DEPARTMENT OF MATHEMATICS,

UNIVERSITY OF KARACHI,

Course Outline

MATH 685: Astronomy I

Course contents:

Section A: Orientation of earth, latitude, longitude, meridian, dateline international, poles, Greenwich mean time (GMT), time zones, rotation of earth about its axis, formation of day and night with demonstration, revolution of earth round the sun, tilting of earth axis, seasons, solar calendar, lunar calendar, core of earth, origin of earth magnetism, geographic and magnetic north poles, solar and lunar eclipses, solar system

Section B: Problem-solving techniques in astronomy, mathematics of instruments used in astronomical observations, errors in astronomical observations

Section C: Gravitational mass and inertial mass, weak principle of equivalence, mass and weight, factors in modeling of 'g', expression for 'g' (inside and outside earth)

Section D: Parts of rocket, rocket and aircraft engines, astrodynamical terminologies, convention to label axes, coördinate transformations, combination of rotations, Euler angles, review of cylindrical and spherical-polar coördinates, infinitesimal transformations, coördinate systems used in astronomy.

Books Recommended:

1. Baker, R. H., Astronomy, Van Nostrand, Amsterdam, 1998.
2. Battin, R. H., An Introduction to the Mathematics and the Methods of Astrodynamics, AIAA Education Series, New York, 1987 and 1999.
3. Deusch, R., Orbital Dynamics of Space Vehicles, Prentice Hall, Englewood Cliffs, New Jersey, USA, 1963.
4. Smart, W. M., Textbook on Spherical Astronomy, Cambridge Univ. Press, Cambridge, UK, 1962.
5. Swihart, T. L., Astrophysics and Stellar Astronomy, John Wiley, New York, 2001.