Course Code: COMP483  
Course Title: Operating Systems

Academic Year: 2010-2011  
Academic Term: FALL  
Course Credit: (3, 2) 4

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Assistant(s):

Course Objectives:
This course is about the concepts, structure, and mechanisms of operating systems. Its purpose is to present, as clearly as possible, the nature and characteristics of modern-day operating systems. In spite of variety and pace of change, certain fundamental concepts apply consistently throughout. The intent of this course is to discuss the fundamentals of operating system design and provide practical training in multi-user and multi-tasking operating system LINUX.

Weekly Schedule:
1. CONCEPTS AND STRUCTURE OF OPERATING SYSTEMS: processes, files, execution, interrupts, system calls, shell, memory hierarchy, cache memory, operating systems functions, and characteristics.

2. PROCESESS: process states, process description, process control structures, threads, competition among processes for recourses, mutual exclusion, disabling interrupts.

3. PROCESSES: lock variables, strict alternation, busy waiting, Peterson's solution.

4. PROCESSES: classical IPC problems such as the problem of producer and consumer and the problem of five dining philosophers.

5. PROCESSES: classical IPC problems such as the problem of readers and writers and the problem of sleeping barber.


7. MEMORY MANAGEMENT: memory management without swapping or paging, multiprogramming with fixed partitions.

8. MEMORY MANAGEMENT: swapping, multiprogramming with variable partitions, memory management with bit maps, memory management with linked lists.

9. 1st term week.

10. MEMORY MANAGEMENT: memory management with buddy system, virtual memory, paging, page replacement algorithms, optimal page replacement algorithm.

11. MEMORY MANAGEMENT: not-recently used page replacement algorithm, first-in first-out page replacement algorithm, second chance page replacement algorithm, clock page replacement algorithm, least recently used page replacement algorithm, simulation of LRU in software, aging algorithm.

12. DEADLOCKS: deadlock detection and recovery, recovery from deadlock, recovery through preemption, recovery through killing processes, deadlock prevention by attacking mutual exclusion condition, deadlock prevention by attacking hold and wait condition, deadlock prevention by attacking no preemption condition, deadlock prevention by attacking circular wait condition.

13. DEADLOCKS: deadlock avoidance, recourse trajectories, safe and unsafe states, the banker’s algorithm for a single.

14. DEADLOCKS: the banker’s algorithm for multiple resources.

Textbook(s) / Required Reading:

Recommended Reading:
| Grading Criteria       | 1st midterm exam – 35%  
|                       | Quizzes – 20%  
|                       | Final exam – 45%   |
| Academic Honesty      | Individual accountability for all individual work, written or oral. Copying from others or providing answers or information, written or oral, to others is cheating. Providing proper acknowledgment of original author. Copying from another student’s paper or from another text without written acknowledgement is plagiarism. According to University’s bylaws **cheating and plagiarism** are serious offences resulting in a failure from exam or project and disciplinary action (which includes an official warning may appear in student’s transcript or/and suspension from University for up to one semester). |
| Additional Remarks    | • Attendance is compulsory. A student not attended exams and 50% of the classes will receive NG grade.  
|                       | • Students are strongly encouraged to attend exams on exam date. One general make-up exam will be given at the end of the semester after the finals. Any student not attended exam on time and provided reasonable excuse within three days following the exam will be able to attend make-up exam. |