

UAV Remote Sensing

- 1.1 Course Number: CS383
- 1.2 Contact Hours: 3-0-0 Credits: 9
- 1.3 Semester-offered: 3rd year-Odd
- 1.4 Prerequisite: photogrammetry and geographic information system (GIS); basic GIS or CAD data processing experience; datums and coordinate systems; maps accuracy standard
- 1.5 Syllabus Committee Member: Dr. Sushum Biswas, Dr. Daya Sagar Gupta & Dr. Gargi Srivastava
2. **Objective:** : To educate students on the use of drones to acquire scientific remote sensing data and process various drone-based sensor data sets for multiple applications. The course will involve hands-on experience with drone vehicles, sensors, imagery software and applications. Gain hands-on experience with drone vehicles, sensors, image processing software and applications. With the proliferation of drones there are increasing opportunities to use drones for scientific remote sensing data acquisition and applications. This advanced course focuses on understanding the fundamentals behind acquiring scientific remote sensing imagery with drone-based cameras (e.g. multi-spectral and thermal) and processing the data for various applications
3. **Course Content:**

Unit-wise distribution of content and number of lectures

Unit	Topics	Sub-topic	Lectures
1	Introduction: Course Requirements, Basic Drone Remote Sensing Concepts	Course syllabus and expectations Drone, UAV, UAS definitions and history Introduction to GGS's drone platforms Drone remote sensing applications	6
2	Drone System Components	Overview of Drone data processing software and AWS	6
3	Drone Systems, Platforms and Licensing	Overview of Drone data processing software and AWS	6
4	Drone Photogrammetry 1	Processing drone imagery	6

5	Multi-spectral sensing with UAV's	Sensor calibration; Sensor calibration	6
6	Drone-based LiDAR data collection and processing	Drone-based LiDAR data collection and processing	5
7	Drone Remote Sensing Analysis- Science and application	Drone Remote Sensing Analysis-Science and application	5
		Total	40

4. Readings

4.1 Textbook:

Small-Format Aerial Photography and UAS Imagery, ISBN: 9780128129425

4.2 Reference books:

Nothing specific. Study material shared during the course

5 Outcome of the Course: The students should be able to:

- Understand how to use drones as a platform to acquire scientific remote sensing data
- Understand components and functions of a drone system
- Understand the photogrammetric principles of drone-based image acquisition and processing
- Participate in application-specific flight planning and data acquisition with a drone
- Develop insight into regulations and qualifications for safe and legal drone operation
- Understand how to operate various drone-based sensors, RGB camera, Multispectral, Thermal, LiDAR
- Develop the ability to process drone-derived raw data imagery (RGB camera, Multispectral, Thermal, LiDAR) to various products and applications.
- Gain oversight of the complete mission pipe-line, from planning to final product
- Learn to present research proposals and complete a project as a team member