EE 542 : Internet and Cloud Computing, Fall 2014 (updated Nov.5, 2014)

Class Website: http://www.uscdn.net/webapps/login for all sections, no access thru USC blackboard

DEN Studio Section 30535D and DEN 30537: 12:30 – 1:50 pm, M.W. OHE 100 D
Sec.30533D : 2:00 – 3:20 pm, M.W. VPD 106, Sec. 30413D : 1:00 – 3:50 pm, Friday, KAP 158

Instructor : Kai Hwang, Professor of Electrical Engineering and Computer Science
Office Hours: M.W.F. 9 – 11 am, EEB 212, Contact: kaihwang@usc.edu, Tel. : 213-740-4470 (Office)
TA: Yue Shi, Office Hours: Tu. 2 – 4:30 pm, Wed. 10-11:30 am, EEB 110. Email: yu esi@usc.edu
Mentor: S. Abhilash, Office Hours: Th.10-12 am, Fri. 11am – 1 pm, EEB 110, Email: sabhilas@usc.edu

Catalogue Description: Principles and technologies of server clusters, virtualized datacenters, Grids/P2P, Internet clouds, social networks, Internet of Things (IoT), and applications

Prerequisite: EE 457 or EE 450 recommended preparation, or consent from the instructor.


Course Contents and Objectives:
This course is designed for graduate students in electrical engineering and computer science. Students will learn the theory, architecture, hardware/software, and programming of computing clouds and other network-based computing systems. Both M.S. and Ph.D. students can benefit from the course. Students will have the opportunity to gain hands-on experience on Amazon cloud (AWS) or any public cloud. Case studies include applications such as Amazon EC2 and S3, Google AppEngine, Salesforce, Facebook, Dropbox, iCloud, MapReduce, Hadoop, VMWare Tools, etc.

Syllabus and Weekly Lecture Contents: (Lecture ordering subject to change, check with the latest online version posted frequently. Friday students follow Friday schedule except mid-term, final exam and report due day

<table>
<thead>
<tr>
<th>Lectures (Red for Friday)</th>
<th>Topics Covered, Book Chapters, Due Dates, Quiz, and Exams</th>
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<tbody>
<tr>
<td>Lec.1 / 2, Aug.25, 27, 29</td>
<td>Internet Technology, Distributed Systems, and Big-Data . Chap.1</td>
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<tr>
<td>Lec. 3 /4, Sept.3, 5, 8</td>
<td>Cluster Infrastructure and Middleware. Chap.2, (Sept.1, no class)</td>
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<td>Lec. 5 /6, Sept.10,12,15</td>
<td>Cloud and Project Spec., Chap.4, HW #1 due Sept.12 for Fri. and 15 for MW Secs.</td>
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<td>Lec. 7 /8, Sept.17,19, 22</td>
<td>Public Clouds and Project Applications, Chapters 4 and 6</td>
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<td>Lec. 9/10, Sept. 24, 26, 29</td>
<td>MapReduce and MatrixMultiply, Chap.6, Quiz#1 for Lectures 1 ~ 8</td>
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<tr>
<td>Lec. 11/12, Oct. 1, 3, 6</td>
<td>Cloud Benchmark Evaluation, (Handout paper). Proposal due Oct.1, 3</td>
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<tr>
<td>Lec.13/14, Oct. 8, 10, 13</td>
<td>GAE, Azure, Cloud OS/SW, HW #2 due Oct.10 for Fri. and 13 for MW secs</td>
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<td>Lec.15, Oct. 15, 17 (1-2:20 pm)</td>
<td>Reviews and HW/Quiz Solutions, Proposal reviews with TA and Mentor</td>
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Oct.20, 2014 (Monday) for all students in 3 sections
Mid-Term Exam, 12 – 1:50 pm, 3 rooms in MPH building, B27 (12:30 pm section plus 25 students from other sections), MPH 102 (30 students in 2 pm section), TH119 (25 Friday students), covering Lectures 1-15, Chaps.1, 2, 4, 6, HW #1-2, Quiz #1.

Lec.16/17, Oct. 22, 24, 27 Virtual Machines and Hypervisors, Chap.3 (Parts 1 and 2)
Lec.18/19, Oct.29, 31, Nov.3 Virtual Clustering and Grids, Chap.3 (Part 3), Chap.7 (HW#3 assigned)
Lec.20 / 21, Nov. 5, 7, 10 P2P Networks, Chap.8 (Parts 1 and 2), Interim Reports reviews with TAs and Hwang
Lec.22 / 23, Nov.12, 14, 17 Internet of Things, Chap.9, HW #3 due Nov.12, 14 for WM and Friday classes
Lec.24 / 25, Nov.19, 21, 24 Cloudlets, Mobile Clouds, Chap.9, Quiz#2 on Nov.19 and Nov.21 covering 8 Lectures 16 ~ 23, Final Project Report due Nov.24 (no late reports will be accepted)

Nov.26 - 29, 2014 Thanksgiving Holiday, no class. only one-week from the Final exam.

Lec.26 / 27, Dec.1, 3 Big Data and Review Session (Friday students come to Review Session on Dec.3 or watch the DEN lecture tapes for the last two Lectures 26 and 27 )

Dec. 5, 2014 (Friday), for all students in 3 sections Final Exam: 1 – 3 pm, SGM 123, covering Lectures 5 ~ 27, Chaps.1-4 and 6 – 9, all handout papers, HW # 1-3, Quiz # 1-2, and AWS Apps. Project

Grading Policy and Class Rules: The course work is evaluated with 5 performance metrics in 15 weeks:

- **Homework Sets (15%)**: 3 Homework Sets to be done individually. Each HW set takes at least 10 hours
  Some may take 30 hours. Get started immediately with readings and investigated solutions.
- **Two Quizzes (10%)**: Covering all previous lectures or beyond the last exam, (about 40 minutes each)
- **Mid-Term Exam (25%)**: Oct.20, 2014, Time/place and coverage shown in the above Table, try to present in MPH Building 10 minutes before exam.
- **Term Project (20%)**: Team effort on cloud experiments with a team report due in class room for MW sections on Nov.24, 2014. For Friday section, report due in EEB 212 before noon time on Nov.24.
- **Final Exam (30%)**: Dec.5, 2014, time/place in above table, applied to all students. This is a comprehensive exam for 2 hours covering Lectures 5 ~ 27, AWS project, and related book Chapters and handout papers.

**Note**: No late homework or project report will be accepted. Term Projects are done in teams of 4 students each. Team members can be formed across the sections. All quizzes and exams are closed-book/notes. Students in all 3 sections take Mid-term and Final exams at the same time. No make-up exam or quiz will be given to any student, if you miss the exam or quiz in the announced schedule.