جامعة الملك عبدالله
للعلوم والتقنية
King Abdullah University of
Science and Technology

Course Syllabus: Advanced Distributed & Networked Systems - CS 390G

Division	Computer, Electrical and Mathematical Sciences & Engineering
Course Number	CS 390G
Course Title	Advanced Distributed & Networked Systems
Academic Semester	Spring
Academic Year	2016/2017
Semester Start Date	01/22/2017
Semester End Date	05/18/2017
Class Schedule (Days & Time)	04:00 PM - 05:30 PM | Sun Wed

Instructor(s)

Name	Email	Phone	Office Location	Office Hours
Marco Canini	marco@kaust.edu.sa	+966128080489	0144, 1, Al-Khawarizmi (bldg. 1)	There are no fixed office hours. Please request a 30-min slot with the instructor based on availability: https://doodle.com/mcanini

Teaching Assistant(s)

Name	Email

Course Information

Comprehensive Course Description	CS 390 is an advanced course in distributed and networked systems. This course takes the form of a seminar that is based on a selection of papers that either have had a strong impact on distributed and networked systems today, or explore novel ideas that may be important in the future. The syllabus for this course will vary from year to year so as to cover a mixture of older and more contemporary papers. Contemporary papers will be generally selected from the past 5 years, primarily drawn from high quality conferences such as SOSP, SIGCOMM, OSDI, NSDI and EuroSys. Students are expected to read papers before the class, write a summary and “review” of the paper prior to class, and participate in the discussion during the class. The course has one semester-long project that is aimed at producing a conference/workshop-quality research paper and must involve writing some software. The paper must address an open research problem. Suggested project ideas will be provided by the instructor. To get ideas for projects, please DO be courageous and read ahead in the course schedule! Your project topic is expected to be distinct from your “regular” research project. It can be related, but try to strike out a new direction that is truly distributed systems! It is highly recommended that you work in groups. Teams are suggested to be 2 to 3 students. All projects will have to submit three versions of reports (proposal, midterm, and final reports); these submissions should read like research papers (or parts thereof). Up to five “best projects” at the end of the semester will be earmarked for expedited submission to a renowned conference, with the help of the instructor's involvement even after the semester is over.

Course Description from Program Guide	This class is a graduate seminar that covers design and implementation concepts in distributed systems and networked systems by reviewing a selection of classical and contemporary papers. We will study efficient system design and evaluation, as well as learn high-level system issues, with a focus on exciting topics in distributed and networked systems. Research in these areas also tends to be scattered across disjoint sets of researchers and conferences, and the course attempts to study commonalities. The syllabus for this course will vary from year to year so as to cover a mixture of older and more contemporary systems papers. Contemporary papers will be generally selected from the past 5 years, primarily drawn from high quality conferences such as SOSP, SIGCOMM, OSDI, NSDI and EuroSys. On completion of this module students should have a broad understanding of some key papers and concepts in computer systems research, as well as an appreciation of how to argue for or against any particular idea. There is no textbook for this course.
Goals and Objectives	By the end of the course, students should be able to -Comprehend and critique relevant research papers in the area of distributed and networked systems. -Present their research both orally in a concise way and within the allotted time as well as in writing. -Defend the research approach, design decisions, and the evaluation methods in a discussion. -Moderate a discussion after a research presentation.
Required Knowledge	Basic Computer Science and basic computer programming skills are essential. Knowledge of Operating Systems and Distributed Systems (CS 240), or Computer Networks (CS 244), or an equivalent course, or instructor consent, is required.
Reference Texts	There is no textbook for this course. We will read the papers in the schedule, which are available electronically through the course website.
Method of evaluation	**10.00**% - Attendance and Participation **20.00**% - Scientific review article presentation **50.00**% - Research Project **20.00**% - Presentation
Nature of the assignments	The main work of this class is to read frequently and deeply. Each student will be individually responsible for writing up a short summary of every paper. Research projects are the other critical aspect of the course. Your goal is to do publishable quality systems research; that is, to add to our understanding of how to build systems. Research projects must be written up in a term paper. Informal programming assignments, which will not be graded, might be included to help with research projects. There are no exams in the course.
Course Policies	We will have zero tolerance for academic misconduct. Cheating, plagiarism, and any form of dishonesty will be handled with maximum severity, according to university regulations. If you are ever in doubt about whether an action on your part may constitute unacceptable behavior, please ask the instructor before proceeding—doing so afterward is too late. **Your work** Apart from the term project, any work you turn in must be your own and is to be done individually, and the usual code of conduct applies. You must acknowledge any sources of your words, ideas, and software when they are not your own, and you must disclose in advance, without any specific request, any sources you used. Do not use code from a student who took the course in a previous semester. **Late work** There is no policy on late work. If you cannot submit your work by the deadline, it will not be accepted. **Attendance and participation.** It is expected that you will attend and participate actively to all lectures. If you have any concerns about not being able to regularly attend class (e.g., you will have to miss several classes during the quarter) please discuss this as soon as possible with the course staff. Attendance is a necessary but not sufficient condition for good class participation. In particular, we expect papers to have been read thoroughly prior to lecture and that you should prepare questions or opinions about the reading, and I may call upon you to speak in class. We evaluate class participation by observing how prepared you are to discuss the covered papers.
Additional Information	For a more up to date version of this syllabus and the actual lecture schedule, you are required to see the version of the syllabus on the class website. The class website will be announced on the first lecture. An online discussion forum will be offered on the Piazza system. This instructor does not use Blackboard.

Tentative Course Schedule *(Time, topic/emphasis & resources)*		
Week	**Lectures**	**Topic**
1	Sun 01/22/2017 Wed 01/25/2017	Introduction Cloud Computing
2	Sun 01/29/2017 Wed 02/01/2017	Peer to peer systems Key-value Stores and NoSQL
3	Sun 02/05/2017 Wed 02/08/2017	Latency = $$$
4	Sun 02/12/2017 Wed 02/15/2017	Programmable networks
5	Sun 02/19/2017 Wed 02/22/2017	Dataflow Programming Frameworks
6	Sun 02/26/2017 Wed 03/01/2017	Graph Processing
7	Sun 03/05/2017 Wed 03/08/2017	Streaming Systems
8	Sun 03/12/2017 Wed 03/15/2017	Approximation
9	Sun 03/19/2017 Wed 03/22/2017	Distributed Machine Learning
10	Sun 03/26/2017 Wed 03/29/2017	No class. Marco at NSDI.
11	Sun 04/02/2017 Wed 04/05/2017	No class. Spring break.
12	Sun 04/09/2017 Wed 04/12/2017	Data Consistency and Coordination Datacenter Resource Allocation and Scheduling
13	Sun 04/16/2017 Wed 04/19/2017	Reliability and verification
14	Sun 04/23/2017 Wed 04/26/2017	Debugging and Performance
15	Sun 04/30/2017 Wed 05/03/2017	No class on May 3rd.
16	Sun 05/07/2017 Wed 05/10/2017	No class on May 7th.
17	Sun 05/14/2017 Wed 05/17/2017	Security Crypto Currency
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Note

The instructor reserves the right to make changes to this syllabus as necessary.