Internet of Things Fundamentals 2023-2024 Catal

[ARCHIVED CATALOG]

ITSP 235 - Internet of Things Fundamentals

PREREQUISITES/COREQUISITE: (ITSP 135 - Hardware / Software Support or (ITSP 132 - IT Support Essentials I and ITSP 134 - IT Support Essentials II)) and SDEV 120 - Computing Logic.

PROGRAM: Information Technology Support
CREDIT HOURS MIN: 3
LECTURE HOURS MIN: 2
LAB HOURS MIN: 2
DATE OF LAST REVISION: FALL, 2020

Students shall be able to work with micro hardware and single board controllers, such as Arduino and Raspberry Pi, to connect through a network to store and retrieve databases across devices. Students will ascertain the value created by collecting, communicating, coordinating, and leveraging the data from connected devices. Students will understand strengths and weaknesses of application duty cycle and data rate/data-intensive for continuous recognition applications, battery consumption/low-power design, and range extension techniques including data mining and mesh networking/communication range.

MAJOR COURSE LEARNING OBJECTIVES: Upon successful completion of this course, the student will be expected to:

1. Understand basic electronics theory including Ohm's Law and Power Law
2. Understand and identify microdevice interfaces including microcomputers and single board controllers (SBC)
3. Create circuits using sensors, actuators, breadboards, and single board controllers
4. Develop architecture to see the system as a whole including:
    a. Communication between devices such as breadboards, single board devices, computers, internet, M2M and other components.
    b. Operating system and software application installation on micro devices
    c. Connection of devices to a distributed environment
    d. Understand and evaluate the application of wireless technologies: Wi-Fi, LoRa, and 3G/4G cell service
    e. Program micro-devices in current programming languages
    f. Resolving issues with network stability/intermittent connection
5. Understand data systems incorporated by industry within IoT devices
    a. Collect data from multiple devices
    b. Report/Visualize data from multiple devices
6. Understand security paradigms which considers:
    a. Setup, maintenance, and updating Enterprise data
    b. Shared vs. public vs. private
    c. Importance of security, privacy, ethics, and authenticity
    d. Industry standards and regulations
7. Understand how sensors work and developments for reliability. (preventative maintenance, safety, energy savings)
8. Discuss and implement business use cases of sensors in a distributed environment in laboratories and course projects.

COURSE CONTENT: Topical areas of study include -

- Working with sensors
- Distributed computing
- Cloud and Fog computing
- IoT architecture
- Micro device remote access
- Data analysis
- Security risks in centralized and distributed systems
- Business use cases of IoT

Course Addendum - Syllabus (Click to expand)
