Course Outline

1. Document Information

Degree Program	Computer Science
Course Number	CS 500
Course Title	Computer Architecture
Semester Hours	3
Course Coordinator	Koushik Sinha
Revision Term	Spring 2020
Latest Revision	Fall 2020

2. Catalog Description

Review of logical circuit design. Hardware description languages. Algorithms for highspeed 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.

3. Textbooks

- Hennessy, J. L. (2017). Computer Architecture: A Quantitative Approach. Elsevier, 6th Edition. ISBN: 9780128119051.

4. References

5. Course Learning Outcomes

- 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.

6. Assessment of the Contribution to Student Outcomes

Outcome	1	2	3	4	5	6	7
Assessed	X	X	X				

7. Prerequisites by Topic

CS 320 with a grade of C or better or graduate standing.

8. 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