

## PCAC2012 INTERNET OF THINGS AND CLOUD (3-0-0)

**OVERALL COURSE OBJECTIVES:** To provide learners with an in-depth understanding of the evolution of Internet of Things and related technologies, equip them with the skills to utilize advanced technology platforms like DragonBoard™ and AWS, and allow them to apply these skills in developing innovative IoT-enabled applications and systems.

**LEARNING OUTCOMES: On successful completion of the course the students shall be able to:**

1. Understand, compare, and explain how telephony and media delivery networks operate.
2. Understand circuit switched networks and packet switched networks and their trade-offs.
3. Comprehend key innovations that have transformed the communication, entertainment, and consumer electronics industry.
4. Describe the DragonBoard™ 410c peripherals, I/O expansion capabilities, computing capabilities, and connectivity capabilities.
5. Use Linux terminal for embedded purposes and configure integrated development environment (IDE) for software development.
6. Understand and utilize various AWS cloud services such as EC2, IoT and more, to build and integrate projects that leverage the cloud.

**COURSE CONTENT:**

### **Module 1: [Internet of Things: How did we get here?](#) [21 Hours]**

This course explores the convergence of multiple disciplines that have led to the advent of present-day smartphones and the Internet of Things. The lessons explore the evolution of telephony networks, broadcast networks, and consumer electronics, along with the impact of the internet, multimedia content, smartphones, and apps. It also covers the emerging, interconnected platform: the Internet of Things. Upon completion, learners will understand how peer-to-peer networks differ from broadcast networks, the tradeoffs between circuit-switched and packet-switched networks, and the workings of several key innovations and digital services. The course provides an important grounding for anyone interested in the technological development of the Internet of Things, and further resources for a more in-depth exploration of the topics.

#### **Sub-Topics**

Circuit Switched Networks  
Computer Telephony  
Features and Apps  
Future Outlook  
Packet Switched Networks  
Wireless Technologies

#### **Formative Assessments:**

16 quizzes.

### **Module 2: [Internet of Things V2: DragonBoard™ bring up and community ecosystem](#) [21 Hours]**

This course is designed for individuals seeking to develop the skills needed to prototype embedded products using advanced technologies. The course utilizes the DragonBoard™ 410c single board

computer (SBC) to provide a hardware and software development environment for Internet of Things specialization courses. Ideal for learners interested in using Linux for embedded purposes, pursuing a career in the design and development of Internet of Things products, or those involved in entrepreneurial, innovative, or DIY communities, this course offers both theoretical knowledge and hands-on development practice. Key learning outcomes include understanding the DragonBoard™ 410c peripherals, navigating a Linux terminal, configuring an integrated development environment (IDE) for software development, utilizing Git and GitHub for version control, and creating projects that interface with sensors and actuators through GPIO and Arduino.

### **Sub-Topics**

Advanced Projects and Code  
Changing your Operating System (Supplemental / Optional)  
DragonBoard Bringup and Ecosystem  
Mezzanines and Sensors (Canned Demos w/ software)  
Rescuing your Bricked Board (Supplemental / Optional)

### **Formative Assessments:**

5 quizzes and 1 peer-review assignment.

### **Module 3: [Internet of Things V2: Setting up and Using Cloud Services](#) [10 Hours]**

This course provides an introduction to Amazon Web Services (AWS) and its significance, enabling learners to make informed design decisions about which services to use. The course covers interfacing with the AWS cloud, developing software for data sending and receiving, and how to structure projects with diverse services. Upon completion, learners will have a clear understanding of the cloud, be able to install and configure the AWS CLI and SDK on a Linux system, utilize various AWS services such as EC2, IoT, etc., build projects heavily leveraging the cloud, and integrate the cloud into embedded systems.

### **Sub-Topics**

Advanced Projects and Code - Deep dive  
Systems Architecture

Cloud 101 for Dragonboard 410c  
Real projects using AWS Cloud services

### **Formative Assessments:**

3 quizzes and 1 peer-review assignment.

### **ASSESSMENT:**

**For summative assessments, Coursera will provide question banks for which exams can be conducted on the Coursera platform or the faculty will create their own assessments.**

*Note: If a Course or Specialization becomes unavailable prior to the end of the Term, Coursera may replace such Course or Specialization with a reasonable alternative Course or Specialization.*