

Course Name: Internet of Things (3 Cr.)

Course Code: CACS460

Year/Semester: IV/VIII

Class Load: 5 Hrs. / Week (Theory: 3Hrs. Practical: 2 Hrs.)

Course Description: The course introduces basics of IoT. It covers introductions of IoT, Devices and platform for developing IoT Systems, Design methodology, Data Analytics for IoT, Servers & Cloud offering and IoT system security.

Objective:

The objective of this course is to introduce the students about the principles, techniques, development and applications of IoT System.

Course Contents:

Unit 1: Introduction to IoT

[8Hrs.]

- 1.1 Definition and Characteristics of IoT.
- 1.2 Physical and Logical Design of IoT.
- 1.3 IoT Enabled Technologies
- 1.4 IoT and M2M
- 1.5 Domain Specific IoTs: Home Automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health and Lifestyle.

Unit 2: Sensor, Actuators and Interfacing

[18 Hrs.]

- 2.1 Roles of Sensors and actuators, Types of sensors: Active and passive, analog and digital, Contact and no-contact, Absolute and relative
- 2.2 Working of sensors: Position, occupancy and motion, velocity and acceleration, force, pressure, flow, Acoustic, Humidity, light, radiation, temperature, chemical, biosensor, camera.
- 2.3 Development boards: Arduino and Raspberry pi installation, interfacing and programming using python.

Unit 3: IoT Platform Design Methodology

[6 Hrs.]

Case Study on IoT System for Weather Monitor

Unit 4: Data and Analytics for IoT

[10Hrs.]

- 4.1 An Introduction to Data Analytics for IoT
- 4.2 Machine Learning
- 4.3 Big Data Analytics Tools and Technology
- 4.4 Edge Streaming Analytics
- 4.5 Network Analytics

Unit 5: IoT Physical Servers and Cloud Offering

[3Hrs.]

Cloud storage models and Communication APIs of IoT Systems

Unit 6: Securing IoT Systems

[3Hrs.]

- 6.1 IoT Security Challenges
- 6.2 IoT System's Security Practices



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Laboratory Work:

Implement the concept mentioned in the course using Python as a programming language, Arduino or Raspberry pi as a System board. All sensors mentioned in course should be implemented in a single project or separately to observe their working mechanism.

Evaluation:

Examination Scheme				
Internal Assessment		External Assessment		Total
Theory	Practical	Theory	Practical	
20	20	60	-	

Reference Books:

1. ArshdeepBahga, Vijay Madiseti, "Internet of Things (A Hands-on-Approach)", University Press India Pvt. Ltd., 2015.
2. David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry, "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", Pearson Education (Cisco Press Indian Reprint).
3. Raj Kamal, "Internet of Things: Architecture and Design Principles", McGraw Hill Education, 2017.
4. Gary Smart, "Practical Python Programming for IoT", ISBN-10: 1838982469
5. Gaston C. Hillar Internet of Things with Python, ISBN-10: 1785881388

