

Structure for B.Sc. Syllabus

Inforce from June 2019

B. Sc. (PHYSICS)

Sr. No.	Course Code	Course Title	Credits
1	PH-201	Physics Paper I	2
2	PH-202	Physics Paper II	2
3	PH-203	Practical	2

Faculty Code: Science

Subject Code: PH

Name of Program: B.Sc.

Subject: PHYSICS

External Examination Time Duration: 02 Hours

Name of Exam	Semester	PAPER No.	Course Group	Credit	Internal Marks	External Marks	Total Marks
B.Sc.	1	PH-101		02	20	50	70
		PH-102		02	20	50	70
		PH-103	Practical	02	20	40	60



Syllabus for F. Y. B. Sc. Sem II

Physics Paper I (PH – 201)

Unit 1	Angular momentum and Gravitation (Physics by Halliday, Resnick and Krane, Vol. 1, 5th Ed.)
	Torques (9.1), rotational inertia and Newton's second law (9.2), rotational inertia of solid bodies (9.3), torque due to gravity (9.4), equilibrium applications of Newton's laws for rotation (9.5) Angular momentum of a particle (10.1), systems of particles (10.2), angular momentum and angular velocity (10.3), conservation of angular momentum (10.4), the spinning top (10.5), Origin of the law of gravitation (14.1), Newton's law of universal gravitation (14.2), the gravitational constant G (14.3), gravitation near the earth's surface (14.4), the two shell theorems (14.5), gravitational potential energy (14.6), the gravitational field (14.7), modern developments in gravitation (14.8)
Unit 2	Oscillation and Waves (Oscillation and Waves by Suresh Garg, C. K. Ghosh and Sanjay Gupta)
	Introduction (3.1), principle of superposition and linearity (3.2), superposition of two collinear SHOs of same frequency (3.3), superposition of two collinear SHOs of nearly equal frequencies (3.4), superposition of two mutually perpendicular harmonic oscillations (3.6), describing wave motion (7.3), phase of a wave (7.4), energy transported by a progressive wave (7.5), intensity of a wave (7.6)
Unit 3	Particle properties of waves (Concepts of Modern Physics by A. Beiser)
	Blackbody radiation (2.2), photoelectric effect (2.3), what is light (2.4), X-rays (2.5), X-ray diffraction (2.6), Compton effect (2.7), pair production (2.8), photons and gravity (2.9)
Unit 4	Elasticity (Properties of Matter by D.S. Mathur, S Chand & Co., 2009)
	Twisting couple on a cylinder (8.22), torsional pendulum (8.26), determination of coefficient of rigidity (n) for a wire (8.27), bending of a beam (8.39), the cantilever (8.30), transverse vibrations of a loaded cantilever (8.32), depression of a beam supported at the ends (8.33), determination of Y by bending of beams (8.34), determination of elastic constants by Searle's method (8.36)

Suggested Books:

1. Mechanics (Berkeley Physics Course 1 by C Kittel, W D Knight, M Alvine and A Ruderman, Tata McGraw-Hill, 1991.
2. Modern Physics by Kenneth S Krane Wiley India Edition, 2016
3. Vibrations and Waves by A. P. French, CBS; 1st Ed., 2003



Syllabus for F. Y. B. Sc. Sem II

Physics Paper II (PH – 202)

Unit 1	Magneto-statics and electromagnetic induction (Physics by Halliday, Resnick and Krane, Vol. 2, 5thEd.)
	Magnetic interactions and magnetic poles (32.1), the magnetic force on a moving charge (32.2), circulating charges (32.3), the magnetic force on a current carrying wires (32.5), the torque on a current loop (32.6), Faraday's experiments (34.1), Faraday's law of induction (34.2), Lenz's law (34.3), motional emf (34.4), generator and motor (34.5)
Unit 2	Thermodynamics (Physics by Halliday, Resnick and Krane, Vol. 2, 5thEd.)
	Temperature and thermal equilibrium (21.1), thermal expansion (21.4), the ideal gas (21.5), a molecular view of pressure (22.2), the mean free path (22.3), the distribution of molecular speeds (22.4), equations of state for real gas (22.6), heat: energy and transit (23.1), the transfer of heat (23.2), the first law of thermodynamics (23.8), the application of the first law of thermodynamics (23.8), defining entropy change (24.2), entropy change for irreversible process (24.3), the second law of thermodynamics (24.4), entropy and the performance of engines (24.5), entropy and the performance of refrigerators (24.6), the efficiency of real engines (24.7)
Unit 3	Special purpose diodes and Bipolar Junction Transistors (Electronic principles by A. P. Malvino, 6th Ed. Tata McGraw-Hill Ltd.)
	The zener diode (5.1), the loaded zener regulator (5.2), optoelectronic devices (5.8), The unbiased transistor (6.1), the biased transistor (6.2), transistor currents (6.3), the CE connection (6.4), the base curve (6.5), collector curves (6.6)
Unit 4	Optics (Optics by Ajoy Ghatak, 6thEd. McGraw-Hill Education)
	Introduction (12.1), Huygens' theory (12.2), rectilinear propagation (12.3), introduction (13.1), superposition of two sinusoidal waves (13.5), introduction (14.1), coherence (14.3), interference of light waves (14.4), the interference pattern (14.5), the intensity distribution (14.6), introduction (18.1), single slit diffraction pattern (18.2)

Suggested Books:

1. Electricity and Magnetism by A S Mahajan and A R Rangwala 7thEd. Tata McGraw-Hill, 2003.
2. University Physics by H. D. Young, R. A. Freedman and A. Lewis Ford, 13th Ed. Pearson Education, 2013
3. Fundamentals of Optics by F. Jenkins and H. White, 4th Ed. McGraw Hill Education, 2017



Syllabus for F. Y. B. Sc. Sem II

Practical (PH – 203)

List of experiments

Group A	
1	Force constant (k) of a spring
2	Elastic constants (Y, η, K & σ) by Searle's method
3	Characteristics of photocell
4	"Y" by cantilever
5	"Y" by bending of a beam supported at two ends & loaded in the middle
6	Thermal conductivity of a bad conductor by Lee's method

Group B	
1	Study of magnetic field due to Solenoid
2	Characteristics of BJT (CE configuration)
3	Wattage of a lamp
4	Newton's rings experiment
5	To determine refractive index of the material of prism using spectrometer
6	Zener diode as a voltage regulator

Suggested Books

1. D.C. Tayal, University Practical Physics, Edited by Ila Agarwal, Himalayan Publishing House
2. B. L. Worsnop and H. T. Flint, Advanced Practical Physics, Asia Publishing House, New Delhi.
3. P. Khandelwal, A Laboratory Manual of Physics for Undergraduate Classes, Vani Publication House, New Delhi.
4. Geeta Sanon, BSc Practical Physics, 1st Edn. (2007), R. Chand & Co.

Note:

1. The duration of each experiment is of 2 hours. Two such experiments are to be performed by each student per week.
2. In the external exam, a student will have to perform two experiments, one from each group. The experiment will be of 2 hours duration.
3. It is recommended that there should not be more than 20 students per batch in the external exam.



Evaluation:

Pattern of end-semester examination

For Semesters I and III

1. The question paper will comprise of objective type questions totalling 50 marks.
2. There shall be negative marking of 25% marks per wrong questions attempted.
3. No marks will be deducted for not attempting a question.

For Semesters II, IV, V and VI

1. The question paper will be of 50 marks.
2. There shall be five questions carrying 10 marks each.
3. Question 1 will consist of 12 short answer questions of 1 mark each. A student can answer any 10 questions. Question 1 will cover the whole syllabus and 3 short answer questions will be asked from each unit.
4. Question 2 will be asked from unit 1, question 3 from unit 2, question 4 from unit 3 and question 5 from unit 4.
5. Question 2 onwards, each question will consist of option (a) or (b). Each question will include two sub-questions. Each sub-question will have theory based questions of 6 marks followed by one problem or application of 4 marks. A student should attempt any one of the two options (a) or (b).

