Course Code: 15IS666
Credits: 3

Course type: PC
CIE Marks: 50 Marks

Hours/week: L-T-P 1 – 2 – 0
SEE Marks: 50 Marks

Total Hours: 35
SEE Duration: 3 Hours

Course learning objectives

1. To introduce the Internet of Things, basics and fundamentals.
2. To present the techniques of interfacing the modules and with IoT systems.
3. To understand the case studies/applications of IoT and develop the skills of designing IoT applications.

Pre-requisites:

Unit – I
7 Hours

Case studies/applications.

Unit – II
7 Hours

Introduction To Internet Of Things: Definition and Characteristics of IoT, physical design of IoT, IoT Protocols, IoT communication models, IoT Communication APIs, Communication protocols, Embedded Systems, IoT Levels and Templates.
Case studies/applications.

Unit – III
7 Hours

Prototyping IoT Objects Using Microprocessor / Microcontroller: Working principles of sensors and actuators. Setting up the board - Programming for IOT. Reading from Sensors, Communication: communication through Bluetooth, Wi-Fi.
Case studies / applications.

<table>
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<th>Unit – IV</th>
<th>7 Hours</th>
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Case studies / applications.

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<tr>
<th>Unit – V</th>
<th>7 Hours</th>
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<tr>
<td><strong>Device Discovery Management:</strong> Device Discovery capabilities – Registering a device, De-register a device.</td>
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<tr>
<td><strong>Cloud Services for IoT:</strong> Introduction to Cloud Storage models and communication APIs Web-Server. Web server for IoT.</td>
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Case studies / applications.

<table>
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<tr>
<th>Text Book:</th>
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<table>
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<tr>
<th>Reference Book:</th>
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<tbody>
<tr>
<td>2. Marco Schwartz, “Internet of Things with Arduino: Build Internet of Things Projects With the Arduino Platform”.</td>
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**Course Outcome (COs):**

At the end of the course, the student should be able to: **Blooms Level**
CO1. Illustrate the functionality of Microprocessors, Complex Systems, Embedded System and IoT.

CO2. Identify and demonstrate the skill of interfacing sensors and actuators with microcontroller development boards.

CO3. Design and develop software programs using embedded C or python programming languages for IoT applications.

CO4. Apply device discovery and cloud services for IoT applications

CO5. Analyze given Case studies / Applications in IoT.

Program Outcome of this course (POs)

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. PO1

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. PO2

3. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. PO5

4. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. PO9

5. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions. PO10

Course delivery methods Assessment methods
1. Lecture & Board
2. Power-point Presentation
3. Online Videos / Learning
4. NPTEL / EDUSAT
5. Class Room Exercises

1. Assignments
2. Quizzes
3. Internal Assessment Tests
4. Course Seminar
5. Course Project (Mini project)

Scheme of Continuous Internal Evaluation (CIE):

<table>
<thead>
<tr>
<th>Components</th>
<th>Average of best two IA tests out of three</th>
<th>Average of assignments (Two) / activity</th>
<th>Quiz</th>
<th>Class participation</th>
<th>Total Marks</th>
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<tbody>
<tr>
<td>Maximum Marks:</td>
<td>25</td>
<td>10</td>
<td>5</td>
<td>10</td>
<td>50</td>
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➤ Writing two IA test is compulsory.

➤ Minimum marks required to qualify for SEE : 20

Self-Study topics shall be evaluated during CIE (Assignments and IA tests) and 10% weightage shall be given in SEE question paper.

Scheme of Semester End Examination (SEE):

1. It will be conducted for 100 marks of 3 hours duration. It will be reduced to 50 marks for the calculation of SGPA and CGPA.
2. Minimum marks required in SEE to pass: 40 (out of 100 )
3. Question paper contains 08 questions each carrying 20 marks. Students have to answer FIVE full questions. SEE question paper will have two compulsory questions (any 2 units) and choice will be given in the remaining three units.