## OUTLINES OF COURSES

| Phys 1001 | MECHANICS | (CR3) |
|---|---|---|
| Preq. | FSc/A-Level (Physics) or equivalent | |

**Objectives**

*At attending this course students will be able to understand classical concepts of motion and apply their knowledge to mechanical systems.*

**Syllabus**

Vectors and vector algebra, inertial and non-inertial reference frames, Newton's laws of motion and their applications, Newton's Law of gravitation, gravitational potential energy, escape velocity, Kepler's laws, work done by constant and variable forces, gravitational and spring forces, power, conservative and non-conservative forces, work and potential energy, isolated systems and conservation of mechanical energy, work done by external forces including friction and conservation of energy, system of particles, motion of a system of particles and extended rigid bodies, center of mass and Newton's laws for a system of particles, linear momentum, impulse, momentum and kinetic energy in one and two dimensional elastic and inelastic collisions, rotation about a fixed axis and kinematical parameters, rotational inertia, parallel-axis theorem, torque and Newton's law for rotation, work and rotational kinetic energy, power, rolling motion, angular momentum for a single particle and a system of particles, conservation of angular momentum, Gyroscope motion, static equilibrium involving forces and torques, determination of moment of inertia of various shapes, effects of torque and its relation with angular momentum, non-inertial systems and fictitious forces, uniformaly accelerated systems, physics in rotating frame, coriolis effect.

***Recommended Books***

1. *Mechanics by C. Kittel, et al., Berkeley Physics Course Volume 1, Berkeley (1965) .*
2. *An Introduction to Mechanics, by D. Kelepner and R. Kolenkov, Cambridge, (2013)*
3. *Physics (Volume 1 & 2) by R. Resnick, D. Halliday and K. S. Krane (5th Edition), Wiley (2002).*
4. *University Physics with Modern Physics by H. D. Young, R. A. Freedman (14th Edition), Addison-Wesley (2015).*
5. *Fundamentals of Physics by D. Halliday, R. Resnick and J. Walker (9th Edition), JWiley (2011)*
6. *Physics: Classical and Modern by F. J. Keller W. E. Gettys and M. J. Skove (2th Edition), McGraw Hill (1992)*