Unit-1 Introduction to Unmanned Aircraft Systems

16 MARKS

Basic Concepts and History

1. Define Unmanned Aerial Vehicles (UAVs).
2. Discuss their primary components and how they differ from manned aircraft.
3. Trace the historical development of UAVs.
4. Identify and describe at least three key milestones in their evolution.
5. Describe the different categories of UAVs based on their size, range, and application.
6. Include examples for each category.
7. Explain the significance of UAVs in modern warfare.
8. Provide historical and contemporary examples of their use in military operations.
9. Discuss the role of UAVs in commercial applications.
10. Highlight at least three industries where UAVs are making a significant impact.

UAV Components and Systems

1. Detail the key components of a UAV.
2. Explain the function of each component, including the propulsion system, avionics, communication systems, and payload.
3. Compare and contrast the different types of propulsion systems used in UAVs.
4. Discuss the advantages and disadvantages of electric versus internal combustion engines.
5. Explain the role of flight controllers in UAVs.
6. How do they contribute to stability and control during flight?
7. Describe the various sensors used in UAVs.

8. Discuss how these sensors contribute to different UAV functionalities, such as navigation and data collection.

Analyze the communication systems used in UAVs.

Explain how data is transmitted between the UAV and the ground control station.

Flight Dynamics and Control

1. Describe the principles of flight dynamics as they apply to UAVs.
2. Include discussion on lift, drag, thrust, and weight.
3. Explain the different flight control modes used in UAVs (e.g., manual, semi-autonomous, and autonomous). Provide examples of scenarios where each mode might be used.
4. Discuss the challenges associated with maintaining UAV stability and control.
5. How do flight controllers and stabilizing systems address these challenges?