Course Title	Course Code	Credit Hours
Unmanned Aircraft Systems	AE-481	3-0

Textbooks:

- Paul G. Fahlstrom, and Thomas J. Gleason, "Introduction to UAV Systems", Wiley

Reference Books/Materials:

- Kimon P. Valavanis, George J. Vachtsevanos (Editors), "Handbook of Unmanned Aerial Vehicles", Springer
- Reg Austin, "Unmanned Aircraft Systems: UAVs Design, Development and Deployment", Wiley
- Randy Beard, and Tim McLain, "Small Unmanned Aircraft: Theory and Practice", Princeton University Press
- Ahmad Taher Azar and Anis Koubaa, "Deep Learning for Unmanned Systems", Springer International Publishing
- Yasmina Bestaoui Sebbane, "Intelligent Autonomy of UAVs: Advanced Missions and Future Use", CRC Press

Course Objectives:

The course aims to help students:

- Understand the design, development, and operational principles of UAVs.
- Explore autonomous systems and their applications in aerospace.

Course Outline:

- Overview of UAV Types and Classifications.
- UAV Aerodynamic Principles and Flight Dynamics.
- Propulsion Systems for UAVs: Electric, Internal Combustion, and Hybrid.
- Flight Control Systems: PID Controllers, Autopilots, and Stability Augmentation.
- Sensors and Actuators Used in UAVs.
- UAVs Materials and Manufacturing Techniques
- UAV Navigation and GPS/INS Integration.
- Communication Systems and Data Links for UAVs.

- Data Acquisitioning and Data Visualization Techniques
- Ground Control Stations and UAV Operation.
- Autonomous Flight and AI-Driven Decision-Making.
- Obstacle Avoidance and Path Planning Algorithms.
- Regulatory Frameworks and Airspace Management for UAVs.
- UAV Payload Integration: Cameras, Sensors, and Delivery Systems.
- Ethical Considerations and Privacy Concerns in UAV Use.
- Case Studies: UAV Applications in Military, Agriculture, and Disaster Management.
- Future Trends and Innovations in UAV Technology.