

**Subject Code: 02PY0231**
**Subject Name: Physics-III**
**B.Sc. Year – II (Sem-III)**

**Objective:** This course aims to make students to be able to interpret and apply the fundamentals of Atomic physics, X-rays, Semiconductors, Lasers and its applications.

**Credits Earned: 5 Credits**

**Course Outcomes:** After completion of this course, student will be able to

- Apply knowledge of physics in other branches of science to solve scientific problems

**Teaching and Examination Scheme**

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE	IA	CSE	Viva (V)	Term Work (TW)	
4	0	2	5	50	30	20	25	25	150

**Contents:**

<b>Unit</b>	<b>Topics</b>	<b>Contact Hours</b>
1	<b>Atoms and X-Rays:</b> Some Properties of Atom, Electron Spin, Angular momentum and Magnetic Dipole moments, The Stern-Gerlach Experiment, Magnetic Resonance, The Pauli Exclusion principle, X-Rays and the Ordering of the element, the continuous X-Ray Spectrum, The Characteristics X-Ray Spectrum, Ordering the Elements	15
2.	<b>Semiconductor Physics :</b> Energy Level in solids, Valence Band, Conduction Band, Forbidden Band, Conductor, Semiconductors and Insulators, Chemical bonds in semiconductors like Germanium and Silicon, Intrinsic and Extrinsic Semiconductors, Conductivity of Semiconductor materials, P N Junction Diode, Junction Transistor.	15
3	<b>Optical Interference and Diffraction :</b> Light as wave, Diffraction, Young's interference experiment, Coherence, Intensity in Double slit Interference, interference from Thin Films, Michelson's Interferometer, Diffraction and Wave Theory of Light, Diffraction by a single Slit Locating the minima, Intensity in Single Slit Diffraction, Diffraction by Circular Aperture, Diffraction by Double slit, Diffraction Gratings.	15
4	<b>LASER</b> LASER, Properties LASER, Stimulated absorption, Spontaneous Emission, Stimulated Emission, Einstein's relation between coefficients A and B, Population inversion, Optical Resonator, Ruby LASER, Gas Laser, Laser Diode, Applications of Laser in Various fields.	15

**Reference Books:**

1. Principles of Physics – Halliday, Resnick and Walker, 10<sup>th</sup> edition Wiley Publication (2015)
2. SEARS AND ZEMANSKY'S University Physics with Modern Physics 13<sup>th</sup> edition by H. D. Young and R. A. Freedman. Pearson Publication (2012)

**Physics**

3. Electronic Devices and Circuit Theory 8<sup>th</sup> edition by Robert Boylestad , PHI publication. (2009)
4. Engineering Physics – R K Gaur and S L Gupta, 8<sup>th</sup> edition Dhanpat Rai Publications (2011)
5. Lectures on Physics Vol. 1, 2, 3 by Feynman, Pearson Publication (2009)

**Suggested Theory distribution:**

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
20%	20%	30%	15%	10%	5%

**Suggested List of Experiments:**

1. To measure resistivity (conductivity) and energy band gap of given semiconductor by Four probe method
2. To Study P N Junction Diode Characteristics.
3. To Study Zener Diode Characteristics.
4. To Study I-V Characteristics of Transistor.
5. To Study of Full Wave Rectifier.

**Instructional Method:**

- a. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.
- b. The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
- c. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.



- d. Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory