Brooklyn College
Department of Computer & Information Sciences

CISC 7312 [*705X] Operating Systems II

37½ hours plus conference and independent work; 3 credits

Study of the more advanced aspects of operating systems with emphasis on overall design and system structure. Asynchronous operation and interprocess communication. Network operating systems. Debugging and verification.

Syllabus

Week 1. Introduction
  - Introduction
  - What are distributed systems?
  - Distributed system goals
  - Types of distributed systems

Week 2. Architectures
  - Architectural categories
     * Centralized
     * Decentralized
     * Hybrid
  - Middleware and architecture
  - Management and monitoring

Week 3. Components
  - Processes and Threads
  - Virtualization
  - Clients and Servers
  - Code migration

Week 4. Communication
  - Basics
  - Remote procedure calls
  - Message-oriented communication
  - Stream-oriented communication
  - Multicasting

 Week 5. Naming I
   - Flat naming
     * Simple solutions

    * Distributed hash tables
    * Hierarchical naming

Week 6. Naming II
 - Structured Naming
   * Name spaces
   * Name resolution
 - Attribute-based naming

Week 7. Synchronization I
 - Clock synchronization
 - Logical clocks

Week 8. Synchronization II
 - Mutual exclustion
 - Election algorithms

Week 9. Consistency and Replication
 - Data-centric models
 - Client-centric models
 - Replication management
 - Consistency Protocols

Week 10. Fault Tolerance I
 - Introduction
 - Process resillience
 - Client-server communication

Week 11. Fault Tolerance II
 - Reliable group communication
 - Distributed commit
 - Recovery

Week 12. Security
 - Secure channels
 - Access control
 - Management

Week 13. Distrubuted Object-Based Systems
 - Architecture
 - Processes
 - Communication
 - Naming
 - Synchronization

Week 14. Distributed file systems

- Architecture
  - Processes
  - Communication
  - Naming
  - Synchronization

Week 15. Final exam

Textbooks

"Distributed Systems: Principles and Paradigms (2e)", Andrew S. Tanenbaum and Marten Van Steen, Pearson, 2007.

"Distributed Systems: Concepts and Design (4e)", George Coulouris, Jean Dollimore, and Tim Kindberg, Addison Wesley, 2005