

EECS 250 - Advanced Topics in Computer Systems

Description

This course introduces advanced topics of computer systems, including computer architecture, operating systems, Internet of Things (IoT) systems, computer networks and mobile computing. The goal of the course is to cover both fundamental knowledge and top-flight research topics in computer systems. In Spring 2019, the instructor will give 15 lectures in a broad array of computer systems, including computer architecture, operating systems, and Internet of Things (IoT) systems. In each of the rest 11 classes, one paper will be presented orally by a student within 30 minutes and commented by the instructor and the other students in the rest 45 minutes. One student presents at most two papers in the whole semester.

Instructor

- Instructor: Wan Du
- Office Hours: Tue 10:30 am to 11:45 am at SE2 208.
- Webpage: <http://faculty.ucmerced.edu/wdu/>

Class schedule

Date	Presenter	Content
01/22	Instructor	Introduction of computer systems and the course plan
01/24	Instructor	The Internet of things and networked embedded systems
01/29	Instructor	Computer systems
01/31	Instructor	Computer systems
02/05	Instructor	Operating Systems
02/07 (Homework 1)	Instructor	Operating Systems
02/12	Instructor	Operating Systems
02/14 (Homework 2)	Instructor	Advanced Operating Systems
02/19	Instructor	Advanced Operating Systems
02/21 (Homework 3)	Instructor	Advanced Operating Systems
02/26	Instructor	Computer networks
02/28 (Homework 4)	Instructor	Computer networks
03/05	Instructor	Low-Power Wide Area Networks
03/07	Instructor	Mobile computing systems
03/12	Instructor	Convolutional Neural Networks
03/14	<i>Student 1</i>	System Architecture Directions for Post-SoC/32-bit Networked Sensors, SenSys 2018
03/19	<i>Student 1</i>	FoggyCache: Cross-Device Approximate Computation Reuse, MobiCom 2018
03/21	<i>Student 2</i>	DeepCache: Principled Cache for Mobile Deep Vision, MobiCom 2018
03/25-03/29		Recess week

04/02	<i>Student 2</i>	FastDeepIoT: Towards Understanding and Optimizing Neural Network Execution Time on Mobile and Embedded Devices, SenSys 2018
04/04	<i>Student 3</i>	SkyCore: Moving Core to the Edge for Untethered and Reliable UAV-based LTE networks, MobiCom 2018
04/09	<i>Student 3</i>	EXIMIUS: A Measurement Framework for Explicit and Implicit Urban Traffic Sensing, SenSys 2018
04/11	<i>Student 4</i>	CrowdEstimator: Approximating Crowd Sizes with Multi-modal Data for Internet-of-Things Services, MobiSys 2018
04/16	<i>Student 4</i>	AIM: Acoustic Imaging on a Mobile, MobiSys 2018
04/18	<i>Student 5</i>	Rubiks: Practical 360-Degree Video Streaming for Smartphones, MobiSys 2018
04/23	<i>Student 5</i>	Flare: Practical Viewport-Adaptive 360-Degree Video Streaming for Mobile Devices, MobiCom 2018
04/25	<i>Student 6</i>	Conductive Inkjet Printed Passive 2D TrackPad for VR Interaction, MobiCom 2018
04/30		Finalize the project
05/02		Finalize the project
05/07		Project presentation (20 minutes/each)
05/09		Project presentation (20 minutes/each)

The papers listed in the table are some papers suggested by the instructor. The students can find some other papers. Please let the instructor know the selected paper two weeks before your presentation.

Grading

- Homework (40%): Four pieces of homework will be given for all the lectures.
- Paper summary (20%): Every student, *except the speaker*, will be required to submit a one-page summary of the paper before each paper-discussion class.
- Paper presentation (20%): The student presenting the paper does not need to submit a summary.
- Project report and presentation (20%): Every student will, individually or in a group of at most two, execute a research project that is related to computer systems and can also be related to her/his own research topic. Each project will build a prototype of a computer system (e.g., an image processing system, or CNN implementation on smartphones), or partially implement a paper we have read. At the end of the term, each student or group must submit a 1-page report and present their project in class.

Prerequisites

No

Textbook

No

Program Learning Outcomes

At the end of this course, students will have hands-on experience with the development of computer systems; gain deep knowledge of the recent development of networking systems and mobile computing systems; identify the major research challenges in current research of systems; and be conversant with performance analysis and evaluation of computer systems. Through lectures, readings, homework assignments, and projects, students will demonstrate:

- Are able to identify novel and significant open research questions in computer systems, especially wireless networking systems and mobile computing systems.
- Are able to situate the above questions in the contexts of current research literatures.

- Are able to apply their knowledge of computing, mathematics, science, and engineering to the analysis of technological problems, as well as to the design and implementation of viable solutions to those problems.
- Possess the characteristics of lifelong learners; they are able to acquire and use new techniques, skills, and engineering and scientific tools for research and development in electrical engineering and computer science, as well as to develop new methods and make new discoveries.
- Practice a high standard of professional ethics, including integrity in the conducting and writing of research.
- Communicate effectively through oral, visual, and written means, effectively addressing a broad range of technical audiences.

Academic Integrity

Academic integrity policy. Each student in this course is expected to abide by the University of California, Merced's Academic Honesty Policy. Any work submitted by a student in this course for academic credit will be the student's own work. Students are encouraged to study together and to discuss information and concepts covered in lectures. Students can provide/receive "consulting" to/from other students. However, the permissible cooperation should never involve one student having possession of a copy of all or part of the work done by someone else, in the form of an email, an email attachment file, a storage device, or a hard copy. Should copying occur, both the student who copied work from another student and the student who gave material to be copied will receive zero credit for the corresponding assignment. Penalty for violation of this Policy can also be extended to include failure of the course and University disciplinary action. During examinations, each student has to do only their own work. Talking or discussing is not permitted, nor students comparing their papers, copying from others, or collaborating in any way. Any collaborative behavior during examinations will result in failure of the exam and may lead to failure of the course and University disciplinary action.

Disability service information

Accommodations for students with disabilities: The University of California, Merced is committed to ensuring equal academic opportunities and inclusion for students with disabilities based on the principles of independent living, accessible universal design diversity. I am available to discuss appropriate academic accommodations that may be required for students with disabilities. Requests for academic accommodations are to be made during the first three weeks of the semester, except for unusual circumstances. Students are encouraged to register with the Disability Services Center to verify their eligibility for appropriate accommodations.