Astronomy

1. Course Description

This course is an introductory to astronomy, History of astronomy will be presented and planets, stars, and stellar evolution will be discussed. Topics include Kepler's law of planetary motion. Planets and artificial satellites obey Newton's law and their position and velocity can be predicted precisely by applying the Kepler equation. The minimum amount of energy required by a satellite to transfer another orbit and 'rendezvous' of two satellites will be discussed.

2. Course Objectives

This introductory course presents a fundamental knowledge of astronomy. The goal of this course is to be able to calculate a orbital motion based on the Kepler' law, and the universal law of gravitation.

3. Grading Policy

Final examination (70%), report (30%)

4. Textbook and Reference

Reference
S.Kinoshita   Celestial Mechanics and Orbital Dynamics   University of Tokyo Press ISBN4-13-060721-9

5. Requirements(Assignments)

Lecture note and related papers will be shown up in LMS. Student must pre-study scientific terms.

6. Note

7. Schedule

[1]   Introduction of Astronomy

[2]   Unit and coordinate system of star

[3]   Evolution of Star 1: HR diagram (Practice1 Drawing HR diagram)

[4]   Evolution of Star 2: Energy source of star

[5]   Evolution of Star 3: From birth to end of star

[6]   Outer cosmos: expansion of space

[7]   Orbit of planet 1: elliptical orbit

[8]   Orbit of planet 2: Kepler equation

[9]   Orbit of planet 3: From Kepler equation to Newton's gravity theory (Practice2 Drawing orbits of Pluto and Neptune)

[10]   Orbital dynamics 1: Two body problem

[11]   Orbital dynamics 2: Formula of elliptical orbit

[12]   Orbital dynamics 3: Solution of Kepler equation

[13]   Orbital dynamics 4: Orbit of satellite (Homan orbit),Rendezvous (Pactice3 velocity change for rendezvous)

[14]   Introduction of Relativity theory

[15]   Final examination and summaries