Research Related to This Course

- Processes and Threads
  - OOPSLA’11, SOSP’11

- Synchronizations
  - EuroSys’17, ASE’17

- Memory Management
  - SIGCSE’17, OSDI’08

General Information

- Self Introduction
  - Research interests: security, reliability and performance issues of parallel applications (Software Research Group)
  - Looking for the REU student

- Class Page
  - [http://www.cs.utsa.edu/~tongpingliu/teaching/cs3733/cs3733.html](http://www.cs.utsa.edu/~tongpingliu/teaching/cs3733/cs3733.html)
  - Syllabus, class schedule, slides and assignments

- Prerequisites:
  - CS 3423 (Systems Programming)
  - CS 3843 (Computer Organization)
  - Solid background of C/C++
General Information (cont.)

- Required textbook:
  - *Operating System Concepts*, by Silberschatz, Galvin and Gagne (SGG), 9th edition (older versions work)
  - *Unix Systems Programming (USP)*, by Robbins and Robbins

Contact Information

- Office: NPB 3.328
- Office hours:
  - TuTh: 3:45pm – 5:00pm;
  - Or by appointment
- Email: Tongping.Liu@utsa.edu
  - Best way to reach me!
  - PLEASE put “CS3733” in the subject line or the body
  - Common questions are better to be posted at Blackboard forum.

Grade Distribution

- Programming projects (30%)
  - Four projects are expected
  - Discussions are allowed but no code-copying/cheating
- Quizzes (10%)
  - Will be assigned randomly during classes
  - Thus, attendance is mandatory
- Two Midterm Exams (15% each)
  - Closed books, closed notes
- One Final Exam (30%)
  - December 13 (12:30pm – 3:00pm): fixed date and time
  - Comprehensive, closed books, closed notes
- Bonus points: Projects (4%), Exams (6%)

Final Grade (Out of 1100)

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<tr>
<td>930 - 959</td>
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<tr>
<td>900 - 929</td>
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<tr>
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<tr>
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<td>C+</td>
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<td>&lt;= 599</td>
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Other Policies

- Late policy for projects: every project should turn in no later than 10 days (without prior consent), but with 10% off each day.
- Policy for exams: no early/makeup exam without university sanctioned excuse or prior consent
- Zero tolerance on cheating!
  - Fail directly if cheating in any project and exam

Course Objectives

- Better understanding of basic OS concepts;
- Learn the principles behind the design of operating systems;
- Gain hands-on programming experiences
  - Familiar with C Programming
  - Task Scheduling
  - Virtual Memory Management
  - Multithreaded Programming and Synchronization

Topics to be covered

- Introduction to OS (SGG Chapter 1)
- Programs and Processes (SGG 3.1, 3.2, and USP Chapter 2)
- CPU Scheduling (SGG 5.1-5.3, 5.6)
- Processes in UNIX (USP Chapter 3)
- UNIX I/O (USP Chapters 4, 5 and 6.1-6.4)
- The Token Ring (USP 7.1 – 7.3)
- Threads (SGG Chapter 4 and USP 12.1-12.2)
- Monitors and signals (SGG 6.7, USP 8.1-8.6, and 9.4)
- Network Communication (USP Chapter 18)
- Memory Management (SGG Chapter 18)
- Virtual Memory (SGG 9.1-9.4)
**Summary of Topics**

- Introduction of OS
- Programs and Processes
- CPU Scheduling
- IO and File Operations
- Inter-Process Communication
- Memory Management
- Threads
- Synchronizations

**Project 1:** processes and IO

**Project 2:** CPU Scheduling

Midterm 1 at Week 7

Midterm 2 at Week 14

Project 3: Memory Management

Project 4: Threads and Syncs

Final Exam at 12/13

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**Expectation for OS Course**

- **Difficult** course
  - Significant amount of workload
  - Many abstractions and concepts
  - No much coding examples of the OS implementation (CS4853/CS5463 instead)

- **Important** course
  - Introducing many important concepts, such as concurrency, scheduling, memory management
  - Help understand the performance and scalability
  - Teaching the design of computer systems even if you never touch a line of kernel code

Language courses teach you how to fly, while OS enables you to fly higher and farther

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**Course Design**

- The course was designed by the whole OS team at UTSA, which involves the effort from Dr. Dakai Zhu, Tongping Liu, Steve Robins, Lama Palden, and Turgay Korkmaz

- We designed the slides and projects by combining our wisdom together

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**1st Homework (no credit)**

- Change the default email on Blackboard to your favorite email:

  - Getting future important notices etc;

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