FORDHAM UNIVERSITY, BRONX, N.Y.
PHYS 1501 GENERAL PHYSICS I
1st Summer Session
May 28–June 27, 2019

1. **INSTRUCTOR:**

   - Dr. Quamrul Haider
   - Freeman 206, Telephone 817-4177, e-mail: HAIDER@FORDHAM.EDU

2. **OFFICE HOURS:**

   - Monday, Wednesday and Thursday 2:30–3:30 p.m.
   - Tuesday 12:30–2:30 p.m., or by appointment.

3. **LECTURES:** Freeman Hall

   - Monday, Tuesday, Wednesday and Thursday 9:00 a.m. – 12:00 noon.

4. **Prerequisites:**

   - This is an algebra-based physics course requring a knowledge of high school algebra (exponents, logarithms, identities, first degree equations, quadratic equation, simultaneous equations) elementary trigonometry (circular functions, inverse of circular functions, trigonometric identities) and plane geometry (Pythagorean theorem, area and volume of different shapes and solids, equation of a straight line, equation of a circle. The instructor will go over most of these topics on the first day of class.

5. **TEXTBOOKS:**

   - **Physics** by Cutnell and Johnson (Wiley, 10th edition) (required textbook)
   - **Student Study Guide** by Cutnell and Johnson (Wiley, 10th edition) (recommended book)

6. **COURSE MATERIAL:**

   - See the syllabus (Outline of the course).

7. **EXAMS:**

   - 1st Exam – June 6, 2019 (Thursday)
   - 2nd Exam – June 13, 2018 (Thursday)
   - 3rd Exam – June 20, 2018 (Thursday)
   - Final Exam (Comprehensive) – June 27, 2018 (Thursday)

   The first three exams will each be of one hour duration and will be non-cumulative. Final exam will be of three hour duration and will be cumulative.

8. **HOMEWORK:**

   - Homework problems will be assigned from each chapter. They will **not be collected and graded**. Solutions can be found on the computers in Freeman 205. They will also be discussed during the class period.

9. **GRADES:**

   - 20% for each of the first three exams.
   - 40% for the final exam.

Instructor: Professor Quamrul Haider, Ph.D.
Textbook: Physics by Cutnell and Johnson (Wiley, 10th edition)

DESCRIPTION OF THE MATERIAL TO BE COVERED

1. **Introduction (Chap. 1):** Units, Dimensions, Scientific notation, significant figures, scalars and vectors, vector addition and subtraction, vector components.

2. **Kinematics in one dimension (Chap. 2):** Displacement, speed and velocity, acceleration, equations of motion for constant acceleration, freely falling bodies.

3. **Kinematics in two dimensions (Chap. 3):** Displacement, velocity and acceleration, Equations of kinematics in two dimensions, projectile motion.

4. **Forces and Newton's laws of motion (Chap. 4):** Newton's laws (first, second and third) of motion, gravitational force, weight, normal force, frictional forces, tension force, application of Newton's laws to equilibrium and non-equilibrium cases.

5. **Dynamics of uniform circular motion (Chap. 5):** Uniform circular motion, centripetal acceleration and force, banked curves, satellites in circular orbits, apparent weightlessness and artificial gravity.

6. **Work and energy (Chap. 6):** Work, work-energy theorem, kinetic energy, potential energy, conservative and nonconservative forces, conservation of mechanical energy, nonconservative forces and the work-energy theorem, power.

7. **Impulse and momentum (Chap. 7):** Impulse-momentum theorem, conservation of linear momentum, collisions in one-dimension.

8. **Rotational kinematics (Chap. 8):** Angular displacement, velocity and acceleration, equations of rotational kinematics, angular and tangential variables, centripetal and tangential accelerations, rolling motion without slipping.

9. **Rotational dynamics (Chap. 9):** Effects of forces and torques on the motion of rigid objects, rigid objects in equilibrium, center of gravity, rotational motion about a fixed axis, rotational work, energy and angular momentum.

10. **Fluids (Chap. 11):** Mass density, pressure, relation between pressure and depth in a static fluid, Pascal's principle, Archimedes' principle.

11. **Temperature and heat (Chap. 12):** Temperature scales, thermal expansion (linear, surface and volume), heat and internal energy, specific heat capacity, latent heat of phase change.

12. **Transfer of heat (Chap. 13):** Conduction and convection.

13. **Ideal gas law and kinetic theory (Chap. 14):** Molecular mass, the mole and Avogadro's number, ideal gas law, kinetic theory of gases.

14. **Thermodynamics (Chap. 15):** Zeroth law, first law, thermal processes involving pressure, volume and temperature, specific heat capacities and the first law, second law, heat engines, Carnot engine, entropy and the second law of thermodynamics.