Instructor: Dr. Tong Lai Yu

Objectives:
This course is intended for a second course on operating systems and to provide a basic foundation in the design of advanced operating systems. It stresses on various alternative approaches to system designs.


Suggested References:


Office: JB-346  phone: (909)-537-5334  email: tyu AT csusb.edu

Office Hours: Mon, Wed: 2:15 - 4:15 pm.

Grading:

- Labs – 18%
- Homework – 22%
- Mid Term – 25%
- Final Exam – 35%

Grade Requirements:

- 91 - 100 %: A, A-
- 81 - 90 %: B+, B, B-
- 71 - 80 %: C+, C, C-
- 61 - 70 %: D+, D, D-
- ≤ 60 %: F

Study Policy:
Students are expected to do the labs and homeworks as assigned. They should attend all lectures and study all assigned readings. Students should come to ask the instructor for help or suggestions if they encounter any difficulties or doubts in their work. Discussions with fellow classmates are encouraged but lab or homework-copying is strictly forbidden. All work must be turned in on time. No late work will be accepted unless the student can provide acceptable compelling reasons with appropriate documentation. Also, do NOT turn in any lab or homework by email.

Illness:
A student is responsible for contacting the lecture instructor as soon as possible for providing a satisfactory explanation for missing a scheduled exam or work due to illness or other serious and compelling reasons; documentation evidence is required. Otherwise, missed exams or work will be counted as 0%.

Support for Student with Disabilities:
If you are in need of an accommodation for a disability in order to participate in this class, please contact Services to Students with Disabilities at UH-183, (909)537-5238.
Plagiarism and Cheating:
Students are expected to be familiar with the University’s Policy on cheating and Plagiarism. In-
stances of academic dishonesty will not be tolerated. Cheating on exams or plagiarism (presenting
the work of another as your own, or the use of another person’s ideas without giving proper credit)
will result in a failing grade and sanctions by the University. For this class, all assignments are to
be completed by the individual student unless otherwise specified.

Outline of course:

1. Review and Overview
   processes and threads, semaphores, monitors, serializer,
   process synchronization, deadlocks

2. An Introduction to Distributed Systems
   client-server computing, message-passing, remote procedure call (RPC)

3. Deadlocks
   graph model, knot, banker’s algorithm

4. Distribution Systems Architecture
   centralized and decentralized architectures, middleware

5. Processes
   threads, processes, virtualization client server model, code migration

6. Communication
   layered protocols, types of communication, RPC,
   message-oriented communication, stream-oriented communication

7. Distributed OS Theories
   shared resources, global clock, Lamport’s Logical clocks,
   vector clocks, causal ordering of messages

8. Distributed Mutual Exclusion
   election algorithms, various mutual exclusion algorithms,
   token-based and non-token-based algorithms

9. Agreement protocols
   system model, Byzantine agreement problem, agreement algorithms

10. Distributed File Systems and Shared Resources
    distributed file systems principles, case studies, replications,
    virtual memories, security issues

11. Distributed Scheduling
    load sharing and balancing, load distribution algorithms, load scheduler

12. Recovery
    backward and forward recovery, check points

13. Fault Tolerance
    commit protocols, voting protocols

14. Protection and Security
    policies, access control, cryptography, public keys

15. Multiprocessor and other advanced operating systems
    multiprocessor systems, design issues, database operating systems,
    concurrency control