Course Syllabus

COMP SCI 6001: Special Topics in Real-Time Cyber-Physical Systems
Fall 2018

Schedule: TBD, in TBD Computer Science Bldg.
Course website: TBD
Media Space: https://edtechmedia.mst.edu (for lecture video access, technical help: vcchelp@mst.edu)

Instructor: Zhishan Guo
Office: 306 Computer Science Bldg.
Email: guozh@mst.edu (please include "[CS6001]" in the subject for easy identification)
Office Hours: TBD in 306 Computer Science Bldg., or by appointment

Target Audience: This is a course for research-active students to learn about recent advances in the areas of cyber-physical systems and real-time scheduling. A distance section is created for people live far from Rolla or have time conflict.

Prerequisites: A "C" or better grade in Comp Sci 3800 (or CpE 3150 or equal), Comp Sci 5200 (or equal).

Textbook: There is no textbook for the course. We will study a number of recently-published papers which will be handed out in class (or made available in electronic form).

Description and Course Objectives:
Cyber-physical systems are built from, and depend upon, the seamless integration of computational algorithms and physical components, where both logical and temporal (real-time) correctness need to be demonstrated. This offering (of the series) in Fall 2018 will focus on advanced workload models, novel system designs, and selected emerging topics of such systems.

Grading: Class Participation and Presentation 50%

Project 50%

This class will be far more enjoyable for everyone if all students come to class ready and willing to discuss the material to be covered. I plan to reward students who actively evolve in discussions (in class or on canvas) by increasing their final grades by up to 10%. I also reserve the right to give negative class participation grades to those who do not observe appropriate etiquette in class, which may result in 10% downgrade of your final scores.

Each participant will be required to make a series of presentations to the class, and to complete a major semester project of sufficiently high quality that it could be submitted for consideration towards presentation at a decent conference, or publication in a decent journal. No group work is allowed. Please note that failing to disclose any related project work from other course(s) will result in reduced grade, and may be considered plagiarism.

Special Needs: If you are entitled to extra accommodation for any reason (such as a disability), we make every reasonable attempt to accommodate you. However, it is your responsibility to discuss this with the instructor during the first week of the course. You will need to request that the Disability Support Services staff send a letter to the instructor verifying your disability and specifying the accommodation you will need before the instructor can arrange your accommodation. Disability Support Services is located in 204 Norwood Hall, their phone number is 341-4211, and their E-mail is dss@mst.edu.

Class Etiquette: You are expected to maintain proper etiquette in class, which includes:
- Not making a habit of arriving late, or leaving in the midst of class;
- Not talking (include whispering), sleeping, reading newspapers, etc. in class;
- Do ONLY current-lecture-related actions (if) with your electronic devices.

Homework Assignments and Exams: N/A.

In-class Quizzes: N/A.

Student Honor Code & Academic Integrity: Every student enrolled in this course is expected to be familiar with both the Student Honor Code and Missouri S&T's Student Academic Regulations, including the section on Conduct of Students which on page 23 of the June 2016 revision, defines several forms of Academic Dishonesty such as cheating, plagiarism, and sabotage. Incidences of Academic Dishonesty will typically result in zero grades for the respective course components, notification of the student's advisor, the student's department chair, and the Office of Academic Support, and further academic sanctions may be imposed as well in accordance with the regulations. Note that those who allow others to copy their work are just as guilty of plagiarism and will be treated in the same manner.

Attendance & Classroom Egress Map:
Computer Science Building
https://designconstruction.mst.edu/media/campussupport/designconstruction/secure/floorplan/R0055.pdf

Title IX: Missouri University of Science and Technology is committed to the safety and well-being of all members of its community. US Federal Law Title IX states that no member of the university community shall, on the basis of sex, be excluded from participation in, or be denied benefits of, or be subjected to discrimination under any education program or activity. Furthermore, in accordance with Title IX guidelines from the US Office of Civil Rights, Missouri S&T requires that all faculty and staff members report, to the Missouri S&T Title IX Coordinator, any notice of sexual harassment, abuse, and/or violence (including personal relational abuse, relational/domestic violence, and stalking) disclosed through communication including but not limited to direct conversation, email, social media, classroom papers and homework exercises. Missouri S&T's Title IX Coordinator is interim chief diversity officer Neil Outar. Contact him (naoutar@mst.edu; (573) 341-6038; Temporary Facility A-1200 N. Pine Street) to report Title IX violations. To learn more about Title IX resources and reporting options (confidential and non-confidential) available to Missouri S&T students, staff, and faculty, please visit http://titleix.mst.edu.

Topics

- Introduction to real-time cyber-physical systems. (1 Week)
- The workload model evolution (2 Weeks)
  - Parallel tasks
  - System-aware tasks
- The design & modeling evolution (4 Weeks)
  - Mixed-Criticality scheduling
  - Probabilistic Worst-Case Execution Time
  - Cache delays
  - Heterogeneous platforms
- Other emerging topics and applications (3 Weeks)
  - Security in RTS
  - AI in real-time systems
  - Traffic control
- Project Presentations (3 Weeks)

Disclaimer: *The instructor reserves the right to make changes to the syllabus, including due dates and topics to be covered. Important changes will be announced as early as possible.*