I. Course Title: Architecture and Operating Systems

II. Course Prefix/Number: CSCI 308

III. Credit Hours: 3.0

IV. Prerequisite(s):
CSCI 209 minimum grade D

V. Catalog Description:
Introduction to the concepts of computer architecture and operating systems, including assembly level machine organization, representation of data, memory systems, bus principles, digital logic, microprograms, functional machine architecture, RISC, CISC, parallel architectures, an overview of operating systems and operating systems principles, concurrency, and memory management.

VI. Curricular Relationships:
Provides students with an introduction to computer architecture and basic operating system principles. The course is a prerequisite for CSci 309.

VII. Student Learning Outcomes:
- Students will be able to implement digital logic concepts.
- Students will be able to demonstrate an understanding of assembly level machine organization.
- Students will be able to describe, discuss, and compare various types of operating systems and operating system concepts.
- Students will be able to implement high-level languages.
- Students will be able to describe and utilize the principles used in a variety of computer architectures, memory systems, and memory management.

VIII. Content Outline:
1. Basic computer architecture using a variety of examples.
3. Assembly level machine organization. Basic von Neumann machine, fetch decode execute cycle, I/O, subroutine calls, instruction formats addressing modes and interrupts using the chosen example and appropriate tools.
4. Memory system organization. Storage system, data compression, error protection, cache, bandwidth and virtual memory
5. Machine architecture. Datapaths, ALU, CPU, CU, pipelining, instruction level parallelism
8. Digital logic, the microprogramming level, and the machine level.
9. Memory management. Main memory, cache, paging and segmentation, thrashing and working sets
10. Advanced architectures.

IX. Course Procedures/Policies/Grading Scale:
1. Homework assignments, programming assignments, and laboratory assignments will be given during the semester. Hardware laboratories will involve the design and construction of circuits for stand-alone devices and computer interfaced devices.
2. At least one examination will be given during each semester.
3. A final examination will be given at the end of each semester.

X. Required/Recommended Readings:
A computer architecture text with operating system concepts such as: Tanenbaum. *Structured Computer Organization*, Prentice-Hall, 1999; will be required.

XI. Issues Unique to Course:
Hardware labs will consist of a two-hour session 6 to 8 times during the semester. So scheduling for the course should include two one hour sessions and one two hour session per week.

XII. Additional Departmental Issues:
| AR1 | Digital logic and digital systems | 3 / 6 core |
| AR2 | Machine level representation of data | 3 / 3 core |
| AR3 | Assembly level machine organization | 9 / 9 core |
| AR4 | Memory system organization and architecture | 5 / 5 core |
| AR6 | Functional organization | 7 / 7 core |
| OS1 | Overview of operating systems | 2 / 2 core |
| OS2 | Operating system principles | 2 / 2 core |
| OS3 | Concurrency | 2 / 6 core |
| OS4 | Scheduling and dispatch | 2 / 3 core |
| OS5 | Memory management | 5 / 5 core |