EE 542 : Internet and Cloud Computing, Fall 2015 (updated Sept. 3, 2015)

Class Website: *http://***blackboard.usc.edu** *for all 3 sections. This is not a DEN class.*
Sec. 31119D: MW 10 – 11:15 am, LVL 16; Sec. 30535 D : MW 12 – 1:15 pm, MHP 106
and Sec. 30533 D : MW 2:00 – 3:15 pm, KAP 146
Instructor: Kai Hwang, *Professor of Electrical Engineering and Computer Science,*
Office Hours: M.W. 8:45 – 9:45 am *(before class) and* **3:15 – 4:15 pm** *(after class),* **EEB 212,**
Email: kaihwang@usc.edu, or *Tel.:* **213-740-4470** *(to check my presence in office)*
Three TAs: F. Chen, fenxiaoc@usc.edu for 10 am section, Yue Shi, yueshi@usc,edu for noon section,
and C. Chen, Chienlun@usc.edu; for 2 pm section (TA consulting rooms PHE 310/320)

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

Recommended Background: *(Not prerequisite) EE 457 or EE 450 or consent by instructor.*

Textbooks: **(1)** K. Hwang, G. Fox and J. Dongarra, ***Distributed and Cloud Computing,*** *Morgan Kaufmann Publisher,* 2012. (ISBN 978-0-12-385880-1). (required)
(2) B. Baesens, ***Analytics in a Big Data World***, Wiley, 2014, (ISBN:978-1-118-89270-1).(recommended

Course Description:

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, Internet of Things (IoT). machine learning, and big data analytics.. Students will have the opportunity to gain hands-on experience in using Amazon cloud (AWS), where real-life cloud, big data or IoT applications will be developed and executed on Amazon EC2 and S3, etc. In cloud software, we will cover MapReduce, Hadoop, Spark, Eucalyptus, vSphere, OpenStack, XEN, Docker, VMWare Tools, etc. The course will study many clouds : namely the AWS, GAE, Salesforce, Azure, Rackspace, iCloud, DropBox, Facebook, etc.

Syllabus and Weekly Lecture Contents: *(Lecture order subject to change as the material gets updated)*

Lectures and Dates	**Topics Covered, Source, Due Dates and Exams**
Lec.1 / 2 , Aug. 24, 26	Course Introduction, Basics of Clouds, IoT and Big Data, Chapter 1
Lec 3 / 4, Aug. 31, Sept.2	Large-Scale Server Clusters and Cloud Architecture, Chapters 2 and 4
Lec.5 / 6 Sept. 9, 14, 2015	Virtualization, Virtual Machines and Docker Containers, Chap.3 plus new material
Lec. 7, Sept. 16, 2015	**Cloud Project Specification, (**See posted Spec. Sheet**,** Proposal before **Sept. 30).**
Lec. 8 / 9, Sept. 21, 23,	Cloud Infrastructure and Service Offerings, Chapter 4, **HW#1 due Sept. 21,**
Lec. 10 / 11, Sept. 28, 30	MapReduce, Hadoop and Spark Programming (Chap.6)
Lec.12 / 13, Oct. 5, 7	Cloud Benchmark Evaluation (Handout paper)
Lec.14 / 15, Oct. 12, 14	Big Data and Machine Learning (Baesen's Book), **HW#2 due Oct 12, 2015**
Mid-Term Exam (80 min.)	**12 am – 1:20 pm, Oct. 19, 2015,** Exact time/ place to be confirmed and announced .
Lec.16 / 17, Oct. 21, 26	Cloudlets, Mobile Computing and C-RAN, (Handout paper)
Lec.18/19, Oct. 28, Nov.2	Eucalyptus, Cloud OS , OpenStack, (Chapters 3, 5 and 6)
Lec. 20 , Nov. 4 , 2015	P2P Networks and Social Networks, Chapters 8 and 9
Lec. 21 / 22, Nov. 9, 11	Internet of Things, Sensing Technologies, Chap.9, **Project Report due Nov. 11**
Lec. 23 / 24, Nov.16, 18	Specific Cloud/IoT Application**s , HW#3 due Nov.18**
Lec. 25/26, Nov.23, 30	SMACT technologies and Integrated Applications,
Lec. 27, Dec.2, 2015	Future Internet and Conclusions of The Course (last llecture)
Final Exam (2 hours)	**Dec.11, 2015,** time and place yet to be announced later for all students at the same time

Grading Policy and Class Rules: *The course work is evaluated with 4 performance metrics in 15 weeks:*

- Students from all 3 sections must take the same mid-term and final exams at the same time on the same day.
- **Homework Sets (15 %):** 3 Homework Sets to be done individually.
- **Mid-Term Exam (30 %): Oct.19, 2015,** Time/place to be announced , covering the first 15 lectures.
- **Term Project (20 %):** Team effort on cloud experiments with a **Project Report** due **Nov.11** in class. (weight increased)
- **Final Exam (35 %): Dec.11, 2015,** exact time /place yet to be announced, covering all lectures plus the AWS Project .
- All exams are close-book/ close-notes. No make-up exam. No late homework or late project report will be accepted.
- Submit home work at the class beginning on the due days (**Sept.21, Oct.12, and Nov.18**).
- Term Projects are done in team of 5 students each. Each team must elect a leader who coordinates the group effort and communicates with the TAs and instructor. All Email exchanges must copy to all team members. The Team members can be formed across the section boundary. All team members receive the same project score.
- No negotiation for grade after the exams. You have to work hard to earn a better grade. Skipping the live lectures and book reading and doing the homework and team project casually will hurt your grade badly.