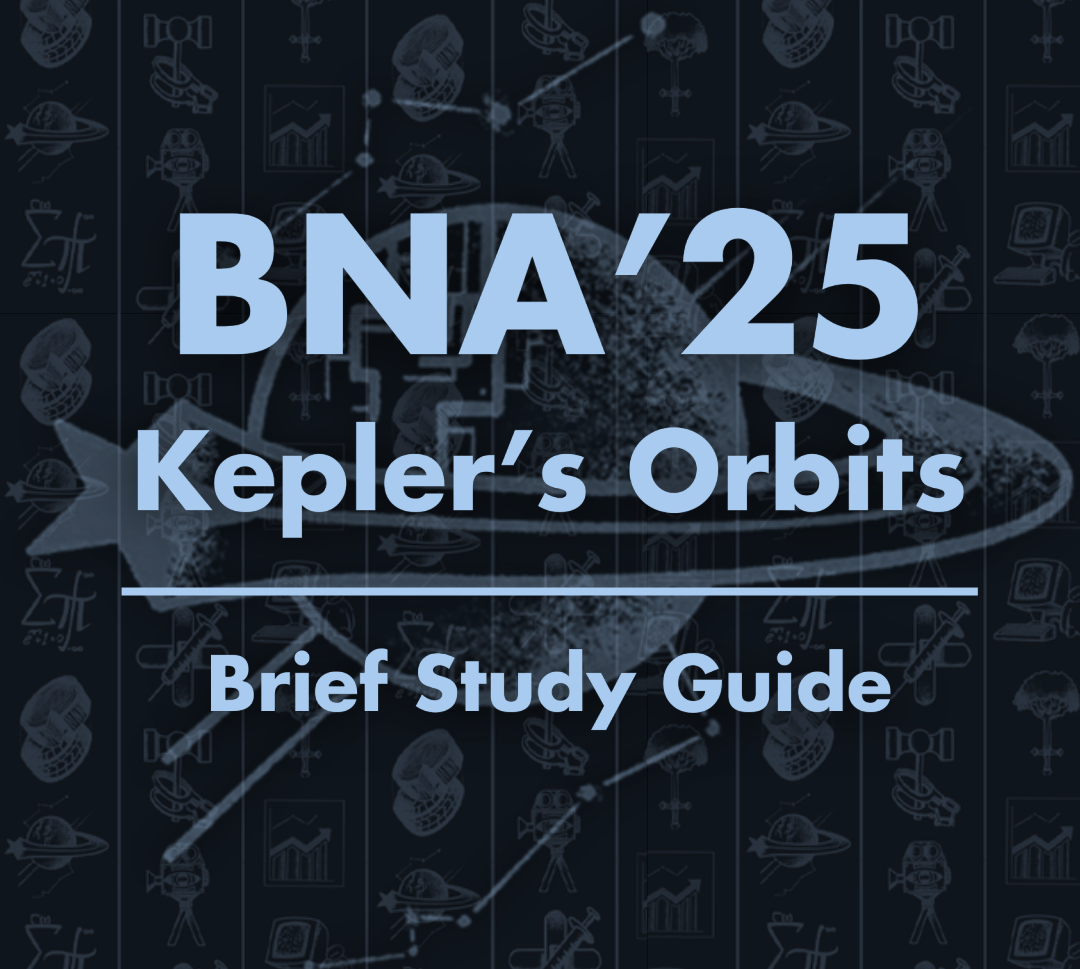
BNA'25

Kepler's Orbits



Brief Study Guide

Kepler's Orbits

"Kepler's Orbits" is the astronomy and aerospace module at Beaconhouse Notion of Academia '25, designed to ignite the imaginations of delegates as they venture into the exciting realms of space technology, aerospace engineering, and the vast wonders of the universe. This module combines astronomy, aeronautics, and astronautics, offering an in-depth exploration of space and flight. Delegates will design, assemble, and test models while studying celestial bodies, orbital mechanics, and cutting-edge space technology.

Round

1

The first round, titled **"Astral Code"**, immerses delegates in the fascinating world of astronomical image processing, data analysis, and celestial exploration. Teams will start by processing raw images of astronomical objects using specialized software to enhance clarity and reveal hidden details. They will then perform arithmetic and logical calculations to extract different kinds of insights about these celestial phenomena. The challenge progresses to image processing of planets, where teams will analyze and uncover unique features. This round combines technical skills and astronomical knowledge, testing delegates' ability to interpret complex data from the cosmos.

Delegate Cap: 2 per team

2

The second round, titled **"Flight Mavericks"**, challenges delegates to demonstrate their engineering prowess

and creativity as they design, build, and launch a lightweight glider with the aim of achieving the longest and most stable flight possible. Delegates will begin by creating a detailed construction plan to maximise flight duration and stability. They will then build their gliders using materials provided and innovative techniques, testing their knowledge of aerodynamics and structural integrity. The gliders will then be launched and evaluated based on different metrics of flight performance to be disclosed at the start of the round, with the most successful designs achieving smooth, steady flights.

Delegate Cap: 3 per team

3

The third round, titled **"Venturi Shift"**, tasks delegates with the mission to design, build, and operate a fully functional wind tunnel to test the aerodynamic properties of various models, such as rockets or aircraft. Teams will construct a tunnel to ensure smooth airflow for accurate aerodynamic testing. They will then test a given model, measuring lift, drag, and stability, while troubleshooting and adjusting airflow as needed. After collecting data, teams will present findings and suggest improvements to optimize performance. This round emphasizes problem-solving and applying theoretical knowledge to practical design challenges in aerodynamics.

Delegate Cap: 3 per team

Note: The information in this document is subject to changes.