ITE 200 Computer Hardware and Software **3 cr.**

Catalog description:

This course surveys the fundamentals and skills required to understand and work with computer hardware and software. Topics include system architecture that goes into details of the roles and assembly and disassembly of various computer parts. System diagnostics, upgrades, maintenance, and documentation are taught as the next steps. Instruction includes lectures, demonstrations, and hands-on work. Three lecture hours per week.

Prerequisite(s): ITE 100.

Course Narrative:

Learning the know how of taking a computer system apart and putting it back, be able to customize one's desktop or laptop as per one's needs, as well as be able to buy the computer and its parts based upon ones usage are some of the things that are the key aspects of this course. Today's computer users benefit from the knowledge of their machine's components, as they are able to make educated decisions when purchasing new hardware or upgrading existing hardware. This course goes into an in depth understanding of various computer components, their functions and assembly, and upgrades, as well as operating system and driver installation. This will give students a hands-on experience of the computer hardware and software and to troubleshoot the issues related to them. This course is a lecture course but will have labs for hands-on experience.

Goals:

   The aims of this course are to help the student to gain an appreciation for the breadth and variety within the computing field and to be better prepared for the technical treatments presented in later courses. Specifically, the goals are:
   G1:   to acquaint the student with computer hardware and software.
   G2:   to provide a standard descriptive vocabulary for various topic areas related to hardware and software.
   G3:   to provide a survey of the most important concepts in computer architecture and software.

Objectives:

   Upon successful completion of this course the student will have demonstrated the ability to:
   O1:   Be familiar with standard tools required to work on a PC and identify safety concerns when working with computer hardware.
   O2:   Be familiar with the layout of and components found on a PC motherboard.
   O3:   Disassemble and assemble hardware components from PC system.
   O4:   Describe techniques and procedures used in maintaining hardware documentation.
   O5:   Examine issues, factors and procedures related to CPU upgrades.
   O6:   Distinguish among the characteristics and functions of a variety of PC bus architectures
   O7:   Identify various types of memory components and determine issues related to memory upgrades.
   O8:   Identify and examine the functions of various types of hard disk drives and alternate storage devices.

O9:   Distinguish among various types of expansion boards, and issues related to their installation.
O10: Identify the functions of various types of input devices and output devices.
O11: Examine issues and procedures related to input and output hardware operation and installation.
O12: Able to install an operating system and related drivers on to an assembled PC.
O13: Illustrate hardware and software maintenance techniques.

Program Objective / Course Objective matrix (For ABET Accreditation Purposes)

(The following Matrix maps the Program Objectives for Information Technology Program outlined by Accreditation Board of Engineering Technology (ABET) with the Course Objectives. The check marks below the course objective represent that those course objectives accomplish specific program objectives set forth by ABET. The program objectives that have a * in front of them means that that course does not address those program objectives.)

Program Objective	O1	O2	O3	O4	O5	O6	O7	O8	O9	O10	O11	O12	O13
PO-A: An ability to apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the discipline.	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
PO-B: An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.							✔	✔		✔			
*PO-C: An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.		✔	✔										
*PO-D: An ability to function effectively on teams to accomplish a common goal.													
PO-E: An understanding of professional, ethical, legal, security and social issues and responsibilities.										✔			✔

Program Objective	O1	O2	O3	O4	O5	O6	O7	O8	O9	O10	O11	O12	O13
*PO-F: An ability to communicate effectively with a range of audiences.													
PO-G: An ability to analyze the local and global impact of computing on individuals, organizations, and society.										✔			✔
*PO-H: Recognition of the need for and an ability to engage in continuing professional development.													
*PO-I: An ability to use current techniques, skills, and tools necessary for computing practice.				✔	✔	✔							
*PO-J: An ability to use and apply current technical concepts and practices in the core information technologies.													
*PO-K: An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.													
*PO-L: An ability to effectively integrate IT-based solutions into the user environment.													
*PO-M: An understanding of best practices and standards and their application.													

Program Objective	O1	O2	O3	O4	O5	O6	O7	O8	O9	O10	O11	O12	O13
*PO-N: An ability to assist in the creation of an effective project plan.													

Topics:

The column on the right hand side represents the Body of Knowledge and number of hours (in parenthesis) set forth by ABET accreditation board for accomplishing minimum required hours assigned for different categories. More information on this body of knowledge can be found in Appendix A "The IT Body of Knowledge" on Page 68 of the following document.
http://www.acm.org//education/curricula/IT2008%20Curriculum.pdf

1. An introduction to computer parts and tools   **SP1(1), SP2(0.5), SP3(0.5)**
   First look at Desktop and Laptop Components
   First look at Mobile Device Hardware
   Tools used by a computer hardware technician
2. System hardware and software   **SIA7(1), PT2(1)**
   Assembling and Disassembling a Desktop and Laptop
   Service Manuals, Warranty Concerns, and Diagnostic tools
3. Motherboard   **SP3(2)**
   Motherboard types and features
     Motherboard Form Factors
     Processor Sockets
     The Chipset
     Buses, Expansion Slots, Ports
   Configuring a motherboard
   Maintaining a motherboard
   Installing and replacing a motherboard
4. CPU and Memory   **IM1(1), SP1(1)**
   Types and Characteristics of Processors
   Selecting a processor to match system needs
   Install a processor
   Memory Characteristics, types of memory, and installing memory
5. Power System and Troubleshooting   **PT1(2)**
   Cooling Methods and devices
   Selecting a power supply
6. Hard drive and other storage devices   **IM1(0.5)**
   Hard Drive Technologies and Interface Standards
   Selecting and Identifying hard drives
   Supporting other types of storage
7. Survey of OS Features and Support Tools   **PT1(1.5), PT2(2)**
   Windows Interfaces
   Windows Tools for users and technicians
   Windows Network Connections
   Windows User Accounts
8. Installing Windows   **PT2(2)**
9. Supporting I/O Devices   **PT2(2.5)**

10. Maintaining Windows   **PT2(2)**
    Schedule preventive measures
    Backup Procedures
    Managing Files, Folders and Storage Devices

Student Experiences:

Assignments
    Lab assignments, given weekly, will exercise theoretical principles discussed during the lectures through practical hands-on exercises. Assignments require students to use information given during the lectures and textbooks, and perform Internet research for necessary materials.

Each assignment has a specific due date, with a short grace period during which the assignment may be submitted for reduced credit. When the grace period has expired, the assignment will no longer be accepted, and a student who has failed to submit the assignment will have a penalty deducted from the term point-total.

Other than the labs, there will be homework, quizzes, projects, midterm, and a final.

Grading
    Final grades will be determined on the basis of the following approximate weights:
    • Labs, Homework assignments, Quizzes   60%
    • Midterm exam   20%
    • Final exam   20%

Student Experiences by Course Outcome (Objective) matrix

	O1	O2	O3	O4	O5	O6	O7	O8	O9	O10	O11	O12	O13
Labs/Homework Assignments	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quizzes	✓	✓	✓	✓	✓			✓	✓	✓	✓		
Midterm Examination	✓	✓	✓	✓	✓	✓	✓						
Final Examination	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Bibliography:

1. Andrews, Jean; Dark, Joy; West, Jill. A+ Guide to IT Technical Support. Ninth Edition. Cengage Learning, 2017.
2. Andrews, Jean. A+ Guide to Hardware. Ninth Edition. Cengage Learning, 2017.