HimShikhar
HerbTech
NATURE. SCIENCE. SUSTAINABLE FUTURE.

IIT Mandi
CATALYST
A Technology Business Incubator

1 Month Residential Program

on

AI, IoT & Emerging Technologies

Agriculture as case study

At

Indian Institute of Technology, Mandi Campus

भारतीय प्रौद्योगिकी संस्थान, मंडी परिसर



PRAYAS 5.0 - 1 Month Residential Programme

June - July 2026 | 1 Months | Offline - In Campus

Learn → Build → Experiment → Innovate

Program Summary

Prayas 5.0, a certificate course on AI,IoT & Emerging Technologies

1 month residential program at IIT Mandi Catalyst

- **Institute Name**

  Catalyst, IIT Mandi

- **Programme Duration**

  1 Month

- **Faculty**

  IIT, Mandi

- **Learning Mode**

  Offline (Residential at campus) sessions by IIT Faculty

- **Daily Effort**

  6+ Hours Everyday

- **Certificate**

  Upon completion of the course, participants would be given certificate.

Frequently Asked Questions

What will be the mode of learning?
There will be 5-6 hours daily classes conducted by the IIT faculty. The programme is spread for a duration of 1 month. The learning experience will include rich discussions with eminent faculty and seasoned peers, case-based learning, assignments and quizzes and guided capstone project work for which the participants will have to put in an additional effort.

Who evaluates the assignments, projects and simulations for this programme?
The examination and evaluation of graded submissions, project work and simulations, if any, is at the discretion of the IIT faculty.

Who gives grades / inputs on the assignments and projects?
Examination / Evaluation shall be conducted by the Program Coordinator.
.

What type of certificate will I receive?
Upon successful completion of the programme, participants will be awarded a certificate of completion and will be eligible to receive certificate.

Will Bsates/Institute help with placement services?
This programme is designed with some of the best faculty and to cover relevant topics in a manner that creates positive career outcomes. Over 85% Bsates learners have witnessed career growth post completing their programme. As an additional service, we provide job placement assistance, resume writing guidance, navigating job search and interview prep along with this programme. All this guidance is provided over recorded videos, this is not live.

Learning Mode?
The primary mode of learning for this programme is residential offline sessions with faculty members.

Where will I stay and have food during my stay at IIT Mandi?
Participant's will stay in the campus hostel and meals would be served at campus hostel mess.

Where will I do practical sessions?
Participants would be utilizing the Labs and lecture halls of campus during the course.

PRAYAS 5.0 is jointly organised by Catalyst IIT Mandi, Himshikhar Herbtech, and Bsates EdTech Foundation.

Programme Mentors



Prof. Tushar Jain
Professor
School of Computing & Electrical Engineering



Prof. Dipankar Deb
Professor
Center for Artificial Intelligence & Robotics



Dr. Indu Joshi
Assistant Professor
School of Computing & Electrical Engineering



Dr. Kaushik Halder
Assistant Professor
School of Computing & Electrical Engineering



Dr. Deepak Deelip Patil
Assistant Professor
School of Mechanical & Materials Engineering

PRAYAS 5.0 – AI, IoT and Emerging Technologies

PRAYAS 5.0 is an intensive **4-week residential program** designed to develop industry-relevant technical skills in **Artificial Intelligence (AI), Internet of Things (IoT), and Emerging Technologies.** Combining Python programming, Machine Learning, Generative AI, Computer Vision, sensor-based IoT, and cloud-connected systems, the program emphasizes practical learning through hands-on labs and real-world applications in Smart Agriculture. Participants will build and test AI/IoT solutions, work on a team-based capstone project, and develop practical problem-solving, innovation, and project development skills to prepare for emerging technology careers.

Learning Approach: 30% Conceptual Learning | 50% Hands-on Labs | 20% Project & Innovation.

Learn → Build → Experiment → Innovate

Course Outline

PRAYAS 5.0 (2027 Edition)
Artificial Intelligence, Robotics & Internet of Things (IoT) – Smart Agriculture Edition

Duration: 4 Weeks | Format: Offline, Hands-on Residential Programme

Week 1: Robotics Fundamentals & Smart Agriculture Sensors
- Introduction to Robotics, AI and IoT in Agriculture
- Microcontrollers, Arduino Programming and Embedded Systems
- Soil Moisture, pH and Environmental Sensors
- Motors, Actuators, Relays and Smart Drip Irrigation
- Sensor-Based Monitoring and Agricultural Automation

Week 2: Mechanical Design, CAD & Agricultural IoT
- Agricultural Rover Design and Chassis Development
- CAD Modelling, 3D Printing and Rapid Prototyping
- ESP32-Based Smart Farming Systems
- IoT Communication Protocols: MQTT, HTTP and CoAP
- Cloud Dashboards, Remote Monitoring and Smart Alerts
- Greenhouse and Polyhouse Climate Automation

Week 3: Autonomous Robotics & Intelligent Navigation
- Autonomous Agricultural Robots and Field Navigation
- PID-Based Motion Control and Obstacle Avoidance
- Swarm Robotics and Multi-Robot Coordination
- Introduction to SLAM, ROS 2 and Robotic Simulation
- Wireless Communication Between Agricultural Robots
- Development and Testing of an Autonomous Field Rover

Week 4: Edge AI, Computer Vision & Precision Agriculture
- Machine Learning for Soil Analysis and Crop Suitability
- Neural Networks for Plant Stress and Disease Prediction
- Computer Vision using OpenCV and TensorFlow Lite
- Edge AI Deployment on Raspberry Pi and ESP32-CAM
- AI-Based Weed Detection, Precision Spraying and Fruit Ripeness Classification
- Digital Twins, Field Simulation and Capstone Project Showcase

Hands-on Projects & Applications
- AI-Powered Crop Health and Disease Detection Rover
- Smart Irrigation and Soil Monitoring System
- IoT-Enabled Greenhouse Climate Controller
- Autonomous Agricultural Transport Robot
- AI-Based Weed Detection and Precision Spraying
- Smart Grain Storage and Animal Intrusion Monitoring

Programme Highlights
- Hands-on robotics, AI and IoT laboratory sessions
- Practical exposure to agricultural automation technologies
- CAD design, 3D prototyping and robotic simulation
- Team-based project development and testing
- Capstone Project Demonstration

Build intelligent solutions for real-world agricultural challenges through Robotics, AI and IoT.

Integrated Agricultural Use Cases (Capstone Projects)

1. Vision-Based Crop Health & DiseaseScout Rover:
Autonomous ground rover equipped with onboard camera running MobileNet/TFLite to classify healthy vs. diseased leaves in real time.

2. Multi-Depth Soil Chemistry & Moisture Telemetry Node:
In-ground probe measuring volumetric soil moisture, pH, temperature, and electrical conductivity with remote telemetry.

3. Automated Closed-Loop Smart Drip Irrigation Controller:
Soil-moisture-triggered relaypump and solenoidvalve system delivering dynamic, threshold-based micro-irrigation.

4. Precision Spot-Spraying / Weed Exterminator Bot:
Vision-guided rover distinguishing weeds from cash crops and triggering targeted servo-actuated micro-nozzles.

5. Smart Polyhouse / Greenhouse Microclimate Regulator:
Automated climate node monitoring temperature, humidity,and PAR light to regulate exhaust fans, misting, and shade curtains.

6. Line/Trench-FollowingAgricultural Transport Cart:
PID-tuned cart autonomously hauling tools or harvested produce along crop rows and trenches.

7. AI-Powered Fruit Ripeness & Yield Estimation Station:
Static edge-AI scanning station categorizing fruit maturity stages(unripe, ripe, overripe) and counting yield.

8. Acoustic & PIR Animal IntrusionAlert / Deterrence Node:
Boundary guardian detectingwildlife intrusions via PIR/ultrasonic sensingand firing automated deterrent alarms.

9. Multi-Robot Collaborative Field Mapping (Swarm Concept):
Scout and worker bots coordinating over ESP-NOW/MQTT to map barrenpatches and target interventions.

10. Autonomous Grain Silo & Storage Monitoring Node:
Sensor unit tracking internalsilo temperature, relativehumidity, and fill level to prevent post-harvest spoilage.



Program Details

Program Start Date **June - July 2027**

PRAYAS 5.0 is a transformative residential program focused on Artificial Intelligence, IoT and Emerging Technologies, with hands-on learning and real-world applications. Designed to bridge the gap between academic knowledge and industry practices, the program offers participants immersive practical exposure, expert mentorship and innovation-driven projects.

Fees of the Program is 62,400/- + GST

Which includes everything like **Hostel Accommodation + Mess** charges for 1 month

Sample Certificate

Upon successful completion of the programme, participants will be awarded a certificate of completion and will be eligible to receive the certificate



Note:

All certificate images are for illustrative purpose only and may be subject to change at the discretion of Program Coordinator. We encourage you to attend all the sessions and make the best out of these interactive learning experiences. The recorded videos and learning material will be available throughout the duration of the programme.

About Himshikhar Herbtech

Himshikhar Herbtech is an IIT Mandi-incubated startup working at the intersection of Agriculture, Artificial Intelligence and Machine Learning. The company focuses on applying AI/ML methodologies to develop technology-driven solutions for smart, sustainable and data-driven agriculture, enabling better productivity, resource optimization and decision-making.

About Catalyst IIT Mandi

Catalyst IIT Mandi is the innovation and entrepreneurship hub of IIT Mandi, dedicated to nurturing startups, innovators and technology-driven ideas. It provides mentorship, incubation, industry connections and access to a vibrant innovation ecosystem, helping transform promising ideas into impactful solutions.

Group Photo: PRAYAS 3.0 (2025)



Group Photo: PRAYAS 4.0 (2026)



Apply for the programme here

APPLY NOW

For more information

Please Visit

www.bsates.tech

For any queries WhatsApp an advisor on **9211287397**

For registration and any other information, please get in touch with us at:

prayasiitmandi@bsates.tech

agm-admin@iitmandicatalyst.in

In collaboration with

BSATES EDTECH

LEARN • INNOVATE • EMPOWER

Bsates EdTech Foundation is committed to transforming education through technology-driven learning and industry-oriented skill development. With a focus on bridging the gap between academic knowledge and practical skills, Bsates empowers learners with future-ready competencies in emerging technologies. Building on the successful collaborations of **PRAYAS 3.0 in 2025** and **PRAYAS 4.0 in 2026 at IIT Mandi**.

BSATES continues this journey through PRAYAS 5.0 – AI, IoT and Emerging Technologies, with an emphasis on hands-on learning, real-world applications, innovation, and job readiness.