

## CS 6290 : NETWORKS AND DISTRIBUTED PROCESSING

---

<i>Semester Hours:</i>	3.0	<i>Contact Hours:</i> 3
<i>Coordinator:</i>	Hassan Rajaei	
<i>Text:</i>	Various	
<i>Author:</i>	VARIOUS	
<i>Year:</i>	Various	

### SPECIFIC COURSE INFORMATION

#### *Catalog Description:*

Computer network architecture and protocols. Routing, congestion, and flow control. Client-server models and remote procedure calls. Topics may include algorithms for broadcasting, check pointing, termination detection, and other problems. Prerequisites: Full Admission to MS in CS program or consent of department.

Course type: **ELECTIVE**

### SPECIFIC COURSE GOALS

- I know how diverse components of a distributed processing system communicate with each other.
- I am able to describe which protocols to use to pass data between heterogeneous nodes in the distributed networked system.
- I am able to describe the difference between the distributed operating system and the network operating system.
- I am able to describe what is an atomic transaction and what is meant by commit or abort a transaction in a distributed system.
- I am able to describe why time is an important issue in a distributed system and why it is difficult to have a single clock in a distributed network to synchronize all processes.
- I know what is meant by transparency in distributed networking processes and I am able to identify several types of transparency in a distributed system.

### LIST OF TOPICS COVERED

- Review of Computer Network Concepts
  - Technologies: Ethernet, Token Ring, ATM
  - Protocol Layers
  - Transport Level Protocols
- Client/Server Computing
  - Client roles

- Server roles
- Distributed System Protocols and OS
  - Interprocess Communication with Case Study
  - Remote Procedure Calls with Case Study
  - Protocols for Distributed Systems
  - Network File Systems
    - File System Characteristics
    - Access Control
- Name Servers
- Distributed Operating Systems
  - Structure of the OS Kernel
  - Processes and Threads
  - Clock Synchronization
    - Physical and Logical Clocks
    - Clock Synchronization Algorithms
  - Security
    - Cryptography and Public Key Encryption
    - Digital Signatures and Authentication
    - The Kerberos System
- Distributed Algorithms
  - Distributed Transactions
    - Characteristics of Distributed Transactions
    - Two-Phase Commit Protocol
    - Concurrency Control
      - Locking
      - Timestamp Ordering
- Mutual Exclusion
- Deadlock Resolution
  - Load Balancing