

# ESE537: Mobile Sensing Systems and Applications (Fall 2021)

## Syllabus

---

### 1. Course Staff and Office Hours

Name	Email	Office Hours	Office	Phone
Fan Ye	fan.ye@	TuTh 2-4pm	Light Engr	631-632-8393
Instructor	stonybrook.edu		217	

---

### 2. Course Description

This is a graduate course focusing on recent advances and developments in mobile sensing systems and their applications, especially those leveraging modern mobile devices and embedded, customized sensors. Topics include: conventional mote-class sensor networks, participatory sensing leveraging mobile devices, intelligent hardware and Internet-of-Things, location sensing, future information centric networking, and applications in smart homes, buildings, transportation, environment and health/fitness. Students need to read latest literature and write reviews, work on research projects and develop solutions, present their work and write formal reports. The practice of the basic research skills are major components. The course intends to be self-sufficient and prior experiences in programming, mobile devices and embedded systems is highly recommended.

### 3. Objectives

The course intends to give students a broad understanding of the evolution and latest development in mobile sensing systems and applications, from the conventional mote-class sensors, to mobile device based sensing, and the future of a rich combination of heterogeneous devices. Students will also be trained for essential research skills, including literature study and critique, oral presentation, problem formulation, solution development, and formal writing. Through hand-on and cutting edge research problems, students can practice their skills by developing and evaluating designs through prototypes and/or simulations.

### 4. Readings

Readings will be mostly research papers, plus online materials which will be distributed in advance.

### 5. Content

1. Mote-class sensing systems: different sensor node platforms and MAC technologies, data dissemination, applications in structure, environment and data center monitoring
2. Mobile device based sensing systems: characteristics of modern mobile devices (e.g., smartphones, tablets) and their embedded sensors
3. Participatory sensing: the paradigm, common mathematical and algorithmic techniques, applications in transportation (e.g., fuel efficiency, road monitoring), activity recognition, fitness/health monitoring (e.g., sleep quality, exercise), environment monitoring (e.g., noise, pollution)
4. Location sensing technologies: WiFi based, light based, inertial based, image based,

acoustic based localization and indoor floor plan construction

5. Customized sensing, especially those for health data (e.g., vital signs, activities) and applications (e.g., aging population, screening and surveillance of diseases).

## **6. Grading**

The grade will be based on attendance, presentation, assignments, and one hand-on project where high quality reports are expected.

Attendance and discussion	20%
Oral presentation	20%
Assignments (Paper/material reviews)	30%
Project (execution, report, presentation)	30%

## **7. Disability**

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, 128 ECC Building (631) 632-6748. They will determine with you what accommodations are necessary and appropriate. All information and documentation are confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information, go to the following web site: <http://www.ehs.sunysb.edu> and search Fire Safety and Evacuation and Disabilities.

## **8. Academic Honesty**

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Any suspected instance of academic dishonesty will be reported to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at <http://www.stonybrook.edu/uaa/academicjudiciary/>

## **9. Conduct**

The University at Stony Brook expects students to maintain standards of personal integrity that are in harmony with the educational goals of the institution; to observe national, state, and local laws and University regulations; and to respect the rights, privileges, and property of other people. Faculty are required to report disruptive behavior that interrupts faculty's ability to teach, the safety of the learning environment, and/or students ability to learn to Judicial Affairs.