

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Sessional	Final Exam	Total
COM-802 (A)	UAVs and Drone Technology	PEC	3	2	1	0	50	100	50

**Course Outcomes:**

At the end of the course the students will be able to	
CO1	Articulate the basic principles, components, and applications of drone technology.
CO2	Demonstrate knowledge of drone hardware components and their functionality.
CO3	Appreciate drone flight dynamics, control systems, and navigation techniques.
CO4	Develop knowledge of drone navigation and synchronization techniques.
CO5	Formulate algorithms for drone operations, control, and intelligence.

**Detailed Syllabus****Section-A**

**UNIT 1:** Introduction to Drones: Basics of drone technology and its historical background, Types of drones and their applications in different industries, Current trends, and prospects of drone technology. Drone applications in industries such as agriculture, construction, cinematography. **(6 Hrs.)**

**UNIT 2:** Drone Components and Systems: Understanding drone hardware components: frame, motors, propellers, and batteries, Introduction to drone sensors like GPS, accelerometers, gyroscopes, and camera. **(9 Hrs.)**

**UNIT 3:** Overview of drone software and control: Drone Flight Dynamics and Control, Principles of flight including aerodynamics, lift, drag, and thrust, Drone stabilization and control mechanisms, Introduction to flight modes and maneuvers. **(11 Hrs.)**

**Section-B**

**UNIT 4:** Drone Navigation and Synchronization: Global Positioning System (GPS) and its role in drone navigation, Autonomous flight and obstacle avoidance systems, Sensor technologies for mapping, imaging, and data collection, Drone Operation and Flight Planning, Practical Implementation of application-based Drone Model. **(9 Hrs.)**

**UNIT 5:** Algorithms: Flight Control Algorithms, Navigation Algorithms, Path Planning Algorithms, Obstacle Detection and Avoidance, Target Tracking Algorithms, Swarm Algorithms, Image, and Video Processing. **(8 Hrs.)**

**Textbooks**

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Introduction to UAV Systems	Paul Fahlstrom and Thomas Gleason	Wiley Publication	4 <sup>th</sup> (2012)

**Reference Books**

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Drone Technology: Future Trends and Practical Applications	Sachi Nandan Mohanty	Wiley Publication	1 <sup>st</sup> (2023)
2	Drone Technology in Architecture, Engineering and Construction	Daniel Tal, John Altschuld	Wiley Publication	1 <sup>st</sup> (2021)