

# **BHAKTA KAVI NARSINH MEHTA UNIVERSIT, JUNAGADH**



## **Syllabus for the Subject of PHYSICS**

**under the Faculty of SCIENCE**

*B.Sc.-Sem: 1*

*(Physics)*

Effective from June - 2018.

**B.Sc. Semester -1**  
**P-101 : Physics Theory**  
(In force from June-2018)  
**(Mechanics & Semiconductor Electronics)**

**60 hour**

**70 Marks**

**UNIT 1: (12 hour : 14 Mark)**

**Vectors algebra :**Vectors and Scalars, Scalar and Vector Products (for 2 & 3 vectors), derivative of a vector with respect to parameter

**Special theory of relativity:** Constancy of speed of light, postulates of special theory of relativity, length contraction, time dilation, relativistic addition of velocities

**UNIT 2: (12 hour : 14 Mark)**

**Semiconductors Physics:** Semiconductor materials, Energy Bands in solidsmetals

Insulators and semiconductor, Intrinsic Semiconductor, Crystal Structure

of Intrinsic semiconductor, Charge Carriers in Intrinsic semiconductor,

Conduction in Intrinsic semiconductor, Extrinsic semiconductors, N-type

Semiconductor, P-type Semiconductor, Effect of temperature on conductivity of

Intrinsic and Extrinsic Semiconductor, PN junction, Formation of PN junction, PN

junction with Forward and Reverse biasing, Reverse Breakdown, V-I

Characteristic of a PN junction diode, The ideal diode, Static and Dynamics

Resistance of a diode.Zener Diode, Zener Breakdown, V-I Characteristic of a

Zener diode, Numerical Examples.

**Reference books for unit 1,2 :**

1. Concept of physics By H C Verma part 1 Publisher: BharatiBhawan
2. Sears and Zemansky's University Physics with modern physics  
By H D Young Publisher: PEARSON
3. Basic electronics and linear circuits By N NBhargava, D C Kushreshtha,  
S C Gupta Publisher: Technical Teachers Training Institute Chandigarh.
4. Elements of Electronics ByBagde& Singh Pub: S.chand

### **UNIT 3: (12 hour : 14 Mark)**

**Laws of Motion & Dynamics of System of Particles:** Frames of reference, Newton's Laws of motion, Kinetic Energy, Work and Work-Energy theorem, Calculation of Work Done, Conservative and Non-Conservative force (only definition), Potential Energy and Conservation of Energy, Definition of Center of Mass, Center of Mass of Two Particles and several group of Particles, Linear Momentum and its Conservation Principle,

**Rotational Motion:** Angular velocity and Angular Acceleration, Torque of a Force about the Axis of Rotation, Moment of Inertia and  $I = \sum m r^2$ , Moment of Inertia of rectangular Bar, Moment of Inertia of Solid Cylinder, Angular Momentum, Conservation of angular momentum

### **UNIT 4: (12 hour : 14 Mark)**

**Gravitation:** Newton's Law of Gravitation, Gravitation Potential Energy, Gravitation potential, Gravitational field, Calculation of Gravitational Potential and Field due to a Point Mass, Kepler's Laws, Motion of Planets and Satellite in circular orbit. Geosynchronous orbits, Weightlessness, Escape velocity, Basic idea of GPS

### **UNIT 5: (12 hour : 14 Mark)**

**Elasticity:** Elasticity, Stress and Strain, Hooke's law, Relation between Longitudinal Stress and Strain(stress-strain diagram), Modulus of Rigidity, Poission's Ratio, Determination of Young modulus by Searles method.

**Oscillations:** Simple Harmonic Motion, Equation for SHM and its Solutions, Terms associated with SHM like (Time Period, Frequency, Amplitude, and Phase), SHM as a Projection of Circular Motion, Energy conservation in simple harmonic motion, Kinetic and Potential Energy, Damped Oscillations, Forced Oscillation and Resonance.Numerical Examples.

#### **Reference books for unit 3,4,5:**

1. Concept of physics By H C Verma part 1 Publisher: BharatiBhawan
2. Sears and Zemansky's University Physics with modern physics By H D Young Publisher: PEARSON

**Other Reference books:**

1. Mechanics Berkeley Physics course Vol 1
2. Lectures on physics, R.P.Feynman, Vol-1
3. Physics – Resnick and Halliday
4. Principles of electronics By V.K.Mehta Publisher: S.Chand
5. Electronic Device And Circuits By Allen Mottershead Pub: PHI

**LIST OF EXPERIMENTS****B.Sc. Semester-I**

1. To Study of errors in observation Using Vernier Caliper, Micrometer Screw.
2. To determine 'g' and radius of gyration using Bar Pendulum,
3. To determine the Moment of Inertia of rectangular body & prove law of perpendicular axis by Bifilar Suspension.
4. To determine the Moment of Inertia & Modulus of rigidity by Torsional pendulum.
5. To determine the Young's Modulus of long wire by Searl's method.
6. To determine the Poisson's ratio of rubber tube.
7. To study of Charging and Discharging of Capacitor and RC time constant.
8. To determine Low resistance by Projection method.
9. To study of Tangent galvanometer (Constant of T.G. & Verification of Ohm's law, to find reduction factor of TG)
10. To determine Low resistance by Potentiometer.
11. To study Semiconductor Diode Characteristics.
12. To study Zener diode Characteristics

**Reference Books:**

1. B.Sc. Practical physics By C.L.Arora Pub: S.chand.
2. A text book of Practical Physics ByInduPrakash&Ramkrishna  
Pub: KitabMahal, New Delhi.
3. Practical Physics ByS.L.Gupta and V. Kumar  
Pub: PragatiPrakashan, Meerut.
4. B.SarafetaI-Physics through experiments Vol. I & II.



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**UNIVERSIT JUNAGADH**



**Syllabus for the Subject of**

**PHYSICS**

**Under the Faculty of SCIENCE**

*B.Sc.-Sem: 2 (Physics)*

In force from June - 2018.

**B.Sc. Semester -2**  
**P-201 : Physics Theory**

(In force from June-2018)

**(Wave, Optics & Semiconductor Devices)**

**60 hour 70 marks**

**UNIT -1: (12 hour: 14 Mark)**

**Wave Motion and Waves in a String:** Wave motion, Transverse Wave Travelling in String, Velocity of a Wave in a String, Interference and the principle of Superposition, Standing waves on a String, Normal Modes of a String, Laws of Transverse Vibrations of a String.

**Sound:** Speed of Sound Wave in a material medium, Speed of Sound in Gas-Newton's Formula and Laplace's Correction, Intensity and loudness of Sound Wave - Decibels, Beats, Musical Scale, Acoustics of Buildings, Application of Acoustic phenomena, Doppler Effect.

**Reference books:**

1. Concept of physics By H C Verma part 1 Publisher: Bharati Bhawan
2. Sears and Zemansky's University Physics with modern physics  
By H D Young Publisher: PEARSON

**UNIT -2: (12 hour: 14 Mark)**

**Semiconductor Diode:** Use of Diode in Rectifiers, Half-Wave Rectifier, Full-Wave Rectifier, Centre-tap Rectifier, Bridge Rectifier, Performance of Half- Wave & Full-Wave Rectifier (Rms value of current, Ripple factor, Rectification Efficiency), Comparison of Rectifiers, Filter Circuit, Capacitor Filter, Inductor

Filter, LC filter,  $\pi$  Filter, Review of Zener diode, Zener Diode as Voltage Regulator.

**Transistor:** Structure of Transistor, Types of BJT, Action of a Transistor, Working of a Transistor, Relation Between Different Current in Transistor, Three Configurations of Transistor, Transistor Characteristics ( CB and CE Configuration), Comparison between the three configurations, Why CE Configuration is preferred in Circuit.

**Reference books:**

1. Basic electronics and linear circuits By N NBhargava, D C Kushreshtha & S C Gupta , Publisher: Technical Teachers Training Institute Chandigarh.
2. Elements of Electronics By Bagde & Singh Publisher :S.chand
3. Principles of electronics By V.K.Mehta Publisher: S.Chand 4.
4. Electronic Device And Circuits By Allen Mottershead Pub: PHI

**UNIT -3: (12 hour: 14 Mark)**

**Wave Optics: Interference:** Electromagnetic nature of Light, Wave Front, Huygens Principle. Superposition of Waves, Conditions for Interference, Techniques of Obtaining Interference: Division of Amplitude and Division of Wave front, Young's Double Slit Experiment, Lloyd's Single Mirror-Determination of Wavelength of Light, Fresnel Biprism – Experiment Arrangement & Determination of Wavelength of Light, Interference in Thin Films, Types of thin film –Parallel and wedge-shaped films, Newton's Rings: Determination of Wavelength of Light & refractive index.



#### **UNIT -4: (12 hour: 14 Mark)**

**Wave Optics: Diffraction:** Types of Diffraction-Fraunhofer and Fresnel Diffraction, Fraunhofer Diffraction at single slit, Fraunhofer Diffraction at Double Slit, Plane Diffraction Grating, Fraunhofer Diffraction at Plane Diffraction Grating. Rectilinear Propagation of Light and Half-Period Zones, Zone Plate, Action of Zone Plate, Comparison Between Zone Plate and Convex Lens, Diffraction Pattern of a straight edge.

#### **UNIT -5: (12 hour: 14 Mark)**

**Electrostatics:** Electrostatic Field, Electric Flux, Gauss's theorem of Electrostatics, Application of Gauss Theorem-Electric field due to point charge, Infinite Line of Charge, Uniformly Charged Spherical Shell and Solid Sphere, Plane Charged Sheet, Charged Conductor.

**Electromagnetic Induction:** Faraday's Laws of Electromagnetic Induction, Lenz's Law, Self and Mutual Inductance, L of Single Coil, M of Two Coils, Energy Stored in Magnetic Field.

#### **Reference Books for unit 3,4,5 :**

1. A Text Book Of OPTICS By N.Subrahmanyam, Brijlal, M.N. Avadhanulu  
Publisher: S.chand.
2. Principle of OPTICS By B.K.Mathur Publisher: Gopal Printing
3. Fundamentals of OPTICS By Jenkins and White Publisher: McGraw-Hill
4. Fundamentals of OPTICS By Gulati and Khanna Publisher: R.Chand
5. Introduction to Electrodynamics By D. J. Griffiths
6. Electricity and Magnetism By D.C. Tayal

## **LIST OF EXPERIMENTS**

### **B.Sc. Semester-II**

1. To determine the unknown frequency of Tuning Fork By Melde' s Experiment
2. To Verify the Laws of vibrating strings by Melde's Experiment.
3. To Study the Resonator and to determine unknown frequency of tuning fork.
4. To Calibrate a Spectrometer.
5. To Study Dispersive curve, and to determine the dispersive power of the material of a prism for different colours.
6. To determine wavelength of light using Newton's Ring.
7. To study the CB Characteristic of Transistor.
8. To study the CE Characteristic of Transistor.
9. To study Half-Wave Rectifier.
10. To study Full-Wave Rectifier (Centre tap).
11. To study Bridge Rectifier.
12. To Study of a Transformer.
13. To study Characteristics of Photo diode.
14. To study Deflection magneto meter (one magnet and two magnets).

### **Reference Books:**

1. B.Sc. Practical physics By C.L.Arora Pub: S.chand
2. A text book of Practical Physics ByInduPrakash&Ramkrishna Pub: KitabMahal, New Delhi.
3. Practical Physics ByS.L.Gupta and V. Kumar Pub: PragatiPrakashan, Meerut.
4. B.SarafetaI-Physics through experiments Vol. I & II

## **PAPERSTYLE FOR SEMESTER 1 AND 2**

1. B.Sc. Physics Syllabus for semester 1 and 2 consists of 5 units,
2. All units carry 14 marks.
3. 70 marks for theory and 30 marks for internal examinations.
4. Total 5 questions one question from each unit.
5. Each question of 14 mark
6. Time duration:  $2\frac{1}{2}$  hours.

Question:1 from Unit 1 : Mark 14

Question:2 from Unit 2 : Mark 14

Question:3 from Unit 3 : Mark 14

Question:4 from Unit 4 : Mark 14

Question:5 from Unit 5: Mark 14

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