Syllabus for the Sri Lankan Astronomy and Astrophysics Olympiad (SLAAO) and for the International Olympiad on Astronomy and Astrophysics (IOAA)

(Note: The examination on Sri Lankan Junior Astronomy Olympiad-SLJAO-is mainly based on the astronomy course material in school text books and school curricula up to grade nine.)

1. Basic Astrophysics

Celestial Mechanics Kepler's Laws, Newton's Laws of Gravitation, Electromagnetic Theory & Quantum Physics Electromagnetic spectrum, Radiation Laws, Blackbody radiation, Doppler effect; Thermodynamics Thermodynamic equilibrium, Ideal gas, Energy transfer; Spectroscopy and Atomic Physics Absorption, Emission, Scattering, Spectra of Celestial objects, Line formations; Nuclear Physics Basic concepts

2. Coordinates and Times

Celestial Sphere Spherical trigonometry, Celestial coordinates, Equinox and Solstice, Circumpolar stars, Constellations and Zodiac; Concept of Time Solar time, Sidereal time, Julian date, Heliocentric Julian date, Time zone, Universal Time, Local Mean Time

3. Solar System

The Sun Solar structure, Solar surface activities, Solar rotation, Solar radiation and Solar constant, Solar neutrinos, Sun-Earth relations, Role of magnetic fields, Solar wind; The Solar System Earth-Moon System, Formation of the Solar System, Structure and components of the Solar System, Structure and orbits of the Solar System objects, Sidereal and Synodic periods Phenomena Tides, Seasons, Eclipses, Aurorae, Meteor Showers

4. Stars

Stellar Properties Distance determination, Radiation, Luminosity and magnitude, Color indices and temperature, Determination of radii and masses, Stellar motion, Stellar variabilities; Stellar Interior and Atmospheres Stellar nucleosynthesis, Energy transportation, stellar atmospheres and spectra; Stellar Evolution Stellar formation, Hertzsprung-Russell diagram, Pre-Main Sequence, Main Sequence, Post-Main Sequence stars, End states of stars

5. Stellar Systems

Binary Star Systems Classification, Mass determination in binary star systems, Light and radial velocity curves of eclipsing binary systems, Doppler shifts in binary systems; Star Clusters Classification and Structure ; Milky Way Galaxy Structure and composition, Rotation, Interstellar medium; Normal and Active Galaxies Classification, Distance determination ; Accretion Processes Basic concepts

6. Cosmology

Elementary Cosmology Cluster of galaxies, Dark matter, Gravitational lenses, Hubble's Law, Big Bang, Cosmic Microwave Background Radiation

7. Instrumentation and Space Technologies

Multi-wavelength Astronomy; Observations in radio, microwave, infrared, visible, ultraviolet, X-ray, and gamma-ray wavelength bands, Earth's atmospheric effects; Instrumentation and Space Technologies Ground- and space-based telescopes and detectors (e.g. charge-coupled devices, photometers, spectrographs), Magnification, resolving and light-gathering powers of telescopes