ECE 4613 – Computer Architecture  
Spring 1999

1997-1999 Catalog Data:  
G4613 Computer Architecture (Crosslisted with Computer Science 4613). Prerequisite: 3223 or Computer Science 3613. Covers basic concepts of computer system design and communication between components, along with current and historical examples of computer architecture. (F)

Prerequisite: ECE 3223 or CS 2613


References: Class notes provided on the web.

Course Objectives:

Coordinator: Dr. Linda S. DeBrunner, School of Electrical & Computer Engineering

Prerequisites by Topic:  
Understanding of digital design and computer organization (ECE 3223 or CS 2613); familiarity with assembly language programming, ability to use computer for programming and for document preparation.

Topics (by day):
1. Define computer architecture
2. Examine trends
3. Evaluate performance
4. Classify instruction set architecture design choices
5. Design instruction set architecture
6. Evaluate instruction set architecture
7. Design basic pipelines
8. Handle pipeline structural hazards
9. Handle pipeline data hazards
10. Handle pipeline control hazards
11. Analyze pipelining issues
12. Exam #1
13. Outline cache design parameters
14. Design caches
15. Improve cache performance
16. Design main memory
17. Design virtual memory
18. Using modern library tools (Engineering Librarian)
19. Future of computing architectures (video tape)
20. Design computer components interconnection
21. Apply I/O performance measures
22. Design input/output
23. Design simple networks
24. Analyze network designs
25. Describe ATM networks
26. Apply parallel architecture models
27. Analyze cache coherency
28. Exam #2
29. Poster presentations
30. Review and final comments
Schedule: Lecture – 1 hour 15 minutes twice per week

Computer Usage:
1. Extensive use of word processing in developing paper
2. Use of presentation software in developing components of poster presentation

Design Projects: In homework problems, students compute performance measures that are typically used in making design decisions.

Laboratory Projects: none

Written and/or Oral Communications:
1. Each student will prepare a well-researched survey paper on a computer architecture topic of his/her choice.
2. Each student will prepare a poster (similar to those presented at professional conferences) and make a very brief presentation on the topic of his/her survey paper.

Teamwork: Students are encouraged to work together to understand homework assignments and class material.

Assessment Methods Used:
1. Standard course evaluation
2. In-class exams
3. Graded homework
4. Paper and poster presentation; summaries of other students’ presentations

Contribution to Professional Component:
Engineering Science: 2 credits or 67%
Engineering Design: 1 credit or 33%

Program Objectives: Related Strategy and Actions:
2:i
3:i
3:iii
4:i

ABET 2000 Criterion 3 Contents:
a, b, c, e, f, g, h, i, j, k

Prepared by: Linda S. DeBrunner Date: May 1999