

Syllabus for CSCI555 Spring 2009

Class Information

People

Name:	Ted Faber ¹	Seongwook Youn	
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Office Hours:	TuTh 10:50 - 11:50 AM	M 10 AM - 12 noon	
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Classroom

Tuesdays and Thursdays, 8:30-10:50 AM, OHE132

Description

This class is a discussion of advanced topics in operating systems and distributed systems. Students will read and discuss relevant papers in the field and write a term paper² on an area of operating systems research.

Prerequisites

CS402x or the equivalent as well as passing the department OS screening exam.

Academic Integrity

All students are required to abide by the USC code of Student Conduct³, in particular the elements of that code dealing with academic integrity. Violation of that Code will be dealt with as described in SCAMPUS.⁴ Understand that I will assign an *F* in CSci555 for any offense described therein. If you have *any* questions about the responsibilities of either students, faculty, or graders under this policy, contact the instructor or the Office of Student Judicial Affairs and Community Standards.⁵ You can also investigate the excellent publications⁶ that SJACS provides. Even if you are confident that you understand academic integrity issues, I encourage you to read *Trojan Integrity: A Guide for Avoiding Plagiarism*⁷, which is a short review/overview of the issues.

Grading

Homework:	10%
Term Paper:	35%

² <http://www.isi.edu/~faber/cs555/papers.html>

³ <http://web-app.usc.edu/scampus/university-student-conduct-code/>

⁴ http://web-app.usc.edu/scampus/wp-content/uploads/2007/08/appendix_a.pdf

⁵ <http://www.usc.edu/student-affairs/SJACS/>

⁶ <http://www.usc.edu/student-affairs/SJACS/pages/resources/faculty/publications.html>

⁷ <http://www.usc.edu/student-affairs/SJACS/forms/tig.pdf>

Final:	30%
Midterm:	25%

The term paper accounts for a significant fraction of the grade, and has many intermediate deadlines. Allocate your time, and arrange your class schedule accordingly

Should you find an error in the grading of an assignment, bring it first to the attention of the primary grader for that assignment. For homeworks, this will be the TA and for examinations and the term paper that will be the instructor⁸. While the instructor is happy to review and discuss your answers to exam and homework questions in office hours or e-mail, few grading errors (other than arithmetic errors) are found.

Examinations

Exams are closed book, and will cover the lectures, readings and homework assignments. All students *must* take the exams at USC. This includes all remote students except for those at Palmdale, NASA-Ames, San Diego and Phoenix.

- The Midterm exam is scheduled for Thursday 12 Mar 2009 during class time (8:00 - 9:20 PST), Room TBA.
- The Final exam is scheduled for Tuesday, 12 May 2009 from 8:00 AM to 10:00 AM PDT. Room is VKC 150.

Term Paper

The term paper will be a 12-page paper on a current topic in OS research. Details will be given in class. A companion document⁹ describes the paper requirements in detail.

Web Page

The class web page is at <http://www.isi.edu/~faber/cs555>¹⁰ This is the primary venue for announcements made outside of class, so check it often.

Classes

13 Jan 2009 Class Goals and Requirements. A general preview of the class structure and goals. Definition of student and instructor responsibilities. Papers on reading papers.[Keshav07][Levin83]

Distributed Systems

15 Jan 2009 System Organization. The end-to-end argument[Saltzer81], local autonomy (loosly coupled systems)[Clark80], and Athena[Champine90].

20 Jan 2009 Communication. Implementation of monitors[Lampson80] and communicating processes[Hoare78].

22 Jan 2009 Communication. Remote Procedure Calls[Birrell84], Linda[Carriero85], and JINI[Waldo99].

⁸ <mailto:faber@isi.edu>

⁹ <http://www.isi.edu/~faber/cs555/papers.html>

¹⁰ <http://www.isi.edu/~faber/cs555>

27 Jan 2009 Distributed Shared Memory. Memory coherence models[Li89], Content Addressable Networks[Ratnasamy01], and FreeNet[Clarke00].

29 Jan 2009 Names. The naming problem[Saltzer82][Sollins03] and closures[Neuman89]

3 Feb 2009 Names. Hierarchical naming[Ritchie74], user-centric naming[Pike92], and Intentional naming[Adjie-Winoto99]

5 Feb 2009 Searching. Google[Brin98] and Connections[Soules05]

10 Feb 2009 Consistency. Grapevine[Birrell82] and DNS[Mockapetris87].

12 Feb 2009 Consistency. Weighted voting[Gifford79] and ACID vs. BASE[Fox97].

17 Feb 2009 Consistency. The Byzantine Generals Problem[Lamport82]and LOCUS[Walker83].

19 Feb 2009 Consistency. FICUS[Guy90] and Coda[Kistler92].

24 Feb 2009 Consistency & Distributed Properties. Logical clock synchronization[Lamport78] and Distributed Sanpshots[Chandy85].

26 Feb 2009 Distributed Properties. Virtual Time[Jefferson85] and ISIS[Birman93].

Security

3 Mar 2009 Cryptography. Crypto overview[Voydock83] and Needham-Schroeder authentication[Needham78].

5 Mar 2009 Authentication. Kerberos[Neunman94] and authentication logic[Burrows90]

10 Mar 2009 Access Controls. Flask[Spencer99], confinement[Lampson73], and Plan 9[Cox02].

24 Mar 2009 Capabilities. Hydra[Wulf74], Amoeba[Tanenbaum90], and SPIN[Bershad95]

Systems

26 Mar 2009 File Systems. Practical design[Lampson83], and the Network File System (NFS)[Sandberg85].

31 Mar 2009 File Systems. The Log Structured File System (LFS)[Rosenblum91], LFS performance[Seltzer95].

2 Apr 2009 File Systems and Disk Layout. Soft-Updates[McKusick99], and RAID disk systems[Patterson88].

7 Apr 2009 More File Systems. XFS[Sweeney96], and the Google File System[Ghemawat03]

9 Apr 2009 Microkernels. Mach[Black92], and microkernel performance[Liedtke93].

14 Apr 2009 Microkernels/Extensibility. The x-kernel[Hutchinson91], streams[Ritchie84].

16 Apr 2009 Resource-constrained Systems. Emeralds[Zuberi99] and TinyOS[Hill00].

21 Apr 2009 Performance Studies. Performance studies[Chen96]

23 Apr 2009 Process Migration and Transparency. Condor[Litzkow88] and Sprite[Ousterhout88].

28 Apr 2009 Virtualization. Xen[Barham03] and NetLab[White02].

30 Apr 2009 Case Studies. OS errors[Chou01].

Bibliography

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