COURSE OUTLINE

CITA170 – COMPUTER CONCEPTS AND OPERATING SYSTEMS

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Revised by: Robert House

CANINO SCHOOL OF ENGINEERING TECHNOLOGY
Decision Systems Department
November 2014
A. TITLE: Computer Concepts and Operating Systems

B. COURSE NUMBER: CITA170

C. CREDIT HOURS: 3

D. WRITING INTENSIVE COURSE: No

E. COURSE LENGTH: 15 weeks

F. SEMESTER(S) OFFERED: Fall/Spring

G. HOURS OF LECTURE, LABORATORY, RECITATION, TUTORIAL, ACTIVITY: 2 hours of lecture a week; 1 lab a week, 2 hours in length.

H. CATALOG DESCRIPTION: A study of the terminology and concepts associated with computer systems hardware and software. Topics will include: system hardware components, memory organization and management, operating systems, troubleshooting fundamentals, etc. Students will disassemble and reassemble PCs, become familiar with hardware components, learn to collect information about the computer system, install and configure system software, and test and troubleshoot the system to apply the various concepts covered in the course.

I. PRE-REQUISITES/CO-COURSES:
   a. Prerequisites: None.
   b. Co-requisites: None.

J. GOALS (STUDENT LEARNING OUTCOMES):
   By the end of this course, the student will:

<table>
<thead>
<tr>
<th>Course Objective</th>
<th>Institutional SLO</th>
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<tbody>
<tr>
<td>1. Describe basic computer hardware architecture and hardware components;</td>
<td>3. Professional Competence</td>
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<td>2. Install and configure computer operating systems;</td>
<td>2. Critical Thinking</td>
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<td>3. Manage basic computer system assembly;</td>
<td>3. Professional Competence</td>
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<td>4. Describe the function of typical computer peripherals;</td>
<td>3. Professional Competence</td>
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<tr>
<td>5. Install typical computer peripherals;</td>
<td>3. Professional Competence</td>
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<tr>
<td>6. Use basic troubleshooting techniques to isolate faults in hardware/software; and</td>
<td>2. Critical Thinking</td>
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<td>7. Work in teams to troubleshoot and repair computer equipment.</td>
<td>3. Professional Competence</td>
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<td>4. Inter/Intrapersonal Skills</td>
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K. TEXTS:
   A+ Practical Application 220-702. Testout.

L. REFERENCES: Internet resources selected by the instructor.
M. **EQUIPMENT:** Set of computers connected to the network, set of computers not connected to the network for assembly/disassembly, various peripherals, and some tools and measurement devices.

N. **GRADING METHOD:** A-F

O. **MEASUREMENT CRITERIA/METHODS:** Exams, quizzes, lab reports and homework assignments.

P. **DETAILED COURSE OUTLINE:** See attached sheet

Q. **LABORATORY OUTLINE:** See attached sheet
DETAILED TOPICAL OUTLINE

CITA170 - COMPUTER CONCEPTS AND OPERATING SYSTEMS

I. How Computers Work - An Overview
   A. Basic Computer Concepts
   B. Interaction between Hardware and Software

II. An Introduction to Hardware
   A. Introduction to Digital Circuits
      1. Number systems: decimal, binary, hexadecimal, conversions
      2. Basic digital circuit elements
      3. Basic digital logic gates
   B. Computer Architecture
      1. CPU and chipset
      2. BIOS
      3. Memory systems
      4. Permanent storage systems
      5. Common I/O ports
      6. Peripherals
      7. Buses

III. How Hardware and Software Work Together
   A. Software Fundamentals
      1. What is software; it's role in a computer system
      2. Types of software – system and application
      3. Operating systems – history, functions, tools
   B. Boot Up Sequence
      1. Role of hardware
      2. Role of BIOS
      3. Role of operating system
   C. System Resources
      1. How an Operating System uses system resources
      2. How system resources are assigned

IV. PC Maintenance and Repair Fundamentals
   A. Hardware and Software Tools
   B. Preventive Maintenance Plan
   C. Safety Procedures
   D. Troubleshooting Approaches

V. Electricity and Power Supplies
   A. Basic electrical concepts and devices
   B. Description and preventions of electricity-based damages
   C. Form factors
   D. Energy conservation – Energy Star standards
   E. Troubleshooting PC power supply problems

VI. Processors and Chipsets
   A. Processor Types and Performance Evaluation Criteria
   B. How Processors Work
   C. Chipsets and How They Work
D. Maintaining Processor Performance and Integrity – Cooling Systems
E. Processor Installation and Upgrade

VII. Motherboards
A. Components on a Motherboard
B. Installing or Replacing
C. Configuring, Supporting, and Troubleshooting
D. Buses and Bus Architectures

VIII. Managing Memory
A. Types of Memory and How Each Works
B. Error Checking
C. Measuring Memory Speed
D. Upgrading
E. Troubleshooting

IX. Hard Drives
A. Floppy Drives Organization
B. Hard Drives – Physical and Logical Organization
C. Hard Drives Technologies
D. Communication between PC and HD
E. Installation and Troubleshooting
F. Maintenance, Optimization and Protection

X. I/O Devices
A. Types of I/O Devices
B. Principles of Installation and Support
C. Using ports and expansion slots for add-on devices
D. Multimedia Devices

XI. Operating Systems
A. The Role and Architecture of and Operating System
B. Common Operating Systems for PCs – MS Windows Family
C. Other Operating Systems
D. Windows 2000/XP
   1. Installation
   2. Maintenance and Support
   3. Troubleshooting
E. UNIX like Operating Systems (Linux)
   1. Installation
   2. Maintenance and Support
   3. Troubleshooting

XII. Purchasing a PC or Building Your Own
**LABORATORY OUTLINE**

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<table>
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<tr>
<th>LABORATORY</th>
<th>TOPIC</th>
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<tr>
<td>1</td>
<td>Identification of PC parts and gathering of system information with OS tools</td>
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<td>2</td>
<td>Assembly and disassembly of a computer system</td>
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<td>3</td>
<td>Study of the boot process; reading system resource allocation</td>
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<td>4</td>
<td>Form factors and using multimeters</td>
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<td>5</td>
<td>Motherboards – components identification methods</td>
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<td>6</td>
<td>Flash BIOS/Motherboard upgrades</td>
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<td>7</td>
<td>Using third party software to gather system info</td>
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<td>8</td>
<td>Computer Diagnostic/Management Tools – system &amp; third party</td>
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<td>9</td>
<td>Using research tools to find information for a chosen part, such as Kingston website for RAM</td>
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<td>10</td>
<td>Installing and configuring an OS – Windows XP</td>
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<td>11</td>
<td>Installing and configuring an OS – Linux</td>
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<td>12</td>
<td>Installing application software</td>
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<td>13</td>
<td>Troubleshooting Windows XP</td>
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<td>14</td>
<td>Troubleshooting common computer system problems</td>
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