

Mission X

From Earth to Mars

Interplanetary Orbit Simulation Internship



Who We Are

ZenoSky is a forward-thinking technical training institute committed to bridging the gap between academic knowledge and real-world industry demands. We specialize in equipping students, aspiring aerospace professionals, and engineers with practical, hands-on skills in satellite operations, space mission design, and interplanetary simulations.



ZenoSky is an authorized reseller and academic promoter of FreeFlyer, a premier tool for space mission simulation and orbit determination. Through this partnership, we deliver industry-relevant training and solutions in orbital mechanics and mission planning.

Why This Training & Internship?

This program offers a powerful blend of technical training and hands-on internship experience in orbital mechanics, space mission design, and trajectory simulation. Using Python and FreeFlyer—the tools trusted in Industry, you'll gain industry-relevant skills in orbit determination and interplanetary mission planning to confidently step into the space sector.

What Can You Expect ?

By the end of this program, you'll be able to:

- Write orbital simulations in MATLAB
- Understand and apply Keplerian elements
- Code and visualize interplanetary transfers
- Build and analyze missions in FreeFlyer
- Compare results from custom code and professional tools

Tools & Skills You Will Learn

- MATLAB (Scientific Programming)
- FreeFlyer® (Orbit Simulation)
- Lambert's Transfer Modeling
- Keplerian Orbit Modeling
- Trajectory Designing
- Initial Orbit Determination

Real-World Projects You'll Build

- Earth Orbit Simulation using Keplerian Elements
- Lambert Transfer: Earth to Mars Trajectory
- FreeFlyer Satellite Scenario with Sensors & Ground Stations
- Interplanetary Mission Design & Comparison (MATLAB vs FreeFlyer)

PROGRAM OVERVIEW

WEEK 1: MATLAB FOR SPACE APPLICATIONS

- Introduction to MATLAB environment and syntax
- Control structures: if, else, for, while
- Working with arrays, matrices, and structures
- Functions and scripts for modular code
- Implementing simulation logic using structures and cell arrays
- Mini Project: Simulate a basic multi-stage rocket in MATLAB

WEEK 2: FUNDAMENTALS OF ORBITAL MECHANICS

- Newton's Laws & gravitational motion in space
- Introduction to orbital elements (Keplerian elements)
- Rocket equation and velocity calculations
- Orbital energy and types of orbits
- Exercise: Calculate orbital parameters for an Earth satellite

WEEK 3: INTERPLANETARY ORBIT DESIGN

- Fundamentals of orbit determination techniques
- Lambert's Problem: theory and real-world applications
- Implementing Lambert's algorithm in MATLAB
- Understanding transfer orbits and time-of-flight
- Exercise: Simulate an Earth-Mars transfer using Lambert's solution in MATLAB

WEEK 4: INTRODUCTION TO FREEFLYER

- Overview of FreeFlyer interface and workflow
- Creating mission objects: Satellites, Sensors, Ground Stations
- Designing orbital scenarios and mission timelines
- Basics of FreeFlyer's orbit determination tools
- Project: Simulate an Earth observation mission using FreeFlyer

WEEK 5: CAPSTONE PROJECT

- Develop an interplanetary Mars transfer mission in FreeFlyer
- Compare results from MATLAB (or Python) and FreeFlyer: trajectory, travel time, delta-V
- Analyze differences in outputs and modeling approaches
- Create a final report and presentation

Live doubt-clearing sessions with instructors and mentors

CERTIFICATION & RECOGNITION

- Certificate of Completion issued by ZenoSky
- Industry-recognized experience with FreeFlyer simulation software
- Capstone project to showcase in your academic or professional portfolio
- Eligible for recommendation letters based on performance
- Valuable addition to resumes, LinkedIn profiles, and graduate applications



Who Can Join the Course?

Anyone with intellectual curiosity and a passion to explore space is welcome to join

How to Join ?

Submit your details through the Google Form below, and we'll get back to you with further instructions.

GET STARTED →

Other Course Details

- Mode: Online
- Requirements:
 - A laptop or desktop with basic processing power
 - Stable internet connection
 - Interest and commitment to complete weekly assignments and the capstone project
- Program Fee: ₹ 5000

Contact Us

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ENGINEERING TOMORROW'S SKIES

