EE542 : Internet and Cloud Computing
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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 the Internet and its protocols, cloud computing, networks for cloud computing, machine learning and big data analytics, and how they relate to Internet of Things.

Students will begin to learn the real-world details on the working of the Internet and gain hands-on experience in network protocol design that will enable custom behaviors. Then the students will learn about the priorities and constraints of the networks used in Cloud platforms and what they would be able to do at the network protocol level tune the performance. Then the students will obtain and program Internet of Things modules that are actively being used in industry to collect and transfer data to the industry standard Cloud computing platform. Finally, the students will have an opportunity to utilize data analytics (including machine learning) tools, services, and programming languages supported by Cloud platforms to process the collected IoT data.

Recommended Courses: EE 457 and EE 450 recommended

Required Textbook: None

Other Requirements: Experience in C programming

Grading
- 15% Class participation and Quizzes
- 10% Reading assignments (based on the scores for the summary presentation slides)
- 30% Laboratory assignments (based on the scores for all of the assignments)
- 50% Final Project

Preparation for Classes
- Students will be using Linux based system through the course. It is strongly recommended that the students become familiar with its navigation and use.
- Majority of the assignments will require the use of C/C++ and Python under various environments. It is recommended that students become familiar with the languages and relevant development environment.
- It is recommended that the students become familiar with some form of hardware.

Grading Policies
- Late Policy: The score for the assignments turned in late will be deducted by 50%.
- Grade Adjustment: If you dispute any scoring of a problem on an exam or homework set, you have one week from the date that the graded paper is returned to request a change in the grade. After this time, no further alterations will be considered. All requests for a change in grade must be submitted in writing to me.
- Changes/Information: The student is responsible for all assignments, changes of assignments, announcements, lecture notes etc. All such changes should be posted on the course web-site.
- Other: As per university guidelines published in SCampus, the academic integrity policy will be upheld.

Statement for Students with Disabilities:
Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained

from DSP. Please be sure the letter is delivered to me (or to TA) as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m.–5:00 p.m., Monday through Friday. The phone number for DSP is (213) 740-0776.

Statement on Academic Integrity
USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. All students are expected to understand and abide by these principles. The Student Guidebook contains the Student Conduct Code in Section 11.00, while the recommended sanctions are located in Appendix A:http://www.usc.edu/dept/publications/SCAMPUS/gov/. Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at: http://www.usc.edu/student-affairs/SJACS/.

Syllabus and Weekly Lecture Contents

Lectures	Topics Covered, Source, Due Dates and Exams
Lectures 1, Week 1	Course Introduction
Lectures 2-4, Weeks 1-3	Introduction to Computer Networks
Lectures 5-7, Weeks 3-4	The Internet and Network Protocol
Lectures 8, Week 5	Software Defined Network and Networking for Cloud
Lectures 9-10, Week 5-6	Distributed and Parallel Computing Systems
Lectures 11, Week 6	Introduction to Cloud Computing
Lectures 12-14, Week 7-8	Components of Cloud Infrastructure
Lectures 15-16, Week 8-9	Internet of Things
Lectures 17-19, Week 9-10	Big Data and Machine Learning
Lectures 20, Week 11	Data Analytics and Clustering
Lectures 21-22, Week 12	Map Reduce
Lectures 23-24, Week 13	Industry Standard Internet of Things
Lectures 25-26, Week 14	Cloud Performance and Scaling Techniques
Lectures 27-28, Week 15	Security in Cloud and IoT
Lectures 29-30, Week 16	Practice Final Project Presentations
Lectures 31-32, Week 17	Final Project Presentations

Reading Assignments
There are weekly reading assignments for which summary slide presentations must be submitted. The presentation should be 3-4 pages including title and summary.

Laboratory Assignments
1   Network Sockets
2   Network Performance Measurements
3   Computer Network Protocol Design
4   Network Driver Module Modification
5   Internet of Things
6   Cloud Computing Platform
7   Storing and Displaying IoT data in Cloud
8   Spark Programming
9   Machine Learning/Deep Learning

Final Project

Final project consists of presentation, report, and demonstrations. And the grades will be based on the scores from all of the components.

Presentation: There will be a 10 minute final slide presentation and 5 minute Q&A session for each project group. All students will be required to participate and attend.

Project Demonstrations: There will be weekly demonstration of the project progress until the final due date of the project. Weekly milestones defined at the beginning of the project must be demonstrated for a full credit.

Project Report: The report should be in the form of a conference paper. This template is provided. The font size of the content of the paper should be between 10-11pts. The report must be DOUBLE COLUMN with minimum of 10 PAGES of content with more than 5 IEEE/ACM papers in the reference. Formatting for the reference must be consistent with IEEE/ACM standard. A potential target conference/workshop should be indicated. The final project report is due on the final examination date.