CS – 550 Operating Systems

Instructor: Tom Bartenstein

Course Web Page:
http://www.cs.binghamton.edu/~tbartens/CS550_Spring_2020/

Catalog Description

- Advanced topics in operating systems:
  - Process synchronization,
  - Linguistic support for concurrency,
  - Virtual memory,
  - Deadlock theory,
  - Robustness,
  - Security,
  - Mathematical models and correctness of concurrent programs.
- Treatment of selected topics in distributed and multiprocessor operating systems

Course Topics

Mix of background material and advanced topics

- Processes, Threads, and Events
- Concurrency
- Virtual Memory
- Storage and File Systems, including Input/Output
- Security
- Virtualization
- Introduction to Linux Kernel Programming
- Other topics, as appropriate

Course Goals

- Learn enough to be able to read a well-written published paper on operating system topics, understand the points made, and be able to judge the merits of the ideas presented.
- Learn enough to be able to discuss standard operating system topics with reasonable intelligence
- Use knowledge about operating systems to improve solutions to other problems (performance, efficiency, memory footprint, etc.)
- Gain insights about concurrency and concurrent programs
- Be able to apply operating system problem solving methodologies and solutions to other problems in other computer science disciplines

Expectations

- Pre-Requisites
  - CS350 -- Undergraduate OS. Familiar with the fundamentals concepts in Operating Systems as covered in CS350.
  - Proficient programming in C.
  - Proficient in the use of a debugger (such as gdb)
  - Comfortable working and programming in the Linux environment.

- 3 Credit Hour Course implies 9-9.5 hours per week
  - Lectures/Discussions/Meetings
  - Assigned readings
  - Assignments
  - Study for Tests and Exams

Textbook & Other Resources

- *Modern Operating Systems*, by Andrew Tanenbaum, Prentice Hall; 4th edition.
  - Textbook is a parallel resource to the lectures
  - Two learning streams is better than one
- Cross references in slides using : Chap X.Y
- "Supplemental Material" on the class page for on-line references
- Kernighan, Ritchie, *The C Programming Language*
- Silberschatz, Galvin, Gagne, *Operating System Concepts*; 7th or 8th edition
- James E. Smith Jim, Jr. Smith, Ravi Nair, *Virtual Machines: Versatile Platforms for Systems and Processes*

Teaching Staff

- Prof: Tom Bartenstein (tbartens@binghamton.edu)
  - Office Hours: TBD @ EB Q06 (behind CS secretary)
  - e-mail
  - By appointment
- Teaching Assistants
  - See Class Web Page (assignments not finalized yet)

Professional Background

- 1975-1979 - BA in Mathematics Swarthmore College
- 1979-2001 – Programmer/Architect at IBM Endicott
  - PCB design transfer to Mfg
  - Integrated Circuit Manufacturing Test Generation and Diagnostics
  - Published papers and wrote many patents
- 2001-2011 – Architect at Cadence Design Inc. Endicott
  - Won Cadence “Innovator of the Year” aware in 2010
- 2011-2017 – PhD at Binghamton University in CS
  - Dissertation: Rate Types in Stream Programming
- 2015-???? – Adjunct Lecturer at BU
  - Architecture and Programming Languages

Academic Honesty

- For Yourself!
  - College education is not cheap - Don't waste it!
  - You will eventually get caught
- For your peers
  - One person cheating hurts all other students
  - If you cheat, your friends will get a lower grade
- For me
  - Cheating wastes time and effort
  - Cheaters hurt my reputation
- For the institution
  - Our reputation depends on you!

Academic Honesty Policy

- Academic dishonesty has no place in a university
- The Watson School has an academic honesty code.
- It is your responsibility to read and understand it.
- When in doubt, ask beforehand!

http://www.binghamton.edu/watson/about/honesty-policy.pdf

Academic Honesty on Assignments

- Unless otherwise noted, assignments are individual assignments. This means that all work submitted will have been done by you.
- You may (and are encouraged to) seek help from others, including the instructor, TAs, and classmates. Help includes assistance with:
  - using the software tools needed to complete an assignment
  - understanding the specifications or requirements of an assignment
  - evaluating strategies for solving a problem
  - debugging code that you have written
  - interpreting compiler and run-time error messages

Academic Dishonesty on Assignments

Obvious violations of the principles of academic honesty include, but are not limited to:

- submitting another person's work (in whole or in part) as your own
- submitting the same work (with or without minor changes) as another student

Accounts Used in this Class

- CS LDAP Account (G-7, Q-22, remote.cs.Binghamton.edu)
- VM Linux / CSVB – Details later in the semester
- BU Email account (<username>@binghamton.edu)
- Access to myCourses for assignments and grades

To ask or not to ask?

- Instructors and TA's are not psychic!
  - If you don't ask, we don't know you need help
  - If you don't ask, the other 5 students who have the same problem won't get help
- Please let us know if…
  - Your are lost
  - You don't understand something
  - You don't have the background
  - Class can be improved

- Ask for help early – don't wait until the test or exam!
- Give feedback! The more feedback – the better the course!

Asking Questions

- Make Google your friend!
  - Can't beat the response time!
- Email me and/or TAs
  - tbartens@binghamton.edu
- Stop by during office hours
  - After class or by appointment

Exams and Assignment Deadlines

- No make-up exams
  - Very few exceptions – medical emergencies etc.
  - The earlier we know about problems, the more flexible we can be
- Assignment Deadlines are firm
  - Some flexibility if you are 10 or 15 minutes late
  - Late penalties will be assessed

- Please plan other commitments around these deadlines!
  - Travel, interviews, etc.

Attendance

- If you can't make it to class, send me an email BEFORE class starts
- Unannounced quizzes with no make-up
  - If I have gotten an email from you, you are excused from the quiz
  - If I do not have an email from you, you get a zero on the quiz

Grading

Assignments (4)	40%
Tests (2 tests & final)	60%

There is no predefined average number to letter mapping!
Letter Grades depend on comparisons with students in previous and current semester, difficulty of tests, etc.