



# **CS 550:** Advanced Operating Systems Syllabus

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Illinois Institute of Technology

CS 550: Advanced Operating Systems  
August 24<sup>th</sup>, 2015

# Introductions

- **Professor: Ioan Raicu**

- Office Hours Time: Monday 12:45PM-1:45PM (SB237D) & Wednesday 10:20AM – 11:20AM (SB237D)

- More Information:

- <http://www.cs.iit.edu/~iraicu/>
- <http://datasys.cs.iit.edu/>

- **TAs ([cs553-f14@datasys.cs.iit.edu](mailto:cs553-f14@datasys.cs.iit.edu)):**

- **Tonglin Li ([tli13@iit.edu](mailto:tli13@iit.edu))**

- Office Hours Time: Tuesday/Thursday 5PM-6PM (SB002)



# Course Overview

- General issues of design and implementation of distributed systems.
- Focus on interprocess communication, distributed processing, sharing and replication of data and files.
- Approximately two third of the course will be devoted to basic concepts and techniques.
- The remaining one third will be on assorted current topics in modern operating systems and distributed systems.

# Course Overview (cont)

- Understand methods and approaches to:
  - Design, implement, and evaluate distributed systems
- Course involves:
  - Lectures, outside invited speakers, homeworks, programming assignments, exams, and a project
- Prerequisites:
  - CS 450 Operating Systems
- Required texts:
  - Andrew S. Tanenbaum and Maarten van Steen. “Distributed Systems: Principles and Paradigms”, Prentice Hall, 2nd Edition, 2007. (Required)
  - Randy Chow and Theodore Johnson. “Distributed Operating Systems & Algorithms”, Addison-Wesley, 1997.

# Course Topics

- Introduction to Distributed Systems
- System Architectures & Client-Server Models
- Remote Procedure Call
- Remote Method Invocation
- Message- and Stream-Oriented communication
- Processes and threads
- Accelerator Architectures
- Accelerator Programming

# Course Topics (cont)

- Code migration and scheduling
- Naming
- Synchronization
- Consistency models
- Fault Tolerance
- Networked file systems
- Parallel File Systems
- Distributed File Systems

# Text books

- REQUIRED: Andrew S. Tanenbaum and Maarten van Steen. “Distributed Systems: Principles and Paradigms”, Prentice Hall, 2nd Edition, 2007
  - <http://www.amazon.com/Distributed-Systems-Principles-Paradigms-Edition/dp/0132392275>
- OPTIONAL (but will be required in CS553): K. Hwang, G. Fox, and J. Dongarra. “Distributed and Cloud Computing”, Morgan Kaufmann, 2011
  - <http://www.amazon.com/Distributed-Cloud-Computing-Parallel-Processing/dp/0123858801>

# Programming Assignments & Projects

- Programming Assignments and Projects
  - 4 assignments
  - Will give hands on experience with distributed computing
  - Should work individually
  - Expected to know (or learn quickly) some of these languages and systems:
    - Linux, Virtual Machines, Amazon AWS, multi-threading, sockets, C/C++, Java, Python, Bash



# Computer Usage

- Computer systems that can be used for development of projects:
  - **Jarvis:** 20-node (100+ cores) Linux Cluster running SGE and NVIDIA GPUs
  - **Amazon AWS:** \$100 credit per student

# Quizzes

- 5 brief (10 min) quizzes covering material from prior 2 weeks
- The quizzes will be individual and administered online, but students will be allowed to use their textbooks and any notes they have, including online resources
  - Quizzes are worth 5% each; the lowest grade quiz will be dropped
- **Schedule:**
  - **Wednesday, September 16th, 2015**
  - **Wednesday, September 30th, 2015**
  - **Wednesday, October 14th, 2015**
  - **Wednesday, October 28th, 2015**
  - **Wednesday, November 11th, 2015**
- **There will be no makeup quizzes.**

# Exams

- 1 Exam covering the entire course content
- The exam will be individual, but students will be allowed to use their textbooks and any notes they have (on paper)
  - No electronic devices such as phones, eReaders, tablets, or laptops will be allowed; simple calculators can be used
  - The exam is worth 25% of the overall grade
- Schedule:
  - **Monday, November 23<sup>rd</sup>, 2015, 11:25AM - 1:25PM in Perlstein Building 131**
  - Please note that the exam is extended for 45 minutes after the usual end of class, but this should not interfere with anyone's other classes due to the lunch period. Also note that the exam is scheduled outside the official final exam week.
- **There will be no makeup exam.**

# Late Policy

- Assignments will be due at 11:59PM on the date they are due; there will be a 15 minute grace period
- There will also be a 7-day late pass, where students can submit late assignments without penalty
  - The late pass can be used in 1-day increments spread out over multiple assignments.
  - Any late submissions beyond the grace period and beyond the 7-day late pass, will be penalized 10% every day it is late
- Exams & Quizzes
  - There will not be any makeup quiz or exam; do not miss any quiz or exam

# Grading

- **Project (1): 25%** -- can use late day passes
- **Programming Assignments (4): 30%** -- can use late day passes
- **Quiz (6): 20%** -- will drop lowest grade
- **Exam (1): 25%**
- **Scale:**
  - **A:** 87% ~ 100% (top 25% percentile for PhD students)
  - **B:** 75% ~ 86% → class average
  - **C:** 62% ~ 74%
  - **D:** 50% ~ 61%
  - **E:** 0% ~ 49%

# Plagiarism

- **Do not copy from other students in the class**
- **Do not copy from solutions from students who took CS550 in the past**
- **Do not copy solutions from online sources; always cite your work if you use any information from papers, books, or online material**
- **Any incident will result in a 0 on your assignment; for serious or chronic cases, it will result in receiving an E for the final grade**

# Questions

- Write me: [iraicu@cs.iit.edu](mailto:iraicu@cs.iit.edu)
- Call me: 1-312-567-5704
- Write the TAs and me: [cs550-f15@datasys.cs.iit.edu](mailto:cs550-f15@datasys.cs.iit.edu)
- Online discussion forum:
  - <http://piazza.com/iit/fall2015/cs550/home>
- Office hours:
  - **Monday:** 12:45PM-1:45PM (loan SB237D)
  - **Tuesday:** 5PM-6PM (Tony SB002)
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