CS 3270: OPERATING SYSTEMS AND NETWORKS

Semester Hours: 3.0
Contact Hours: 3

Coordinator: Ray Kresman

Text: Selected from multiple sources
Author(s): VARIOUS
Year: VARIOUS

SPECIFIC COURSE INFORMATION

Catalog Description:
Design of multiprocessing operating systems, process scheduling and synchronization. Device drivers and communication hardware. Networks and their topologies. Communication protocols and client/server environments with implication for operating system services and user programs. Prerequisites: Grade of C or better in CS 2020 and CS 2170.

Course type: REQUIRED

SPECIFIC COURSE GOALS

• I understand different process-scheduling algorithms and their performance trade-offs.
• I understand the different memory management techniques.
• I can build processes that employ inter-process communication and synchronization mechanisms.
• I understand how modern networks (LAN and WAN) function with a protocol stack like TCP/IP.
• I can create client/server-based applications using a network connection.

STUDENT OUTCOMES ADDRESSED BY THIS COURSE

• B.1 Analyze a given problem, and identify and define the computing requirements appropriate to its solution
• B.2 Use current techniques, skills, and tools in computing practice
• B.3 Apply mathematical foundations, algorithmic principles, and computer science theory as appropriate in modeling and solving real-world problems
• B.5 Apply design and development principles in the construction of software systems of varying complexity

LIST OF TOPICS COVERED

• Introduction (1 week)
• Operating Systems
  o Introduction
    ▪ Overview
    ▪ Services
    ▪ Protection
  o Processes
    ▪ Program vs. Process
    ▪ Representation
    ▪ Management
  o Process Coordination
    ▪ Communication
    ▪ Synchronization (Semaphores, Message Passing)
    ▪ Scheduling
  o Memory Management
    ▪ Fixed Assignment
    ▪ Dynamic Assignment
    ▪ Virtual Memory
• Networks and Distributed Systems
  o Introduction
    ▪ Benefits
    ▪ Applications
    ▪ Network Components
    ▪ Types of Networks
  o Communication Basics
    ▪ Protocols
    ▪ Communication Software
    ▪ Communication Hardware / Media
- Synchronous vs. Asynchronous
- RS-232 Interface

  - Network and Protocol Architectures
    - IEEE 802 LAN Standards
    - LAN Configurations
    - Ethernet
    - Token Ring
    - TCP/IP
    - OSI
    - ISDN, ATM

  - Transmission and Switching
    - Circuit Switching
    - Packet Switching

  - Client-Server Computing
    - Language Support
    - Socket Interface
    - RPC
    - Web Enabled Applications
    - Network Security