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MINISTRY OF
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RASHTRIYA RAKSHA UNIVERSITY

(An Institution of National Importance)
Pioneering National Security and Police University of India
Ministry of Home Affairs, Government of India

CENTRE FOR AEROSPACE STUDIES

School of Internal Security, Defence and Strategic Studies

ONLINE
DRONE
CERTIFICATE COURSE

Mode: Online
Date: 20th April to 24th April 2026

SCAN FOR REGISTRATION

UNDERSTANDING DRONES ECOSYSTEM: TRENDS IN DEVELOPMENT, EMPLOYMENT & REGULATIONS OF DRONES OPERATIONS

ABOUT THE COURSE

The rapid evolution of unmanned aerial systems (UAS), commonly known as drones, has fundamentally transformed operational environments across civil, commercial and security domains. From surveillance and disaster response to logistics, infrastructure monitoring and defence applications; drones are now integral part of modern technological ecosystems. This growing relevance necessitates a structured understanding of drone technology, regulatory frameworks, operational principles, emerging counter drone measures. Understanding Drones Ecosystem: Trends in Development, Employment & Regulations for Drones Operations course is designed to address this need by equipping participants with essential knowledge and situational awareness required to operate, regulate or engage with drone ecosystems responsibly and effectively.

Delivered in an online format over five days, the programme introduces participants to the foundational architecture of drone systems while situating their use within national and international regulatory frameworks. The course begins by examining stakeholders, aviation norms and India's evolving drone regulations, including certification, classification, operational guidelines and compliance mechanisms. This regulatory grounding ensures that participants understand both the opportunities and responsibilities associated with drone operations.

Building on this framework, the course explores the science of flight through aerodynamics and flight principles. Participants gain conceptual clarity on take-off dynamics, maneuvering, navigation and the operational behavior of unmanned platforms. Subsequent modules provide a technical overview of rotorcraft and hybrid drone systems, including system architecture, mission planning and comparative performance characteristics. This technical exposure enhances operational literacy while promoting informed decision-making in deployment and risk assessment.

Recognising the expanding strategic footprint of drones, the programme also addresses applications across civil governance, security and emerging technological domains. Discussions extend to the broader drone ecosystem in India, including innovation initiatives, indigenous development and future trajectories influenced by technologies such as artificial intelligence and digital systems integration. Participants are encouraged to evaluate both capabilities and limitations, fostering a balanced understanding of operational potential and systemic challenges.

A critical component of the course examines the security dimension of unmanned systems. With the proliferation of drone technology comes the parallel rise of rogue and hostile applications. The programme introduces participants to anti-drone technologies, threat detection frameworks, tracking systems and neutralisation methods. By analysing contemporary operational lessons and counter-UAS strategies, participants develop awareness of vulnerabilities and protective measures essential for safeguarding critical infrastructure and public safety.

Ultimately, the course adopts a multidisciplinary approach that integrates regulatory knowledge, technical fundamentals, operational awareness and security perspectives. It aims to cultivate informed practitioners capable of navigating the evolving drone landscape with responsibility, compliance and strategic insight. Upon completion, participants will possess a coherent understanding of drone ecosystems, enabling them to engage confidently with policy, operational planning and emerging technological developments in this rapidly advancing domain.

In light of this, the Centre for Aerospace Studies, School of Internal Security, Defence and Strategic Studies (SISDSS), Rashtriya Raksha University will be organising a 5-day Certificate Course on “Understanding Drones Ecosystem: Trends in Development, Employment & Regulations for Drones Operations”, conducted by experienced practitioners and subject-matter experts to equip participants with a comprehensive understanding of drone technology, regulatory frameworks, operational principles and counter-drone awareness, encompassing its technical, legal and security dimensions.

Course Objective

This course aims to provide participants with a foundational understanding of drone technology, regulatory frameworks, flight principles, operational concepts and emerging anti-drone technologies enabling informed decision-making and operational awareness in civil and security domains.

1. Evolution of Drones

- o History of Drones development from start to modern era.
- o Effect of Industrial Revolution
- o Evolution of both civil and military drones.
- o How applications have influenced Drones Development.

2. Classification of Drones

- o Types of Drones- Fixed Wing, Rotary Wing, Hybrid.
- o Classification by Weight / Size such as Nano, Micro, Small, medium, Large.
- o Classification by Application such as Civil Drones, Military drones, Civil Security and Law Enforcement Drones.
- o Swarm Drones

3. Application of Drones

- o Civil applications (Delivery Logistics), agriculture, mining, inspection, Disaster management (SAR, firefighting, flood monitoring), Mobility (Air Taxi, passenger drones), Wild life Tacking, Climate research, Traffic Management, Military Applications
- o Civil Security and Law Enforcement Applications

4. UAV Hardware & Components

o Basic drone terminology & parts
o Types of drones, material used and size of drones
o Drone Anatomy: Different parts of drones
o Avionics & C2 Link
o Intro to Mission Planning
o Instrument Flying &Navigation (GCS)
o Pros and Cons of Rotorcraft Drones

5. Basic Principles of Flight

o Fundamentals of flight
o Aerodynamics
o Take-off, flight, and landing
o Manoeuvres, turns and circuit pattern

6. Functional and Technological Aspects of Drones: Emerging Trends

o Communication Systems: RF control, Satellite links, 5G-enabled
o Navigation systems: GPS/GNSS, computer vision, Simultaneous Localisation and Mapping (SLAM)
o Payload Technologies: Cameras (EO/IR), LiDAR, Hyperspectral sensors, delivery payloads.
o Power and Propulsion: Battery Technology, Solar, Hydrogen Fuel Cells, Hybrid Propulsion
o AI and autonomy: autonomous flight, swarm intelligence, machine learning for mission planning
o Edge computing & onboard processing

7. Indian Drone Eco System

o Promotion efforts by Govt if India. Startups
o Indigenisation
o Events like Mehar Baba Competition, Drone Shakti etc
o Development limitations
o Future Requirements
o Testing Facilities
o Market Forces

8. Counter UAS

o Types: Fixed, mobile
o Detection systems: Radar based, ESM based (RF Based), IR sensors/Electro Optical
o Neutralisation Systems: Soft Kill, DEW based kill (LASER, Microwaves),
Kinetic destruction, projectiles, interceptor drones, nets.
o Limitations of CUAS
o Collateral Damage in kinetic kills and soft kills.
o Challenges in neutralizing Swarm drones
o Spoofing and Jamming Issues

9. Standard Operating Procedures Regulatory Frame work for Drones' Flying in India

o National Drone Rules and Regulations
o Zone classifications for Drone flying and No-Fly Zones
o Drone Categories and Certification requirements
o Air Space Management Issues
o Security concerns. Unauthorised Drones over airports, military zones.
o Drones as tools for terrorism, smuggling arms, narcotics, etc.

10. Maintenance of Drones

o Physical & Structural Maintenance
o Propulsion System Maintenance
o Power system Maintenance
o Sensors & Calibration

LEARNING OUTCOMES

- Understanding Aerodynamics of Drone Flights
- Understand how journey of Drones commenced and where has it reached influenced by modern technology.
- Effect of AI, block chain on Drones.
- Types of Drones. Understand systems and sub systems of a drone.
- Knowledge of maintenance of Drones.
- Know civil and military applications of Drones and what lies ahead in future.
- What is the Drones Eco system in India?
- What are the Govt initiated measures to promote research, design and production of indigenous Drones.
- Regulations and Rules with respect to Drones Flying. Do's and Don'ts. Zones classification for Drones Flying and No Flying Zones. Limitations and Gaps.
- Challenges in Air Space Management.
- What are Counter Unmanned Airborne Systems, how to these operate and what are challenges faced by CUASs
- Lessons learnt from recent conflicts in military use of Drones.
- Threats from Rouge Drones

EXPERTS

- **Air Commodore Rajiv Mittal (Retd)**
- **Air Commodore Rajnish Verma (Retd)**
- **Pro (Dr)DK Pandey**
- **Group Captain Ajay Kishore Mishra (Retd)**
- **Wing Commander MVN Sai (Retd)**
- **Mr. Abhishek Kumar**
- **Mr. Chintan Parmar**

REGISTRATION FEE

- **Fees:** INR 500/-

REGISTRATION LINK

- Click here to register:
  https://rise.rru.ac.in/Course/611/0

(or scan the QR)

IMPORTANT DETAILS

- **Date:** 20th April to 24th April 2026
- **Mode:** Online
- **Last date of registration:** 20th April 2026
- **Certification:** Rashtriya Raksha University

CONTACT:

CONVENER:

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ABOUT RASHTRIYA RAKSHA UNIVERSITY

Rashtriya Raksha University (RRU), an Institution of National Importance under the Ministry of Home Affairs, Government of India, is a pioneering national security and police university. The University is committed to enhancing the capabilities of India's security, police, and allied forces through interdisciplinary education, research, training, and extension. With a vision to become a global leader in internal security, strategic studies, and law enforcement, RRU fosters academic excellence, innovation, and practical application to advance national security and resilient governance.

The University serves as a hub of specialised knowledge and capacity building for various stakeholders, including police organisations, armed forces, intelligence agencies, and policymakers.

RRU actively integrates technology, research, and policy development to strengthen India's internal and external security frameworks.

ABOUT SCHOOL OF INTERNAL SECURITY DEFENCE AND STRATEGIC STUDIES

The School of Internal Security, Defence and Strategic Studies (SISDSS) carries out academic research and training programs in the field of defence, strategy, and security studies. SISDSS provides an opportunity to study war from a multi-disciplinary perspective, from statecraft to strategy, deterrence and war fighting, strategic leadership and communication, military technology and more.

ORGANISING COMMITTEE:

- Dr. Ashutosh Pandey, Director (I/c), SISDSS.,RRU
- Air Commodore Rajnish Verma (Retd), Centre Head, Centre for Aerospace Studies, SISDSS, RRU.
- Ms. Nasima Khatoon, Assistant Professor (Research), SISDSS, RRU
- Mr. Yatharth Thumar, Academic Development officer, SISDSS, RRU
- Mr. Abhishek Kumar , Drone Instructor, SISDSS, RRU
- Mr. Chintan Parmar, Drone Instructor, SISDSS, RRU
