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IoT — Complete Syllabus (Open Elective-3, Option 2)

BTEUP Diploma in Electronics Engineering • 5th Semester • Session 2026-27

Subject 5.6.2 — Open Elective-3, Option 2 (Practicum) • Qualifying (Q) • 2 Credits • L 1 – P 3 • Choose this OR AI & ML OR Industrial Automation & MES

Note: The PDF gives this subject as 7 numbered topic sections (not 5 units), with no unit-wise periods, no marks-distribution table and no reference-books list — so periods, weightages and books are not shown. The PDF's "experiments" list (1-13) repeats the course outcomes almost verbatim rather than naming distinct experiments; it is reproduced as printed. The 5.6 scheme row is shared by all three Open Elective-3 options.

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
5.6.2	Open Elective-3: IoT	Practicum (Q)	1 - 3	2	50	—	N/A (Q)
IoT Total				2	50	—	N/A (Q)

What This Subject Aims To Do

To develop skills on Internet of Things (IoT) using the latest software and hardware — building IoT applications and devices using controllers, sensors, actuators and other electronic components — and competency in IoT across home automation, smart city, agriculture, automotive and manufacturing, including opportunities to start a business with novel IoT applications.

Unit-Wise Complete Topic List

Note: no marks-distribution table is given for this subject in the official syllabus, so unit weightages are not shown.

Section 1 — Introduction to Industrial Safety Practices

Topics: Fire Extinguishers & its Types; Safely handling Tools & Equipment; Use of proper Tools & Equipment & its maintenance; OSH & practices to be observed as a precaution

In simple words: Workshop safety: fire extinguishers, correct tool use and occupational safety and health.

Section 2 — Fundamentals of Internet of Things

Topics: Introduction of Internet of Things; Basics of electricals & electronics components used in IoT; History of IoT; Applications, Benefits and Limitations of IoT; Important components of IoT – Micro Controller, Sensors, actuators, communication protocol, cloud etc; IoT Architecture – Physical layer, Network layer, Data processing layer, Application layer.

In simple words: What IoT is, its history, benefits and limitations, its key components, and its four-layer architecture.

Section 3 — IoT Microcontrollers and Single board computer

Topics: Introduction to microcontroller; Different types of microcontrollers, Arduino, Raspberry pi; Introduction to input, output and PWM, interface of camera to raspberry pi, interface of various sensors to raspberry pi, IOT protocol (HTTP, MQTT, HTTPS) for RPI, Study connection of raspberry pi to cloud; Important features of microcontroller; Specification of microcontroller; Selection of microcontroller based on IoT application; Basic programming of microcontroller; Advanced programming of micro controller; Debugging of program, Testing of program

In simple words: The brains of IoT devices: Arduino and Raspberry Pi, their programming, interfacing sensors and cameras, and connecting to the cloud (HTTP, MQTT, HTTPS).

Section 4 — IoT Sensors

Topics: Introduction of Sensors; Various types of Sensors and their applications; Specifications of sensors; Working principle of important sensors; Comparison of sensors and relative advantages and limitations; Selection of sensor based on IOT application; Interfacing of sensors with microcontroller to develop IOT application; Testing of sensors for IOT application

In simple words: Sensors: their types, working principles, specifications, and how to choose and interface the right one for an application.

Section 5 — Use of Actuators for IoT applications

Topics: Introduction to actuators; Various types of actuators; Working principle of actuator; Applications of actuators; Comparison of various actuators and relative advantages and limitations; Selection of actuator based on IOT application

In simple words: Actuators: the devices that let an IoT system act on the physical world, and how to choose between them.

Section 6 — IoT Network Connectivity

Topics: Introduction to IoT network technologies; Various options for IoT connectivity; Comparison of various options for IoT connectivity; Selection of IoT connectivity based on application parameter like Range, Data size, Rate of data transfer, Type of data, Number of devices to be connected etc.

In simple words: How IoT devices connect: the network options available, and choosing one by range, data size, speed and number of devices.

Section 7 — Cloud and Application of IoT

Topics: Various options available to store IOT Data; Comparison of storage options; Storage on premises and Cloud; IOT Database; Selection of database; Interfacing Database with IOT application; Requirements for IoT applications; Selection of sensors and actuators as per IoT application; IoT dashboard building; Authentication; IoT application building as per real world application related to Smart City, Healthcare, Automotive, Manufacturing; IoT based mobile application development; Use of API in IoT application Building; Basics of Machine Learning and AI; Use of Machine Learning and Artificial Intelligence in IoT; Industrial Use cases

In simple words: The cloud side: storing IoT data, databases, dashboards and authentication, building real IoT applications for smart cities, healthcare, automotive and manufacturing, and where ML and AI fit in.

Practical Work

- Comply with Industry health and safety guidelines.
- Identify the market needs & customer demand analysis.
- Ability to develop basic circuit design and measurement techniques and calibration according to common engineering standards symbols, unit, schematics.
- Ability to generate ideas for upgrading existing product or creation of new product as per customer requirement.
- Ability to convert Ideas into reality by developing prototype model with the help of microcontrollers and wired or wireless protocols.
- Ability to develop IOT applications based on specific needs.
- Ability to handle cloud operations for internet of things applications.
- Ability to implement ideas for entrepreneurship and better career opportunities.
- Create value by using problems solving approach and by applying innovation techniques.
- Ability to develop IoT applications related to home automation, agriculture, smart city, automotive, manufacturing etc.
- Able to create innovative products, processes, services, business models etc.
- Able Create and protect their intellectual property.
- Start Their Own Business | Start up | Entrepreneurship.

Reference Books

Reference books are not listed for this subject in the official syllabus.

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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.