

GANPAT UNIVERSITY									
FACULTY OF DIPLOMA ENGINEERING									
Programme		Diploma Engineering				Branch/Spec.	Electronics and Communication Engineering		
Semester		VI				Version	1.0.0.0		
Effective from Academic Year			2026-27			Effective for the Batch admitted in		July 2024	
Course Code		1EC61PE02	Course Name			Drone Technology			
Teaching Scheme						Examination Scheme (Marks)			
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	1	0	4	Theory	40	60	100
Hours	3	0	2	0	5	Practical	30	20	50
Pre-requisites									
Basics concepts of Electronics, electrical and mechanical components									
Course Outcomes									
On successful completion of the course, the students will be able to:									
CO1	Analyze the fundamental principles of flight and the structural components of various Unmanned Aerial Vehicles (UAVs).								
CO2	Evaluate propulsion systems, sensors, and communication protocols required for stable drone operation.								
CO3	Design and Simulate flight paths and control algorithms for autonomous navigation.								
CO4	Synthesize knowledge of DGCA regulations and safety protocols for commercial and private drone deployment.								
Theory Syllabus									
Unit	Content								Hrs.
1	Introduction to UAVs and Aerodynamics: History of drones, Classification (Nano, Micro, Small, Medium, Large), Principles of flight: Lift, Weight, Thrust, and Drag, Dynamics of Multirotors: Pitch, Roll, and Yaw.								07
2	Hardware and Propulsion Systems: Airframe materials and designs, Brushless DC (BLDC) Motors and KV ratings, Electronic Speed Controllers (ESC), Li-Po Battery technology and Power Distribution Boards (PDB), Propeller theory.								09
3	Sensors and Control Units: Architecture of Flight Controllers (e.g., Pixhawk, KK), Sensors: IMU, GPS, Magnetometer, Barometer, and Ultrasonic sensors; Telemetry and Radio Frequency (RF) communication; Payload integration (Gimbals and Cameras).								10
4	Navigation and Autonomous Flight: Introduction to PID control; Manual vs. Autonomous flight modes; Mission planning: Waypoints, Geo-fencing, and Return-to-Launch (RTL); Use of GCS software (Mission Planner/Q ground Control).								10
5	Indian Regulatory Framework and Maintenance: DGCA Rules 2021; Digital Sky Platform; NPNT (No Permission, No Takeoff); Airspace zones (Green, Yellow, Red); Pre-flight/Post-flight checklists and troubleshooting.								09
Practical Content									
Practical assignments and tutorials are based on the above syllabus.									
Text Books									
1	Fundamentals of Drone/UAV Technology by Dr. Nitesh Tiwari, S.K. Kataria and Sons.								
Reference Books									
1	Mastering Drone Technology with AI by Dr. Subhash K. Shinde, BPB Publications.								
2	Drone Technology: Future Trends by Sachi Nandan Mohanty, Wiley-Scrivener.								

ICT/MOOCs Reference	
	https://onlinecourses.nptel.ac.in/noc26_ae03/preview
	https://onlinecourses.nptel.ac.in/noc25_ae30/preview

Mapping of CO with PO and PSO:															
	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P O 12	P S O 1	P S O 2	P S O 3
CO1	2	2	1	1	2	0	0	0	0	1	0	2	2	1	1
CO2	3	3	3	2	2	0	0	0	1	1	1	2	1	2	2
CO3	2	2	1	2	1	0	0	0	0	1	0	2	2	1	1
CO4	3	1	2	2	1	0	0	0	0	1	0	3	1	2	2