Department	Electrical and Computer Engineering
Course Number	**EE 466**
Course Title	Computer Architecture and System Organization
Course Designation	Required for CpE, Elective for EE
University Catalog Description	Semesters Offered: S; 3 credit lecture; Prerequisites: EE 371. --Design of computer system instruction sets, data path, storage, and memory systems. Cost and speed relations, tradeoffs between hardware and software architectures including CISCs and RISCs, multiprocessors, and distributed processors. Control and implementation tradeoffs.
Faculty Coordinator	Dr. Ross Snider
Prerequisites by Topic	Digital Logic, Assembly Language Programming.
Textbook	Hennessy and Patterson, *Computer Architecture: A Quantitative Approach*, 4th edition and instructor notes.
Course Objectives	To produce graduates who understand how computers work, how the various computer components are organized, how hardware and software interact, what features and technologies are used to improve speed and capability, and how these features may effect program execution.
Course Learning Outcomes	At the conclusion of EE 466, students are expected to be able to: 1) Have a basic understanding of the historical events that have influenced modern computers and also the technological developments that have enabled the rapid growth of the computer industry. 2) Understand how instructions are implemented in computers. 3) Understand how the PicoBlaze Microcontroller works and be able to create an embedded system with it using VHDL. 4) Understand how software or hardware can be used to perform many operations and the tradeoffs between CISC and RISC computers. 5) Analyze ALU operations at the logic gate level. 6) Understand how a cache memory system works for both a direct mapped and a set associative cache. 7) Calculate the effects of ALU pipelining for a given set of instructions in terms of performance while taking into account increased clock speed and stalling due to data dependencies. 8) Understand the basics of speculative execution and branch prediction, and how these techniques can effect software and hardware design.
Topics Covered	1) Fundamentals of Computer Design. 2) Instruction Set Principles 3) PicoBlaze Microcontroller, MicroBlaze and PowerPC 4) VHDL Review. 5) Pipelining 6) Cache Principles 7) Instruction-Level Parallelism.
Class/Laboratory Schedule	EE 466 meets three times/week for 50 minute lectures.
Professional Component (Criterion 5)	This course is focused towards providing a fundamental introduction to the structure and organization of modern computers for the computer science and computer engineering student. Students will learn the basic technologies being used in modern computers to store and process information in terms of both the hardware and low level software. Understanding the advantages and limitations of these techniques is a principal part of this course.

ECE Program Outcomes	a. an ability to apply the knowledge of mathematics, science and engineering. c. an ability to design a system, component or process to meet desired needs. e. an ability to identify, formulate, and solve engineering problems. h. The broad education necessary to understand the impact of engineering solutions in a global and societal context. j. a knowledge of contemporary issues. k. an ability to use the techniques, skills and modern engineering tools necessary for engineering practice. n. An ability to program microcontroller/microcomputer systems using assembly and high-level languages. o. An ability to design digital systems using modern design tools.
ABET Credit Hours	3
Prepared by	Ross Snider May 2009