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Fundamentals of Internet of Things — Complete Syllabus

BTEUP Diploma in Computer Science & Engineering • 5th Semester • Session 2026-27
Subject 5.2 (Practicum) • Total 100 Marks • 3 Credits • L 1 - P 4

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
5.2	Fundamentals of Internet of Things	Practicum	1 - 4	3	60	Practical 40 (3 hrs)	100
IoT Total				3	60	40	100

What This Subject Aims To Do

IoT is a hot technology worldwide, cutting across agriculture, space, healthcare, manufacturing, construction, water and mining, with applications such as innovative shopping systems, infrastructure management, remote health monitoring, emergency notification and transportation systems. By the end you should be able to: understand the concepts of the Internet of Things; understand what constitutes an IoT design solution; identify the sensors and other devices needed for different IoT solutions; understand the component parts of an IoT network and its connections; and build small IoT applications.

Unit-Wise Complete Topic List

Unit 1 — Introduction to Internet of Things (10 Periods)

Topics: Introduction to IoT; defining IoT; things in IoT; characteristics of IoT; physical design of IoT; logical design of IoT; functional blocks of IoT; IoT protocols; IoT communication models; IoT communication APIs; IoT enabling technologies.

In simple words: What IoT really means, what its building blocks are, and how things talk to each other and to the internet.

Unit 2 — IoT Devices (12 Periods)

Topics: How electronic devices fit with the Internet of Things and why they are important: breadboard and its internal connections; LED and its connections; tri-colour LED; resistor; introduction to end devices, sensors and actuators; differentiating between different sensor types.

In simple words: The hands-on electronics foundation: breadboards, LEDs, resistors, and the sensors and actuators that let a device sense and affect the real world.

Unit 3 — IoT Networks (12 Periods)

Topics: Introduction to the components of basic IoT networks; types of network connections and how data travels through them; the role of internet protocols; understanding of microcontrollers/Arduino and communication protocols.

In simple words: How IoT devices connect and send data — network types, internet protocols, and the microcontroller at the centre of it all.

Unit 4 — Arduino (12 Periods)

Topics: Features of Arduino device; Arduino device introduction; components of Arduino board; C Arduino programming language; understanding basics of Arduino IDE; functions; control statements; loops; data types; variables.

In simple words: Meet Arduino: the board, its parts, its programming environment, and the C-style code that makes it do things.

Unit 5 — IoT and M2M (10 Periods)

Topics: Introduction; M2M; difference between IoT and M2M; SDN and NFV for IoT — software defined networking, network function virtualisation; IoT and WoT (Web of Things).

In simple words: How IoT differs from the older machine-to-machine idea, and the newer networking ideas (SDN, NFV) and the Web of Things that sit behind large IoT systems.

Practical Work

- Installation of Arduino IDE.
- Interfacing Light Emitting Diode (LED) — blinking LED.
- Interfacing button and LED — LED blinking when the button is pressed.
- Interfacing Light Dependent Resistor (LDR) and LED — displaying an automatic night lamp.
- Interfacing temperature sensor (LM35) and/or humidity sensor (e.g. DHT11).
- Interfacing Liquid Crystal Display (LCD) — display data generated by a sensor on the LCD.
- Interfacing Air Quality Sensor — pollution (e.g. MQ135) — display data on LCD, switch on LED when the sensed data is higher than a specified value.
- Interfacing Bluetooth module (e.g. HC05) — receiving data from a mobile phone on Arduino and displaying it on the LCD.
- Interfacing Relay module to demonstrate a Bluetooth-based home automation application (using Bluetooth and relay).

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Source: BTEUP 3rd Year curriculum (folder2627), approved in C.D.C. meeting held on 16.07.2026. Topic lists follow the official syllabus; short explanations are the author's own plain-English summaries, not syllabus text.

Please confirm with your own polytechnic for any local changes.