



भारत अंतरिक्ष शिक्षा अनुसंधान केंद्र

Bharat Space Education Research Centre

नई दिल्ली, भारत

New Delhi, India

दूरभाष : +917303048646

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ROCKETRY DESIGN WORKSHOP

2-day session covering core content: 11th & 12th April, 2026

Session 1: (3 Hours)	Duration	Topics Covered
0:00 – 0:10	10 min	Introduction & Workshop Overview — Goals, expectations, icebreaker, and structure overview.
0:10 – 0:30	20 min	Rocketry Fundamentals and History — Basics of rockets, historical context, and applications; Newton's Third Law.
0:30 – 1:00	30 min	Physics of Rocket Flight — Application of Newton's laws, thrust vs. weight, and conceptual introduction to the rocket equation.
1:00 – 1:30	30 min	Propulsion Basics — Types of rocket engines (solid, liquid, hybrid), thrust generation, total impulse, and specific impulse (Isp).
1:30 – 2:00	30 min	Aerodynamics & Stability — Forces on a rocket, CG vs. CP, fin and nose cone design, and stability margin.
2:00 – 2:30	30 min	Rocket Design Parameters — Mission objectives, mass breakdown, thrust-to-weight ratio, and introduction to multi-stage designs.
2:30 – 3:00	30 min	Q&A / Recap Discussion



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Session 2 (3 Hours)	Duration	Topics Covered
0:00 – 0:30	30 min	Advanced Rocket Physics — Tsiolkovsky rocket equation, multi-stage rockets, and performance implications.
0:30 – 1:00	30 min	Propulsion Details — Model rocket motor classification (A, B, C, etc.), thrust curve analysis, and propellant comparisons.
1:00 – 1:30	30 min	Aerodynamics Deep Dive — Drag factors, drag coefficient, flight phases, and recovery systems (e.g., parachutes).
1:30 – 2:00	30 min	Rocket Assembly & Launch Readiness — Hands-on overview of rocket structure, fin alignment, engine mounting, and safety checks before simulated launch.
2:00 – 2:30	30 min	Simulation Software Tutorial — Introduction to OpenRocket, defining rocket parts, running simulations, analyzing altitude and stability results.
2:30 – 3:00	30 min	Q&A

Participants opting for a single technology may register via the provided link. For access to all technologies, apply through lateral entry only

2-Day Rocketry Design Session: <https://forms.gle/zXMKbpjncP8vPiyi7>



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दिनांक: 27 मार्च 2026

2-Day Defence Drone Workshop: 18th & 19th April

Day - 1

DAY 1: AERODYNAMICS & CORE HARDWARE SYSTEMS

Focus: Engineering Fundamentals and Tactical Design

Time Slot	Module	Key Sub-topics
00:00 - 00:45	The UAV Ecosystem	Defense classifications (HALE/MALE), Fixed-wing vs. VTOL, Global & Domestic UAV trends.
00:45 - 02:00	Propulsion & Avionic Suites	BLDC motor dynamics, ESC protocols, Li-Po/Li-Ion energy density, Flight Controller architectures (SoC).
02:00 - 03:00	Aerodynamics & Control	Bernoulli's principle in UAVs, PID tuning, Vibration isolation, and RF Telemetry links (2.4GHz / 5.8GHz / LoRa).



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दिनांक: 27 मार्च 2026

Day - 2

DAY 2: TACTICAL INTELLIGENCE & AUTONOMY

Focus: Mission Planning, AI, and Regulatory Compliance

Time Slot	Module	Key Sub-topics
00:00 - 01:00	Payload & ISR Systems	Electro-Optical (EO) & Infra-Red (IR) sensors, Photogrammetry, and LiDAR integration for terrain mapping.

Day - 2

01:00 - 02:00	AI & Edge Computing	Computer Vision for target tracking, Autonomous Waypoint Navigation, and Swarm Intelligence basics.
02:00 - 03:00	Policy & Career Roadmap	DGCA Drone Rules 2021, Digital Sky, National Security Ethics, and Defense R&D career pathways.

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2-DAY DEFENCE DRONE TECHNOLOGY : <https://forms.gle/6H5tYw56ihsm1Z3S9>



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दिनांक: 27 मार्च 2026

1-Day Artificial Intelligence Workshop: 25th April, 2026

1. Foundations of Generative AI	1.4 AI Providers and Models (March 2026)	<ul style="list-style-type: none">• OpenAI — GPT-5, GPT-5.2, o3, o4-mini• Anthropic — Claude Sonnet 4.6, Claude Opus 4.6• Google — Gemini 3, Gemini 2.5 Pro• Meta — Llama 4• DeepSeek — DeepSeek V3• xAI — Grok 3• Mistral — Mistral Large 2• Alibaba — Qwen 2.5• Which Model to Use for Which Task
2. Prompting Effectively	2.1 Why Most Prompts Fail	<ul style="list-style-type: none">• The Search-Engine Habit• How Context Changes Output Quality
2. Prompting Effectively	2.2 The Six Elements of a Strong Prompt	<ul style="list-style-type: none">• Role• Task• Context• Format• Examples• Constraints
2. Prompting Effectively	2.3 Best Practices	<ul style="list-style-type: none">• Specificity• Iteration• Providing Raw Material• Verifying AI-Generated Facts• Data Privacy and What Not to Share
2. Prompting Effectively	2.4 Advanced Techniques	<ul style="list-style-type: none">• Chain of Thought• Few-Shot Prompting• Dual Perspective• Self-Critique Loop• STAR Story Builder• Template Filling



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दिनांक: 27 मार्च 2026

GenAI for Everyone

2-Hour Live Webinar Syllabus

Section	Topic	Sub-Topics
1. Foundations of Generative AI	1.1 What Is Artificial Intelligence	<ul style="list-style-type: none">• Traditional AI• Generative AI• Agentic AI
1. Foundations of Generative AI	1.2 How Generative AI Works	<ul style="list-style-type: none">• Tokenization• Embeddings• The Transformer Architecture• How Output Is Generated• Why AI Hallucinates
1. Foundations of Generative AI	1.3 Key AI Terms	<ul style="list-style-type: none">• Context Window• Temperature• Hallucination• RAG — Retrieval-Augmented Generation• Fine-Tuning• AI Agents• Context Engineering• Small Language Models• Multimodal AI



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3. Live Demonstrations	3.1 AI for Job Search and Career Applications	<ul style="list-style-type: none">• Decoding a Job Description• Rewriting CV Bullet Points• ATS Optimisation• Writing a Cover Letter• Interview Preparation• Salary Negotiation Script
3. Live Demonstrations	3.2 NotebookLM for Study and Research	<ul style="list-style-type: none">• How NotebookLM Differs from Other AI Tools• Uploading Sources and Asking Questions• Three-Prompt Exam System• Generating Flashcards• Audio Overview• Teacher Use Case — Building a Study Guide
3. Live Demonstrations	3.3 Hands-On Practice	<ul style="list-style-type: none">• Students — Notes to Exam Questions• Teachers — Lesson Plan Creation• Professionals — Rewriting a Work Task
4. Next Steps	4.1 30-Day Action Plan	<ul style="list-style-type: none">• Week 1 — Explore• Week 2 — Build the Habit• Week 3 — Go Deeper• Week 4 — Teach Someone Else
4. Next Steps	4.2 Tools to Get Started	<ul style="list-style-type: none">• claude.ai• chatgpt.com• gemini.google.com• notebooklm.google.com• perplexity.ai

Apply for Artificial Intelligence Workshop: <https://forms.gle/pBAjtvVnxUbc2S9W7>

25th April, 2026, Duration : 3 Hours, Timings : 2:30 PM -5:00 PM

Vision of Viksit Bharat Abhiyan @2047



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दिनांक: 27 मार्च 2026

1-Day Aircraft Design Workshop

26th April, 2026

Time	Topic	Objectives
0 – 10 min	Introduction to Aircraft Design & Design Process	<ol style="list-style-type: none">1. Understand the purpose and scope of aircraft design.2. Learn step-by-step design methodology.3. Identify trade-offs between performance, cost, and safety.
10 – 20 min	Velocity of Flight & Standard Atmosphere	Differentiate true, indicated and equivalent air speed & Mach number
20 – 30 min	Anatomy of the Aircraft	Identify major components (fuselage, wings, tail, landing gear, engines).
30 – 40 min	Nomenclature of Airfoil	Familiarize with standard terminology of the airfoil.
40 – 60 min	Aerodynamics of Airfoils (Velocity of Flow, Flow Pressure Distribution, Lift, Drag, Aerodynamic Centre and Centre of pressure.	<ol style="list-style-type: none">1. Relate pressure distribution to lift & drag generation.2. Define and locate aerodynamic center and center of pressure.
60 – 75 min	Wing Geometry	Define aspect ratio, taper ratio, sweep, dihedral, twist.



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दिनांक: 27 मार्च 2026

75 – 90 min	External Forces on Aircraft	Understand force balance in steady and accelerated flight and equations of motion.
90 – 110 min	Thrust Required Minimum & Power Required Minimum	Derive conditions for minimum thrust & power requirement.
110 – 125 min	Engine Sizing	Estimate engine thrust/power with aircraft mission needs.
125 – 140 min	Weight Estimation	Break down weights into empty, payload, fuel and structural weights
140 – 155 min	Range & Endurance	Derive the equations for range and endurance (Time of flight). Engage participants in Q&A
155 – 170 min	Flight Equilibrium & Stability Wing alone configuration Wing and tail combination	Understand about static and dynamic stability. Derive equations for longitudinal, lateral, and directional stability for wing alone and wing tail combination
170 – 180 min	Flight Demonstration & Special Topics (Flat plate & Similar Wing-Tail flight) Question and answers	Apply theory to practical demonstration. Preparation of flat plate wing to test glide performance and test glide performance of similar wing –Tail combination) Engage participants in Q&A and wrap-up.

Apply for Aircraft Design Workshop: <https://forms.gle/pBAjtvVnxUbc2S9W7>



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3-Day Robotics Design: 1st, 2nd & 3rd May

MILESTONE DAY WISE:

DAY 1 — Robotics Foundations & Hardware Layer

Duration: 3 Hours

Milestone: Build foundational understanding of robotics systems and hardware.

Time	Duration	Topics Covered
0:00 – 0:15	15 min	Introduction & Workshop Overview
0:15 – 0:45	30 min	What are Robotics? Definition, Laws, Applications
0:45 – 1:30	45 min	Robot Types (Arms, Bipedes, Quadrupeds, Wheeled)
1:30 – 2:00	30 min	Sensors Overview – IMUs, Encoders, Ultrasonic, Cameras
2:00 – 2:45	45 min	Actuators – DC, Servo, Stepper, Advanced Actuation
2:45 – 3:15	30 min	Computing Systems – MCU vs SBC, protocols
3:15 – 3:45	30 min	Hands-On: Sensor Interfacing & Motor Control
3:45 – 4:00	15 min	Q&A / Recap

DAY 2 — Software, Control & Project Development

Milestone: Develop ability to work with algorithms, perception & navigation.

Time	Duration	Topics Covered
0:00 – 0:30	30 min	Navigation: Path & Motion Planning
0:30 – 1:00	30 min	Perception: Object Detection, Tracking, Features
1:00 – 1:30	30 min	Mapping & SLAM Introduction
1:30 – 2:00	30 min	Real-Time Systems & Control Loops
2:00 – 2:45	45 min	ROS Basics – Nodes, Topics, Services
2:45 – 3:45	60 min	Start Project 1 Build: Obstacle-Avoiding Robot
3:45 – 4:00	15 min	Q&A



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DAY 3 — ROS Practice, System Integration & Final Projects

Milestone: Complete two robotics projects and demonstrate autonomous behavior.

Time	Duration	Topics Covered
0:00 – 0:30	30 min	Integration Techniques & System Testing
0:30 – 1:30	60 min	Complete Project 1 – Testing & Optimization
1:30 – 2:45	75 min	Project 2 – Line-Follower Build & PID Tuning
2:45 – 3:30	45 min	Field Testing of Both Projects
3:30 – 4:00	30 min	Closing Feedback, Demonstrations & Certification

Participants opting for a single technology may register via the provided link. For access to all technologies, apply through lateral entry only.

Apply : 3-Day Robotics Workshop : <https://forms.gle/89SwNtsKGQk1ahRF8>



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3-Day Advanced Drone Technology (उन्नत ड्रोन प्रौद्योगिकी)

Workshop: 3-Day session: 8th , 9th & 10th May, 2026

Day	Session	Lecture Title	Topics Covered	Learning Outcome
1	1	Drone Technology Fundamentals & Aerodynamics Basics	a) UAV classifications (fixed-wing, multirotor, VTOL) b) Fundamental forces: lift, drag, thrust, weight c) Airfoil theory and pressure distribution	<ul style="list-style-type: none">Identify major UAV types and their mission envelopesExplain how airfoil geometry generates lift and influences performance
	2	Basic Flight Stability & PID Control Introduction	a) Angle of attack, stall behavior, stability axes b) PID control fundamentals: P, I, D terms and tuning basics	<ul style="list-style-type: none">Recognize stall and recovery techniquesConfigure and tune a basic PID loop to stabilize hover
2	1	UAV Structures, Propulsion & Power Systems	a) Drone frame materials and stress considerations b) Electric motors, propeller selection, ESCs c) Battery technologies and power budgeting	<ul style="list-style-type: none">Assess structural trade-offs for weight vs. strengthSize propulsion and battery systems to meet flight-time requirements
	2	Sensor Suite & Inertial Navigation	a) IMU components: accelerometer, gyroscope, magnetometer b) GNSS integration and error sources c) Complementary vs. Kalman filtering basics	<ul style="list-style-type: none">Integrate sensor data to produce stable attitude estimatesCalibrate IMU/GNSS to achieve reliable position and heading



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3	1	Autonomous Mission Planning & Advanced Control	a) Path-planning algorithms (A*, RRT) b) LQR controller design for trajectory tracking c) Real-time obstacle avoidance strategies	<ul style="list-style-type: none">• Generate and optimize waypoint sequences for dynamic environments• Implement an LQR controller to follow complex flight paths
	2	Real-World Applications, Certification & Case Studies	a) Industry use-cases: AAM, logistics, agriculture, healthcare, disaster relief b) DGCA/EASA certification process and airspace integration standards c) System-level testing and validation protocols	<ul style="list-style-type: none">• Map technical requirements to specific industry applications• Outline roadmap for regulatory approval and field deployment

3-day training program on December 8th, 9th & 10th, 2026 (Friday–Sunday), focusing on advanced Drone Technology (Air Taxi).

Registration Link for 3-Day Drone : <https://forms.gle/weWogvIVzqJqgQKp7>

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AIRCRAFT DESIGN WORKSHOP (वायुयान डिजाइन कार्यशाला)

3-day session covering core content: 15th, 16th & 17th May, 2026

Time	Topic	Objectives
0 – 10 min	Introduction to Aircraft Design & Design Process	<ol style="list-style-type: none">1. Understand the purpose and scope of aircraft design.2. Learn step-by-step design methodology.3. Identify trade-offs between performance, cost, and safety.
10 – 20 min	Velocity of Flight & Standard Atmosphere	Differentiate true, indicated and equivalent air speed & Mach number
20 – 30 min	Anatomy of the Aircraft	Identify major components (fuselage, wings, tail, landing gear, engines).
30 – 40 min	Nomenclature of Airfoil	Familiarize with standard terminology of the airfoil.
40 – 60 min	Aerodynamics of Airfoils (Velocity of Flow, Flow Pressure Distribution, Lift, Drag, Aerodynamic Centre and Centre of pressure.	<ol style="list-style-type: none">1. Relate pressure distribution to lift & drag generation.2. Define and locate aerodynamic center and center of pressure.
60 – 75 min	Wing Geometry	Define aspect ratio, taper ratio, sweep, dihedral, twist.



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75 – 90 min	External Forces on Aircraft	Understand force balance in steady and accelerated flight and equations of motion.
90 – 110 min	Thrust Required Minimum & Power Required Minimum	Derive conditions for minimum thrust & power requirement.
110 – 125 min	Engine Sizing	Estimate engine thrust/power with aircraft mission needs.
125 – 140 min	Weight Estimation	Break down weights into empty, payload, fuel and structural weights
140 – 155 min	Range & Endurance	Derive the equations for range and endurance (Time of flight). Engage participants in Q&A
155 – 170 min	Flight Equilibrium & Stability Wing alone configuration Wing and tail combination	Understand about static and dynamic stability. Derive equations for longitudinal, lateral, and directional stability for wing alone and wing tail combination
170 – 180 min	Flight Demonstration & Special Topics (Flat plate & Similar Wing-Tail flight) Question and answers	Apply theory to practical demonstration. Preparation of flat plate wing to test glide performance and test glide performance of similar wing –Tail combination) Engage participants in Q&A and wrap-up.



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Day2 140– 180 min	1. Range & Endurance. 2. Numerical problems.	Derive the equations for range and endurance (Time of flight). Engage participants in Q&A Interpret how aerodynamic efficiency and fuel consumption influence range and endurance values.
Day3 0 – 90 min	Flight Equilibrium & Stability Wing alone configuration Wing and tail combination	Understand about static and dynamic stability. Derive equations for longitudinal, lateral, and directional stability for wing alone and wing tail combination
Day3 90 – 180 min	Flight Demonstration & Special Topics (Flat plate & Similar Wing-Tail flight)	Apply theory to practical demonstration. Preparation of flat plate wing to test glide performance and test glide performance of similar wing –Tail combination) Engage participants in Q&A and wrap-up.

Participants opting for a single technology may register via the provided link.
For access to all technologies

3-Day Aircraft Design Session: <https://forms.gle/Mg9UHWZ98RMfmKhR6>