StellarXplorers National Finals Competition (NFC)

For National Finals Quiz will be an individual 10-question quiz taken by all team members. This quiz will be a **CLOSED-BOOK QUIZ**, administered using ClassMarker (web-based testing site). Each student will have 10 minutes to complete the quiz. The team score will be the average score of all team members. Study topics come from the *Understanding Space* textbook.

**CHAPTER 1**

**Section 1.1**
- Know the mission(s) of the following spacecraft: Pioneer, Mariner, Viking, and Magellan.

**CHAPTER 2**

**Section 2.1**
Know the key contributions of the Renaissance astronomers Nicholas Copernicus, Tycho Brahe, and Johannes Kepler.

**CHAPTER 4**

**Section 4.3**
- Know how the Total Mechanical Energy, Kinetic Energy, and Potential Energy of a person changes when a person is riding on a playground swing.

**CHAPTER 5**

**Section 5.1**
- Know how each of the following six Classical Orbital Elements (COE) describe an orbit and a spacecraft’s location within the orbit: Semi-major Axis (a), Eccentricity (e), Inclination (i), Right Ascension of the Ascending Node (RAAN) (Ω), Argument of Perigee (ε), True Anomaly (ν)
- Know the relationship between an orbit’s shape and the orbit’s eccentricity.

**Section 5.2**
- Know the characteristics of the following types of orbits:
  - Geostationary
  - Geosynchronous
  - Semi-synchronous
  - Sun-synchronous
  - Molniya

**Section 5.3**
- Know the relationship between the inclination of an orbit and its ground track.

**CHAPTER 9**

**Section 9.2**
- Understand how the orbit inclination determines the number of launch windows per day from a specified launch site, using the textbook definition of Launch Window.
CHAPTER 14

Section 14.1
• Know the definitions of the following terms: effective exhaust velocity, impulse, total impulse, specific impulse.

Section 14.2
• Know how the Hall Effect Thruster and Pulsed Plasma Thruster work.