Six Months Certification Program for Indian Army on

DRONE Technology and Applications

Organized by:
Drone Research Center Indian Institute of Technology Roorkee

Duration: (i) 06 Month (24 weeks)
📍 **IIT Roorkee**
Mode of Course: IN-PERSON
Number of participants: 60
Date of Start (Tentative): November 2023

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About IIT Roorkee

Indian Institute of Technology Roorkee is among the foremost of institutes of national importance in higher technological education and in engineering, basic and applied research. Since its establishment, the Institute has played a vital role in providing the technical manpower and know-how to the country and in pursuit of research. The Institute ranks amongst the best technological institutions in the world and has contributed to all sectors of technological development. It has also been considered a trend-setter in the area of education and research in the field of science, technology, and engineering.

The Institute had celebrated its Sesquicentennial in **October 1996** and now completed more than **175 years** of its existence. It was converted to **IIT** on **September 21, 2001** by an Ordinance issued by the Government of India declared it as the **nation's seventh Indian Institute of Technology,** an **"Institution of National Importance".**

The Institute offers **Bachelor's Degree** courses in **10** disciplines of **Engineering and Architecture** and **Postgraduate's Degree** in **55** disciplines of **Engineering, Applied Science, Architecture** and **planning**. The Institute has facility for **doctoral work** in all **Departments** and **Research Centers.**

The Institute admits students to **B.Tech**. and **B.Arch**. courses through the **Joint Entrance Examination (JEE)** conducted at various centers all over India**.**

Overview

As a National Mission to improve employment in India and to improve employability of technology graduates, a programmed on Drone Technology and its Applications has been initiated. Drone technology is futuristic technology and is evolving very fast all over the world. In the recent times the avenues for application and usage of Drones in civilian and defense sectors have increased manifold. The Government of India also promoting the use of Drone in civil and defense applications which are creating job opportunity for the drone technology experts..

Objective

The objective of this course is to introduce different type of UAV systems for military and civilian applications. It cover drone design, assembling, flying techniques, field planning, data acquisition, data preprocessing and interpretation of useful information for the project.

Corse content:

(i) Theory:

- Introduction to unmanned aerial vehicles (UAVs)
- Policies, Standards, Trends, and state-of-Technology related to UAVs.
- Flying principles and introduction about different key components and latest technology.
- Mathematical fundamentals related to drone flying and image formation.
- Introduction of various drone components and its assembly.
- Introduction of various payloads/sensors used in remote sensing and navigational field.
- Sensor calibration, UAV data acquisition and Field/Flight planning (All about planning the flight for UAVs)
- UAV Photogrammetry (Including computer vision algorithms: AI, SVM, SLAM).
- Integrating UAVs into 5G and Beyond for wireless coverage
- Design criteria related to UAVs Safety, Cost, portability, commercial viability, and repeatability.
- Anti-Drone Technology
- Stealth Drone
- Introduction of UAV data products and its processing (DEM, DTM, DSM and Ortho-mosaic generation).
- Eextraction of useful information using digital image processing, 3D modelling, machine learning and deep learning on UAV data.
- Aapplications in numerous sector
  - ✓ Surveying (Principle, surveying methods, advance tools and techniques.
  - ✓ Agriculture: Classification, Parametric change estimation, Trend analysis, and Prediction
  - ✓ Surveillance: Detection, Recognition, and Tracking.
  - ✓ Project Monitoring related to construction sites , road etc.
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- Anti-DRONE.
- DRONE Jamming.
- Drone detection .

(ii)Tutorials/Hands on :

- Drone Design and simulation
- Field Hands on (Flying, console, mapping)
- Software/Hardware requirements and installation, image formation, mosaicking and understanding.
- Surveillance: Strategy, planning, processing data, visualisations for
  - ✓ Detection
  - ✓ Recognition
  - ✓ Tracking
- Agriculture monitoring
  - ✓ Strategizing and Planning a Mission
  - ✓ Acquiring of the Data: Multispectral and RGB data
  - ✓ Post-acquisition data processing
  - ✓ Visualizations and analysis
  - ✓ Decision making
  - ✓ Change Detection

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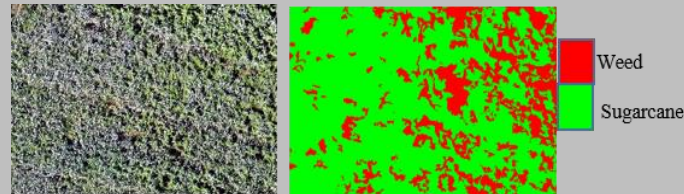
- Project Monitoring: Construction, Road etc.
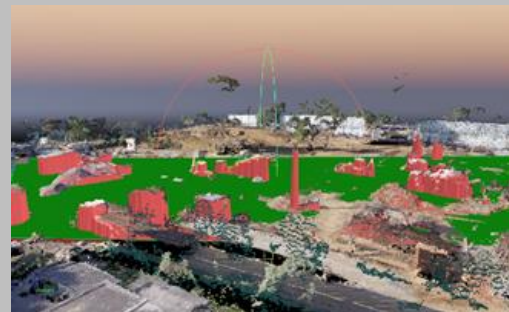
- . Disaster monitoring

(iii) Projects and Seminars

- Interdisciplinary projects
- Advanced seminars on DRONE Application and Assembly

After the completion of this course candidate will gain it knowledge in the theoretical background related to UAVs and data analysis along with the flight planning and data acquisition. This will help to get job in numerous sectors.

Job Opportunity

Future deployment of UAV technology and its greater acceptance in a number of different applications across a diverse stakeholder base has the potential to boost the demand for professionals who are skilled in using this technology. Following are the major sectors in which job opportunity are coming:

- Agriculture Sector
- Defense Sector
- Disaster Management Department
- Construction sites
- Industrial Sites
- Logistics and Deliveries
- Medical Sector
- GIS Mapping and land Surveying
- Etc.,