CSCI 2150  

**Computer Organization**

**Credit Hours:** 3  
**Contact Hours:** 3  

**Course Coordinator:** David Tarnoff  

**Text(s):** None  

**Catalog Description:**

A study of the physical implementation of the computer beginning with the mathematical and logical foundations followed by the component level design then concluded with an introduction to machine architecture. Topics include Boolean algebra, data representation, logic gates, combinational and sequential circuit design, memory cells, memory subsystems, memory hierarchy, I/O subsystems, I/O handling, interrupts, instruction representation, error detection, and serial protocols. A laboratory part of the course provides hands-on experience in upgrading, repairing, and maintaining personal computers.

**Prerequisite(s):** CSCI 1900 and CSCI 1250  

**CS:** REQUIRED  
**IS:** REQUIRED  
**IT:** REQUIRED  

**Course Outcomes:**

Perform mathematical and logic manipulations with numbers in binary format - ETSU Outcomes 3, 4a; ABET Outcome a  

Convert between binary, decimal, hexadecimal, and BCD formats - ETSU Outcome 3; ABET Outcome a  

Demonstrate an understanding of the operation of combinational and sequential logic circuits - ETSU Outcomes 3, 4a; ABET Outcome a  

Design combinational and sequential logic circuits - ETSU Outcomes 3, 4, 5c; ABET Outcome CS-j  

Demonstrate an understanding of the circuitry that comprises memory and other storage devices -ETSU Outcome 3; ABET Outcome c  

Design memory interface logic - ETSU Outcomes 3, 5c; ABET Outcomes c, CS-j  

Demonstrate an understanding of the principles of microprocessor organization and interfacing -ETSU Outcomes 3, CS-1; ABET Outcome c
Demonstrate an understanding of serial protocols - ETSU Outcome 3b; ABET Outcomes c, IT-1

Apply basic methods of installation, upgrading, testing, and troubleshooting of multiple PC operating systems and hardware at the board, and system levels - ETSU Outcome 5c; ABET Outcomes b, IS-j, IT-k

Major Topics:

- General digital system and signal concepts
- Digital signals and binary numbers
- Representing analog values with digital numbers
- Binary representations and arithmetic
- Logic gates
- Combinational logic and boolean algebra
- Laws of boolean algebra
- Standard boolean expression formats
- Karnaugh maps
- Combinational logic applications
- Multiplexers and Demultiplexers
- Memory cells
- State machines
- Introduction to memory and terminology
- Memory hierarchy
- Hard drive details
- Cache concepts
- Processor architecture
- Segment addressing
- Bitwise operations
- Parity/Checksums/Cyclic Redundancy Check
- Serial protocols and protocol stacks
- PC BIOS upgrade & configuration
- PC motherboard/component installation
- Operating system installation and partitioning
- Operating system troubleshooting
- Application installation
- Hard drive performance measurements
- PC Troubleshooting