SYLLABUS FOR BOARD OF STUDIES ADOPTION — generated from the live catalogue record

IoT with Raspberry Pi and Arduino

S-08A · 5 days (configurable 1–5 days) · Informatics · IoT · Years: 3rd, PG

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OVERVIEW

Sensors, actuators, microcontroller programming and a working connected device with a cloud dashboard.

IoT connects the physical and digital worlds across agriculture, manufacturing and cities; a working connected device with a cloud dashboard is a standout final-year project.

HOURS AND CREDIT POSITION

Contact hours: 40 Guided project: 20 Self-study: 0 Notional total: 60

Credit claim: 2
60 notional hours ÷ 30 hours per credit (NSQF track, UGC Micro-credentials Guidelines §5.3.3) = 2 credits.

COURSE OUTCOMES

CO1. Describe the architecture of an IoT system from sensor to cloud (K2)
CO2. Program a microcontroller to read sensors and drive actuators (K3)
CO3. Control hardware from a Raspberry Pi using Python (K3)
CO4. Transmit device telemetry using MQTT (K3)
CO5. Build a connected device with a live cloud dashboard (K3)

COURSE CONTENT — MODULES

Hours shown are the recommended format; module time scales proportionally when the engagement runs 1–5 days.

Module 1 — IoT foundations (5h recommended)
Theory: Architecture, sensors, actuators, the edge-to-cloud path
Lab: Map an IoT architecture
Output: Architecture diagram

Module 2 — Microcontrollers (5h recommended)
Theory: Arduino programming, digital and analog input/output
Lab: Program an Arduino to read and act
Output: Arduino sketch

Module 3 — Single-board computers (5h recommended)
Theory: Raspberry Pi, GPIO, Python control
Lab: Control hardware from a Raspberry Pi
Output: Pi control script

Module 4 — Sensors and actuators (5h recommended)
Theory: Reading sensors, driving actuators, calibration
Lab: Wire and calibrate sensors and actuators
Output: Working sensor rig

Module 5 — Connectivity (5h recommended)
Theory: Wi-Fi, MQTT, publish and subscribe
Lab: Publish telemetry over MQTT
Output: MQTT telemetry stream

Module 6 — Cloud integration (5h recommended)
Theory: Sending telemetry to a cloud service
Lab: Send device data to the cloud
Output: Cloud-connected device

Module 7 — Dashboards (5h recommended)
Theory: Visualising device data
Lab: Build a live dashboard
Output: Device dashboard

Module 8 — Device capstone (5h recommended)
Theory: A connected device with a live cloud dashboard
Lab: Assemble the capstone device
Output: Connected device + dashboard

ASSESSMENT SCHEME (100 MARKS)

Continuous lab exercises — 40 marks
Capstone project & demonstration — 40 marks
Quiz & viva voce — 20 marks

CO–PO MAPPING

CO1 !’ PO1 (strength 2)
IoT architecture is foundational knowledge.

CO2 !’ PO3 (strength 2)
Microcontroller programming is solution development.

CO3 !’ PO3 (strength 2)
Controlling hardware is solution development.

CO4 !’ PO5 (strength 2)
MQTT is a modern tool of the field.

CO5 !’ PO3 (strength 2)
The connected device is a developed solution.

EVERY PARTICIPANT RECEIVES

- Certificate of completion
- Course material
- LMS access
- Interview question bank
- Mock interview & viva practice
- Optional nasscom NSQF assessment (priced per candidate on your quotation)

FEE

¹1,250 per student, incl. GST
Excludes the optional nasscom assessment where offered. Final pricing on your college's quotation.

DESIGNED BY

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