

COURSE CODE	COURSE TITLE	L	T	P	C
1154AE107	AERIAL SURVEY USING UAV	1	0	0	1

Course Category:

Allied Elective

a. Preamble :

UAS (Unmanned Aerial System) are versatile in nature; one of the interesting applications of UAS is aerial mapping. This course gives basic knowledge on UAS and aerial mapping techniques.

b. Prerequisite Courses:

NIL

c. Related Courses:

- Disaster Management
- Unmanned Aerial Vehicle

d. Course Educational Objectives :

- To understand the preliminary concepts of UAS
- To impart basics of aerial mapping

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 UAS, applications & Indian Aviation regulations of UAS	K2
CO2	Discuss working principle of UAS	K3
CO3	Explain the design process of UAS	K2
CO4	Explain aerial photography	K3, S3
CO5	Explain digital camera, sensors and software's for aerial mapping.	K3, S3

a. 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

b. Course Content :

UNIT-I Introduction to UAV

3

Introduction - Parts and functions of UAV – Classifications of UAV – UAV systems overview– UAV applications - Indian Aviation regulations – Applications of UAV.

UNIT-II Basics of Aeronautics

3

Forces acting on Airplane – Basics of UAV aerodynamics, structures, propulsion and flight mechanics – UAV control techniques.

UNIT-III UAV design

3

Introduction – Performance and geometrical scaling techniques - Weight Estimation – Selection of Parameters – Wing loading and thrust loading – aerodynamics design - Launching and recovery design - Landing Gear design – CG Location and its effects on Aircraft stability – Structural Design – Design sheet preparation

UNIT-IV Aerial Survey

3

Introduction To UAV Photogrammetry and Mapping Basics – Mapping – Surveying- Agriculture – Spotting - 3D Maps And Models - DEM / DTM / DSM (surface models) - Orthophoto's (geospatially corrected aerial images) - 3D Building Models - Contour Maps - Planimetric features (road edges, heights, signs, building footprints, etc) - Volumetric Surveys.

UNIT-V Sensors and software's for Aerial Survey

3

Imaging sensors and basics of remote sensing - Case study on sensors and software's for Aerial mapping - DJI Mavic Pro - DJI Matrice 100 Customizable UAV - DJI Phantom 4 For Photogrammetry - SenseFly eBee Pro Mapping UAV - 3DR X8-M Drone For Aerial Mapping – open source software's

Total: 45 Periods

h. Learning Resources

i. Text Books :

1. Andy Lennon “ Basics of R/C model Aircraft design” Model airplane news publication