

Course Number	CS 401	Course Title	Computer Architecture				
Semester Hours	3	Course Coordinator	Koushik Sinha				
Catalog Description	Review of logical circuit design. Hardware description languages. Algorithms for high-speed addition, multiplication and division. Pipelined arithmetic. Implementation and control issues using PLA's and microprogramming control. Cache and main memory design. Input/Output. Introduction to interconnection networks and multiprocessor organization.						
Textbooks							
SP20							
Hennessy, J. L. (2017). <i>Computer Architecture: A Quantitative Approach</i> . Elsevier, 6 th Edition. ISBN: 9780128119051.							
References							
Course Learning Outcomes							
<ul style="list-style-type: none"> • To understand the concepts in computer organization and architecture. • To learn to design processor, control, memory, and I/O sections. • To learn the basic concept and design of multiprocessor systems. 							
Assessment of the Contribution to Student Outcomes							
Outcome →	1	2	3	4	5	6	7
Assessed →	X	X	X				
Prerequisites by Topic							
CS 320 with a grade of C or better or graduate standing.							

Major Topics Covered in the Course

1. Evolution and taxonomies of Computer Architecture, review of I/O interface {4 classes}
2. Processor design, microprogramming, instruction formats, number representations, design of advance and high speed arithmetic circuits, addition and subtraction, multiplication, division, pipelined arithmetic {10 classes}
3. Memory organization: semiconductor memories, associative memories, cache memories, parallel memories {4 classes}
4. Pipelines: instruction, arithmetic, static and dynamic pipeline designs, structural, data, and control hazards {12 classes}
5. CISC/RISC features {4 classes}
6. Interconnection networks: non-blocking, blocking, rearrangeable networks {6 classes}
7. Parallel computers: multiprocessors and multicomputers, cache coherence {6 classes}

NOTE: When course is taken as 500-level credit (CS 591 “Special Topics”), there will be additional requirements such as a research project.