# CENTRE FOR STEM & SPACE SCIENCE

Nurturing Technocrats of Future

॥ ऋते ज्ञानान्न मुक्तिः॥

## About Us

Education Career Foundation (ECF) has been established in 2016 under the aegis of Education Career Foundation Charitable Trust under the Act 1860 and 1950 of charity commissioner of India with the realization that social transformation can occur through the spread of high quality education. ECF has received 12AAG from Income Tax Department of India and designated as ISO 9001:2015 Certified Charitable Trust.

The horizon of Educational Career Foundation (ECF) have been widening since established. All the programs are designed to make student more practical oriented and thereby make them capable of facing the challenges in real life more confidently. With the well-equipped infrastructure, facilities of information and communication technology and with a team of dedicated staff ECF is all geared to take up all challenges in era of globalization. The selfless efforts put by the devoted teachers and staff enabled ECF to carve its own niche in the field of education.

In today's world on every step there is huge competition at every stage of life hence ECF prepares individual not only for their future profession but also gives lifelong learning.

We are offering new and contemporary elective courses, reviewing courses offerings, developing new project material, and modernizing IT infrastructure. We provide Management Programs, Certification and Diploma Courses. Other certified training courses in both online and offline mode for the professional growth of an individual. We have developed smart phone-based applications, Blog site for interactivity, online library, social media integration, etc. ECF also provides free counselling and career guidance for today's youth.

**Feathers of Education Career Foundation (ECF)**

- Group of Junior and Senior colleges across Pune city (Arts, commerce & Science)
- Institute of skills and Entrepreneurship Development.
- Successful Integration of ICT in Education
- Career Guidance
- Education Consultants
- Achievement

**Education Icon Awards 2020**

# Centre for STEM and Space Science

Nurturing Technocrats of Future

We are in the era of advanced technology and its applications are part of daily lives. Rapid advancements in science and technology force us to be updated at all levels. Automation is the reality and job world is constantly changing. The requirement for highly skilled professionals with strong domain knowledge and technical skills is increasing in all the fast-growing industries. Technological workforce is in demand now and will be forever. Government and private organisations are working on specialised skill development for employment and industrial development. But the goals can be better achieved if we work on installing the characteristics and personal skills that are required for creation of skilled workforce of Scientists, Engineers, Researchers, Technocrats and Leaders. Instilling the traits in early educational period will be most beneficial as students can identify and learn new skills, get exposure to various tasks and problems early so as to learn problem solving, critical thinking, analytical thinking, creativity, innovation, project management and much more.

So, with the aim to provide facilities and infrastructure ECF has initiated the Centre for STEM and Space Science where every student can learn, participate, acquire new skills, make projects, solve problems of real life, create something new along with his/her regular curriculum. This centre will definitely add value to educational development of students.

## What is STEM Education?

STEM stands for Science Technology Engineering Mathematics and STEM Education refers to studying these areas with theoretical as well as a practical approach. The abbreviation was announced by the scientific administrators of the National Science Foundation (NSF) in the USA in 2001.

A STEM curriculum is designed to provide its students with maximum possible practical exposure and hands-on experience in a particular field. It offers a perfect blend of course modules with a few mandatory lab assignments and group projects, which help in learning through practical implementation of theoretical knowledge

## Space Science

Everyone is always fascinated about 'How does the universe work?', 'How many stars, planets and galaxies are there?', 'What are black holes?' And the one that inspires the most 'Is there life beyond Earth?'

Astronomy is a science that seeks to answer such questions through observation and scientific methods. Space science is an interdisciplinary subject that is naturally linked with technology and instrumentation which puts the field in a position to contribute significantly in building a strong technical work force. With the current advancement in this field, there will be a continuous demand of professionals.

In India, astronomy and space science courses are taught at the post graduate level. These courses are generally specialized. There is a need of a curriculum that fills the gap between the current school - college curriculum and skills required for these specialized courses. Our curriculum is flexible for students so they can take an active participation in the course and activities while following their regular routine

## Space science as STEM

Space science consists of astronomy, astrophysics, electronics, rocket science, earth science and many more so it can be considered as one of the most effective methods to apply STEM education. Space science helps student build conceptual understanding about all the fields and helps to develop curiosity through applications. Space science provides opportunities for the student to get hands-on experience on the advanced instruments and introduces them with experimental techniques which help student develop critical thinking, decision making and problem solving. Space science education contributes significantly to form technologically educated manpower pool.

## How our Centre will achieve the goals?

- Courses dedicated for Astronomy and Space science to provide early exposure to the field, acquire knowledge and skillsets for higher education and career in the field
- Group activities to develop leadership skills, communication skills teamwork and coordination
- With individually assigned projects, students will learn to design and invent their own solutions that develop skills like decision making and analytical thinking.
- With our STEM programme students will have interactive learning experience where they will be encouraged to think out of the box and apply their knowledge in real life
- Carefully designed theory lectures and Hands on experience in practical sessions will help understand core concepts and their application in various fields

## Infrastructure & Facilities Provided By The Centre

### Courses

### Observatory

### Library facility


### Space Science lab

### Expert guidance

### Online Support

### Summer Camp & Winter Camp

### Career Guidance

### JEST guidance

Joint Entrance Screening Test
Physics
TCS

**JEST**

### Publications

# Our Courses

## Foundation Courses

### Basic Course in Astronomy

**Course Duration: 50 hours**

**Eligibility: Class 8th and above**

**Course Contents :**

- **Introduction to Astronomy & Astrophysics**
  - History of Astronomy and Space Science
  - Celestial Sphere
  - Solar system
  - Stars
  - Galaxies
  - Universe
- **Observational Astronomy**
  - Star charts, Sky Map reading
  - Optical astronomy
- **Satellites**
  - Introduction to Satellites
  - Navigation Systems
  - Communication Systems
  - Weather Systems
- **Space Missions**
- **Exoplanets**
- **Scope of Astronomy**
- **Experiments**

### Intermediate Course in Space Science

**Course Duration: 50 hours**

**Eligibility: Class 8th and above**

**Course Contents:**

- **Advanced Concepts in Astronomy**
  - Celestial Coordinate systems
  - Earth & Moon
  - Stellar Physics
  - Neutron Stars & Black Holes
  - Galactic Medium
  - Dark Matter & Dark Energy
  - Cosmology
  - Life in the Universe
- **Space Science**
  - Space Propulsion
  - Physical Space Exploration
  - Satellites
  - Space Junk
- **Tools and Techniques in Astronomy**
  - Non-optical Astronomy
  - Data Collection & Analysis
  - Satellite Communication
  - Photodetectors
  - Spectroscopy
- **Space Science as Career**
  - Education
  - Research Domains
  - Careers
  - Experiments

Our Courses

Advanced Courses

# Certificate Course in Astronomy

**Course Duration: 200 hours (6 months)**

**Eligibility: Class 12 & Above**

**Course Contents :**

- **Fundamentals of Astronomy**
  - Naked eye Astronomy
  - Astrometry
  - Measurements in Astronomy
  - Earth & Moon
  - Solar system
- **Stars and Galaxies**
  - Classification of Stars
  - Stellar Evolution
  - Study of Compact objects
  - Galaxies
  - Active Galactic Nuclei
- **Techniques of Astronomy and Space Exploration**
  - Telescopes and Detectors
  - Spectroscopy
  - Space Exploration
  - Rockets and Spacecrafts
  - Satellites
- **Related Fields and Applications**
  - Cosmology
  - Astrochemistry
  - Astrobiology
  - Special Materials for Space
  - Experiments

## Our Courses

# Diploma in Space Science

**Course Duration: 400 hours ( 1 year)** **Eligibility: Class 12 & Above**

**Course Contents:**

### Semester 1

- **Part A – Foundations of Science and Astronomy:**
  - Unit 1 – Methods and Tools of Science
  - Unit 2 – Basics of Astronomy
- **Part B – Technical Tools and Skills**
  - Unit 1 – Electronics
  - Unit 2 – Digital Signal Processing
  - Unit 3 – Image Processing
  - Unit 4 – Data Analysis
- **Part C – Stars and Galaxies**
  - Unit 1 – Stellar Astronomy
  - Unit 2 – Galactic Astronomy

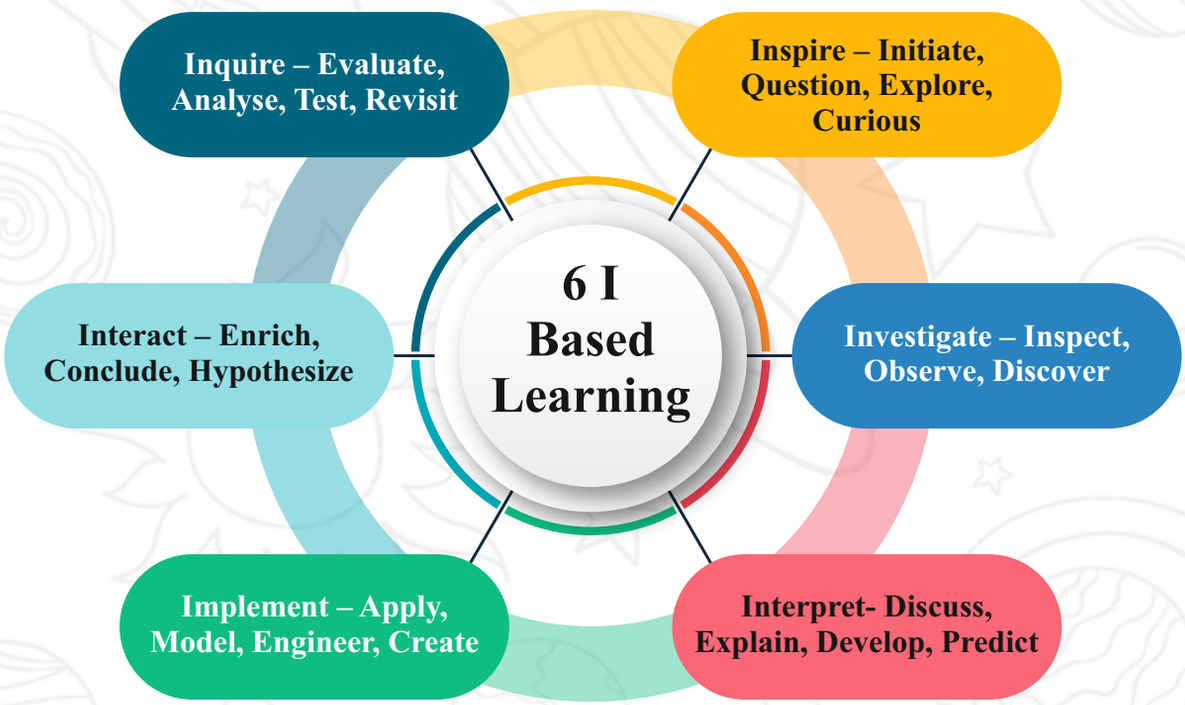
### Semester 2

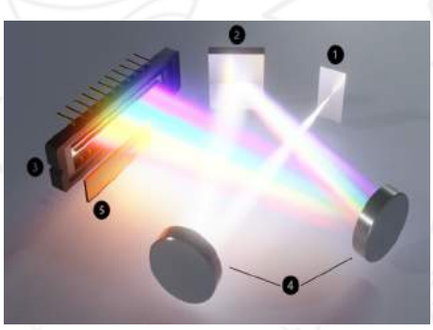
- **Part A – Observational Techniques for Exploration**
  - Unit 1 – Radio Astronomy
  - Unit 2 – Spectroscopy
  - Unit 3 – Interferometry
- **Part B – Physical Exploration of Space**
  - Unit 1 – Rockets
  - Unit 2 – Spacecrafts
  - Unit 3 – Satellites
- **Part C – Earth and Space Science**
  - Unit 1 – Earth and Moon
  - Unit 2 – Atmospheric science
  - Unit 3 – Space Physics

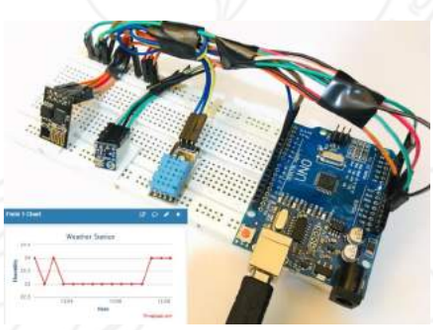
## STEM Programme

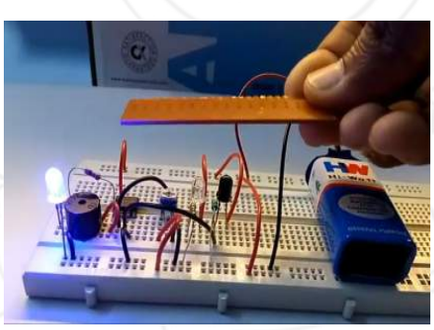
A dedicated programme in Science Technology Engineering and Mathematics where students acquire new skills, concepts, techniques to explore, create, innovate, discover, find solutions which helps them to become competent, self-reliant and ready for future challenges

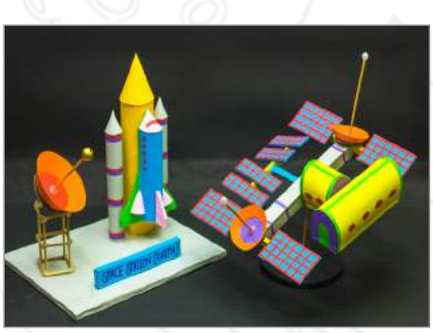
India is full of top quality talent but the exam focused education model has limited the students when it comes to innovation, problem solving and creativity. This is where the STEM education and our program come in to fill this gap









## 15 Days STEM Programme

**Age Group : 10yrs To 15yrs**

**Division of activities:**

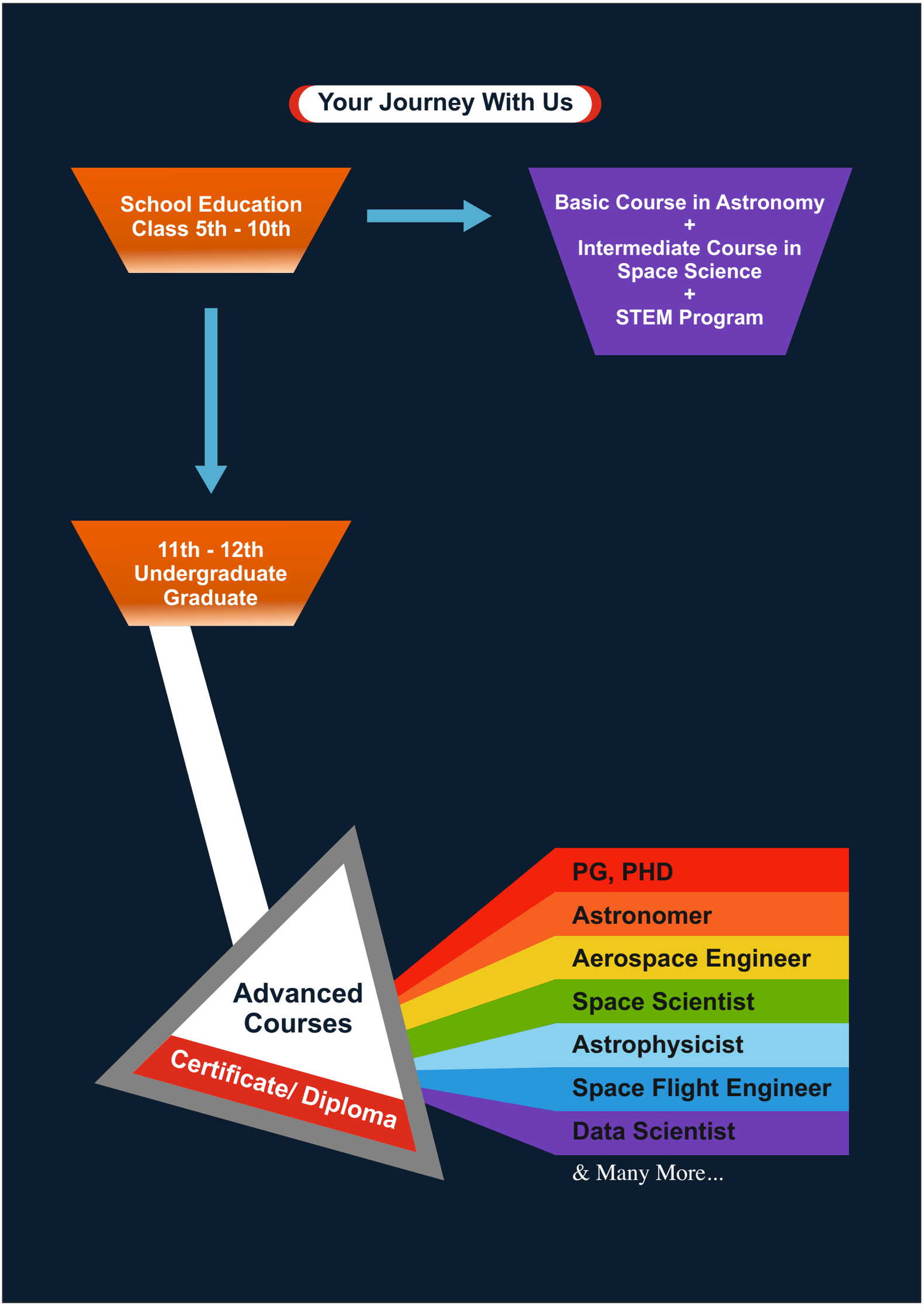
**Concept Based:**

- Detecting pollutants in water
- Working of telescope
- Saltwater circuit
- Solar power
- Quality testing
- Specific Gravity
- Refractive index
- BRIX
- Carbon Cycle
- Photosynthesis
- Optimization

**Project Based:**

- Build your own Motor
- Thermostat
- Burglar alarm
- Color sensor
- Moisture sensor
- Swamp cooler
- Know Your Sky
- Computational Thinking

## Skills developed through STEM Education


Your Journey With Us
School Education
Class 5th - 10th
Basic Course in Astronomy
+
Intermediate Course in
Space Science
+
STEM Program
11th - 12th
Undergraduate
Graduate
Advanced
Courses
Certificate/ Diploma
PG, PHD
Astronomer
Aerospace Engineer
Space Scientist
Astrophysicist
Space Flight Engineer
Data Scientist
& Many More...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Branches

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