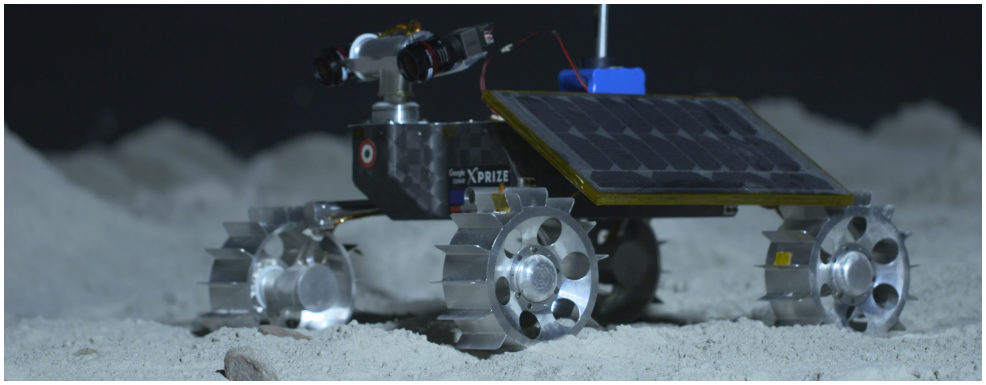

TEAM INDUS FOUNDATION

SPACE EDUCATION: THE YOUNGLINGS PROGRAM

TEAMINDUS FOUNDATION FOR EXCELLENCE

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THE YOUNGLINGS PROGRAM

To quote Benjamin Franklin: **"Tell me and I'll forget, Teach me and I'll remember, Involve me and I'll learn."**

Research shows that students retain only 5% of a lecture, 50% of any audio-visual aid and 80% of what is experienced.

When we take a look at our education system, we see lecturing as the only predominant method used.

At TeamIndus Foundation, we are attempting to transform the typical teacher-centered classroom by encouraging a curriculum that is driven by problem-solving, exploratory learning, and requires students to actively engage in a situation, in order to find its solution.

Internship Goal

The Younglings program engages students with an intensive experience in a research and development environment, under the guidance of a TeamIndus engineer who serves as the student's mentor. The project is also designed to expand the student's understanding of possible career choices that are available in the industry of space exploration.

This will include programs ranging from special presentations, immersive learning, hands-on opportunities and behind the scenes of the engineering we have built so far. The students will get a chance to interact directly with the engineers and scientists who have worked on building the spacecraft and the rover ECA. Finally, at the end of the internship, students present their learnings to a broad audience of engineers and senior ex-ISRO scientists and are awarded the 'THE YOUNG SCIENTIST' certificate of appreciation.

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PROGRAM DETAILS:

DAY-1

- Facility tour of the Mission hardware, Mission Operations Centre and Lunar testbed.
- Understanding mission elements- Roles of Orbiters, Landers and Rovers
- Difference between Flyby and Orbiter missions
- How to select a landing site for Moon or Mars missions
- Deciding the science instruments to be carried on orbiter, landers and rovers

Each session is followed by discussing and solving real problems faced by Engineers while working on these areas .

DAY-2

Introducing the major sub-systems of the spacecraft:

- Structure and Thermal sub-systems
- Propulsion sub-system
- Power & Communication
- Guidance Navigation and Control
- Flight Dynamics

Flight Dynamics

- Basics of Orbital Dynamics
- Introduction to trajectory design process
- Hands on training on using GMAT software tool, to design missions. Students will learn to compute the net delta-v and propellant required to design the Hohmann transfer mission in GMAT.

DAY-3

EPS (Electrical Power Sub-system)

- Familiarize students with different aspects of Power Management ,understand how our solar panels impact the battery size , what is SoC (State of charge) and how is it calculated.
- Insights into commonly used power sources

Structure sub-system

- Spacecraft design and the hardware used.
- Videos on the various tests conducted on TeamIndus lander like drop test and vibration test. Students also get an insight into the landing gear design.
- Close analysis of the TeamIndus spacecraft and Rover , calculate the distance travelled on the Moon in the absence of an odometer.

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PROGRAM DETAILS:

DAY-4

Propulsion Sub-system

- Mechanics of flight and space travel – fundamental forces and relationships
- Calculating the effect of solar radiation on propellant tanks using the Ideal Gas law of Thermodynamics
- Prototypes and next-gen propulsion concepts
- Group activity of launching and landing a stomp rocket at a pre-designated area. Involves brainstorming, designing, prototyping, testing, and evaluating results.

Guidance Navigation and Control sub-system

- Image processing and analysis.
- Image noise reduction using mean and median.
- Lunar landing sites and TeamIndus mission's Terminal Descent strategy.·
- Gaining hands-on experience on the MATLAB computer vision tool.

DAY-5

Avionics

- Understanding how Telemetry and Telecommand (TMTC) module interfaces the spacecraft's communication hardware to communicate with the ground station on Earth.
- Role of OBC module in processing algorithms for the entire mission.
- Role of sensors, IMU, high precision accelerometers and gyros in Spacecraft's attitude control

Rover Navigation-Practical session

- Navigate a Rover on TeamIndus' simulated Lunar pit, through the application of navigational algorithms, control theory and interfacing with sensors and processors

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PROGRAM DETAILS:

The internship will end with a certificate of appreciation and a feedback session.
Lunch will be provided at TeamIndus Cafeteria

Eligibility requirements

- 14 years old on or before the project start date
- Available on a full-time basis (Monday through Friday, 8 hours/day) during the duration of the internship
- This is an intensive internship and students requires absolute focus and interest

Disclaimer

- The sessions can change depending on the availability of the experts and engineers.
- Travel and stay costs have to be incurred by the participants.
- The program begins at 9am and ends at 5pm everyday
- This is an intensive program and expects students to prep before the workshop begins. All prep material will be provided atleast 2 weeks before the workshop begins.
- The students will be given assignments on the sessions that need be be submitted the next day by 9 am
- In case of cancellation of registration upto 1 week prior to the beginning of the program, 50% of the fees will be refunded. There will be NO RE-FUND once the workshop begins.

Contact us

For application questions/ requests, please email moonshot@teamindusfoundation.org with the subject line being “TeamIndus Foundation Younglings program”