

# MEM IIoT Course Syllabus

Oct 1 – Dec 3, 2018

IoT has an enormous market potential of billions of connected devices generating Trillions in revenues. IoT will change industries and transform the way we work and live. Industrial companies are already pivoting from Products to Services leveraging IoT technologies – this digital transformation is more broadly called **the Industrial IoT or Industrial Internet**. At the end, these industrial companies will become network-based businesses with connected products and factories. It's imperative that these companies transform their organizational architecture as they become connected network businesses.

As companies move beyond proof of concepts and pilots into full production and scale, they will have to turn their focus on the people part of the equation, re-skilling and retraining their workforces. This course aims to fulfil this critical gap.

This course is designed as an introductory course to Industrial Internet for anyone working in the industrial sector or planning to embark in a career around IoT.

*At the end of the course, you'll have a strong command of: 1) Industry Dynamics 2) IoT Technology Architecture and 3) IoT Ecosystem.*

This **11-Week** course will cover the following topics:

1. IIoT Market Size and Potential
2. IIoT Market Segments and Verticals
3. IIoT Use-Cases and Case Studies
4. Business Outcome based IIoT Methodology
5. Economics of IIoT
6. The role of Blockchain and Crypto Platforms
7. Data driven Analytics and Role of AI
8. Importance of Security and Architecture
9. Practical/Lab Labs
10. Featured Speakers

**Teaching Method:** A typical class session will be a mix of lectures, practical labs and article/case discussions. In addition, outside speakers will join us and discuss their IoT challenges. Homework will be based on reading assignments and lab work.

**Grading:** Grades will be based on the reading assignments (40%), completion of labs (30%), final class presentation (20%) and class participation (10%). Grading: Letter (ABCD/NP)

# MEM IIoT Schedule, Agenda and Labs

**Class Session:** Mondays, Weekly 1 – 4pm CST.

**Location:** TBD

**Office Hours:** By appointment

**Dates:** Oct 1 – Dec 10, 2018

## **Oct 1, 2018**

### **Session 1 - Introduction to IIoT**

- Definition
- Market Size
- Case Studies
- IoT v IIoT
- Practical: Introduction to IoT Kit

## **Oct 8, 2018**

### **Session 2 - Industrial Internet IIOT**

- Scope
- History
- Vertical and Business Process areas
- Leading companies
- Importance of building Ecosystems
- IIoT Value Chain – who does what?
- Practical: Lab #1

## **Oct 15, 2018**

### **Session 3 - Business Outcome based Methodology**

- IIOT Methodology
- Solution Architecture
- Data Insights Analytics
- Workforce/Labor Displacement
- Economics of IIoT
- Practical: Lab #2

**Oct 22, 2018**

**Session 4 - Technology - Part 1**

- LPWAN and Network
- SW and Cloud
- Security
- Blockchain & Crypto Platforms
- Role of AI & Machine Learning
- Practical: Lab #3

**Oct 29, 2018**

**Session 5 - Technology - Part 2**

- Telematics/Transportation
- Smart Cities
- Smart Grid
- Transportation
- Mining
- Others
- Practical: Lab #4

**Nov 5, 2018**

**Session 6 – Blockchain**

- Ledger based technologies
- Blockchain use-cases for IoT
- Tokens vs Security vs Utility
- ICO
- Practical: Lab #5

**Nov 12, 2018**

**Session 7 – Team Case Study Discussion #1 – Blockchain role in IoT**

**Nov 19, 2018**

**Session 8 – Team Case Study Discussion #2 – Business outcome and AI**

**Nov 26, 2018**

**Session 9 – Guest Speaker Lecture**

**Dec 3, 2018**

**Session 9 – Final Case Presentations**

# Labs

As IoT becomes ubiquitous it is essential for managers to understand how IoT works. These labs are designed to give students hands-on experience on IoT and associated technologies. Students need not have any prior technical experience for these labs. All labs will be conducted in the class but can be completed outside. The lab kits used are from <https://store.particle.io>

**Video1:** Introduction to IIoT Labs.

**Duration:** 15 Minutes

**Objective:** Gives an overview of labs to the students and helps them to get an overview on future videos.

**Deliverable from student :** Watch the video and look at the documents referred in the video.

**Video2:** IIoT Lab1

**Duration of video:**15 Minutes

**Time needed to complete lab:** 1.5 hours

**Objective:** Introduction to the Maker Kit and perform basic experiments on the maker kit.

**Deliverable from the student:** Watch the video and perform the basic experiments mentioned in the lab. Upload a video that showing that on board LED is controlled from Tinker App, on board pin is read by tinker app.

**Video3:** IIoT lab2

**Duration:** Approx 15 minutes

**Time needed to complete the lab:** 1.5 hours

**Objective:** To create a vacant conference room alarm to the user on slack

**Deliverable from the student:** Watch the video and perform the experiments mentioned in the lab. Upload a video, in the video recorded by the student it should be demoed on how the movement around the motion sensor screen translates in 'available' and 'occupied' information on the slack conference channel.

**Video4:** IIoT lab3

**Duration:** Approx 15 minutes

**Time needed to complete the lab:** 1.5 hours

**Objective:** To transfer sensor data to cloud

**Deliverable from the student:** Watch the video and perform the experiment mentioned in the lab. Upload the recording of the computer screen with live updates of the temperature data happening on the google spreadsheet.

**Video5:** IIoT lab4

**Duration:** Approx 10 minutes

**Time needed to complete the lab:** 1.5 hours

**Objective:** To control a motor from a mobile phone

**Deliverable from the student:** Watch the video and perform the experiment mentioned in the lab. Upload the Mobile phone screen shot with the button icon on it. Provide a video with the servo motor moving when the button is pressed on the mobile