Course Overview
About the Instructor

Instructor – Jonathan Walpole
Professor at PSU
Research Interests: Operating Systems, Parallel and Distributed Systems
Course Overview

Based on ~30 research papers
- Read them carefully!
- Submit a written review of each paper BEFORE class!

Class structure
- Lectures with guided discussion
- Integrated sequence of programming projects
- Midterm and final exams

Course web page
www.cs.pdx.edu/~walpole/class/cs533/fall2015/home.html
Topics

Part 1: key concepts and building blocks
- multi-threading and concurrency
- event-based system design
- message passing and RPC

Part 2: Evolution of OS kernel designs
- system structuring using layers
- monolithic kernels with up-calls
- modular kernels and safe extensibility mechanisms
- virtualization
- exo-kernels
Part 3: concurrency on modern CPU architectures
- locking in real-world OS kernels
- scalable spin-lock designs for multiprocessors
- effects of compiler reordering on concurrent code
- hardware reordering, memory consistency models and memory barriers
- designing OS kernels for scalable concurrency
Project

Linux-based
C and x86-64 assembly language programming
Implement a user-level threads library
- threads
- context switching
- scheduler
- synchronization
- concurrent programming
Grade Structure

Midterm exam - 50%
Final exam – 50%

Exams will contain questions relating to the papers, lectures and programming projects
Before Class 2

Visit the class web page
www.cs.pdx.edu/~walpole/class/cs533/fall2015/home.html

Read papers for class 1 and class 2
Submit paper reviews as directed on the class web site
Start looking at project assignment 1
Entrance Exam

CS533 requires foundational knowledge in OS and related topics

- Do you have it?
- If you don’t, you should take CS333, and pass it with a B or better, before coming back to CS533