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Fall 2013

### CEG 7370-01: Distributed Computing

Yong Pei

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# CEG 7370 Distributed Computing

## Syllabus

Fall Semester, 2013

- Time/Place:** Lecture: 4:40 – 6:00 PM, M/W, Millett 286  
For the web section, the lecture videos will be made available as early as the following day.
- Instructor:** Dr. Yong Pei, 489 Joshi Research Center  
Tel. 937-775-5111, Email: yong.pei@wright.edu  
Office Hours: 12:45-2:15 pm, M/W.
- Prerequisite:** Undergraduate level CEG 4350 or equivalent.  
Expected background: operating system, process and thread, C/C++ and JAVA programming experience in UNIX or Linux.
- Catalog Data:** Semaphores: weak and strong, split-binary, distributed. Distributed Algorithms. Communicating sequential processes. Distributed Tuple Space. Clients and servers, RPC, RMI, Hadoop. 3 hours lecture.
- Text Books:** *Recommended:*
1. Coulouris, G., Dollimore, J., and Kindberg, T. , Distributed Systems: Concepts and Design, 4th Edition, Addison Wesley, 2005
  2. Queueing Systems, Volume I: Theory, L.Kleinrock, John Wiley & Sons, 1975.
- References:*
- A. Silberschatz, P. Galvin, and G. Gagne, *Operating System Concepts*, John Wiley & Sons.
  - Tanenbaum, A. and Maarten van Steen, Distributed Systems Principles and Paradigms, 2002: Prentice-Hall, ISBN 0-13-088893-1.
  - A. Tanenbaum, *Distributed Operating Systems*, Prentice Hall.
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- Website:** CEG 7370 in Pilot.
- Grading:** Project assignments – 40 %  
Midterm Exam – 30%  
Final – 30%

## Lectures:

The following tentative schedule defines in greater details what material is covered in the course and when it is covered.

**Week**                      **Topic/Tests etc.**

### Fundamentals of distributed computing and systems

1-2                      Models of distributed Systems, IPC, Networking, Remote procedure call, Remote Invocation  
2-3                      OS Supports and Security. DFS, NFS, AFS  
3-4                      Name, directory & discovery services, Peer-to-peer systems, Fault tolerant services,  
Transactions with replicated data

### Case studies of distributed computing system

5-6                      GFS, MapReduce, Hadoop, Hadoop Files System  
6-7                      Multimedia streaming and VOD  
7-8                      Pastry – a Structured DHT Overlay Network

(Mid-term exam Wednesday of the 8<sup>th</sup> week)

8-9                      Distributed sensor systems  
9-10                     Mobile and Ubiquitous computing

### Distributed System Modeling and Performance Evaluations:

11-12                    Basic concepts in probability and stochastic process; exponential distribution, poisson process, Little's theorem, Markov chain, balance equations, birth-death process. Selected topics from Chapters 1,2,3 of Kleinrock and handouts.  
13-14                    Queuing Theory Fundamentals; M/M/1, M/M/\*. Selected topics from Chapters 3,4,5 of Kleinrock and handouts.

(Final Exam on Monday of Week 15)

15-16                    Open-Design Project Presentations