ISRO Space Tutor

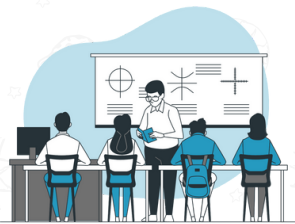**A brahmàstra- ISRO Collaboration Program**

Brahmastra Aerospace & Defence Pvt. Ltd.

Brahmastra Aerospace & Defence Pvt. Ltd. started in 2019 with the dream of creating a Space Ecosystem. Through brahmastra, more than 25,000 students across Ninety-two countries have benefitted in their career paths. We are running with the motto of

"Through hardships, to the stars".

What we did?

25,000+
Students
Taught Globally

300+
Students Trained
under IIRS-ISRO

250+
Institution
collaboration

100+
Students Placed in
international universities

90+
Countries
served

05+
Students Projects under
Skill development program

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ISRO Space Tutor Program

This announcement of **Indian Space Research Organisation (ISRO) Space Tutor program** aims to engage with the NGOs / educational institutions purely engaged in the STEM education and promotion, to engage with ISRO in promoting space education and creating awareness of space activities & applications to the student community for creating scientific temperament and culture of innovative thinking amongst the students.

brahmàstra-ISRO Collaboration

Brahmàstra Aerospace & Defence Private Limited, a space EdTech company, has constantly been working on educating students in the space domain. Kicking off from the year 2019, team brahmàstra has been teaching over 25k students through space outreach programs and short courses. Now we have taken another step forward in space education by collaborating with ISRO.

Brahmastra have been recognised as "Registered Space Tutor of ISRO". We are immensely thankful to ISRO for this great opportunity. and we promise to continue our efforts in spreading space knowledge to every child of this nation.

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Satellite

A satellite is an object that moves around a larger object. Earth is a satellite because it moves around the sun. The moon is a satellite because it moves around Earth. Earth and the moon are called "natural" satellites. But usually when someone says "satellite," they are talking about a "man-made" satellite.

There are hundreds of satellites in operation. They are used for diverse purposes such as weather forecasting, television signal, amateur radio and internet communications and the Global Positioning System. They are also used to look outward at the solar system for research and data gathering purposes.

Course Highlights

- The basic knowledge about satellite technology
- The basic mechanism of satellite its types
- The basic knowledge on satellite communication
- To enable the student to become familiar with satellites and satellite services.
- Study of satellite orbits and launching.
- Study of earth segment and space segment components   Study of satellite access by various users.

Course Outcome

- Able to learn the dynamics of the satellite
- Able to understand the communication satellite design.
- Able to understand how analog and digital technologies are used for satellite communication networks.
- Able to learn the design of satellite links.
- Able to study the design of Earth station and tracking of the satellites.

Course Structure

- Lecture Session - 4 hrs
- Design Session - 1 hr
- Calibration Session - 1 hr
- 3D CAD designed by the participants - 3 hrs
- Doubt clearing session - 3 hours
- Certificate Distribution - 1 hr

Topics Covered

- Elements of orbital mechanics
- Elements of communication satellite design
- Spacecraft subsystems
- Satellite launch systems
- Satellite onboard processing.
- Antenna and tracking systems
- Equations of motion

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Rocket

A rocket is a vehicle that uses jet propulsion to accelerate without using the surrounding air. A rocket engine produces thrust by reaction to exhaust expelled at high speed.[2] Rocket engines work entirely from propellant carried within the vehicle; therefore a rocket can fly in the vacuum of space. In fact rockets work more efficiently in a vacuum and incur a loss of thrust due to the opposing pressure of the atmosphere.

A model rocket are small rockets designed to reach low altitudes (e.g., 100–500 m (330–1,640 ft) for 30 g (1.1 oz) model) and be recovered by a variety of means

Course Highlights

- The basic knowledge about rocket science
- The basic mechanism of rockets its types
- An overview of model rocketry
- Model rocket and its components
- Study of Model Rocket and launching.
- Study of earth segment and space segment components
- Study of interplanetary missions by various users.

Course Structure

- Lecture Session - 4 hrs
- Design Session - 1 hr
- Fabrication Session - 6 hrs
- Calibration Session - 1 hr
- Testing Session all Model Rockets designed by the participants - 3 hrs
- Doubt clearing session - 3 hours
- Certificate Distribution - 1 hr

Topics Covered

- Solid Rocket Propulsion
- Liquid Rocket Propulsion
- Hybrid Rocket Propulsion
- Nuclear & Advanced Propulsion.
- Functions, Parts & Mechanisms
- Aerodynamics, Space Dynamics.

Course Outcome

- Solid Rocket Propulsion
- Liquid Rocket Propulsion
- Hybrid Rocket Propulsion
- Nuclear & Advanced Propulsion.
- Functions, Parts & Mechanisms
- Aerodynamics, Space Dynamics.
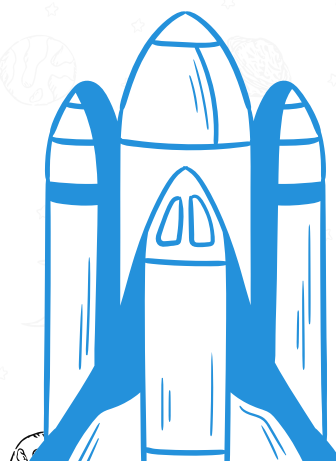
Drone

A drone is a type of unmanned aerial vehicle (UAV), which is an aircraft without a human pilot, crew, or passengers. Unmanned aerial vehicles (UAVs) are a part of an unmanned aircraft system (UAS), which also comprises a ground-based controller and a communications network for the UAV..

There are various application of drones. Initially drones were only used by military. Now it is used by many professional and individuals. Drones are used in various fields. Areas isn which drones can be used are construction, defense, photography, marketing, delivery, agriculture, rescue

Course Highlights

- The basic knowledge about Drone technology
- The basic mechanism of drone and its types
- The basic knowledge on working principle behind drones
- To be familiar with the parts of a drone
- Applications of drones in various fields
- Recent advancements in drones

Course Outcome

- Physics behind drones
- Basic electronics of drones
- Introduction to Aerospace.
- Functions, Parts & Mechanisms
- Careers in Drone sector..

Course Structure

- Lecture Session - 4 hours
- Drone Assembly session - 3 hours
- Drone flying session - 1 hour
- Doubt clearing session - 1 hours
- Certificate Distribution - 1 hour

Topics Covered

- Basic Flight Mechanics
- Basic Aerodynamics
- Basic Electronics
- Various Applications
- Drone fly and operating
- Driving and controlling
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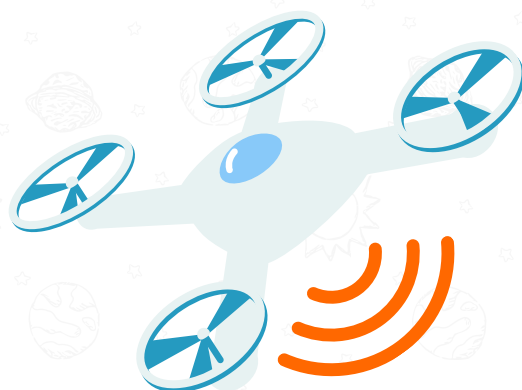
Astronomy

The study of astronomy includes everything in the universe besides our planet's atmosphere. That includes celestial bodies like the Sun, Moon, planets, and stars that we can see with our unaided eyes. It also includes things like far-off galaxies and small particles that we can only glimpse through telescopes or other tools. It even raises queries about entities like dark matter and dark energy that we are completely unable to observe.

In this course, we'll learn all about understanding our Space, Planets, Stars, how to study and observe them, Astronauts who explore Space, and how even you can become an Astronaut!

Course Highlights

- Introduction to Astronomy
- Introduction to space and time
- Studies about the stars, planets, and galaxies
- Gravity and Newton's laws
- Telescope- types, size, use, AI technology, Star gazing
- Spacecraft-Types, contribution in astronomy
- Astronauts-Training, Living in Space, Missions in Space
- ISRO Missions
- Mars and Lunar Exploration-Gaganyaan, Mangalyaan

Course Structure

- Lecture Session - 6 hrs
- Activity Session - 1 hr
- Doubt clearing session - 3 hours
- Certificate Distribution - 1 hr

Topics Covered

- Introduction to Space
- Galaxies and the Universe
- Spacecraft and Space Exploration
- Observing the Space
- ISRO Missions
- Mars and Lunar Missions
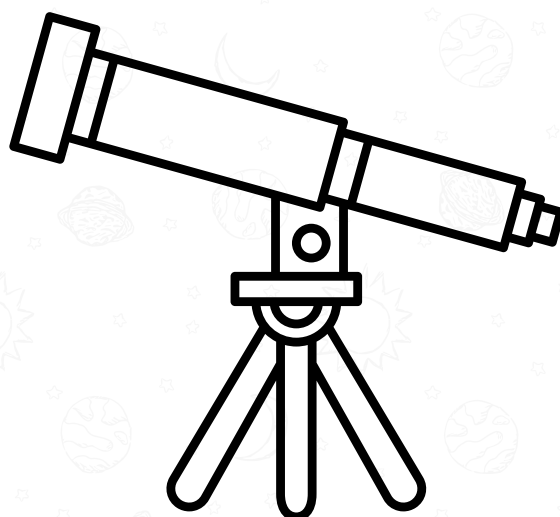- Astronauts and their life in Space

Course Outcome

- Understanding Space and time
- Observation of Universe
- How to use a telescope
- Basic knowledge of Spacecrafts, their types and application in Astronomy
- How to start journey in the fields of Astronomy and Space

Aeronautics & Aviation

Aeronautics is the study that deals with designing, manufacturing, flying ,and navigating of an aircraft. The word Aeronautics in Greek literally means Air and Navigation, and the technology has emerged from the roots of nature. Inspired from birds, early men started building aircrafts which later became an eminent part of living. Aircrafts are used for transportation, emergency evacuation, defence services, and also exploration.

Modern aircrafts include Commercial airplanes, Fighter Jets, Freighter or Cargo planes, Stealth Jets, Interceptor planes and more! Aviation technology is constantly improving and engineers are aiming to increase safety and reliability on flying machines. In this course, we'll take a dive into this amazing and innovative realm of Aeronautics and Aviation!

Course Highlights

- Introduction to Aeronautics and Aviation, and types of Aviation
- The basic knowledge about manufacturing technology
- The basic mechanism of aircraft and it's parts
- Types of Aircrafts and uses in industry
- Gliders - Design, working and application
- Unmanned Aerial Vehicles - Design and application

Course Structure

- Lecture Session - 6 hrs
- Activity Session - 1 hrs
- Doubt clearing session - 3 hrs
- Certificate Distribution - 1 hr

Topics Covered

- Aeronautics and Aviation
- Aerospace Structures
- Manufacturing Technology
- Aerodynamics, Avionics, Navigation System
- Aircraft Design and Maintenance
- Career in Aviation

Course Outcome

- Basics of Flying Mechanism
- Aircraft Materials
- Designing and manufacturing of aircrafts
- Types of engines and differences
- The basic knowledge on flight mechanics and aerodynamics
- Aircraft design, Avionics & Navigation
- How to start your journey in the field of Aviation

Mars & Moon Rovers

A rover (or sometimes planetary rover) is a planetary surface exploration device designed to move across the solid surface on a planet or other planetary mass celestial bodies. Some rovers have been designed as land vehicles to transport members of a human spaceflight crew; others have been partially or fully autonomous robots.

Rovers are typically created to land on another planet (other than Earth) via a lander-style spacecraft, tasked to collect information about the terrain, and to take crust samples such as dust, soil, rocks, and even liquids. They are essential tools in space exploration.

Course Highlights

- The basic knowledge about mars & moon rover
- The working mechanism of rover
- The basic knowledge on rover communication
- To enable the student to become familiar with interplanetary rover
- Study of orbiter, Lander, Rover.
- Study of earth segment and space segment components
- Rocker Bogie Mechanism

Course Outcome

- Rocker Bogie Mechanism
- Interplanetary mission
- Orbiter, Rover and Lander differences
- Communications between interplanet
- Design and development of Rover
- Investigation and operations of rover
- Sensors and electrical components

Course Structure

- Lecture Session - 5 hrs
- Design Session - 3 hr
- Testing Session rover designed by the participants - 3 hrs
- Operating and controlling
- Doubt clearing session - 3 hours
- Certificate Distribution - 1 hr

Topics Covered

- Introduction of rover
- Rocker bogie mechanism
- Different types of rover launched
- Rover mission
- Communication and Data Handling
- Sensors & Electrical components
- Mechanism of rover
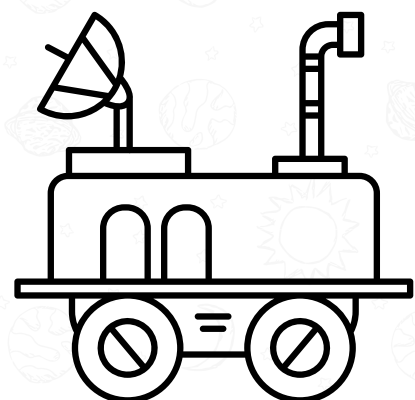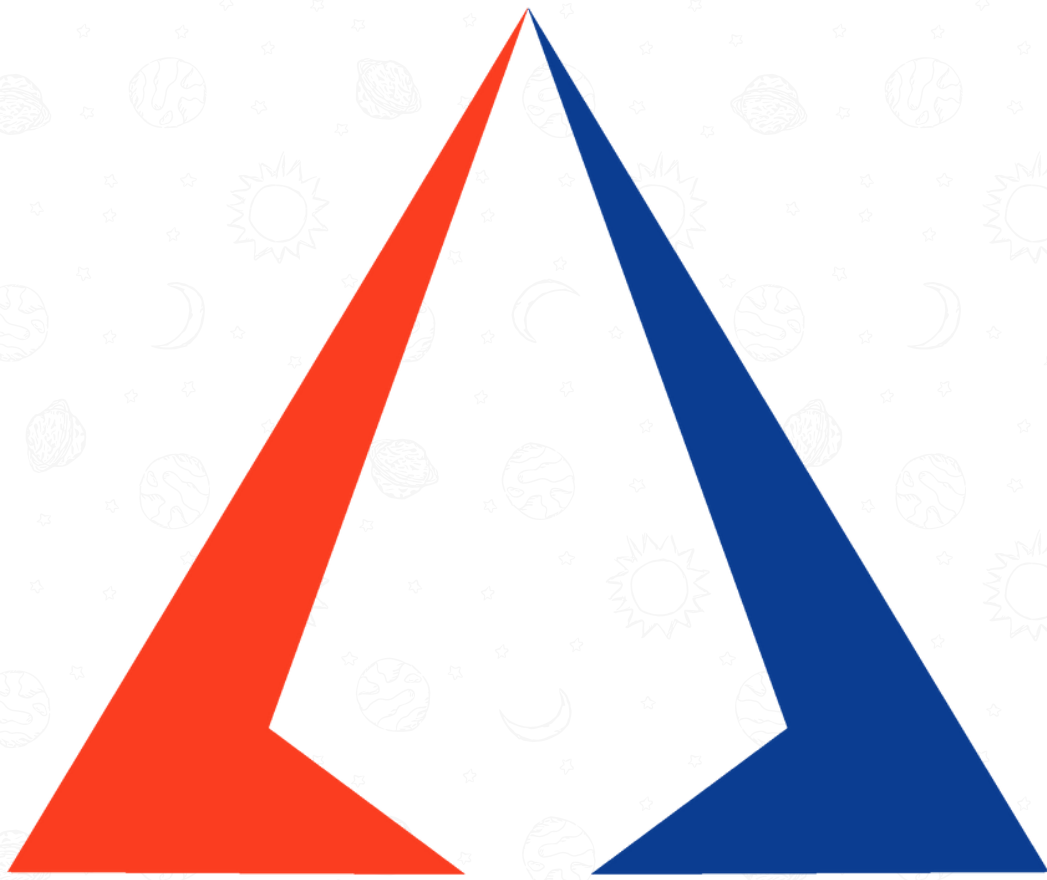
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