



Reference: ITBI/CUET/DLG 1302

Date: 22/10/2025

Outline for

Drone Workshop: Introduction to Robotics, IoT, and Drone Building

Organized by: **Diligite Ltd.**

Collaborating Partner: **IT Business Incubator, CUET**

Registration Link: www.itbi-cuet.com/drone-workshop

Learning Outcome: Students will be able to learn how smart systems connect, from basic robotics and IoT to building and flying drones.

Workshop Summary

No.	Subject	Comments
1	Duration	1 Day (6 Hours of Sessions)
2	Delivery Mode	Offline
3	Schedule	Friday, 10:00 AM – 1:00 PM and 2:00 PM – 5:00 PM
4	Pre-requisites	Yes - Basic knowledge of electronics
5	Lab Facilities	ITBI, CUET & Diligite Ltd. will provide.

Coordinator

Professor Dr. M. Moshikul Hoque

Professor, Dept of CSE, CUET
Director, IT Business Incubator, CUET
Former Dean, Faculty of ECE, CUET
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Master Trainer

Professor Dr. Sharif Uddin Ahmed Rana

CEO, Innovation Lab, USA
Professor, Paris Graduate School, France
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Trainers

S. M. Fahim Faysal

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CEO, Diligite Ltd.

Trainer & Mentor, EDGE IICT CUET DST

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Outline & Hourly Schedule

Hour 1 – Introduction & Bluetooth Robot Car (Basics & Demo)

Topics:

- Welcome, objectives, and overview of the day's topics
- Basic concept of robotics and control systems
- Components of a Bluetooth-controlled robot car: chassis, DC motors, motor driver (L298N), Arduino/ESP32, and Bluetooth module (HC-05)
- Understanding Bluetooth serial communication

Demonstration (by Instructor):

- Step-by-step explanation of connections using a sample robot car
- Demonstrate how Bluetooth commands control motor movement
- Show working of a pre-built robot car controlled via smartphone app

Learning Outcomes:

- Understand how wireless control works in a simple robot
- Recognize key hardware parts and their functions
- Learn how Arduino processes Bluetooth signals for motor control

Hour 2 – IoT Project: Temperature & Weather Station

Topics:

- What is IoT and how it connects devices to the internet
- Basic IoT system structure: sensor → controller → cloud → dashboard
- Introduction to sensors (DHT11/DHT22, BMP180)
- Using platforms like ThingSpeak or Blynk to visualize real-time data

Demonstration (by Instructor):

- Connect a DHT11 sensor with ESP32/NodeMCU
- Show real-time temperature and humidity data on an IoT dashboard
- Explain code structure and data upload process

Learning Outcomes:

- Understand IoT data flow and online visualization
- Learn the basics of sensor interfacing
- See real-time example of IoT in action

Hour 3 – Quadcopter Fundamentals (Theory + Components Demo)

Topics:

- Principles of flight: lift, thrust, drag, and weight
- How quadcopters achieve stability and control
- Main components: Frame, BLDC motors, ESCs, propellers, flight controller, transmitter, receiver, battery
- Understanding circuit layout and power distribution



Demonstration (by Instructor):

- Show each drone component and explain its purpose
- Illustrate wiring diagram and setup on a display/projector

Learning Outcomes:

- Identify all major drone parts and their functions
- Understand how flight controllers and ESCs interact
- Learn basic aerodynamics behind drone flight

Hour 4 – Drone Assembly & Setup Process**Topics:**

- Step-by-step drone assembly workflow:
 1. Mounting motors on frame
 2. Connecting ESCs and flight controller
 3. Receiver binding and transmitter setup
 4. Mounting propellers and power system
- Software overview: Betaflight/Mission Planner basics

Demonstration (by Instructor):

- Display assembly process live or through a recorded clip
- Show flight controller configuration screen
- Demonstrate correct propeller alignment and battery connection

Learning Outcomes:

- Understand how to assemble a drone from scratch
- Learn the correct wiring and calibration sequence
- Be aware of safety steps during assembly

Hour 5 – Drone Calibration, Safety & Future Applications**Topics:**

- ESC calibration and motor testing
- Pre-flight checks: motor direction, propeller balancing, battery health
- Basic flight safety measures and do's & don'ts
- Real-world drone applications in mapping, delivery, and surveillance
- Future integration with IoT and AI

Demonstration (by Instructor):

- Show motor spin test and basic setup using flight software
- Explain calibration steps and safety procedures

Learning Outcomes:

- Understand the process of preparing a drone for safe flight
- Learn about drone calibration and testing workflow
- Explore real-life drone applications and future possibilities

Hour 6 – Q&A Session and Troubleshooting



Overall Learning Outcomes of the Workshop

By the end of the 6-hour session, participants will:

1. Understand how a Bluetooth robot car works and how to control it wirelessly.
2. Learn the fundamentals of IoT systems through a live demonstration.
3. Gain strong theoretical and visual understanding of quadcopter design and assembly.
4. Understand drone calibration, safety, and operation principles.
5. Develop awareness of how robotics, IoT, and drones connect in modern technology applications.

Participant's Eligibility and Selection Process

To participate in the workshop, candidates must apply through the registration link. An online eligibility test will be conducted, followed by a short viva. Selected students will be confirmed based on their performance in the test.

Contact Information

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