

Syllabus: CS818(001)/CS795(002), Spring 2017
Wireless and sensor networks and their applications
(subtitle: Wireless Networking in the Internet of Things)

Lecture: Art and Design Building L008
Tuesdays 4:30 - 7:10 pm

Instructor: Song Min Kim (song@gmu.edu)
Assistant Professor, Computer Science
Office hour: Thursdays 10AM-12PM@Engineering 5305 or by appointment

Course web page: All class materials will be made available in blackboard <https://mymasonportal.gmu.edu/> including up-to-date schedule, announcements, references, and supplemental reading materials.

Note: This course satisfies the breadth requirement of “Systems and Networks” for CS MS

Course summary: Wireless and sensor networks contain a large body of self-organizing devices, each equipped with wireless communication, computation, and storage capabilities. Some of them also have sensing and actuation functionalities. With the fundamental impact on how we interact with the physical world, wireless technologies are extensively applied to diverse sectors including transportation, energy, manufacturing, and healthcare to improve services, promote economic growth, and ultimately enhance the quality of life. In fact we are rapidly moving towards the Internet of Things (IoT) era where everything is interconnected – In other words, where the wireless and sensor network dominate every aspect of our lives. This course presents various wireless technologies, including Wireless LAN, cellular, and Ad-hoc, with an emphasis on sensor networks. It offers comprehensive view ranging from networking functions to systems and applications – e.g, wearables for healthcare. Students will also obtain hands-on experience on programming small devices to sense and communicate. We will cover topics including, but not limited to, the followings.

- Introduction to wireless technologies (cellular, WLAN, Ad hoc, and sensor network)
- Programming the wireless sensor nodes
- Wireless and sensor networking basics (protocols and media access control techniques)
- Middleware services (time synchronization, localization, power management)
- Advanced networking techniques
- Systems and applications (wearable, cyber-physical system, smart city, etc.)
- Security and privacy

Prerequisites: Knowledge on C language (e.g., CS222 or CS262) and networking courses (CS455/CS555) would be helpful, but not strictly enforced. Please consult with the instructor early in the semester in case you are not sure if you have necessary background.

Textbook: No textbook. We will discuss the latest research publications in premier conferences such as MobiCom, SIGCOMM, SenSys, MobiSys, and NSDI.

Grading policies: Grades will be assigned based on the below weight and scale. The scale may be lowered or raised as needed, mostly to assign appropriate letter grades for students in borderlines, or to adjust for overly difficult or easy assignments.

Weight		Scale		
Paper critiques:	20%	A+:100 – 97	A: 96-93	A-: 92-90
Class participation	5%	B+: 89 – 87	B: 86-83	B-: 82-80
Paper presentation:	25%	C+: 79 – 77	C: 76-73	C-: 72-70
Final project:	50%	D: 60 – 69	F: < 60	

Course load: Weekly paper critiques, two paper presentations, and a final project (proposal + report). Please see below for the details of each item. No exam.

Paper critiques: Two paper critiques per week. Each critique should be 1/2 page (single-spaced), therefore two critiques will fit into 1 page. **Both hard and soft copies should be submitted.** Soft copy is due, in email, every Tuesday 2:30PM (2 hours before class). Hard copy should be submitted in class. **Late submission is NOT allowed.** Each critique is worth 1% of the course. A total of 22 critique assignments will be available, where they can add up to 20%. That is, you are allowed to miss 2 critiques (assuming all other critiques are good) without any score deduction.

Paper presentations: Each oral presentation is for 50 minutes, plus 20 minutes for QnA. The presentation should not only cover the in-depth discussion of the paper, but also all necessary background and related work for the class to fully understand the technical approach described in the paper. The evaluation criteria of presentation include clarity, organization, technical content, and answers to the questions raised by the class. The score of the presentation will be a combination of the scores from the students (excluding the presenter) and the score from the instructor.

Final project: May work individually, or in groups of two. While students get to work on research topics they decide to investigate, the topic should be discussed with and approved by the instructor for course relevance, workload, etc. Some novel contribution is expected such as improving a technique discussed in the class. Implementation on real devices is a plus (devices will be provided), but not required. More details on project requirements will be handed out throughout the semester. The project has three elements.

- **Project proposal:** A single-page document and a 5-10 min. in-class oral presentation of the project.
- **Project presentation:** In-class 20-minute oral presentation of the project outcome.
- **Project report:** Four-page (individual) or six-page (group of two) project report in two-column ACM proceedings template, following the structure of typical research articles.

Class participation: Attendance, checked with submitted hard-copies of paper critiques.

Honor code: All students must adhere to the Honor Codes of [GMU](#) and the [Department of Computer Science](#). Violation will result in a failing grade.

Disability statement: If you have a disability or other condition affects that may affect your academic performance, please document it with the [Office of Disability Services](#) and let the instructor know in the first week of the semester to accommodate needs.