

DRONE CURRICULUM for 50-hours fast track certificate course

Course name : Drone Operation & maintenance

L - T - P : 3-1-0

Credits - 4

Course Objectives:

Introduction to drone technology, basic concepts of flight of drones, rules and regulations, radio frequency, components used in drones, assembly, employ-ability and entrepreneurship skill development.

Module 1: Conditions required before flying (3L)

DGCA Civil Aviation Requirement - UIN number - UAOP - RPAS Do's and Don'ts - Airspace structure and airspace restrictions with the knowledge of No fly zones - ATC Radio telephony and phraseology - Understanding ATC operations - Collision avoidance - Weather and Meteorology - Standard atmosphere, measuring air pressure, heat & temperature, cloud formation - METAR Terminal Aviation Routine Weather Report (METAR)

Module 2: Basic aerodynamics and Introduction to drone technology (10L)

Introduction to aerodynamics - Fundamental principles of flying - Forces of flight - axes of flight - drone nomenclature - types of drones - fixed wing - multicopters - Current/Future uses of drones - components used in drones

Module 3: Principles of electricity and related components used in drones (10L)

Electricity fundamentals - wattage, voltage, amperage and their relationship - soldering techniques - motors - AC & DC differences - amperage and voltage ratings - brushed vs brushless motors - BLDC - Kv ratings - calculation of motor capability in drone build - Batteries - series and parallel connection - rechargeable batteries - Li-PO battery characteristics - Charging & cell balancing - various connectors - Electronic Speed Controller (ESC) - Flight controller - role of flight controllers - sensors - recognize different sensors and their application in drones - sense and avoid technology - GNSS application

Module 4: Payloads, GCS, Applications and Preventive measures (10L)

Payloads - camera options: lens, exposure settings - LiDAR. Thermal, RGB, Hyper spectral - other payload possibilities - Ground Control Station (GCS) - Introduction to Telemetry - data tracking - mission planning - First-Person-View flying - safety accident avoidance - checklists - first aid in case of electrical accidents

Course name : Drone pilot Practicals

L - T - P : 0-0-2

Credits - 1

Course Objectives:

Simulator training - Identify and select drone components - assembly – Li-PO battery charging - drone flying

Activities: (13P)

1. Choose respective drone components
2. Solo Take-off, flying and landing of a drone

Course Outcomes:

Students will be familiar with

- DGCA regulations and no fly zones
- Drone technology and how drones function
- Components used in a drone
- Various payloads and their application
- Drone flying without any assistance

References :

1. DGCA CAR regulations
2. Airframe handbook by FAA-15A
3. Helicopter theory of flight
4. Robotshop website
5. Droneomega website
6. Employability skill by Arihant publications approved by NSDC