ISM 253: **Information Technology Architecture**

Syllabus – Summer 2016

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General Information

Instructor

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Schedule

Thursday, May 26, 2016 - Thursday, July 14, 2016
Class: Monday, 6:00-10:30

Text and supplements

Introduction to Computing Systems from Bits and Gates to C and Beyond, 2nd Edition , by Patt and Patel, McGraw Hill Publishing (ISBN 0-07-246750-9), 2004.

There will also be handouts given during class to supplement the text

Course Description and Objectives

Information systems management is an exciting, dynamic field with numerous areas and applications that can lead to a wide range of challenging and rewarding careers. Information systems process information. In order to be processed, information must be represented in such a way that it can be manipulated by a machine - the computer. This course answers the question, ***How does a computer work?***

All instructions and information on a computer are ultimately represented as a series of binary digits - 0 and 1. Therefore, the computer is a physical device that must be based on binary digital logic. From this logic, physical components (hardware) such as memory and processors are designed. These components must respond to given instructions (software). This course examines the organization and operation of a digital electronic computer from the digital logic used to build the hardware components to the instructions used to manipulate the hardware components. The course also examines general hardware and software components, with a specific focus on the operating system functions. Specifically, this course has the following objectives:

1. Provide a basic understanding of how various types of information such as characters, numbers, pictures, sounds, movies, and instructions are represented on a computer system.
2. Provide a basic understanding of binary digital logic including the basic
3. Boolean functions and how they are used to build useful hardware components such as flip-flops, registers, counters, decoders, encoders, multiplexers, and adders.

4. Provide an understanding of the basic organization of a computer system in terms of digital hardware components and how software instructions are executed using the digital components at the machine level.
5. Provide an understanding of the fundamental hardware and software components of a computer system.
6. Research and present information about specific information systems (hardware and software) showing the ability to effectively communicate acquired knowledge pertaining to this course.

Course Topics, Readings, & Assignments (subject to change)

Session	Topic	Assignment
1	Course overview What is an information system? Information representation The basic logic functions	No assignment due Read Chapter 1 and Chapter 2 prior to class
2	Synthesis of logic functions Creating useful circuits Circuits in a computer system Hardware components of a computer system	Assignment #1 due Read Chapter 3 and Chapter 4.1 prior to class
3	Building the basic logic functions - electronics laboratory Building useful circuits - electronics laboratory	Assignment #2 due Review electronics handout prior to class
4	A look inside the computer (cadaver night) The execution of an instruction at the machine level	Assignment #3 due Read Chapter 4.2-4.5 prior to class Project assigned
5	Characteristics of an instruction An instruction set - LC3 A machine language program - LC3 Class exercise - creating a machine language program	Assignment #4 due Read Chapter 5, Chapter 6, and Appendix A prior to class
6	From machine language to assembly language (to H.L.L.) An assembly language program - LC3 Class exercise - creating an assembly language program	Assignment #5 due Read Chapter 7 prior to class
7	Software components of a computer system The operating system	Assignment #6 due
8	Project presentations	Project presentations

Grading

This course uses specification-based assessment.

To obtain a C, all of the following specifications must be successfully met:

- € All six homework assignments must be fully completed. (Course outcomes 1-5)
- € All six quizzes must be fully completed. (Course outcomes 1-5)
- € A course-related topic must be researched and presented the final night of class. (Course outcome 6)

To obtain a B, in addition to all of the specifications for a C, all of the following specifications must be successfully met:

- € All six homework assignments must be revised to 100% correctness. (Course outcomes 1-5)
- € All six quizzes must be revised to 100% correctness. (Course outcomes 1-5)
- € A course-related topic must be researched and presented the final night of class meeting the *basic* requirements (Course outcome 6)

To obtain an A, in addition to all of the specifications for a B, all of the following specifications must be successfully met:

- € A course-related topic must be researched and presented the final night of class meeting the *advanced* requirements (Course outcome 6)
- € Successfully complete a research paper (minimum ten pages, double spaced, 12-point font, 1-inch margins on the assigned course-related topic. The topic is assigned the fourth session. The initial paper, in MLA format, is due by the start of the sixth session. The final paper is due by the start of the final session.

Each specification will earn one of three designations:

- **M** - Meets the specification within acceptable thresholds.
- **N** - Needs improvement in order to meet the specification within acceptable thresholds. A due date in which the improvements need to be made will be assigned.
- **O** - Open, either nothing was turned in or what was turned in did not show an acceptable level of effort. This results in an unexcused token.

Each student starts with zero **U**nexcused tokens. An **U**nexcused token will be given for each unexcused absence or missed due date. At the end of a semester, 0 or 1 unexcused tokens will raise the grade to a +, 2 or 3 will keep the grade the same, and 4 or 5 will lower the grade to a -. Each token after 5 will lower the grade one level (ie from a B- to a C+, a C+ to a C, etc.).

Academic Dishonesty Policy

In accordance with Doane's academic dishonesty policy which articulates the college's stance on honesty in the classroom, any act of dishonesty in pursuing the work of this course will be penalized.

First confirmed act of dishonesty:

- Report to Academic Affairs as required by college policy.
- Receipt of a zero (0) for the activity.

Second and subsequent confirmed acts of dishonesty will be forwarded to and handled by the Vice President for Academic Affairs in accordance with policy guidelines.

Remember, collaboration among classmates is necessary and expected as an integral part of the education process. Copying will not be tolerated!