CS 3011 : Information Technology Hardware and Software (4)

Catalog Description:
Principles and application of telecommunication and computer systems hardware and software focusing on coding of data and programs, system hardware organization, and operating systems.

Textbook: Steven D. Burd, *Systems Architecture*, 5th Ed. Thompson, 2005.

Course Goals:
The aim of this course is to provide the hardware/software technology background to enable systems development personnel to understand the trade offs in computer architecture for effective use in a business environment. System architectures for single user, central, and networked computing systems are presented, as well as single user and multiuser operating systems. Topics include CPU architecture and instruction sets, input and output devices, networking components, and operating system software for coordinating and controlling the use of all of the hardware.

Prerequisites by Course & Topics
CS 2511: Software Analysis and Design: Familiarity with the requirements and design of large systems.
FMIS 2201: Basic business practices.

Major Topics Covered in the Course
- Data Coding and Storage
- Computer Organization
- Language Translation and Execution
- Operating Systems Fundamentals
- Network and Communications Fundamentals
- Systems Administration

Class/Laboratory Schedule: Lecture: 3 hours per week, Laboratory: 2

Course Outcomes
1. Understand coding of information.
    a. Ability to convert numerical data to and from its computer representation.
    b. Understand principles for representing structured data in a computer.
2. Understand the basic operation of computers.
    a. Understand the fetch-execute cycle.
    b. Understand the principles of computer organization.
    c. Understand the principles of computer data storage.
    d. Understand the operation of important peripheral devices such as disk drives and graphics display devices.
3. Understand the principles of systems software.
    a. Understand the translation of high-level languages into machine code.
    b. Understand the loading and execution of programs.
    c. Understand the interaction between computers and peripheral devices.
    d. Understand the principles and concepts of process management.
    e. Understand the principles and concepts of file system management.
    f. Understand the principles and concepts of memory management.
4. Understand the principles of networks and network communication.
    a. Understand the fundamental principles and concepts of communication.
    b. Understand the layering of network hardware and software.
    c. Understand how resources are accessed through a network.

Relationship to Program Outcomes

CS 3011 is a required core course for IS&T majors that is taken after successful completion systems analysis and design and management information systems. This course contributes to meeting the following program outcomes:

1. *Students understand the mathematics and statistics that underlie scientific applications.*
   This course provides students with an in-depth understanding of how integer and floating point computations are actually carried out. This allows the student to understand the limits of what can actually be computed both with respect to precision and range. Course outcome 1 supports this program outcome.
3. *Students understand the fundamentals of computer organization and architecture, data structures and related algorithms, and programming languages.*
   CS 3011 provides a comprehensive introduction to computer organization and architecture. Students understand the motivation and design principles that led from CISC and RISC architectures to superscalar architectures. Students also learn OS fundamentals. Course outcomes 1-4 support this program outcome.
4. *Students can apply computer science principles and practices to a variety of problems.*
   Students learn about systems and systems software, giving them a basis to understand and develop solutions to a wide variety of problems. Course outcomes 1-4 support this program outcome.

Assessment Plan for Course:
This course is assessed every third year by the instructor and a course assessment document covering all of the course outcomes and their effect on the program outcomes is prepared.

Estimate CSAB Category Content

	CORE	ADVANCED		CORE	ADVANCED
Data Structures			Computer Organization and Architecture	3	
Algorithms			Concept of Programming Languages	1	
Software Design					

Coordinator/Prepared by: G. Shute