Student Led Course (SLC): CS 3907 - 1 credit: Spring 2022

IoT Applications with Raspberry Pi

Instructors: Jack Umina, Jonathan Terry, Gabe Parmer, Kartik Bulusu

Meeting time: Fridays 12noon (once a week).

The Internet of Things (IoT) has been rapidly transforming the world into a complex system of connected devices and applications. This transformation has been enabled by advances in sensor and microcontroller technology -- examples include smart sensors, medical sensors, and single board computers such as the Raspberry Pi. In this hands-on project based course, students will develop IoT applications using the Raspberry Pi platform. Students will be introduced to the Raspberry Pi platform, IoT application challenges, implement several guided assignments and then complete a term project from ideation to deployment.

Pre-requisite: Programming proficiency (working knowledge of Python), familiarity with networks, interest in working with hardware boards.

Instructor Contact Information:

- Prof Kartik Bulusu bulusu@gwu.edu
- John Umina jumina@gwu.edu
- Jon Terry jterry82@gwu.edu
- Gabe Parmer gparmer@gwu.edu

Office Hours:

- John Umina
  - *Meet in Tompkins 409 or Zoom*
  - Tuesdays**:** 2:15-3:15pm
  - Wednesdays**:** 11am-12pm
- Jon Terry
  - *Meet in Tompkins 409 or Zoom*
  - Fridays**:** 1:15-3:15pm

Discussion forum: A class Slack channel will be set up for discussions. Please use this channel to communicate with the instruction team and participate in discussions. Students are encouraged to provide comments and respond to questions from other students

Syllabus and Schedule

Date	Topic(s) and readings	Assignment(s) due
Week 1	Introduction to IoT and Raspberry Pi. Class requirements, logistics, technical infrastructure.	Complete Surveys and provide equipment pickup information. Python review.
Weeks 1-5	Introduction to Raspberry Pi: basic functionality, operating system install, networking, python programming for the Pi.	Assignment 1: Set up your Pi. Simple Python program to run on the Pi
Week 3-5	Peripherals and Sensors: medical sensors, ultrasonic, camera, getting started with SenseHat, Sensor data analysis using Pandas.	Assignments 2,3,4: Work with individual sensors, putting it all together for an application using multiple sensors.
Week 6	Term Project Proposal Presentations: Students present ideas and get feedback before final ideation.	Term Project Proposal Presentations
Week 7-9	Weekly Project Check-in with Instruction Team	Project Status Updates
Week 10	Project Preliminary Design Presentations	Presentations
Week 11-12	Weekly Project Check-in with Instruction team	Project Status Updates and Demos
Weeks 13-14	Final Term Project Presentation and Demos	Term Project

Grading

- Guided Assignments (40%)
    - Students must demo their assignments to one of the instruction team.
- Term Project: (60%)
    - Oral project presentation to the class (including proposal presentation)
    - Weekly Check-ins (meetings, preliminary demos, design process)
    - Demo of the final project.

Late Submissions: No late submissions unless due to medical exceptions. Assignments will need to be demo-ed to the instruction team (during office hours or class) the week the assignment is due.

University policies

University policy on observance of religious holidays

In accordance with University policy, students should notify faculty during the first week of the semester of their intention to be absent from class on their day(s) of religious observance. For details and policy, see "Religious Holidays" at provost.gwu.edu/policies-procedures-and-guidelines

Academic Integrity Code

Academic Integrity is an integral part of the educational process, and GW takes these matters very seriously. Violations of academic integrity occur when students fail to cite research sources properly, engage in unauthorized collaboration, falsify data, and in other ways outlined in the Code of Academic Integrity. Students accused of academic integrity violations should contact the Office of Academic Integrity to learn more about their rights and options in the process. Outcomes can range from failure of assignment to expulsion from the University, including a transcript notation. The Office of Academic Integrity maintains a permanent record of the violation.

More information is available from the Office of Academic Integrity at studentconduct.gwu.edu/academic-integrity. The University's "Guide of Academic Integrity in Online Learning Environments" is available at studentconduct.gwu.edu/guide-academic-integrity-online-learning-environments. Contact information: rights@gwu.edu or 202-994-6757.

Support for students outside the classroom

Disability Support Services (DSS) 202-994-8250

Any student who may need an accommodation based on the potential impact of a disability should contact Disability Support Services to establish eligibility and to coordinate reasonable accommodations. disabilitysupport.gwu.edu

Counseling and Psychological Services 202-994-5300

GW's Colonial Health Center offers counseling and psychological services, supporting mental health and personal development by collaborating directly with students to overcome challenges and difficulties that may interfere with academic, emotional, and personal success.
healthcenter.gwu.edu/counseling-and-psychological-services

Safety and Security

- In an emergency: call GWPD 202-994-6111 or 911
- For situation-specific actions: review the Emergency Response Handbook at safety.gwu.edu/emergency-response-handbook
- In an active violence situation: Get Out, Hide Out, or Take Out. See go.gwu.edu/shooterpret

Stay informed: safety.gwu.edu/stay-informed