, 1998.
Xilinx ISE Student Edition Software, Prentice Hall, 2003.

References: None.

Prerequisites by Topic:

1. Digital Logic
2. Combinational and sequential circuits
3. SSI/MSI/LSI components
4. Programmable devices

Topics:

1. Review of combinational and sequential digital circuits
2. Elements of VHDL language
3. Circuit synthesis using VHDL
4. FPGA/CPLD device architectures
5. State machine specification in VHDL
6. Register transfer circuits
7. Arithmetic and Logic Unit design
8. Tri-state bus design
9. Multiplier and divider circuits
10. Bus controller and interface design
11. Selected DSP computing implementations
12. Spatial vs. temporal computing concepts, high performance circuits
13. Project design methodology
14. Project Reviews

Schedule:

Computer Usage: All VHDL design assignments will be done on personal computers or laptop.

Design Projects: One directed design project required.

Laboratory Projects: None

Assessment Methods Used: Standard Course Evaluation

Contribution to Professional Component:

Engineering Science	2 credits or 67%
Engineering Design	1 credit or 33%

Program Objectives, Related Strategy, and Action: 2.i, 2. iii

ABET 2000 Criterion 3 Contents: c,e,i,k

Prepared by: Monte P. Tull **Date:** 2/20/03