A. **TITLE:** Computer Concepts and Operating Systems

B. **COURSE NUMBER:** CITA 170

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:**
   3 hours of lecture a week

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, hardware security and software security etc. This course should be taken concurrently with CITA 175 Computer Concepts and Operating Systems Lab course.

I. **PRE-REQUISITES/CO-COURSES:**
   a. Prerequisites: None.

J. **GOALS (STUDENT LEARNING OUTCOMES):**

   By the end of this course and CITA 175 Computer Concepts and Operating Systems Lab course, the student will be able to:

<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. Foundational Skills</td>
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<td>2. Install and configure computer operating systems;</td>
<td>3. Foundational Skills</td>
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<td>3. Manage basic computer system assembly;</td>
<td>3. Foundational Skills</td>
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<td>4. Describe the function of typical computer peripherals;</td>
<td>3. Foundational Skills</td>
</tr>
<tr>
<td>5. Install typical computer peripherals;</td>
<td>3. Foundational Skills</td>
</tr>
<tr>
<td>6. Use basic troubleshooting techniques to isolate faults in hardware/software;</td>
<td>3. Foundational Skills</td>
</tr>
<tr>
<td>7. Work in teams to troubleshoot and repair computer equipment.</td>
<td>3. Foundational Skills</td>
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K. **TEXTS:**


L. **REFERENCES:** Internet resources selected by the instructor.
M. **EQUIPMENT:** None.

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

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

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

Q. **LABORATORY OUTLINE:** N/A
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 Operating System
   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

XIII. Hardware Security and Software Security