SAVITRIBAI PHULE
PUNE UNIVERSITY
(Formerly University of Pune)

DRONEACHARYA
AERIAL INNOVATIONS
LIMITED

Board of Studies,
Department of Technology

Electronics & Electrical (EE) Technology

Curriculum Structure for

Professional Certification Programme

in

CERTIFICATE COURSE IN DRONE BUILDING

Course Name: Professional Certification Programme in

CERTIFICATE COURSE IN DRONE BUILDING

Compulsory Modules – 3

Duration: 10 DAYS

Course Intake: - 40

Course Mode: - Classroom (Hybrid)

Eligibility Criteria:

10th Pass
Education Background:- Should able to read,Understand& write English/Hindi

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Board of Studies, Electronics and Electrical Technology(EE)

Curriculum Structure for Professional Certification

Programme in

CERTIFICATE COURSE IN DRONE BUILDING

Sr. No.	Subject Code	Subject Name	Credits	Teaching Scheme (Theory)	Teaching Scheme (Practical)
1	CCDB1	FUNDAMENTALS IN DRONES	2	√	√
2	CCDB2	DRONE HARDWARE AND SOFTWARE	2	√	√
3	CCDB3	DRONE BUILDING HANDS ON	2	√	√
		Total Course Credits	6		

TAKEAWAYS AFTER COMPLETION OF (CCDB) COURSE

A strong foundation in the theory and practical abilities necessary to design, assemble, and maintain drones is the main takeaway from a certificate course in the fundamentals of drone building. The ability to develop specialized drones that are suited to particular requirements is provided by the students' thorough understanding of drone parts, electronics, and manufacturing methods. They also become skilled at maintenance and troubleshooting, ensuring the continued usability of their innovations. The knowledge gained from this course enables students to innovate with drones and advance fields like research, agriculture, aerial photography, and more while maintaining compliance with safety and legal requirements in the quickly developing world of drone technology.

CCDB1 : FUNDAMENTALS IN DRONES

Learning Outcomes

This involves a thorough understanding of the principles underlying drone technology and use. Students will master drone classification, components, and applications while learning about the legal and ethical drone operation regulatory framework put in place by the DGCA. They will get a firm understanding of fixed-wing and multi-rotor UAV flying concepts, enabling them to assess and enhance drone performance. By the end of the course, students should be prepared to handle the complexities of drone operation, regulatory compliance, and the choice of the best UAV platform for particular applications, ensuring their readiness for responsible and efficient drone use across a variety of industries and sectors.

Syllabus

Introduction of Drones: Introduction, Types of drones, Application, Future scope.

DGCA Rules & Regulation: Preliminary, Classification, Authorization & Regulation, Operation of UAV, General.

Basic principles of flight: Lift vs. related wind, Bernoulli's principle, Newton's laws of motion, Lift equation, Pressure distribution, Weight, thrust & Drag, Ground effect.

Fixed Wing UAV: Force operating, Flight maneuver, Controls, Types.

Multi Rotor UAV: Quadcopter physics, Block Diagram, Controls.

CCDB2 : DRONE HARDWARE AND SOFTWARE

Learning Outcomes

Providing students with a thorough understanding of both the physical and digital systems that make up a drone is one of the learning outcomes for a course on drone hardware and software. In order to build and configure working UAVs, students will become proficient at spotting, choosing, and integrating drone hardware parts such motors, propellers, sensors, and flight controllers. They will also learn how to manage software, including how to upgrade firmware, use flight planning software, and use data analysis tools, all of which will help them plan missions, optimize drone performance, and process and analyze flight data. Students should be well-equipped at the end of the course to efficiently develop, manage, and fly drones, utilizing their hardware and software skills to fully utilize drone technology for a variety of applications.

Syllabus

Drone Hardware: Introduction to Drone Hardware, Drone components (Electronic components, Sensors), Drone circuitry.

Drone Hardware: Soldering Technique.

Drone Hardware: Drone Assembly & Disassembly.

Drone Software: Introduction to mission planning & mission planner software, Introduction to the software interface, Geofencing, Parameters and calibration setup.

Drone Software: Introduction to mission planning simulation, Mission planning - plan 1 (simple mission), Plan 1 mission execution using simulation.

Drone Software: Mission planning - plan 2 (Advance mission), Plan 2 mission execution using simulation.

Drone Software: Connecting mission planner software to drone, Initial Setup of drone Calibration of components (ESC, Transmitter, Flight Controller), PID tuning of the drone.

Drone Software: Simulator practice, Test Flight (demo), Designing Software, Introduction to Fusion 360, Design methodology, Designing a drone frame from scratch.

Designing Software: Assembly of all components, Checking the drone characteristics (Material, weight).

Designing Software: Drone design assignment.

Designing Software: Drone design assignment, Simulation Software(MATLAB & Simulink), Introduction to MATLAB and Simulink, Introduction to software interface, Case studies, Simulation Software(MATLAB & Simulink), Understanding PID Control systems, Developing your own basic PID control system.

Drone Equipment and Maintenance: Introduction to Pre-flight, In- flight, Post-flight Checklist, Types of drone maintenance (periodic and condition-based maintenance), Cleaning of drone hardware,Battery Maintenance and charging procedure.

CCDB3: DRONE BUILDING HANDS ON

Learning Outcomes

Students will acquire practical knowledge and abilities that will enable them to autonomously design, assemble, and maintain drones. The ability to choose the right parts, set up flight controllers, put together airframes, and integrate electronic systems will be developed by students as they build fully functional UAVs. In order to ensure the dependability and endurance of their works, they will also learn how to solve technical problems and carry out regular maintenance. These hands-on learning opportunities will enable students to develop into expert drone builders who can modify and adapt drones for particular uses, promote innovation, and support sectors like aerial photography, surveying, research, and more while adhering to safety and regulatory standards in the rapidly evolving field of drone technology.

Syllabus

Drone Building Practical, Components layout and direct implementation, Assembly of actual drone kit, Soldering components and Binding RC, Calibration and mission planning, Troubleshooting Error, Testing drone controls and flying