THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Advanced Operating Systems

CSE 6431

Credit Hours:
3.00 - 3.00

Course Levels:
Graduate (5000-8000 level)

Course Components:
Lecture

Course Description:
Advanced topics in operating systems and concurrency; introduction to distributed systems.

Prerequisites and Co-requisites:
Prereq: 2431 (660) or 5431.

Course Goals / Objectives:
- Master language and operating system constructs such as semaphores and monitors and their use for process synchronization and mutual exclusion
- Master principles and algorithms for distributed mutual exclusion in distributed systems
- Be competent with basic issues in developing distributed systems, use of logical clocks, and techniques for interprocess communication
- Be competent with principles and approaches for deadlock detection and avoidance, and fault-tolerance and avoidance in distributed systems
- Be competent with operating system support for database transactions, including ACID properties and serializability of transactions
- Be familiar with modern techniques for fault-detection and failure handling in servers, HPC systems, and data-intensive systems
- Be familiar with use of virtualization and cloud technologies
- Be familiar with software transactional memory (STM) based approaches
- Be exposed to the basic concepts of data consistency and data consistency models

Course Topics:

- Introduction to distributed systems
- Mutual exclusion and synchronization methods and examples
- Foundational issues for distributed systems, like clock synchronization and logical clocks
- Distributed mutual exclusion algorithms
- Support for database transactions
- Deadlock detection and avoidance analysis and techniques
- Advanced Distributed Algorithms and Fault-tolerance methods
- Modern fault-tolerance and failure-recovery: servers, HPC systems, and data-intensive systems
- Virtualization technologies and clouds
- Software Transactional Memory
- Coherence and Consistency Models

Designation:

Elective