

**JADAVPUR UNIVERSITY**  
**COMPUTER AIDED DESIGN CENTRE**  
**Faculty Council of Engineering & Technology**  
**Kolkata - 700 032**

**Certificate course on**  
**Drone Image Processing**

Unmanned Aerial Vehicle (UAV), popularly known as drone, is an airborne system or an aircraft operated remotely by a human operator or autonomously by an onboard computer. In India, officially UAVs are called Remotely Piloted Aircrafts (RPA). UAV based imaging is a new addition to remote sensing. The rapid development and growth of UAVs as a remote sensing platform, as well as advances in the miniaturization of instrumentation and imaging systems, have resulted in an increasing uptake of this technology in the earth observation community. Even though, tough regulations across the globe may still limit the broader use of UAVs, their use continues to increase since they have several advantages over aeroplanes and satellites. First of all, they are cheap. The cost of a drone is almost zero in comparison to aeroplanes and satellites. Secondly, cameras onboard UAVs can achieve a much higher spatial resolution than conventional platforms. A UAV based camera can reach spatial resolution of one to three centimeters. Thirdly, it can be mobilized (launched) instantly from any location. Finally, from a tablet or smartphone, anybody with proper training can successfully run a UAV remote sensing mission using open source software like APM Planner, Mission Planner or proprietary software that comes with some UAV systems.

This course primarily covers the basic concepts of drone imaging, mission planning, and all possible techniques of drone images by using Agisoft software. All remote sensing and image processing community will be benefited from this course. Please note that we are not authorized to provide UAV piloting certificate. The course is primarily focused on mission planning and image processing, although we shall demonstrate UAV piloting.

Primary Software:

1. Mission Planner (opensource)
2. Various geotagging software (opensource)
3. Agisoft (Proprietary, but demo version is available)

**Course Duration:** 1 month / 24 hours [3 days/week]

**Class Duration:** 2 hrs each (12 classes)

**Eligibility:** Anyone who have adequate knowledge in Remote Sensing and Photogrammetry and working exposure in Digital Image Processing software.

**Syllabus:**

<b>TOPIC</b>	<b>No. of Classes</b>
<b>Introducing to UAV:</b> Introduction, types of UAV, UAV policy in India, flight planning, attitude of UAV, ideal time for UAV imaging.	1
<b>Mission Planning:</b> Mission Planning in Mission Planner software	1
<b>Geotagging Basics:</b> Geotagging with Exif tool, removing Lat/Long/Alt Exif information, extracting Lat/Long/Alt information from image files, generating SHP or KML for exposure stations.	1
<b>UAV Image Processing:</b> Photo alignment with geotagged images, point cloud, mesh. Editing of sparse and dense cloud.	1
<b>UAV Image Processing and Analysis:</b> Model texture, tiled model, DSM, DEM, Orthomosaic, Point, line, area, and volume measurement, generating contour lines, classification of point cloud (manual and automatic).	1
<b>UAV Image Processing:</b> Photo alignment with non-geotagged images, photo alignment with GCPs, batch processing in Agisoft.	1
<b>UAV Image Analysis:</b> Classification of point cloud (manual and automatic), contour generation, DSM and DEM generation, Exporting data products.	1
<b>UAV Image Processing:</b> True and conventional orthomosaic, generating/exporting/modifying seamline, how to create/merge/modify multiple chunks.	1
<b>UAV Image Processing:</b> Generating walkthrough video in Agisoft, Post processing of RTK/PPK UAV images, exporting photogrammetric products in other software.	1
<b>UAV Image Processing:</b> Accuracy Assessment (absolute and relative), Network and cloud processing of Drone images, batch processing in cloud/network.	1
<b>UAV Image Processing:</b> 3D model creation (building/small object/statue)	1
<b>Examinations</b>	1
<b>Total</b>	<b>12</b>

**Examination:** One theory test of 50 marks and one practical test of 50 marks at the end of the course. Pass marks is 40. The candidate requires securing 40% marks (20 in 50) individually in theory and practical test.