UNMANNED AERIAL VEHICLES

OPEN ELECTIVE - III

VII Semester

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
A5AE67	OEC	3	0	0	3	30	70	100

COURSE OBJECTIVES
1. To understand the evolution and applications of unmanned aerial vehicles.
2. To illustrate the subsystems of UAVs.
3. To explain the process involved in design of UAVs.

UNIT-I	INTRODUCTION TO UAV

Historical Development, Overview of UAV Systems and sub-systems, Classification, Informal Categories, The Tier System, Classification Change.

UNIT-II	BASIC AERODYNAMICS AND PERFORMANCE of UAV

Basic Aerodynamic Equations, Air foils, lift, drag, moments, Aircraft Polar, The Real Wing and Airplane, Induced Drag, Total Air-Vehicle Drag, Flapping Wings, Rotary wings. Climbing Flight, Range, Endurance, Gliding Flight

UNIT-III	PROPULSIVE SYSTEMS, STRUCTURES AND LOADS, PAYLOAD

Thrust Generation and basic thrust equation, Sources of Power, Loads, types of loads, Materials, construction techniques. Payloads-Reconnaissance/Surveillance Payloads, Weapon Payloads, Other payloads

UNIT-IV	UAV SUBSYSTEMS

Mission Planning and Control Station- Types, Physical Configuration, Planning and Navigation, MPCS Interfaces, Modes of control, piloting and controlling mission, Autopilot system Launch Systems- Basic Considerations, launch Methods for Fixed, rotary wing UAV Recovery Systems

UNIT-V	BASICS DESIGN AND CASE

Introduction to Design and Selection of the System - Conceptual Phase, Preliminary Design, Detail Design, Selection of the System Case study on Indian UAVs(Rustom, Lakshya, AURA) Case study on Israeli-Heron, US- MQ9 Reaper

Text Books:

1. Paul Fahlstrom, Thomas Gleason - Introduction to UAV Systems-Wiley (2012)
2. Reg Austin, "Unmanned Air Systems: UAV Design, Development and Deployment", First Edition, Wiley Publishers, 2015.

Reference Books:

1. Mirosaw Adamski, "Power units and power supply systems in UAV", New Edition, Taylor and Francis Group publishers, 2014.
2. Skafidas, "Microcontroller Systems for a UAV", KTH, TRITA-FYS 2002:51 ISSN 0280-316X. 34, 2002.

COURSE OUTCOMES
1. Classify the Unmanned Aerial Vehicles.
2. Calculate the basic performance parameters for aircraft.
3. Identify and illustrate various payloads and propulsive systems.
4. Explain the functioning of subsystems in UAVs.
5. Illustrate the design process for a UAV..