Cleveland State University  
Department of Electrical Engineering and Computer Science

CIS 480/580: Introduction to Computer Architecture

Catalog Description:  
CIS 480/580 Introduction to Computer Architecture (3-0-3)  
Pre-requisite: CIS 335 Language Processors  
The course focuses on the design of modern computer systems. Topics include processor and instruction set design; addressing; control structures and microprogramming; memory management, caches, memory hierarchy; interrupts; I/O structures and buses. Upon successful completion of this course, a student will be able to design and program embedded systems.

Textbook:  
Structured Computer Organization by Tanenbaum and Austin, Pearson, 6th edition

Coordinator:  
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Course URL: http://grail.cba.csuohio.edu/~sanchita/sanchita.html  
Blackboard Learn: https://bblearn.csuohio.edu/MACAuth/login.jsp

Expected Outcomes:  
Upon successful course completion, a student will be able to:  
- Understand the relationship between hardware implementation and program efficiency  
- Describe the operation of a simple general purpose computer  
- Understand the trade-off between hardwired and micro coded design  
- Explain interrupt systems especially with I/O.  
- Comprehend bus arbitration.

Fulfillment of EE, CE and CIS Program Objectives and Outcomes:  
Objectives:  
1. Graduates will apply the concepts of the discipline including analysis, design, and implementation of information and computing systems.  
2. Graduates will be employed in the computing profession, and will be engaged in life-long learning, understanding, and applying new ideas and technologies as the field evolves.

Outcomes:  
1. An ability to apply knowledge of computing and mathematics appropriate to the program’s student outcomes and to the discipline  
2. Ability to analyze a problem, and identify and define the computing requirements appropriate to its solution  
3. An ability to translate fundamental computing concepts to a variety of emerging technologies  
4. An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.

Student Characteristics:
(a) An ability to apply knowledge of computing and mathematics appropriate to the program’s student outcomes and to the discipline
(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
(i) An ability to use current techniques, skills, and tools necessary for computing practice.
(j) An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.

Prerequisites by Topic:

Machine language, hardware fundamentals, registers, numbering systems, data definition, and addressing modes

Topics:

1. Introduction and Data representation 1
2. Processors 2
3. Digital logic 1
4. Simple hardwired computer 1
5. Microarchitecture 3
6. Instruction Set Architecture Level 3
7. Virtual Memory 2
8. Assembly Language Level 2
9. Final Exam 1

Total Weeks 16