



B.Sc. (PHYSICS)
SEMESTER-I

DETAILED CURRICULUM:

Core course- PHYSICS

PHY-CC-103(Theory)

PHY-CC-104(Practical)

- The Course content has been designed on **Semester pattern**.
- There shall be **01 Theory** papers having **04 unit**(4 lectures in a week set up by departments)
- There shall be **02 Practical** 4 lectures in a week set up by departments.
- There shall be **01 Theory** paper of **70 marks** and 2:30 hours duration in University Examination.
- There shall be **01 Practical Paper** of **50 marks** and 03:00 hours duration in University Examination.
- **There shall be Continuous Internal Evaluation of 30 Marks for theory course.**

Subject Code	Course Type	Paper No.	Title of Paper	TOTAL MARKS EXT.+INT*= TOTAL	Passing Standards EXT.+INT*= TOTAL	CREDITS	TOTAL TEACHING HOURS (In 15weeks)	Exam Duration (Hours)
22839	Core Course Theory -103	Paper PHY- CC- 103	Mechanics and Optics	70 + 30 * = 100	28+12* =40 marks	04	60 hrs	2.5
22840	Core Course Practical-104	Paper PHY- CC- 104	PRACTICAL PHYSICS-1	EXT 50	20 marks	02	60 hrs	3
TOTAL				120 + 30 = 150		06	120 hrs	

Internal	Marks
Test	15
Assignment / Presentation	10
Seminar / Presence	05
Total	30



B.Sc. (PHYSICS)
SEMESTER-II

DETAILED CURRICULUM:

Core course- PHYSICS

PHY-CC-203(Theory)

PHY-CC-204(Practical)

- The Course content has been designed on **Semester pattern**.
- There shall be **01 Theory** papers having **04 unit**(4 lectures in a week set up by departments)
- There shall be **02 Practical** 4 lectures in a week set up by departments.
- There shall be **01 Theory** paper of **70 marks** and 2:30 hours duration in University Examination.
- There shall be **01 Practical Paper** of **50 marks** and 03:00 hours duration in University Examination.
- **There shall be Continuous Internal Evaluation of 30 Marks for theory course.**

Subject Code	Course Type	Paper No.	Title of Paper	TOTAL MARKS EXT.+INT*= TOTAL	Passing Standarads EXT.+INT* = TOTAL	TOTAL TEACHING HOURS(In 15weeks)	Exam Duration (Hours)	CREDITS
22841	Core Course Theory-203	PHY- CC- 203	Electricity Magnetism and Modern Physics	70+30* =100	28+12* =40 marks	60 hrs	2.5	04
22842	Core Course Practical-204	Paper PHY- CC- 204	PRACTICAL PHYSICS-2	EXT 50	20 marks	60 hrs	3	02
		TOTAL		120+30=150		120 hrs		06

Internal	Marks
Test	15
Assignment / Presentation	10
Seminar / Presence	05
Total	30



B.Sc. Physics
SEMESTER-1

Course No.- PHY-CC- 103(Theory)

Credits: 04

Title of the Paper : Mechanics and Optics

Marks: Semester End Examination: 70

Internal Examination : 30

TOTAL 100

Unit	Detailed Syllabus	Teaching Hours	Marks/Weight
1	Vector and Classical Mechanics <ul style="list-style-type: none">➤ Surface area as vector➤ Scalar triple product➤ Geometrical interpretation of scalar triple product➤ Rotational behavior of scalar triple product➤ Vector triple product➤ Reciprocal vector➤ The derivative of a vector Differentiation of Vector <ul style="list-style-type: none">➤ Formulae of Differentiation of Vector➤ Gradient of a Scalar field➤ Divergence of a Vector field➤ Curl of a Vector field Classical Mechanics <ul style="list-style-type: none">➤ Newton's Laws of motion➤ Frames of reference➤ Mechanics of a particle➤ Examples	15	18
2	Elasticity <ul style="list-style-type: none">➤ Definition of stress and strain➤ Hooke's law and elastic constant➤ Strain energy➤ Restoring couple- required to produce torsion and elastic wire with derivation➤ Torsional pendulum➤ Bending of beam and cantilever➤ Relation between isothermal and adiabatic elasticities of gases➤ Poisson's ratio➤ Determination of Poisson's ratio for rubber➤ Searl's relation between elastic constant and derivations➤ Examples	15	18



3	Wave and Oscillations Traveling Waves <ul style="list-style-type: none">➤ Speed of propagation of waves in a stretched string longitudinal waves in a bar➤ Plane waves in a fluid➤ Transmission of energy by a travelling wave Simple Harmonic Motion <ul style="list-style-type: none">➤ Characteristics of simple harmonic motion➤ Graphical Method: Composition of two linear simple harmonic motions in the same direction and at right angles with each other➤ Analytical Method : Composition of two linear simple harmonic motions in the same direction and at right angles with each other➤ Lissaious figures➤ Compound pendulum and derivation of time period➤ Examples	15	17
4	Optics Interference and Diffraction <ul style="list-style-type: none">➤ Condition of interference➤ Interference by thin film➤ Interference due to transmitted light➤ Interference by variable thickness (wedge-shaped) film➤ Types of interference : Wavefront division and Amplitude division➤ Wavefront division :Fresnel Biprism➤ Amplitude division : Newton's ring➤ Fresnel's Assumptions➤ Fresnel Half Period Zones and Rectilinear propagation of light➤ Positive and Negative Zone plate➤ Fraunhofer diffraction at a single slit➤ Intensity distribution in diffraction pattern of a single slit in Fraunhofer diffraction➤ Examples	15	17
		60hours	70marks

Course Outcome - Learner will able to learn the basic conceptual and theoretical aspects of Mechanics and Optics and their applications.



**B.Sc. Physics
SEMESTER-1**

Course No.- PHY-CC- 104

Credits: 02

Title of the Paper: Physics Practical

Marking Scheme : Semester End Examination: 50

TOTAL 50

DETAILED CURRICULUM FOR PRACTICAL

[Based on paper P- 103]

Students have to prepare their Practical journals of Physics for Laboratory work and they have to submit certified journals in the University practical exams. Students are not allowed in the laboratory without certified journals in the University practical examination.

Detailed Syllabus for Physics practical	Teaching Hours
SECTION A(General Physics)	
1. To determine Young's modulus of a given wire.	02
2. To determine expansion coefficient of pressure of constant volume air thermometer and to determine absolute zero temperature and atmospheric pressure.	02
3. To determine moment of inertia of body with different shapes using bi-filler suspension.	02
4. Calibration of spectrometer with help of prism spectra.	02
5. To determine wavelength of sodium light using Newton's ring.	02
6. To determine refractive index of liquid by using liquid lens method.	02
7. To determine 'g' by bar pendulum .	02

Detailed Syllabus for Physics practical	Teaching Hours
SECTION B(Electricity and Magnetism)	
1. To determine wattage and temperature of a given lamp.	02
2. To verify tangent's law using tangent galvanometer.	02
3. To determine low resistance using projection method.	02
4. To determine magnetic moment and pole strength using deflection magnetometer.	02
5. To study bridge rectifier.	02
6. To determine Impedance of coil using series L-R ac circuit.	02
7. To study characteristics of thermistor.	02
8. To determine resistance of galvanometer and current sensitivity by half deflection method.	02



References Books

- 1) Mathematical physics by H.K.Das &Dr. Rama Verma
- 2) Mathematical physics by Rajput
- 3) Nirav college physics paper :101
- 4) Nirav college physics paper :102
- 5) Introduction to classical mechanics by R.G.Takwale & P.S. Puranik
- 6) Classical Mechanics & Properties of Matter by A.B.Gupta
- 7) A textbook of optics by Dr. N. Subrahmanyam & Brij Lal
- 8) Optics by Singh & Agarwal
- 9) Properties of matter by D.S.Mathur
- 10) Electric circuit analysis by Soni & Gupta
- 11) Nirav college physics paper :202
- 12) Engineering physics by Dr. M.N.Avadhanulu (S.CHAND'S)
- 13) Advanced practical physics by Chauhan And Singh
- 14) B.Sc.Practical Physics by C L Arora
- 15) Practical Physics by Kumar and Gupta**



MAHARAJA KRISHNAKUMARSINHJI BHAVNAGAR UNIVERSITY
(With effect from Academic Year 2020-2021)

B.Sc. Physics
SEMESTER-2

Course No.- PHY-CC- 203(Theory)

Title of the Paper : Electricity Magnetism and Modern Physics

Credits: 04

Marks: Semester End Examination: 70

Internal Examination : 30

TOTAL 100

Unit	Detailed Syllabus	Teaching Hours	Marks/Weight
1	AC Bridge and DC Circuit <ul style="list-style-type: none">➤ A.C.Bridge introduction and general Bridge balance equation➤ Maxwell Bridge➤ Owen's Bridge➤ De-sauty Bridge➤ Anderson Bridge➤ R.L. Circuit in series growth and decay➤ R.C. circuit in series growth and decay➤ Series LCR circuit and its analysis and condition of oscillation➤ Quality factor➤ Examples	15	18
2	Magnetism <ul style="list-style-type: none">➤ Classification of Magnetic Materials: Diamagnetic, Paramagnetic, Ferromagnetic➤ Magnetic Permeability➤ Magnetic Properties of materials➤ Langevin's theory for diamagnetic materials(Classical)➤ Weiss Theory of paramagnetism➤ Paramagnetic Susceptibility of a Solid Substances➤ Hysteresis loop for ferromagnetic substances➤ Ferromagnetic domains➤ Tangent law➤ Hard and Soft Magnetic Materials➤ Examples	15	18
3	Diode Circuits and Modern Physics <ul style="list-style-type: none">➤ PN junction diode➤ Use of diodes in rectifiers➤ The Half wave Rectifier➤ The Full wave Rectifier➤ The Bridge Rectifier➤ Definition of filter	15	17



	<ul style="list-style-type: none">➤ Types of filters : Shunt capacitor filter, Series inductor filter➤ Thermal radiation and Black body radiation➤ Planck's radiation law➤ Rayleigh – Jeans law➤ Wien's law and Wien's Displacement law➤ De Broglie hypothesis➤ Uncertainty principle➤ Examples		
4	Relativity <ul style="list-style-type: none">➤ Frame of reference➤ Newtonian Relativity➤ Galilean transformation equations➤ The Ether hypothesis and the Michelson-Morley experiment with result➤ Postulates of special theory of relativity➤ The Lorentz transformation equations➤ Length contraction➤ Time dilation➤ Addition of velocity➤ Variation of mass with velocity➤ Mass energy equivalence ($E=mc^2$)➤ Examples	15	17
		60hours	70marks

Course Outcome - Learner will able to learn the basic conceptual and theoretical aspects of Electricity Magnetism and Modern Physics and their applications.



B.Sc. Physics
SEMESTER-II

Syllabus for UG B.Sc. Programs Course
Course No.- PHY-CC- 204

Credits: 02

Title of the Paper: **Physics Practical**
Marking Scheme : Semester End Examination: 50
TOTAL 50

DETAILED CURRICULUM FOR PRACTICAL

[Based on paper P- 203]

Students have to prepare their Practical journals of Physics for Laboratory work and they have to submit certified journals in the University practical exams. Students are not allowed in the laboratory without certified journals in the University practical examination.

Detailed Syllabus for Physics	Teaching Hours
SECTION A (General Physics)	
1.To determine temperature coefficient of thermal conductivity by Lee's method.	02
2.To determine wavelength of mercury spectral lines with the help of grating method.	02
3.To determine Poisson's ratio of rubber tube.	02
4.To study resonator to determine unknown frequency of tuning fork.	02
5.To determine Melde's tuning fork frequency and to verify laws of vibrating string.	02
6.To determine radius of curvature of a given lens and refractive index of glass using optical lever method.	02
7.To determine moment of inertia of a disk using Torsional pendulum.	02
8.To determine Young Modulus 'Y' of the given rectangular bar by Cantilever.	02
SECTION B (Electricity and Magnetism)	
1. To determine resistivity of electrolyte using Kohlrausch bridge.	02
2. To determine ratio of magnetic moments of two bar magnets using vibration magnetometer.	02
3. To determine resistance of galvanometer and Leclanche cell using P.O.Box Kelvin-Mens methods.	02
4. To study magnetic field of coil using Stuart gee galvanometer.	02
5. To determine self-inductance of a given coil using Anderson bridge.	02
6. To determine ratio of capacity of two capacitors using desauty bridge.	02
7. To study parallel resonance of L.C.R. circuit.	02
8. To study PN junction diode forward characteristics.	02



References Books

- 1) Electricity and Magnetism by D.N.Vasudev
- 2) Electricity and Magnetism by R.Murugeshan
- 3) Elements of Solid State Physics by S.O.Pillai
- 4) Nirav college physics
- 5) Electricity and Electronics by D.C.Tayal
- 6) Electric circuit analysis by Soni & Gupta
- 7) Nirav college physics paper :102
- 8) Modern physics by Murugeshan
- 9) Modern physics by Basier
- 10) Modern physics by Aruldas & P Rajagopal
- 11) Advanced practical physics by Chauhan And Singh
- 12) B.Sc.Practical Physics by C L Arora
- 13) Practical Physics by Kumar and Gupta