इलेक्ट्रॉनिकी एवं
सूचना प्रौद्योगिकी मंत्रालय
MINISTRY OF
**ELECTRONICS AND
INFORMATION TECHNOLOGY**
सत्यमेव जयते

भारतीय विज्ञान संस्थान

FACULTY UPDATION PROGRAM

**AN INITIATIVE UNDER THE PROJECT
"CAPACITY BUILDING FOR HUMAN RESOURCES IN UNMANNED AIRCRAFT SYSTEM (DRONE AND RELATED TECHNOLOGY)"**

APRIL 25 - 29, 2023

ORGANIZED BY
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SUPPORTED BY
MINISTRY OF ELECTRONICS AND INFORMATION TECHNOLOGY

Registration Fee
For faculty: Rs 6,000/- (Excluding GST)
Limited seats available

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ABOUT

The Indian Institute of Science, Bengaluru is organizing a workshop for capacity building for Human resource development in Unmanned Aircraft Systems (Drones and related fields), a project funded by MeitY (Ministry of Electronics and Information Technology).
This enriching program has been spread across five days and below is the list of topics covered in the program.

DAY 1 - CONTROL, GUIDANCE, AND NAVIGATION (APRIL 25, 2023)
- Basics of Drone Modeling and Simulation
- Control design and validation
- Navigation and guidance

DAY 2 - FUNDAMENTALS OF DEEP-LEARNING FOR DRONE ANALYTICS (APRIL 26, 2023)
- Basics of Deep Neural Networks, Convolutional Neural Networks for Detection and Segmentation
- Applications of aerial vehicles

DAY 3 - CO-SIMULATION AND ROBOT OPERATING SYSTEM [ROS] (APRIL 27, 2023)
- Introduction and Overview of ROS
- ROS and ROS2 connectivity with MATLAB
- Hands-on-tutorial: ROS Control Project - Navigate through a maze
- Introduction to VMware
- Co-simulation with Gazebo
- Deploying ROS nodes
- Demonstration: Co-simulation with Unreal Engine

DAY 4 - SLAM AND OBSTACLE AVOIDANCE (APRIL 28, 2023)
- Overview of Low-cost Hardware Connectivity
- Using ROS on Raspberry Pi using MATLAB and Simulink
- Indoor navigation systems and SLAM
- Sense and Avoid drone systems

DAY 5 - APPLICATIONS (APRIL 29, 2023)
- Applications of drones in agriculture
- Applications of drones in firefighting
- Applications of drones in surveillance
- Drone regulations and training

PRE-REQUISITES

Participants are highly recommended to fulfill the pre-requisites stated below to ensure an effective hands-on experience during the program

- Participants are requested to bring **their own laptop** with the following installed:
  - Follow the instructions on ROS 2 Dashing and Gazebo to install VMWare and ROS 2 Dashing (Desktop) or ROS Melodic (Desktop).
  - Follow the instruction on MATLAB Installation to install MATLAB [Version: 2023a] (including all toolboxes) in the Virtual Machine
- Participants are requested to go through the following:
  - MATLAB Onramp
  - Simulink Onramp
  - These courses are freely available at MATLAB and Simulink Training (mathworks.com)
- Participants are requested to bring a Raspberry Pi [4B recommended] and a compatible camera. Follow the instructions on Raspberry Pi Ubuntu Mate to flash the recommended OS onto the Raspberry Pi's SD card