EE 693 E – Wireless Networks and Internet of Things

Spring 2025

Instructor: Haofan Cai, PhD

Email: haofanc@hawaii.edu

Course Focus

- Focuses on the networking aspects of wireless networks and Internet of Things: protocols at the various layers and how they answer the specific requirements posed by these networks (e.g., data driven, energy efficient, etc.) and their applications (monitoring, tracking, etc.). Explores how physical layer and hardware issues may influence protocol design.

Course Prerequisites

- EE 368 is recommended as a prerequisite.

Textbook (Optional)

- Krishnamurthy Raghunandan, Introduction to Wireless Communications and Networks: A Practical Perspective, 1st edition, Springer Cham, 2022, ISBN: 978-3-030-92187-3

Course Objectives

- Through this course, the students will develop a comprehensive understanding of wireless communication technologies and their applications in the context of the Internet of Things (IoT).
- Understand the architecture and design principles of wireless systems, including sensors, data processing, and communication.
- Understand the security challenges and solutions associated with wireless networks and IoT devices, including authentication, encryption, and secure data transmission.
- Learn to analyze and compare various wireless networking protocols, including Wi-Fi, LoRa, RFID and cellular networks, with a focus on their suitability for IoT applications.
- Examine real-world IoT applications across various domains, such as healthcare, smart cities and industrial automation, and analyze case studies to understand their practical implementation.
- Be able to prototype and develop IoT systems using hardware platforms, sensor integration, and programming.

Course Topics

- Wireless network basis
- Wireless sensor networks
- Data collection and aggregation

- Routing for wireless networks
- Wireless security
- WiFi
- RFID systems
- IoT applications
- Machine learning in IoT
- Federated learning
- 5G/6G