ECE 442/510 – Internet of Things and Cyber Physical Systems
Summer 2022

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Office Location: Meet online (Zoom)

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Office Hours: by appointment in advance
Office Location: Meet online (Zoom)

Class Time Wednesdays and Thursdays, 9:00 AM to 12:00 PM
Class runs until June 23rd

Class Location Zoom (link available under "Zoom Class Meetings" on Blackboard)

Prerequisites ECE 242 or Consent of Instructor or Graduate Standing
General understanding of writing computer programs and embedded computing
Basic knowledge of computer architecture and network data communication system

Class Website Illinois Tech Blackboard

Textbook There's no required textbook for this course.
Lecture slides will be uploaded to the Blackboard. *(password protected)*

Reference Books

"Internet of Things and Data Analytics Handbook"
By H. Geng
John Wiley & Sons, Inc., 2016
ISBN: 978-1119173649

"Cyber-physical Systems"
By R. Rajkumar, D. de Niz and M. Klein
Addison-Wesley, 2016
ISBN: 978-0321926968

"Internet of Things: Principles and Paradigms"
By R. Buyya and A.V. Dastjerdi
Morgan Kaufmann, 2016
ISBN: 978-0128053959

"Internet of Things: A Hands-On Approach"
A. Bahga, V. Madisetti, VPT, 2014
ISBN: 978-0996025515

"Making Things Talk", 3rd Edition
By Tom Igoe
Maker Media, 2017
ISBN: 978-1680452150

"Raspberry Pi Sensors"
By Rushi Gajjar
Packt Publishing, 2015
ISBN: 978-1784393618

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Course Objective

- To introduce students to the fundamentals of Internet of Things (IoT) and embedded computing
- To provide understanding of utilizing IoT to build cyber physical systems
- To understand various data communication methods enabling data mobility in real-time
- To understand how to analyze and visualize user data
- To provide comprehensive understanding of IoT by exploring real-world IoT application scenarios
- To gain a better understanding of various technologies that can be utilized for IoT implementations

Topics Covered

- Introduction to Internet of Things and Cyber Physical Systems
- Domain Specific IoTs and IoT Design Case Studies
- Introduction to Embedded Systems
- Design with Arduino and Raspberry Pi
- IoT Sensors and Actuators
- IoT Networking Technology (Wi-Fi, Cell, Bluetooth, ZigBee, NFC, RFID)
- DBMS and IoT Cloud Platform Design
- IoT M2M and Middleware Architecture
- Security and Privacy
- Cybersecurity Law

Grading

- Attendance: 5%
- Reading Assignments: 20%
- Design Laboratory Experiments: 30%
- Design Project and Presentation: 45%

Homework Policy

- All homework assignments and presentation need to be submitted to the Blackboard.
- Late submission will not be accepted nor graded.
- Working together on all assignments are encouraged but **copying assignments will call for disciplinary action**.

Assignment Policy

- Design Project: **In groups of two**
- Design Laboratory Assignments: **work in group but individual reports**
- Reading Assignments: **individual reports**
- **You are responsible for the parts required in your Design Project and Design Laboratory Experiments**

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Academic Honesty

It is your responsibility to be familiar with Illinois Tech Code of Academic Honesty: https://web.iit.edu/student-affairs/handbook/fine-print/code-academic-honesty

Working together on the assignments are encouraged **but copying assignments will call for disciplinary action**. **All submissions including exercises, programming assignments and exam papers must be your own.** If the above policy and/or any part of the Illinois Tech Code of Academic Honesty is violated in any similarity within the Reading Assignments, Research Projects, Design Laboratory Experiments, programming assignment codes, comments, customized program behavior, any writings and/or figures are found, both the helper (original source of work submission) and the requestor (duplicated/modified work submission) will be called for academic disciplinary action including zero score of the submission/exam **AND** degrading course letter grade by one.

If the above policy and/or any part of the Illinois Tech Code of Academic Honesty is violated in any similarity within Design Project and Presentation, both the helper (original source of work submission) and the requestor (duplicated/modified work submission) will receive a failing grade E for this course, and will be notified to the student's advisor, department and the university.

ADA Statement

Reasonable accommodations according to American Disability Act (ADA) will be made for students with documented disabilities. In order to receive accommodations, students must obtain a letter of accommodation from the Center for Disability Resources and make an appoint to speak with as soon as possible. The Center for Disability Resources (CDR) is located in 3424 S. State St. Suite 1C3-2, (312) 567-5744 or disabilities@iit.edu