COURSE CODE	COURSE TITLE	L	T	P	C
1153AE106	INTRODUCTION TO UAV	3	0	0	3

Course Category:

University Elective

a. Preamble :

This course provides hands on experience on design, fabrication and flying of UAV category aircraft. Students will get in-depth skill set on design and fabrication techniques of UAV.

b. Prerequisite Courses:

NIL

c. Related Courses:

- Fundamentals of Flight
- Flapping wing Dynamics

d. Course Educational Objectives :

- To understand the preliminary concepts of model aircraft design
- To impart practical skill on fabrication and flying of UAV category aircrafts

e. Course Outcomes :

Upon the successful completion of the course, students will be able to:

CO Nos.	Course Outcomes	Knowledge Level (Based on revised Bloom's Taxonomy)
CO1	Describe the parts and functions of UAV & Indian Aviation regulations of UAV	K2
CO2	Explain the concepts of Aerodynamics, Propulsion & Structures of Model Aircrafts	K3
CO3	Describe the working principle and components of UAV	K2
CO4	Demonstrate the design process of UAV	K3, S3
CO5	Demonstrate design, fabrication and Flying of UAV	K3, S3

f. Correlation of COs with POs :

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	**H**	**H**	**H**	M			H	H			
CO2	H		**H**	**H**				H	H			
CO3	H		**H**	**H**				H	H			
CO4	H	**H**	**H**	**H**				H	H			
CO5	H	**H**	**H**	**H**				H	H			

H- High; M-Medium; L-Low

g. Course Content :

UNIT I BASICS OF FLIGHT 9

Different types of flight vehicles - Components and functions of an airplane - Forces acting on Airplane - Physical properties and structure of the atmosphere - Aerodynamics –Airfoil nomenclature -aerofoil characteristics - Angle of attack, Mach number- Lift and Drag - Propulsion and airplane structures.

UNIT II UNMANNED AERIAL VEHICLE 9

Difference between aircraft and UAV - Parts and functions of Fixed, Rotorcraft and flapping wing UAV – various History of UAV's, Types of Drones, Applications and Uses. Characteristics of Multi rotor vehicle, Fixed Wing vehicle, Flapping wing Vehicles and their applications – Defense, Civil, Environmental monitoring (physical, chemical and biological).

UNIT III PAYLOADS FOR UAV 9

Payloads – Classification of Payloads – camera – sensors – radars – various measuring devices – classification of payload based on applications – Hyper spectral sensors – laser detection and range – synthetic aperture radar – thermal cameras – ultra sonic detectors - case study on payloads.

UNIT-IV LAUNCH AND RECOVERY 9

Launching systems - UAV Launch Methods for Fixed-Wing Vehicles - Vertical Takeoff and Landing UAV Launch - Recovery systems.

UNIT-V UAV NAVIGATION AND GUIDANCE SYSTEMS 9

Navigation - Dead Reckoning – Inertial – Radio Navigation – Satellite – Way point Navigation. Dijkstra's Algorithm – A- star Algorithm - –UAV Guidance – Types of guidance - UAV communication systems - Ground control station – Telemetry - UAS future.

Total: 45 Periods

h. Learning Resources

i. Text Books :

1. Andey Lennon " Basics of R/C model Aircraft design" Model airplane news publication