



**1.1.2: The programmes offered by the institution focus on employability / entrepreneurship / skill development and their course syllabi are adequately revised to incorporate contemporary requirements**

**SYLLABUS OF THE COURSES FOCUSING  
EMPLOYABILITY / ENTREPRENEURSHIP / SKILL  
DEVELOPMENT**



**EMPLOYABILITY**

**ENTREPRENEURSHIP**

**SKILL DEVELOPMENT**

**B.Sc. PHYSICS**

<b>I B.Sc (PH)</b>	<b>PROPERTIES OF MATTER</b>	<b>19PH101</b>
<b>SEMESTER – I</b>		<b>HRS/WK - 4</b>
<b>CORE -1</b>		<b>CREDIT - 3</b>

**OBJECTIVE:**

To know about the various properties of solids and liquids.

**COURSE OUTCOMES (CO):**

**At the end of the Course the students should be able to exhibit**

**CO1:** Learn the basics of elasticity and its importance in beams

**CO2:** Study the concepts of Elasticity and the various methods to determine the parameters experimentally

**CO3:** Acquire Knowledge of bending of beams

**CO4:** Be familiar with the surface tension

**CO5:** Study the concepts of viscosity and surface tension and the various methods to determine the parameters experimentally

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER – I	COURSE CODE: 19PH101					COURSE TITLE: PROPERTIES OF MATTER						Hours: 4	Credits: 3
Course Outcomes Cos	Programme Outcomes POs					Programme Specific Outcomes PSOs						Mean Score of CO's	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	4	3.8	4	3.5	3.5	3.8	3.5	3	4	3	4	3.65	
CO2	3.5	3	3.5	3	3.5	4	4	4	4	3	4	3.59	
CO3	3	3.5	3	4	3.5	3	3	3.5	4	3.5	3	3.36	
CO4	3	4	4	3	2	3.5	3.5	3.5	3.5	4	2.5	3.32	
CO5	4	4	4	3.5	4	4	3.5	4	4	3.5	2.5	3.73	
Mean Overall Score												3.53	

**Result: The Score for this course is 3.53 (High)**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High
<b>Value Scaling</b>					
Mean Score of COs = $\frac{\text{Total Values}}{\text{Total No. of POs \& PSOs}}$			Mean Overall Score of COs = $\frac{\text{Total Mean Scores}}{\text{Total No. of COs}}$		

This course is having **High** association with Programme Outcome and Programme Specific Outcome

---

**UNIT- I** (12 Hours)

**Elasticity-I:** Hooke's law – stress – strain diagram – Modulus of elasticity - Relation between elastic constants – Poisson's ratio- Expressions for Poisson's ratio in terms of elastic constants – work done in stretching of a wire and twisting a wire.

**UNIT- II** (12 Hours)

**Elasticity-II:** Twisting couple on a cylinder – Torsional pendulum without mass– Rigidity modulus and moment of inertia – Rigidity modulus by static torsion -  $\eta$ ,  $n$  and  $\sigma$  by Searle's method

**UNIT- III** (12 Hours)

**Bending Of Beams:** Bending moment-Expression for Bending moment-Cantilever-Expression for depression at the loaded end of a cantilever-Experiment to determine Young's modulus by Cantilever depression(Pin and Microscope)- Non-Uniform bending-Expression for depression at the midpoint of a beam subjected to Non uniform bending- Experiment to determine Young's modulus by Non uniform bending (using pin & microscope)-Uniform bending- Expression for elevation at the midpoint of a beam subjected to Uniform bending(using pin & microscope).

**UNIT- IV** (12 Hours)

**Surface Tension:** Molecular Interpretation - dimensions of surface tension – Excess of pressure over curved surfaces – Application to spherical and cylindrical drops and bubbles – Variation of surface tension with temperature – Jaeger's method.

**UNIT- V** (12 Hours)

**Viscosity:** Co-efficient of viscosity and its dimensions – Rate of flow of liquid in a capillary tube – Poiseuille's formula – Experiment to determine co-efficient of viscosity of a liquid(Constant volume method) – variation of viscosity of a liquid with temperature and pressure.

**TEXT BOOKS:**

1. BrijLal, N. Subrahmanyam, Properties of Matter, S. Chand Publications, 2002.
2. Murugesan .R, Properties of Matter and Acoustics, New Delhi, S. Chand & Co, 2006.

**REFERENCE BOOKS:**

1. C.L. Arora, P.S. Hemine., Physics for Degree students. First B.Sc Physics, 2010.
2. Mathur D.S., Elements of Properties of matter, S. Chand, 2006.

<b>I B.Sc (PH)</b>	<b>MECHANICS</b>	<b>19PH102</b>
<b>SEMESTER - I</b>		<b>HRS/WK - 4</b>
<b>CORE -II</b>		<b>CREDIT - 3</b>

**OBJECTIVE:**

To understand the basics of gravity, rigid bodies, space science and mechanism of particles.

**COURSE OUTCOMES:**

**At the end of the Course the students should be able to exhibit**

**CO1:** Understand the basic ideas of Centre of Gravity, Centre of Pressure and Fluid dynamics.

**CO2:** Understand the various concepts of mechanics involved in Rigid bodies.

**CO3:** Acquire the concepts of space science

**CO4:** Acquire the knowledge about the projectile and friction

**CO5:** Apply the knowledge to the mechanism of system of particles.

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER - I	COURSE CODE: 19PH102					COURSE TITLE: MECHANICS						Hours: 4	Credits: 3
Course Outcomes Cos	Programme Outcomes POs					Programme Specific Outcomes PSOs						Mean Score of CO's	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	4	4	3.5	4	3.8	3.5	3	3.5	3.5	3.5	3	3.57	
CO2	2.5	4	3	4	4	3.5	3.5	3.5	4	4	3.5	3.59	
CO3	3.5	3.5	4	3.5	3.5	3.5	4	4	3.5	3	3.5	3.59	
CO4	3	4.5	3.5	4	3.5	4	3	3	3.5	4	3.5	3.59	
CO5	3	4	2.5	4	4	4	3.5	3.5	4	3.5	4	3.64	
Mean Overall Score												3.60	

**Result: The Score for this course is 3.60(High)**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High
<b>Value Scaling</b>					
Mean Score of COs = $\frac{\text{Total Values}}{\text{Total No. of POs \& PSOs}}$			Mean Overall Score of COs = $\frac{\text{Total Mean Scores}}{\text{Total No. of COs}}$		

This course is having **High** association with Programme Outcome and Programme Specific Outcome

---

**UNIT - I** (12 Hours)

**Statics, Hydrostatics and Fluid Mechanics:** Centre of gravity- Centre of gravity of a Solid cone- Centre of gravity of a Solid hemisphere-Thrust-Centre of pressure- Vertical rectangular lamina.

Equation of continuity of flow- Energy of the fluid- Euler's Equation of unidirectional flow -Bernoulli's theorem

**UNIT - II** (12 Hours)

**Mechanics Of Rigid Bodies:** Rigid body- Moment of inertia- Radius of gyration- moment of inertia of a solid cylinder, cylindrical shell, solid sphere, spherical shell - Bifilar pendulum-Compound pendulum-Determination of  $g$  and  $k$ .

**UNIT - III** (12 Hours)

**Space Science:** Rockets and satellites- Basic principles of rocket motion - Rocket equation, Thrust and acceleration- Escape velocity of multistage rockets. Liquid, solid and cryogenic propellant rockets- Space shuttle- Orbital velocity- Launching of satellites - Types of satellite Orbits.

**UNIT - IV** (12 Hours)

**Projectiles and Friction:** Introduction to projectile motion-Projectile on an inclined plane - Friction- Laws of friction- Sliding friction - Angle of friction- Cone of friction- Equilibrium of a body on a rough inclined plane acted upon by an external force- Rolling friction and stability.

**UNIT - V** (12 Hours)

**Mechanics Of A System Of Particles:** Generalized Co-ordinates- transformation equations- configuration space- principle of Virtual work- D' Alembert's principle- Lagrange's equations and its applications.

**TEXT BOOKS:**

1. Murugesan, Mechanics and Mathematical Methods, S.Chand and Co., 2005.
2. Gupta Kumar and sharma, Classical Mechanics, PragatiPrakashan, 2001.
3. C.L. Arora, Mechanics, S. Chand Publishing, 2014.

**REFERENCE BOOKS:**

1. Feynmann R.P, Leighton R.B and Sands M, The Feynmann Lectures on Physics, Vols 1, 2 and 3, Narosa, New Delhi, 1998.
2. Brijlal and Subramaniam, Mechanics and Electrodynamics, S. Chand, Kindle Edition, 2005.

I B.Sc (PH)	THERMAL PHYSICS	19PH203
SEMESTER – II		HRS/WK – 4
CORE – III		CREDIT –3

**OBJECTIVE:**

To understand the basics of heat transmission, kinetic theory of gases and working of low temperature devices.

**COURSE OUTCOMES:**

**At the end of the Course the students should be able to exhibit**

**CO1:** Acquire knowledge of methods of heat transmission, different types of Heat engines and Entropy

**CO2:** Understand the nature and the kinetic theory of gases

**CO3:** Understand the different methods of liquefaction of gases.

**CO4:** Study the concepts of low temperature physics, refrigeration and air conditioning.

**CO5:** Understand the concepts of latent heat and its effect on boiling point and melting point and the significance of Maxwell’s thermodynamical relations

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER - II	COURSE CODE: 19PH203					COURSE TITLE: THERMAL PHYSICS						Hours: 4	Credit: 3
Course Outcomes COs	Programme Outcomes POs					Programme Specific Outcomes PSOs						Mean Score of CO's	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	4	3.5	4	3.5	4	3.5	4	4	3.5	3.5	3.5	3.73	
CO2	3.5	4	4	3.5	4	3.5	4	3.5	4	3.5	2.5	3.64	
CO3	4	4	3.5	4	3.5	4	3	3.5	3.5	3.5	4	3.68	
CO4	3	4	3.5	4	3.5	4	4	3.5	3.5	3.5	4	3.68	
CO5	4	4	3.5	3.5	4	4	3.5	4	3.5	3	3.5	3.68	
Mean Overall Score												3.68	

**Result: The Score for this course is 3.68(High)**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High
<b>Value Scaling</b>					
Mean Score of COs= $\frac{\text{Total Values}}{\text{Total No. of POs \& PSOs}}$			Mean Overall Score of COs= $\frac{\text{Total Mean Scores}}{\text{Total No. of COs}}$		

This course is having **High** association with Programme Outcome and Programme Specific

---

Outcome

**UNIT- I** (12 Hours)

**Heat and Thermodynamics: Heat:**  $C_p$ ,  $C_v$  and  $\gamma$  of a gas- Mayer's relation- Basics of Heat transfer: Conduction, Convection, Radiation- Mechanical equivalent of Heat.

**Thermodynamics:** Reversible and irreversible processes – Heat engines – Otto and diesel engines – thermodynamic scale of temperature - entropy - change of entropy in reversible and irreversible processes – T-S diagram– entropy for a perfect gas - third law of thermodynamics

**UNIT- II** (12 Hours)

**Kinetic Theory Of Gases:** Expression for pressure - Transport phenomenon – expression for mean free path - thermal conductivity and diffusion of gases - distribution of molecular velocities – energy distribution function - Degrees of freedom - equipartition law of energy.

**UNIT- III** (12 Hours)

**Adiabatic and Isothermal Changes and Liquefaction Of Gases:** Reversible adiabatic and isothermal changes– equations – Clement and Desormes method of determining  $C_p / C_v$  – Andrew's work on  $CO_2$ – regenerative cooling – the Linde process – Liquefaction of air and hydrogen-KamerlinghOnnes Cascade method for Liquefying Oxygen.

**UNIT- IV** (12 Hours)

**Low Temperature Physics:** Helium – He I and He II – super fluidity - practical applications of low temperatures – refrigerating machines– electroflux refrigerator – Frigidaire – air conditioning machines – effects of  $CF_2$  and  $Cl_2$  on Ozone layer

**UNIT- V** (12 Hours)

**Phase Transition:** First Latent heat equation (Clausius – Clapeyron equation), effect of pressure on melting and boiling point – second Latent heat equation - Maxwell's Thermodynamical relations–derivations.

**TEXT BOOKS:**

1. Mathur D.S., Heat and Thermodynamics, S. Chand, 2014.
2. NarayanamoorthyNandNagarathinam N, Heat, National publishing Co, Chennai, Eight Edition, 1987.
3. Murugesan.R., Thermal Physics., S. Chand & Co., 2009.
4. Brijlal and Subramanyam, Heat and Thermodynamics, S. Chand & Co., 2000.

**REFERENCE BOOKS:**

1. Nelkon Parker, Advanced Level Physics, (Vol.V), Arnold Publication, Berkely Series, 1995.
2. Dr. Ilangovan and Dr.D. Jayaraman,, Thermal Physics, S. Chand & Co., 2014.

I B.Sc (PH)	WAVES AND OSCILLATIONS	19PH204
SEMESTER – II		HRS/WK - 4
CORE – 1V		CREDIT - 3

**OBJECTIVE:**

Know about the basics of Simple Harmonic Motion, Doppler effect and production and detection of Ultrasonics.

**COURSE OUTCOMES:**

At the end of the Course the students should be able to exhibit

**CO1:** Acquire knowledge of Simple Harmonic Motion

**CO2:** Understand the character of Transverse waves

**CO3:** Understand the character of longitudinal waves and Doppler effect

**CO4:** Acquire the knowledge of production, detection and applications of Ultrasonics

**CO5:** Acquire knowledge of Acoustics.

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER - II	COURSE CODE: 19PH204					COURSE TITLE: WAVES AND OSCILLATIONS						Hours: 4	Credits: 3
Course Outcomes COs	Programme Outcomes POs					Programme Specific Outcomes PSOs						Mean Score of CO's	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	4	4	3.5	4	3.5	4	4	3.5	3.5	4	3.5	3.77	
CO2	3.5	3.5	3.5	4	4	3.5	4	3.5	4	4	4	3.77	
CO3	4	4	4	3.5	4	3.5	3.5	3.5	3.5	4	4	3.77	
CO4	4	3.5	3.5	3.5	3.5	3	2.5	4	4	3.5	4	3.55	
CO5	3.5	4	3.5	4	3.5	3.5	4	4	3.5	3.5	3.5	3.68	
Mean Overall Score											3.71		

**Result: The Score for this course is 3.71(High)**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High
<b>Value Scaling</b>					
Mean Score of COs = $\frac{\text{Total Values}}{\text{Total No. of POs \& PSOs}}$			Mean Overall Score of COs = $\frac{\text{Total Mean Scores}}{\text{Total No. of COs}}$		

This course is having **High association** with Programme Outcome and Programme Specific Outcome



---

**UNIT – I** **(12 Hours)**

**Simple Harmonic Motion:** Simple harmonic motion– Velocity and acceleration in SHM – **Energy of a simple harmonic oscillator (LC)** –Examples of simple harmonic oscillators in electrical systems – Superposition of two SHMs of Equal time periods and acting at right angles to each other - Lissajous figures –Damped harmonic oscillations.

**UNIT – II**

**Transverse Waves:** Introduction to transverse waves – Velocity of transverse waves in stretched string – Standing waves on a string-Determination of AC frequency using Sonometer (Steel wire) – Energy of a vibrating string – Standing wave ratio.

**UNIT - III** **(12 Hours)**

**Longitudinal Waves:** Introduction to longitudinal waves – Sound waves in gases – Energy distribution in sound waves – Intensity of sound waves – Longitudinal waves in a solid – Example: **earthquake – Doppler Effect.**

**UNIT – IV** **(12 Hours)**

**Ultrasonics:** Ultrasonics – **Production of Ultrasonics: Piezo electric effect- Piezo electric crystal generator** –Magnetostriction generator –Detection of ultrasonics –Thermal detectors – Piezo electric detectors - Applications of Ultrasonics- Ultrasound scan – NDT.

**UNIT – V** **(12 Hours)**

**Acoustics:** Reflection and transmission of sound waves at boundaries – Diffraction of sound waves- Noise and music – Limits of human audibility – The decibel unit- Reverberation time- Sabine’s formula for growth and decay – **Acoustics of auditoriums and halls– Introduction to acoustic transducers.**

**TEXT BOOKS:**

1. H. J. Pain, The Physics of Vibrations and Waves, John Wiley, (2005), 6th Edition, for Units I, II & III.
2. N. Subrahmanyam, Brijlal, A Text Book of Sound, Second Edition, Vikas Publishing house PVT Ltd, 2016.

**REFERENCE BOOKS:**

1. David Halliday, Robert Resnick and Jearl Walker, Fundamentals of Physics, John Wiley & Sons(2004), 7th Edition.
2. Lawrence E. Kinsler, Austin R. Frey, Alan B. Coppers and James V. Sanders, Fundamentals of Acoustics, John Wiley, (2000).
3. Richard P. Feynman, Robert B. Leighton, Matthew Sands, Feynman Lectures on Physics: The Definitive and Extended Edition. Addison-Wesley, (2005), 2nd Edition.

---

<b>I B.Sc (PH)</b>	<b>PRACTICAL - I</b>	<b>PHP101 &amp; PHP202</b>
<b>SEMESTER - I &amp; II</b>		<b>HRS/WK - 3</b>
<b>CORE - PRACTICAL - I</b>		<b>CREDIT - 2</b>

**(Any 15 out of 20 experiments)**

1. Young's modulus by non-uniform bending – Pin and microscope.
2. Young's modulus by non-uniform bending – Optic lever.
3. Young's modulus by uniform method - Pin and microscope.
4. Young's modulus by uniform method - Scale and telescope.
5. Rigidity modulus – Torsional pendulum –  $n$  of a wire (without masses).
6. Rigidity modulus by static torsion (mirror and telescope method).
7. Compound pendulum.
8. Sonometer – Determination of frequency of tuning fork.
9. Sonometer – Determination of specific gravity of solid and liquid.
10. Sonometer - AC frequency using brass wire.
11. Sonometer - AC frequency using steel wire.
12. Surface tension by drop weight and interfacial liquid – Drop weight method.
13. Surface tension – Capillary rise method.
14. Focal length and refractive index of convex lens (u-v method and conjugate foci method for 'f' and Boy's method for R).
15. Focal length R and  $\mu$  of a concave lens.
16. Co-efficient of viscosity – Burette method.
17. Spectrometer -  $\mu$  of the hollow prism.
18. Potentiometer – Calibration of low range voltmeter.
19. Potentiometer post office box – Resistance & specific resistance of a coil.
20. Specific heat capacity of liquid by Newton's laws of cooling.

II B.Sc (PH)	ELECTRICITY AND MAGNETISM	19PH305
SEMESTER - III		HRS/WK - 4
CORE - V		CREDIT - 3

**OBJECTIVE:**

Understand the concepts of Electrostatic laws, growth and decay of charge in DC circuit.

**COURSE OUTCOMES:**

**At the end of the Course the students should be able to exhibit**

**CO1:** Understand the concepts of Electrostatics and the laws associated with them.

**CO2:** Acquire knowledge of current electricity and thermoelectricity

**CO3:** Understand the growth and decay of charge and current in DC circuits.

**CO4:** Understand the basics of AC and Electromagnetic induction

**CO5:** Understand the concepts of magnetic properties of materials

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER - III	COURSE CODE: 19PH305					COURSE TITLE: ELECTRICITY AND MAGNETISM						Hours: 4	Credits: 3
Course Outcomes COs	Programme Outcomes POs					Programme Specific Outcomes PSOs						Mean Score of CO's	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	4.5	4.8	4	4.5	4	4	4.2	3.5	4	4.5	4	4.18	
CO2	3	3.5	4	4.5	4	4	4	4	3.5	4	2.5	3.73	
CO3	4	4	4.5	3.5	4	3.5	3	3	3.5	4	3.5	3.68	
CO4	3.5	3	3	3.5	4	4.5	4	4	3.5	3	3.5	3.59	
CO5	4	3	3	3.5	3	3	3.5	3.2	3	3	3	3.15	
Mean Overall Score											3.68		

**Result: The Score for this course is 3.68(High)**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High
<b>Value Scaling</b>					
Mean Score of COs = $\frac{\text{Total Values}}{\text{Total No. of POs \& PSOs}}$			Mean Overall Score of COs = $\frac{\text{Total Mean Scores}}{\text{Total No. of COs}}$		

This course is having **High association** with Programme Outcome and Programme Specific Outcome

---

**UNIT- I** (12 Hours)

**Electrostatics:** Coulomb's law – electric intensity and electric potential – electrical images (any four examples) - electric intensity and potential due to an earthed conducting sphere applying the principle of electrical images-capacity – capacitance of a spherical and cylindrical capacitor – energy of a charged capacitor – loss of energy due to sharing of charges

**UNIT- II** (12 Hours)

**Current Electricity:** Carey foster bridge - theory – Determination temperature co-efficient of resistance – Calibration of voltmeter – Ammeter - Using Potentiometer - thermoelectricity- Peltier's coefficient – Thomson coefficient – application of thermodynamics to a thermocouple and connected relations- thermoelectric diagram and uses.

**UNIT- III** (12 Hours)

**Transient Current:** Growth and decay of current in a circuit containing resistance and inductance – Growth and decay of charge in a circuit containing resistance and capacitor- Growth and decay of charge in a LCR circuit – condition for the discharge to be oscillatory – frequency of oscillation.

**UNIT- IV** (12 Hours)

**A.C and Electromagnetic Induction:** Power in AC circuit – wattless current- choke coil - construction and working of transformers- energy losses -single phase, and three phase AC – star and delta connection –electric fuses- circuit breakers, Self-Inductance-Mutual Inductance- Inductances in series and parallel-Principle, construction of AC electric motor.

**UNIT-V** (12 Hours)

**Magnetic Properties of Materials:** Susceptibility- permeability- intensity of magnetization and the relation  $B = \mu(H+M)$ , Principle, working & construction of Ballistic galvanometer -M-H and B-H curves for a magnetic material using magnetometer method and ballistic galvanometer method – Terrestrial magnetism – magnetic elements- dip circle.

**TEXT BOOKS:**

1. Murugesan R, Electricity and Magnetism, 8<sup>th</sup> Edition, New Delhi, S. Chand & Co., 2006.
2. Brijlal and N. Subramanian, Electricity and Magnetism, 6<sup>th</sup> Edition, Agra, Ratan&PrakashNarayanamoorthy M, Nagarathnam N, Electricity and Magnetism, 4<sup>th</sup> edition, Meerut, National Publishing Co.
3. Arora C.L., Electricity and Magnetism, S. Chand Publishing, 2014.

**REFERENCE BOOKS:**

1. David J Griffith, Introduction to Electrodynamics, 2<sup>nd</sup> Edition, New Delhi, Prentice Hall of India Pvt. Ltd, 1997.
2. Sehgal D.L, Chopra K. L and Sehgal N. K, Electricity and Magnetism, New Delhi, Sultan Chand & Co.,

II B.Sc (PH)	BASIC ELECTRONICS	19PH306
SEMESTER – III		HRS/WK - 4
CORE - VI		CREDIT - 3

**OBJECTIVE:**

Understand the working of diode, transistors and oscillators and it applications

**COURSE OUTCOMES:**

At the end of the Course the students should be able to exhibit

**CO1:** Understand the concept of Diodes and its characteristics

**CO2:** Understand the characteristics of transistors

**CO3:** Acquire the knowledge of various oscillators

**CO4:** Understand the wave shaping circuits and multi vibrators

**CO5:** Acquire the knowledge of various applications of electronics

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER - III	COURSE CODE: 19PH306					COURSE TITLE: BASIC ELECTRONICS						Hours: 4	Credits: 3
Course Outcomes COs	Programme Outcomes POs					Programme Specific Outcomes PSOs						Mean Score of CO's	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	4	3.5	3.5	3.5	4	3.5	4	4	3	3	3	3.55	
CO2	4	3.5	2.5	4	3.5	4	3.5	3.5	3	3	4	3.50	
CO3	3.5	4	3.5	4	4	4	4.5	3.5	3.5	3.5	3.5	3.77	
CO4	3.5	3.5	4	3.5	4	3.5	4	4	3	3.5	3.5	3.64	
CO5	4	4	4	4	3.5	3	4	3.5	3	3.5	3.5	3.64	
Mean Overall Score												3.62	

**Result: The Score for this course is 3.62(High)**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High
<b>Value Scaling</b>					
Mean Score of COs= $\frac{\text{Total Values}}{\text{Total No. of POs \& PSOs}}$			Mean Overall Score of COs= $\frac{\text{Total Mean Scores}}{\text{Total No. of COs}}$		

This course is having **High association** with Programme Outcome and Programme Specific Outcome

---

**UNIT – I** (12 Hours)

**Diodes and Its Applications:** PN junction diode - Half-wave, full-wave and bridge rectifier – expression for efficiency and ripple factor –  $\pi$  section filter – Zener diode – Zener regulated power supply

**UNIT –II** (12 Hours)

**Transistor Biasing And Transistor Amplifiers:** Different modes of operation – biasing and characteristics of a transistor in CE mode- h Parameters of CE mode-  $\alpha$  and  $\beta$  of a transistor – Potential divider bias-Double stage RC coupled amplifier – frequency response curve– classification of amplifiers – class A power amplifier – Push-pull, class B power amplifier – Emitter follower.

**UNIT –III** (12 Hours)

**Oscillators:** Voltage gain of a feedback amplifier – Barkhausen criterion – Hartley, Colpitt's, and Phase shift oscillators– expression for frequency of oscillations and condition for sustained oscillations in each case– frequency stability.

**UNIT –IV** (12 Hours)

**Wave Shaping Circuits and Multi Vibrators:** Clipping and clamping circuits – integrating and differentiating circuits – RC time constants. Multivibrators – Astable, – Mono stable and bi-stable multivibrators – Schmitt trigger

**UNIT –V** (12 Hours)

**Testing Electronic Components:** Testing various cables, connectors and fuses (Continuity test using multimeter)- Identifying, finding values and testing different types of resistors and Capacitors(by colour codes & multimeter)-Identifying (leads & type) and Testing Diodes, Zener diodes and Transistors(using multimeter) -Testing IC's.

**TEXT BOOKS:**

1. B.L. Theraja, Electronics, S. Chand Publishing, 2005.
2. V. K Mehta, Principles of Electronics, S. Chand & Co., 2005.
3. M. Arul Thalpathi, Basic and Applied Electronics, Comtek publisher, 2005.

**REFERENCE BOOKS:**

1. A. Malvino, Electronics Principles, McGraw Hill Education, 7<sup>th</sup> Edition, 2006.
2. Allen Mottershed, Electronic Devices and Circuits, Goodyear Pub. Co., 1973.
3. R.S. Sedha, Applied Electronics, S. Chand & Company Ltd; 2<sup>nd</sup> New Edition, 2000.

II B.Sc (PH)	<b>ATOMIC PHYSICS</b>	<b>19PH407</b>
<b>SEMESTER – IV</b>		<b>HRS/WK - 4</b>
<b>CORE -VII</b>		<b>CREDIT - 3</b>

**OBJECTIVE:**

Understand the working of discharge phenomenon of gases, atomic structure, production and properties of X-rays.

**COURSE OUTCOMES:**

**At the end of the Course the students should be able to exhibit**

**CO1:** Acquire knowledge through discharge phenomenon through gases

**CO2:** Get the basic knowledge of atomic structure

**CO3:** Acquire knowledge ionization potential and splitting of energy levels

**CO4:** Understand the concept of photo electricity and verifications by experiments.

**CO5:** Understand the production and properties of X-rays.

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER - IV	COURSE CODE: 19PH407					COURSE TITLE: ATOMIC PHYSICS						Hours :4	Credits: 3
Course Outcomes COs	Programme Outcomes POs					Programme Specific Outcomes PSOs						Mean Score of CO's	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	3	3.5	3	3.2	3.5	4	3	3	3.5	3.5	4	3.38	
CO2	4	4	3.5	4	4	4	2.5	3.5	4	3.5	4	3.73	
CO3	4	3.5	4	3.5	3	3.5	4	4	4	3	3.5	3.64	
CO4	3.5	3.5	4	3.5	3.5	3.5	4	3.5	3.5	3.5	3.5	3.59	
CO5	4	4	3.5	3.5	4	4	3.5	4	4	3.5	3	3.73	
Mean Overall Score												3.61	

**Result: The Score for this course is 3.61(High)**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High
<b>Value Scaling</b>					
Mean Score of COs = $\frac{\text{Total Values}}{\text{Total No. of POs \& PSOs}}$			Mean Overall Score of COs = $\frac{\text{Total Mean Scores}}{\text{Total No. of COs}}$		

This course is having **High association** with Programme Outcome and Programme Specific Outcome

---

**UNIT-I** (12 Hours)

**Discharge Phenomenon through Gases:** Motion of a charge in transverse electric and magnetic fields – specific charge of electron – Dunnington’s method – Magnetron method – positive rays – Thompson parabola method – Aston and Dempster’s mass spectrograph

**UNIT-II** (12 Hours)

**Atomic Structure:** Vector atom model – Pauli’s exclusion principle – explanation of periodic table – various quantum numbers – angular momentum and magnetic moment – coupling schemes – LS and JJ coupling – spatial quantization – Bohr magneton **Spectral terms and notations – selection rules – intensity rule and interval rule.**

**UNIT-III** (12 Hours)

**Ionisation Potential and Splitting of Energy Levels:** Excitation and ionization potential – Davis and Goucher’s method – Zeeman effect – Larmor’s theorem – Debye’s explanation of normal Zeeman effect – Anomalous Zeeman effect – theoretical explanation- Lande’s ‘g’ factor and explanation of splitting of D1 and D2 lines of sodium – Paschen Back effect – theory – Stark effect (Qualitative treatment only)

**UNIT-IV** (12 Hours)

**Photoelectricity:** Photo electricity: Photoelectric emission laws – Lenard’s experiment- **Richardson and Compton experiment- Einstein photoelectric equation -experimental verification of Einstein’s photoelectric equations by Millikan’s experiment.**

**UNIT-V** (12 Hours)

**X-Rays:** **Continuous and characteristic X-RAY spectra absorption of X-RAYS by matter- concept of reciprocal lattice, Compton effect-derivation of expression for change in wavelength-experimental verification**

**TEXTBOOKS:**

1. R. Murugesan, Modern Physics, S. Chand & Co., New Delhi, 2009.
2. N. Subramanian and BrijLal, Atomic and Nuclear Physics, S. Chand & Co., 2013.

**REFERENCE BOOKS:**

1. A. B. Gupta and Dipak Ghosh, Atomic Physics, Books and Allied Publishers, 2<sup>nd</sup> Edition, 2009.
2. D. Halliday, R. Resnick and J. Walker, Fundamentals of Physics, Willey NY, 6<sup>th</sup> Edition, 2001.



II B.Sc (PH)	APPLIED ELECTRONICS	19PH408
SEMESTER – IV		HRS/WK - 4
CORE -VIII		CREDIT - 3

**OBJECTIVE:**

To understand the FET character, various linear operational amplifier, 555 timer and D/A and A/D converter.

**COURSE OUTCOMES:**

At the end of the Course the students should be able to exhibit

**CO1:**Obtained knowledge of special devices and applications

**CO2:**Study of various linear operational amplifier circuits

**CO3:** Study of various applications of operational amplifier

**CO4:**Basis introduction of 555 timer and locked loop

**CO5:**Acquire basis ideas of D/A and A/D converter

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER - IV	COURSE CODE: 19PH408					COURSE TITLE: APPLIED ELECTRONICS						Hours : 4	Credit : 3
Course Outcomes COs	Programme Outcomes POs					Programme Specific Outcomes PSOs						Mean Score of CO's	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	3.5	4	3.5	3	3	3	3	2.5	3.5	3	3.5	3.23	
CO2	3.5	4	4	4	4	2.5	2.5	4	4	4	4	3.68	
CO3	3	3.5	3	2.5	4	4	4	3.5	3.5	4	4	3.55	
CO4	3	3.5	2.5	3.5	4	3.5	4	3.5	4	3.5	3.5	3.50	
CO5	4	3.5	4	3.5	3.5	4	3.5	3.5	3.5	3.5	3.5	3.64	
Mean Overall Score											3.52		

**Result: The Score for this course is 3.52 (High)**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High
<b>Value Scaling</b>					
Mean Score of COs = $\frac{\text{Total Values}}{\text{Total No. of POs \& PSOs}}$			Mean Overall Score of COs = $\frac{\text{Total Mean Scores}}{\text{Total No. of COs}}$		

This course is having **High association** with Programme Outcome and Programme Specific Outcome

---

**UNIT - I** (12 Hours)

**Special Devices and Applications:** FET - Characteristics – parameter FET as amplifier – FET as VVR – MOSFET – Depletion and enhancement – UJT characteristics – UJT as relaxation oscillator – SCR characteristics.

**UNIT – II** (12 Hours)

**Linear Operational Amplifier Circuits:** OPAMP – Parameters – inverting and Non-inverting amplifier – gain – Miller effect – Virtual ground – offset voltage – offset current – PSRR - CMRR. OPAMP – Sign and scale changer – adder, subtractor and averager – integrator and differentiator – voltage follower – solving simultaneous linear equation

**UNIT – III** (12 Hours)

**Applications of Operational Amplifier:** OP AMP logarithmic amplifier – antilogarithmic amplifier – Logarithmic multiplier – Logarithmic divider. Comparator – Schmitt trigger – Astable multivibrator – Monostable multivibrator – Bistable multivibrator – Wein Bridge oscillator – phase shift oscillator.

**UNIT – IV** (12 Hours)

**555 Timer And PLL:** 555 Timer block diagram - Monostable operation – Astable operation – Schmitt trigger. Phase – Locked Loops (PLL): Basic principles – phase Detector- Analog phase detector – Digital phase detector – voltage controlled oscillator (VCO).

**UNIT – V** (12 Hours)

**D / A and A / D Converter:** Weighted resistor D/A converter – 4bit R-2R ladder DAC – Analog to Digital converter – Stair case ADC– Successive approximation ADC

**TEXT BOOKS:**

1. Vijayendran, Integrated Physics, S.Viswanathan Pvt. Ltd., 2009.
2. R.S. Sedha, Applied Electronics, S. Chand & Company Ltd., 2<sup>nd</sup> New Edition, 2000.
3. M. Arul Thalpathi, Basic and Applied Electronics, Cometak Publisher Chennai, 2005.

**REFERENCE BOOKS:**

1. I.J. Jagrath, Electronics – Analog and Digital, Prentice – Hall of India, New Delhi, 1999.
2. Jacob Millman and Christos C. Halkias, Integrated Electronics, McGraw Hill International, 1971.
3. D. Roy Choudhury and Shall Jain, Linear Integrated Circuits, New age International (p) Ltd., 2010.

<b>II B.Sc (PH)</b>	<b>PRACTICAL – II</b>	<b>PHP303&amp;PHP404</b>
<b>SEMESTER – III&amp;IV</b>		<b>HRS/WK - 3</b>
<b>CORE – PRACTICAL – II</b>		<b>CREDIT - 2</b>

**(Any 15 out of 20 experiments)**

1. Young's modulus – Cantilever oscillations (Dynamic method) – Pin and microscope.
2. Rigidity modulus – Torsional pendulum – n (with masses).
3. Bifilar pendulum.
4. Carey Foster bridge - Temperature co-efficient of resistance.
5. Spectrometer – Grating – Normal incidence method.
6. Spectrometer – Grating – Minimum deviation method.
7. Spectrometer i-d curve.
8. Spectrometer - Dispersive power of a grating
9. Spectrometer - Dispersive power of a prism
10. Potentiometer – Calibration of low range ammeter.
11. Potentiometer – Resistance – Specific resistance of a wire.
12. Potentiometer - High range voltmeter.
13. Potentiometer - Comparison of EMF.
14. Post office box - Temperature co-efficient.
15. Thermal conductivity of bad conductor - Lee's disc method.
16. Air wedge – Thickness of a wire.
17. Figure of merit of a table galvanometer.
18.  $M$  and  $B_H$  –  $\tan C$  – Deflection of vibration magnetometer.
19. Field along axis of circular coil –  $B_H$ .
20. Field along the axis of a circular coil deflection magnetometer –  $M$  - Null deflection method.

III B.Sc (PH)	OPTICS & SPECTROSCOPY	19PH509
SEMESTER – V		HRS/WK - 5
CORE - IX		CREDIT - 5

**OBJECTIVE:**

Learn the basics of geometrical optics, Interference, Diffraction, Polarization and various types of spectroscopy.

**COURSE OUTCOMES:**

At the end of the Course the students should be able to exhibit

**CO1:**Learn the basics of Geometrical Optics and Lenses

**CO2:**Study the concepts Interference and its applications

**CO3:**Acquire Knowledge about Diffraction and its applications

**CO4:**To Understand the concept of Polarization and its application in analyzing the optical activities

**CO5:**To Procure the Fundamental knowledge of Spectroscopy

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER - V	COURSE CODE: 19PH509					COURSE TITLE: OPTICS & SPECTROSCOPY						Hours :5	Credits: 5
Course Outcomes COs	Programme Outcomes POs					Programme Specific Outcomes PSOs						Mean Score of CO's	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	1.4	3.3	1.1	3.1	2.3	4.2	4.2	4.1	3.8	4.7	2.3	3.13	
CO2	1.2	3.5	1.3	3.2	2.6	4.4	4.3	4.1	3.9	4.2	2.1	3.16	
CO3	1.6	3.8	1.4	3.2	2.6	4.8	4.6	3.9	3.8	4.0	2.4	3.28	
CO4	1.8	3.8	1.4	3.2	2.4	4.5	4.1	3.9	4.2	3.5	2.1	3.17	
CO5	1.2	3.6	1.1	3.3	2.9	4.1	4.4	4.0	4.1	4.3	2.1	3.19	
Mean Overall Score											3.186		

**Result: The Score for this course is 3.186 (High)**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High
<b>Value Scaling</b>					
Mean Score of COs= $\frac{\text{Total Values}}{\text{Total No. of POs \& PSOs}}$			Mean Overall Score of COs= $\frac{\text{Total Mean Scores}}{\text{Total No. of COs}}$		

This course is having **High association** with Programme Outcome and Programme Specific Outcome

---

**UNIT - I** (15 Hours)

**Geometrical Optics:** Spherical aberration and lenses – Methods of minimizing spherical aberration – Condition for minimum spherical aberration in the case of two lenses separated by a distance – Chromatic aberration in lenses – Condition for achromatism of two thin lenses (In contact and out of contact) – Coma - Ramsden and Huygens's eyepieces– Angular dispersion – Dispersive power – combination of prisms to produce dispersion without deviation – Deviation without dispersion – Achromatic prisms Direct vision spectroscope.

**UNIT - II** (15 Hours)

**Interference:** Colours of thin films – Air wedge – Determination of diameter of a thin wire by air wedge – Test for optical flatness – Michelson's Interferometer – Theory – Applications -  $\lambda$ , thickness of thin transparent material and resolution of spectral lines – Brewster's fringes – Refractive index of gases – Jamin's & Rayleigh's Interferometers – Stationary waves in light.

**UNIT - III** (15 hours)

**Diffraction:** Fresnel diffraction – Diffraction at circular aperture, opaque circular disc, straight edge and narrow wire- Fraunhofer diffraction – single slit – double slit – Rayleigh's criteria – Resolving power of telescope, prism, microscope and grating.

**UNIT - IV** (15 hours)

**Polarization:** Double refraction – Nicol prism – polarizer and analyzer – Huygens's explanation of double refraction in uniaxial crystals – Dichroism – polaroids and their uses – plane, circularly and elliptically polarized light – production and detection – Optical Activity – Fresnel's explanation of optical activity – Specific rotatory power – Determination using Laurent's half shade polarimeter – Kerr effect and Faraday effect.

**UNIT - V** (15 hours)

**Spectroscopy:** Infrared spectroscopy, RAMAN, NMR, ESR - Principle – Instrumentation – applications – LASER, Principles of LASER, Semiconductor LASER, Nd-Yag LASER- Applications

**TEXT BOOKS:**

1. Subramaniam N & Brijlal, Optics, S. Chand & Co. Pvt. Ltd., New Delhi, 1990.
2. R. Murugesan, Optics and Spectroscopy S. Chand & Co. Pvt. Ltd., New Delhi, 2009.

**REFERENCE BOOKS:**

1. Lipson S G, Lipson H and Tannhauser D S, Optical Physics, Cambridge University Press, 1995.
2. D. Halliday, R. Resnick and J. Waler, Fundamentals of Physics, Wiley NY 6<sup>th</sup> Edition, 2001.
3. R. P. Feynman, R. B. Leighton and M. Sands, The Feynman Lectures on Physics, Vols. I, II and III Narosa, New Delhi, 1998.
4. G. Aruldas, Spectroscopy, Vendeur Book Vistas (New Delhi, India), 2009.

III B.Sc (PH)	SOLID STATE PHYSICS	19PH510
SEMESTER – V		HRS/WK - 5
CORE - X		CREDIT - 5

**OBJECTIVE:**

Understand the various types of bonds in solids, X-ray diffraction techniques, Types of magnetic material, superconductors.

**COURSE OUTCOMES:**

At the end of the Course the students should be able to exhibit

**CO1:**To Learn the Fundamental of Bonds in Solids

**CO2:** To Study the concepts of X-ray diffraction its applications in solids

**CO3:**Understanding the properties of Magnetism and its applications in quantum physics

**CO4:**Acquiring theknowledge of Dielectrics and its properties in various materials

**CO5:** To Procure the knowledge of Superconductivity and its applications

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER - V	COURSE CODE:19PH510					COURSE TITLE: SOLID STATE PHYSICS						Hour s :5	Credits : 5
Course Outcomes COs	Programme Outcomes POs					Programme Specific Outcomes PSOs						Mean Score of CO's	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	1.1	3.5	1.2	3.3	2.2	4.4	4.3	4.1	4.5	3.6	2.4	3.14	
CO2	1.2	3.8	1.3	3.3	2.1	3.9	3.7	3.7	3.9	3.7	2.2	2.98	
CO3	1.6	3.8	1.2	3.1	2.3	4.8	4.1	3.8	3.8	3.9	2.5	3.17	
CO4	1.2	3.4	1.6	3.6	2.5	3.9	4.2	4.6	4.3	4.6	2.2	2.95	
CO5	1.4	4.0	1.1	3.7	2.2	4.0	3.9	4.2	4.5	4.3	2.1	3.21	
Mean Overall Score												3.09	

**Result: The Score for this course is 3.09 (High)**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High
<b>Value Scaling</b>					
Mean Score of COs= $\frac{\text{Total Values}}{\text{Total No. of POs \& PSOs}}$			Mean Overall Score of COs= $\frac{\text{Total Mean Scores}}{\text{Total No. of COs}}$		

This course is having **High association** with Programme Outcome and Programme Specific Outcome

---

**UNIT - I** (15 hours)

**Crystals structure of Solids:** Crystal lattice- primitive and unit cell- seven classes of crystals – Bravais lattice- Miller indices- structure of crystals- simple cubic, Hexagonal close packed structure-Face centered cubic structure, Body centered cubic structure, Simple cubic structure- Sodium chloride structure, Zinc Blende structure, Diamond structure

**UNIT - II** (15 hours)

**X-Ray Diffraction:** Diffraction of x-rays by crystals-Bragg's law in one dimension- Experimental method in x-ray diffraction-Laue method, Rotating crystal method-Powder photograph method-von Laue's equations-Point defects- Line defects- Surface defects- Volume defects-Effects of crystal imperfections

**UNIT - III** (15 hours)

**Magnetism:** Different type of magnetic materials- Classical theory of Diamagnetism(Langevin theory)-Langevin theory of Paramagnetism – Weiss theory of Paramagnetism- Qualitative explanation of Heisenberg's Internal Field and Quantum Theory of Ferromagnetism.

**UNIT - IV** (15 hours)

**Dielectrics:** Fundamentals definitions in dielectrics – different types of electric polarization- Frequency and Temperature Effects on Polarization – Dielectric loss – Local Field on internal field Clausius-Mosotti Relation- Determination of Dielectric Constant – Dielectric Breakdown – Properties of Different types of insulating materials

**UNIT - V** (15 hours)

**Superconductivity:** Introduction-Meissner effect-Limitation- Type I & II Superconductivity- Vortex states- BCS Theory (Qualitative treatment only)-Josephson's effect-Copper pair tunneling

**TEXT BOOKS:**

1. S.O. Pillai, Solid State Physics, New Age Science Publication, 2009.
2. Arumugam, Materials Science, Anuradha Publications, 2015.
3. Puri & Babber, Solid State Physics, S. Chand Limited, 2008.

**REFERENCE BOOKS:**

1. C. Kittel, An introduction to Solid State Physics, 5<sup>th</sup> Edition, Published by John Wiley & Sons Inc, 1976.
2. Gupta and Kumar, Solid State Physics, KNath & Co., 2013.

III B.Sc (PH)	DIGITAL ELECTRONICS	19PH511
SEMESTER – V		HRS/WK - 5
CORE - XI		CREDIT - 4

**OBJECTIVE:**

Learn the fundamentals of digital electronics, microprocessor, solving Boolean algebra, various types of converters in electrical circuit and working of 8085 microprocessor.

**COURSE OUTCOMES:**

At the end of the Course the students should be able to exhibit

**CO1:**To Learn the Fundamental of Digital electronics & Microprocessor

**CO2:**To Study the functions of Boolean Algebra

**CO3:**Obtain the knowledge about Arithmetic circuits & Sequential Logic circuits

**CO4:**To Learn about the working of D/A & A/D Converters

**CO5:**To Introduce the concepts and working of microprocessor 8085

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER - V	COURSE CODE: 19PH511					COURSE TITLE: DIGITAL ELECTRONICS						Hours: 5	Credit: 4
Course Outcomes COs	Programme Outcomes POs					Programme Specific Outcomes PSOs						Mean Score of CO's	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	2.1	3.5	2.2	3.3	3.5	3.6	4.3	3.6	4.2	4.3	1.1	3.24	
CO2	3.2	3.8	2.3	3.5	2.8	3.4	4.4	3.2	4.6	4.7	1.2	3.43	
CO3	1.1	3.6	1.2	3.1	3.3	3.8	4.1	3.8	4.4	4.4	1.5	3.11	
CO4	4.0	3.4	1.4	2.6	3.5	3.8	4.6	3.3	4.3	4.1	1.2	3.29	
CO5	2.4	4.0	1.3	3.7	3.6	4.0	4.4	4.3	4.3	4.0	1.1	3.37	
Mean Overall Score												3.304	

**Result: The Score for this course is 3.304 (High)**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High
<b>Value Scaling</b>					
Mean Score of COs = $\frac{\text{Total Values}}{\text{Total No. of POs \& PSOs}}$			Mean Overall Score of COs = $\frac{\text{Total Mean Scores}}{\text{Total No. of COs}}$		

This course is having **High association** with Programme Outcome and Programme Specific Outcome



---

## UNIT - I

(15 hours)

**Digital Fundamentals:** Number systems – decimal, binary, octal and hexadecimal systems – conversion from one number system to another Codes – BCD code – excess 3 code, Gray code – ASCII code – Binary arithmetic – Binary addition – subtraction – unsigned binary numbers – sign magnitude numbers – 1's and 2's complement – Binary multiplication and division.

### Logic Gates and Logic Families

AND, OR circuits using diodes and transistors – NOT using transistors – NAND, NOR and EXOR – functions and truth tables. NAND & NOR as universal gates.

## UNIT - II

(15 hours)

**Boolean Algebra And Simplification Of Logic Circuits:** Laws and theorems of Boolean algebra – De Morgan's theorems and their circuit implications – Duality theorem, simplification of Boolean equations – Karnaugh map – pairs, quads, octets – 2,3 and 4 variables – SOP method – NAND – NAND circuits – POS method – NOR – NOR circuits.

## UNIT - III

(15 hours)

**Arithmetic Circuits and Sequential Logic Circuits:** Arithmetic building blocks – Half adder – Full adder – parallel binary adder – Half subtractor – Full subtractor – The adder-subtractor – digital comparator – parity checker/generator. Flip-flops – JK flip – flop – JK master slave flip-flop – Flip flop applications. Shift register functions- Shift right-shift left-Shift register applications.

## UNIT - IV

(15 hours)

**D/A and A/D Converter:** Introduction – variable resistor network – binary ladder – D/A converter – D/A accuracy and resolution – A/D converter – simultaneous conversion – A/D accuracy and resolution.

## UNIT - V

(15 hours)

**Introduction to Microprocessor 8085:** Basics of semiconductor memory- RAM, ROM, PROM and EPROM. Microcomputer organization-8085 Microprocessor-pin functions-architecture-machine and assembly language-programmer's model of 8085-8085 addressing modes. Classification of instruction and format – 8-bit data transfer and arithmetic instructions

### TEXT BOOKS:

1. Vijayendran, Fundamentals of Microprocessor 8085, S. Viswanathan Printers & Publishers Pvt.Ltd, 2006.
2. Vijayendran, Integrated Electronics, Viswanathan, S., Printers & Publishers Pvt. Ltd., 2009.
3. B. Ram, Introduction to Microprocessor and Microcontroller, Dhanpat Rai Publications, 2012.

### REFERENCE BOOKS:

1. J.P. Agarwal and Anit Agarwal, Solid State Electronics, Pragati Prakashan, 2<sup>nd</sup> Edition, 2014.
2. Herbert Taub and Donald Schilling, Digital Integrated Electronics, McGraw Hill, 1<sup>st</sup> Edition, 2008.
3. Anokh Singh and A. K. Chhabra, Fundamentals of Digital Electronics and Microprocessors, 2<sup>nd</sup> Revised and Enlarged Ed., 2. Chand & Co. Ltd., New Delhi, 2005.

III B.Sc (PH)	<b>ELECTRICAL WIRING</b>	19EPH51A
SEMESTER – V		HRS/WK - 4
ELECTIVE –IOption(I)		CREDIT - 3

**OBJECTIVE:**

Understand the fundamentals of electricity, electrical parameters, various electrical symbols, electrical connections in house and their troubleshooting.

**COURSE OUTCOMES:**

**At the end of the Course the students should be able to exhibit**

**CO1:**To learn the fundamentals of electricity, electrical parameters and testing tool.

**CO2:** Understand different methods of electricity generation and types of motors.

**CO3:**Study the electrical components, symbols, types of circuits and tools

**CO4:** To Study the various methods of joining conductors and electrical accessories

**CO5:** Learn the methods of wiring a house and industry and Hands on training on house wiring and troubleshooting the electrical circuits and appliances

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER - V	COURSE CODE: 19EPH51A					COURSE TITLE: ELECTRICAL WIRING						Hours: 4	Credits: 3
Course Outcomes COs	Programme Outcomes POs					Programme Specific Outcomes PSOs						Mean Score of CO's	
	PO1	PO2	PO3	PO4	PO5	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	3.3	4.6	3.1	4.6	3.2	4.6	4.7	4.4	4.7	4.5	3.4	4.10	
CO2	3.0	4.7	3.5	4.6	3.1	4.1	4.8	4.8	4.6	4.3	3.1	4.03	
CO3	3.1	4.6	3.6	4.7	3.2	4.2	4.6	4.7	4.8	4.8	3.1	4.12	
CO4	3.0	3.8	3.4	4.6	3.1	4.3	4.7	4.6	4.5	4.5	3.3	3.98	
CO5	3.0	4.1	3.6	4.8	3.0	4.7	4.4	4.9	4.1	4.7	3.5	4.07	
Mean Overall Score											4.06		

**Result: The Score for this course is 4.06 (High)**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High
Value Scaling					
Mean Score of COs = $\frac{\text{Total Values}}{\text{Total No. of POs \& PSOs}}$			Mean Overall Score of COs = $\frac{\text{Total Mean Scores}}{\text{Total No. of COs}}$		

This course is having **High association** with Programme Outcome and Programme Specific

---

Outcome

**UNIT - I (12 hours)**

**Electricity Generation:** Fundamentals of electricity - Current, Voltage, resistance - Ohm's law - Power - Kilowatt hour - Watt meter - Electrical measurements - Electric power generation by Thermal, hydro, atomic and nuclear methods - Batteries - Generators - Study of Generator.

**UNIT - II (12 Hours)**

**Electric Circuits and Distribution:** Symbols of electrical parameters - Importance Series, Parallel connections - AC and DC - Conductors - Inductor, Capacitor and transformer - Distribution methods - single phase and three phase - Star and delta connections - Rules of electric connections - SWG - Motors - Study of motor, series and parallel circuits.

**UNIT - III (12 Hours)**

**Electrical Wiring - I:** Tools - Methods of Joining conductors - House wiring methods - Gilt, wood casing, Tough - Rubber sheathed, conduit or PVC pipe and concealed - Switches - ceiling rose - lamp holders, sockets - Fuse base - Distribution box - Trip switches - Earth connection - Experimental study of house wiring.

**UNIT - IV (12 Hours)**

**Electrical Wiring – II:** Main board preparation - Distribution - Cut - out preparation - Switch board preparation - Power factor - IEE regulations - Safety precautions - Testing the insulation - Experimental study of main, distribution and switchboards.

**UNIT - V (12 Hours)**

**Electrical Appliances & Safety Precautions:** Tungsten - filament bulb - tube light - mercury and sodium vapour lamp - LED lamp - heater - iron box - table fan - ceiling fan - battery eliminator - electrical requirement to washing machine and refrigerator - procedure to rectify the electrical faults in electrical appliances.

**Safety Precautions:** Precautions in handling tools Electric shock - First aid on electric shock Precautions to be observed while installing different electric appliances in houses.

**TEXT BOOKS:**

Course material prepared by the Department

**REFERENCE BOOKS:**

1. Earl Gates, Introduction to Basic Electricity and Electronics Technology, Delmar, Cengage Learning, 2014
2. Stan Gibilisco, Dr. Simon Monk, Teach yourself Electricity and electronics, McGraw-Hill Education, 2016.

III B.Sc (PH)	NUMERICAL METHODS & BASIC COMPUTER PROGRAMMING	19EPH51B
SEMESTER – V		HRS/WK - 4
ELECTIVE – I Option(II)		CREDIT - 3

**OBJECTIVE:**

Understand the solve various fundamental mathematical equations, occurs knowledge of C language.

**COURSE OUTCOMES:**

**At the end of the Course the students should be able to exhibit**

**CO1:**To Learn the Solve various Fundamental mathematical equations

**CO2:**To Study the functions of Interpolation methods

**CO3:**Acquiring the knowledge about Numerical integration & Differentiation

**CO4:**To Learn the Basic of C Language

**CO5:**ToProcure the concepts of Control Statements in C Language

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER - V	COURSE CODE: 19EPH51B					COURSE TITLE: NUMERICAL METHODS & BASIC COMPUTER PROGRAMMING						Hours: 4	Credits :3
Course Outcomes COs	Programme Outcomes POs					Programme Specific Outcomes PSOs						Mean Score of CO's	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	1.1	3.8	1.1	3.4	3.5	3.4	4.3	4.6	3.2	3.3	2.1	3.07	
CO2	2.2	3.6	1.1	3.5	2.8	3.6	4.4	4.2	3.5	3.5	1.1	3.04	
CO3	2.1	3.7	1.1	3.1	3.3	3.3	4.1	4.8	3.3	3.6	1.1	3.04	
CO4	3.4	4.4	1.0	4.6	3.5	4.2	4.1	3.3	2.1	3.8	2.2	3.32	
CO5	3.6	4.0	1.0	4.7	3.6	4.0	4.3	4.5	2.0	4.4	2.1	3.47	
Mean Overall Score												2.926	

**Result: The Score for this course is 2.926 (Moderate)**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High
<b>Value Scaling</b>					
Mean Score of COs= $\frac{\text{Total Values}}{\text{Total No. of POs \& PSOs}}$			Mean Overall Score of COs= $\frac{\text{Total Mean Scores}}{\text{Total No. of COs}}$		

---

This course is having **Moderate** association with Programme Outcome and Programme Specific Outcome

**UNIT - I (12 Hours)**

**Solution Of Equation:** Eigen values, Eigen vectors, Cayley Hamilton; characteristic equation of a matrix – Solution of simultaneous equations – Gauss elimination method – Gauss-Jordan method

**UNIT - II (12 Hours)**

**Interpolation:** Linear and Lagrange interpolation – Newton's forward & backward interpolation polynomial equation & determination of roots – Newton-Raphson method

**UNIT - III (12 Hours)**

**Numerical Integration and Differentiation:** Trapezoidal rule – Simpson rule 1/3 & 3/8 – Solution of first & second order differential equation: Taylor series – Euler's method (Improved & Modified) – Solutions of fourth order Runge-Kutta method.

**UNIT - IV (12 Hours)**

**Data Type Operators:** History & Features of C Language - Variable name – data type and sizes – declaration – arithmetic, relational and logical operators – precedence and order of evaluation

**UNIT - V (12 Hours)**

**Control Statements & IPR:** Unconditional control statements – GOTO and labels – Conditional control statements – simple IF, IF..ELSE, nested IF..ELSE, ELSE IF ladder – switch case – break – continue statement. Looping statement – while – do..while – for – nested for loop – (Basic Programs - Qualitative studies only) - Introduction and the need for intellectual property right (IPR) - Kinds of Intellectual Property Rights: Patent, Copyright, Trade Mark

**TEXT BOOKS:**

1. S.S. Sastry, Numerical Methods, Prentice Hall India Learning Private Limited; Fifth edition 2012.
2. Thilagavathi, Numerical Methods, Published by S. Chand & Company Ltd., 2013.

**REFERENCE BOOKS:**

1. Satya Prakash, Mathematical Physics, 4<sup>th</sup> Ed., Sultan Chand & Sons Publication, New Delhi, 2014.
2. A. Singaravelu, Numerical methods, 1<sup>st</sup> Ed., Meenakshi Publication, Tamil Nadu, 2008.

III B.Sc (PH)	<b>GEOPHYSICS</b>	19EPH52A
SEMESTER – V		HRS/WK - 5
ELECTIVE – II Option(I)		CREDIT - 3

**OBJECTIVE:**

Understand formation of earth and solar system, geographical fields, concepts of seismology and geodynamics.

**COURSE OUTCOMES:**

At the end of the Course the students should be able to exhibit

**CO1:**To know the information about the earth and solar system

**CO2:**To Learn the interpretation of Mathematical functions in geographical fields

**CO3:**Obtaining the knowledge about the Magnetic field on earth

**CO4:**To Learn the concepts of Sesimology

**CO5:**ToLearn the basics of Geodynamics

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER - V	COURSE CODE:19EPH52A					COURSE TITLE: GEOPHYSICS						Hours: 5	Credits :3
Course Outcomes COs	Programme Outcomes POs					Programme Specific Outcomes PSOs						Mean Score of CO's	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	2.1	2.8	1.0	2.4	2.5	3.3	3.3	3.8	3.1	3.2	1.1	2.6	
CO2	2.2	2.4	1.1	2.5	2.1	3.5	3.4	3.2	3.6	3.2	1.2	2.58	
CO3	2.3	2.7	1.0	2.7	2.3	3.1	3.7	3.2	3.1	3.3	1.1	2.59	
CO4	3.3	3.4	1.0	2.6	2.2	3.7	3.2	3.6	3.5	3.1	1.2	2.8	
CO5	2.6	2.0	1.0	2.5	2.1	3.0	3.1	3.0	2.0	3.4	1.1	2.34	
Mean Overall Score												2.582	

**Result: The Score for this course is 2.582 (Moderate)**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High
<b>Value Scaling</b>					
Mean Score of COs= $\frac{\text{Total Values}}{\text{Total No. of POs \& PSOs}}$			Mean Overall Score of COs= $\frac{\text{Total Mean Scores}}{\text{Total No. of COs}}$		

This course is having **Moderate** association with Programme Outcome and Programme Specific Outcome

---

**UNIT - I****(15 Hours)**

**The Earth In The Solar System:** Solar System Formation, Accretion, and the Early Thermal State of the Earth-Rotation and Angular Momentum- The Sun-Planetary Formation-Early Thermal State of the Earth- Radioactive Decay-Radiometric Dating- Radioactivity as a Heat Source-Meteorites and the Bulk Composition of the Earth-Chondrites-Secondary Processing-Achondrites-Irons and Stony-Irons-The Terrestrial Planets-One-dimensional Earth's Structure-Lateral Heterogeneity in the Mantle

**UNIT - II****(15 Hours)**

**The Earth's Gravitational Field:** Global Gravity, Potentials, Figure of the Earth, Geoid-Gravitational Potential due to Nearly Spherical Body-The Poisson and Laplace Equations-Cartesian and Spherical Coordinate Systems-Spherical Harmonics-Global Gravity Anomalies- Gravity Anomalies and the Reduction of Gravity Data- Correlation between Gravity Anomalies and Topography-Flexure and Gravity.

**UNIT - III****(15 Hours)**

**The Magnetic Field Of The Earth:** The Main Field-The Internal Field- The External Field-The Magnetic Induction due to a Magnetic Dipole-Magnetic Potential due to More Complex Configurations-Power Spectrum of the Magnetic Field-Downward Continuation-Secular Variation.

**UNIT - IV****(15 Hours)**

**Seismology:** Introduction- Strain-Stress-Equations of Motion, Wave Equation, P and S-waves- From Vector to Scalar Potentials – Polarization-Solution by Separation of Variables- Plane Waves- Snell's Law-Fermat's Principle and Snell's Law- Ray Geometries of the Wave Field-Travel Time Curves and Radial Earth Structure-Surface Waves- Sensitivity Kernels-Excitation of Surface Waves-Dispersion: Phase and Group Velocity-Dispersion Curves- Seismology: Free Oscillation

**UNIT - V****(15 Hours)**

**Geodynamics:** Heat Flow- Heat Flow, Geothermal Gradient, Diffusion-Thermal Structure of the Oceanic Lithosphere-Thermal Structure of the Oceanic Lithosphere (cont.)-Bending, or Flexure, of Thin Elastic Plate-The Upper Mantle Transition Zone.

**TEXT BOOKS:**

1. Lowrie, William. Fundamentals of Geophysics. Cambridge, UK: Cambridge University Press, September 1997.
2. Fowler, C. M. R. The Solid Earth: An Introduction to Global Geophysics. Second Edition. Cambridge, UK: Cambridge University Press, 2004.

**REFERENCE BOOKS:**

1. Turcotte, Donald L., and Gerald Schubert. Geodynamics. 2nd ed. Cambridge, UK: Cambridge University Press, 2001.
2. Stein, Seth, and Michael Wysession. An Introduction to Seismology, Earthquakes and Earth Structure. Malden, MA: Blackwell Science, 2002.

III B.Sc (PH)	<b>FIBER OPTIC COMMUNICATION</b>	19EPH52B
SEMESTER – V		HRS/WK - 5
ELECTIVE – II Option(II)		CREDIT - 3

**OBJECTIVE:**

Understand the basics of optical fibers, character, communication process and various types of connectors and couplers.

**COURSE OUTCOMES:**

At the end of the Course the students should be able to exhibit

**CO1:**To understand the basics of optic fibers

**CO2:** To study the information about the characteristics of fiber optics

**CO3:**To Obtain the knowledge about the Communication processes

**CO4:**To study the functions of couplers and connectors

**CO5:**Procuring the functions of Analog and Digital Links

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER - V	COURSE CODE: 19EPH52B					COURSE TITLE: FIBER OPTIC COMMUNICATION						Hours: 5	Credits :3
Course Outcomes COs	Programme Outcomes POs					Programme Specific Outcomes PSOs						Mean Score of CO's	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	2.1	3.8	2.0	3.5	2.2	4.6	3.2	3.4	4.3	3.4	2.1	3.14	
CO2	2.2	3.6	2.2	3.4	2.1	4.1	3.4	3.8	4.4	3.2	2.1	3.13	
CO3	2.3	2.2	2.4	3.3	2.2	4.4	3.4	3.7	4.6	3.3	2.1	3.08	
CO4	2.4	2.4	2.0	3.1	2.1	4.3	3.2	3.6	4.4	3.5	2.3	3.02	
CO5	2.6	2.4	2.4	2.8	2.4	4.7	3.3	3.8	3.1	3.8	2.1	3.18	
Mean Overall Score												3.11	

**Result: The Score for this course is 3.11 (High)**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High
<b>Value Scaling</b>					
Mean Score of COs= $\frac{\text{Total Values}}{\text{Total No. of POs \& PSOs}}$			Mean Overall Score of COs= $\frac{\text{Total Mean Scores}}{\text{Total No. of COs}}$		

This course is having **High association** with Programme Outcome and Programme Specific Outcome



---

**UNIT – I** (15 Hours)

**Optic Fibers:** Fiber optic revolution – basic characteristics of optical fiber – acceptance angle – numerical aperture – propagation of light through optical fiber – theory of mode formation – classification of fibers – step index and graded index fibers – single mode and multi mode fibers

**UNIT – II** (15 Hours)

**Transmission Characteristics Of Optical Fibers:** Introduction, Attenuation, absorption, scattering losses, bending loss, dispersion, Intra model dispersion, Inter model dispersion

**UNIT – III** (15 Hours)

**Fiber Optic Communication:** Source and detectors for fiber optic communication – Laser and LED – Analog and digital modulation methods – principle of optical detection – pin and APD photo detectors – Noise – Design consideration of a fiber optic communication system.

**UNIT – IV** (15 Hours)

**Fiber Couplers and Connectors:** Introduction, fiber alignment and joint loss, single mode fiber joints, fiber splices, fiber connectors and fiber couplers.

**UNIT - V**

**Analog And Digital Links** : Analog links – Introduction, overview of analog links, CNR, multichannel transmission techniques, RF over fiber, key link parameters, Radio over fiber links, microwave photonics. Digital links – Introduction, point-to-point links, System considerations, link power budget, resistive budget, short wave length bandand transmission distance for single mode fibers, Power penalties, nodal noise and chirping.

**TEXT BOOKS:**

1. R. Murugesan, Modern Physics, S. Chand & Co., 2009.
2. Senthil Kumar, Engineering Physics, VRB Publishers Pvt. Ltd., 2013.

**REFERENCE BOOKS:**

1. John M. Senior, Optical Fiber Communications, Cambridge University Press, 1996.
2. Govind P. Agrawal, Fiber – Optic Communication Systems, John- Willey & Sons, 2007.
3. P. K. Palanisamy, Physics for Engineering, Scitech publishing Pvt. Ltd., Chennai, 2009.

III B.Sc (PH)	<b>PHYSICS IN EVERYDAY LIFE</b>	19SSPH52
SEMESTER - V		HRS/WK-0
SSC		CREDIT-2

### OBJECTIVES:

- To acquire the knowledge about the fundamental parameters in physics and to understand their applications in daily life.
- To understand the flow of heat and its transmission in different forms and to develop a scientific quest among students.
- Transmission of sound waves, characteristics and their applications in human system.
- To discern the basic application of geographical physics, and their utilization in the field of Medication.
- To comprehend the basic ideas of physics in space science and communication networking.

### UNIT –I

**Mechanics:** Weight – Mass - Force – Laws of Motion— Work - Energy – Power- Friction – Centre of Gravity – Torque – Momentum – Angular Momentum.

### UNIT – II

**Heat:** Flow of Heat & Thermal Equilibrium (Applications – Riveting- bimetallic strip – Units of Heat energy – Transmission of heat – Conduction –Convection – Radiation –(Applications – Ocean Currents –Car Radiators – Ventilation – Wind system in atmosphere – Thermos flask).

### UNIT –III

**Sound & Optics:** Sound waves – Doppler Effect –Power of Lens - Physics in the human body: The eyes as an optical instrument; vision defects; Rayleigh criterion and resolving power; sound waves and hearing; sound intensity; the decibel scale.

### UNIT – IV

**Geo & Medical Physics:** Earthquake Richter scale - thunder and lightning - Lightning arrestors Cosmic showers - X-rays Ultrasound scan CT scan – MRI scan.

### UNIT – V

**Space Science & Communication:** Newton’s law of gravitation - Weather forecasting and communication satellites – Indian Satellites- Electromagnetic spectrum- Radio Waves AM & FM transmission and reception.

### TEXT BOOKS:

1. University Physics by F. W. Sears, M. Zemansky, R. A. Freedman, and H. D. Young, Pearson Education
2. Fundamentals of Physics by D. Halliday, R. Resnick, J. Walker, John Wiley & Sons

III B.Sc (PH)	RELATIVITY & QUANTUM MECHANICS	21PH612
SEMESTER - VI		HRS/WK-5
CORE - XII		CREDIT- 5

**OBJECTIVE:**

Understand the basics of relativity, waves and matters, solving Schrödinger equation and its applications.

**COURSE OUTCOMES:**

At the end of the Course the students should be able to exhibit

**CO1:**To understand the concept of Relativity

**CO2:** To Learn the principles& properties of waves and matter

**CO3:** To know about the Schrodinger equations and its applications

**CO4:** To study the mathematical functions in physics

**CO5:** To Gain the knowledge about the special functions

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER - VI	COURSE CODE: 21PH612					COURSE TITLE: RELATIVITY & QUANTUM MECHANICS						Hours: 5	Credits :5
Course Outcomes COs	Programme Outcomes POs					Programme Specific Outcomes PSOs						Mean Score of CO's	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	3.3	4.6	3.1	4.6	3.2	4.6	4.7	4.4	4.7	4.5	3.4	4.10	
CO2	3.0	4.7	3.5	4.6	3.1	4.1	4.8	4.8	4.6	4.3	3.1	4.03	
CO3	3.1	4.6	3.6	4.7	3.2	4.2	4.6	4.7	4.8	4.8	3.1	4.12	
CO4	3.0	3.8	3.4	4.6	3.1	4.3	4.7	4.6	4.5	4.5	3.3	3.98	
CO5	3.0	4.1	3.6	4.8	3.0	4.7	4.4	4.9	4.1	4.7	3.5	4.07	
Mean Overall Score												4.06	

**Result: The Score for this course is 4.07 (High)**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High
<b>Value Scaling</b>					
Mean Score of COs= $\frac{\text{Total Values}}{\text{Total No. of POs \& PSOs}}$			Mean Overall Score of COs= $\frac{\text{Total Mean Scores}}{\text{Total No. of COs}}$		

This course is having **High association** with Programme Outcome and Programme Specific Outcome

---

**UNIT - I** (15 hours)

**General Relativity:** Frames of references - Newtonian relativity-Galilean invariance and conservation laws- postulates of general theory of relativity - propagation of light- **Michelson-Morley experiment - significance of negative result - search for ether**

**UNIT - II** (15 hours)

**Special Relativity:** Postulates of special theory of relativity - Lorentz transformation equations - Length contraction - Time dilation - Relativity of simultaneity - Law of addition of velocities - variation of mass with velocity - relativistic kinetic energy equations Minkowski's four dimensional spaces -time continuum.

**UNIT - III** (15 hours)

**Wave Mechanics:** Dual Nature of Matter-Matter waves - de Broglie wavelength De Broglie's Hypothesis of Matter Wave-Conservation of Energy-Expression for wave velocity and group velocity - **Heisenberg's Uncertainty principle-Mathematical proof of uncertainty Experimental study of matter waves-proof of Uncertainty principle for one dimensional wave packet**

**UNIT - IV** (15 hours)

**Schrödinger Equations:** Wave function-properties of wave functions- Postulates of wave mechanics -Probability Current density- Equality of Continuity theorem- Eigen functions - Eigen values - expectation values - Time dependent and time independent Schrödinger equation.

**UNIT - V** (15 hours)

**Application Of Schrödinger Equations:** **Particle in a one dimensional box - barrier penetration and tunneling effect - linear harmonic oscillator - zero point energy - rigid rotator - hydrogen atom.**

**TEXTBOOKS:**

1. Quantum Mechanics by V. Devanathan, Narosa, Chennai, 2005.
2. Modern physics by R Murugesan, Kiruthiga, Sivaprasath S Chand & Co.(2007)
3. Quantum Mechanics by V K Thangappan, Wiley Eastern

**REFERENCE BOOKS:**

1. A Text Book of Quantum Mechanics by P M Mathews and Venkatesan,, McGraw Hill
2. Quantum mechanics by Ghatak and Loganathan, McMillan
3. Basic quantum mechanics by A Ghatak, McMillan India (2002)

III B.Sc (PH)	NUCLEAR & RADIATION PHYSICS	19PH613
SEMESTER - VI		HRS/WK-5
CORE - XIII		CREDIT- 5

### OBJECTIVE:

To study the nuclear structure, radioactive decay, particle accelerators, and working of nuclear reactor.

### COURSE OUTCOMES:

At the end of the Course the students should be able to exhibit

**CO1:** To understand the Basic concept Nuclear Structure

**CO2:** To Acquire knowledge about Radio Active Decay

**CO3:** Understanding the Construction & Working of various Particle Accelerators

**CO4:** To study the Working of Nuclear reactors & Radiation

**CO5:** To study the Basic Classification of Elementary Particles

### Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes

SEMESTER - VI	COURSE CODE: 19PH613					COURSE TITLE: NUCLEAR & RADIATION PHYSICS						Hours: 5	Credits: 5
Course Outcomes COs	Programme Outcomes POs					Programme Specific Outcomes PSOs						Mean Score of CO's	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	3.2	4.3	3.1	4.1	3.0	4.5	4.5	4.5	4.7	4.6	3.8	4.02	
CO2	3.1	3.9	3.3	4.2	3.1	4.7	4.5	4.8	4.3	4.4	3.7	4.00	
CO3	3.0	4.6	3.1	4.5	3.0	4.1	4.4	4.7	4.5	4.5	3.6	4.17	
CO4	3.4	3.8	3.2	4.5	3.1	4.5	4.8	4.3	4.7	4.6	3.6	4.04	
CO5	3.5	4.5	3.2	4.8	3.7	4.8	4.9	4.9	3.8	4.8	3.4	4.20	
Mean Overall Score											4.086		

**Result: The Score for this course is 4.086 (High)**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High
<b>Value Scaling</b>					
Mean Score of COs = $\frac{\text{Total Values}}{\text{Total No. of POs \& PSOs}}$			Mean Overall Score of COs = $\frac{\text{Total Mean Scores}}{\text{Total No. of COs}}$		

This course is having **High association** with Programme Outcome and Programme Specific Outcome

---

**UNIT – I****(15 hours)**

**Nuclear Structure:** Nuclear spin – determination of magnetic dipole moment, electric quadrupole moment, parity of nuclei, isospin, theories of nuclear composition, proton and electron hypothesis, proton – neutron hypothesis, nuclear forces – meson theory of nuclear forces.

Liquid drop model – Bethe Weizacker’s mass formula – application to alpha decay – Bohr – Wheeler theory – shell model – evidences – theory – energy level diagram – spin orbit interaction – magic numbers – nuclear stability.

**UNIT – II****(15 hours)**

**Radioactive Decay:** Radioactive disintegration – law of successive disintegration – transport and secular equilibrium – radioactive series – Geiger – Nuttal law – Age of earth – alpha particle disintegration energy – alpha particle spectra – theory of alpha decay (Qualitative treatment). Beta ray spectra – origin – neutrino theory of beta decay – electron capture – gamma rays – determination of wavelength by Diamond – crystal spectrometer – nuclear isomerism.

**UNIT – III****(15 hours)**

**Particle Accelerators And Detectors:** Cyclotron – synchrocyclotron – Betatron – electron synchrotron – proton synchrotron (Bevatron)-GM counter – ionization chamber – bubble chamber – scintillation counter – photographic emulsion techniques.

**UNIT – IV****(15 hours)**

**Reactors And Radiation Physics:** Nuclear fission – Chain reaction – four-factor formula – reactor theory – critical size of a reactor – general aspect of reactor design – reactor shielding – reactor control – classification of reactors – pressurized heavy water reactor – fast breeder reactor- Introduction to recent reactors.

Radiation hazards – biological effects of radiation - radiation sickness – radiation units and operational limits radiation survey meters – pocket dosimeter – control of radiation hazards – radiation therapy – radioisotopes used for therapy – nuclear medicine – industrial applications – food preservatives.

**UNIT – V****(15 hours)**

**Elementary Particles:** Classification – types of interaction – symmetry and conservation laws – hadrons – leptons – baryons – mesons – strangeness – hyperons – antiparticles – antimatter – basic ideas about quarks – types of quarks.

**TEXT BOOKS:**

1. Brijlal and N.Subramaniam-Modern Physics
2. D.C. Tayal, Nuclear Physics, Himalaya Publishing House, 2011.
3. R. Murugeshan&Kiruthiga, Sivaprasath, Modern Physics, S. Chand & Co., 2009

**REFERENCE BOOKS:**

1. S. N. Ghoshal, Nuclear Physics, S Chand & Co. Edition, 2003.
2. M. L. Pandya, R.P.S. Yadav, Elements of Nuclear Physics, KedarNath& Ram Nath Publishers, 2000.

3. Nuclear Physics – J B Rajam, S chand Publishing Co.

<b>III B.Sc (PH)</b>	<b>ASTROPHYSICS</b>	<b>19PH614</b>
<b>SEMESTER - VI</b>		<b>HRS/WK-5</b>
<b>CORE - XIV</b>		<b>CREDIT- 4</b>

**OBJECTIVE:**

To study the Astronomy, celestial mechanics, various astronomical instruments, stellar structure and stellar evolution.

**COURSE OUTCOMES:**

**At the end of the Course the students should be able to exhibit**

**CO1:** Study about the History of Astronomy and Celestial Mechanics

**CO2:** Learn the concepts of astronomical instrumentation

**CO3:** Acquire Knowledge of Stellar Magnitudes and Colors

**CO4:** Be familiar with the Stellar structure

**CO5:** Apply the knowledge of Stellar evolution

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER - VI	COURSE CODE: 19PH614					COURSE TITLE: ASTROPHYSICS						Hours: 5	Credits: 4
Course Outcomes COs	Programme Outcomes POs					Programme Specific Outcomes PSOs						Mean Score of CO's	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	3	3.8	4	3.5	3.5	2.8	3.5	3	4	3	3.5	3.41	
CO2	3.8	3.2	3	3	3.5	3.6	4	3.5	3	2.6	3.5	3.33	
CO3	3.5	4	3.2	2.5	3	3	3	3.5	3.5	3	3	3.2	
CO4	3	3.8	3	3.8	3	4	3	2.8	3.5	3	3.5	3.30	
CO5	4	2.5	3.5	3	3.5	2.5	3.5	3	3	3	2.5	3.09	
Mean Overall Score												3.27	

**Result: The Score for this course is 3.27 (High)**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High
<b>Value Scaling</b>					
Mean Score of COs = $\frac{\text{Total Values}}{\text{Total No. of POs \& PSOs}}$			Mean Overall Score of COs = $\frac{\text{Total Mean Scores}}{\text{Total No. of COs}}$		

This course is having **High association** with Programme Outcome and Programme Specific Outcome

---

**UNIT - I** (15 hours)  
**Astronomy:** History of Astronomy Celestial Mechanics; Distances in Astronomy; Magnitude Scale; Color-index Size and Time Scales

**UNIT - II** (15 hours)  
**Astronomical Instrumentation:** Basic Optics; Optical Telescopes; Radio Telescopes; Infrared, Ultraviolet, X-ray, and Gamma-Ray Astronomy

**UNIT - III** (15 hours)  
**Stars:** Stellar Magnitudes and Colors, Brightness and distance, Luminosity, temperature and spectral class, the motion of stars relative to the Sun, the masses of stars

**UNIT - IV** (15 hours)  
**Stellar Structure:** Equations of Stellar Structure – Solutions to Equations of Stellar Structure, Toy Stellar Models: Homologous Stellar Models, the Radiative Stellar Envelope, and Fully Convective Stars with  $H^-$  Opacity, Observational Aspects of Stellar Atmospheres, Continuum Radiation, and Lines

**UNIT - V** (15 hours)  
**Stellar Evolution:** Stellar Clusters Evolution of massive stars, Supernovae, Gamma-Ray bursts White Dwarfs, Chandrasekhar Limit, Neutron Stars, Pulsars GTR, Black holes.

**TEXT BOOKS:**

1. Bradley Carroll & Dale Ostlie, An Introduction to Modern Astrophysics , 2006.
2. T Padmanabhan, Theoretical Astrophysics: Vol. I-II-III, Cambridge University Press (2005).
3. Swapan K Saha, Diffraction-limited imaging with large and moderate telescopes, World Scientific,(2007).

**REFERENCE BOOKS:**

1. Chandrasekhar S, An Introduction to the Study of Stellar Structure, Dover Publications (1967).
2. Binney J, and Merrifield, Galactic Astronomy, Princeton University Press (1998).



III B.Sc (PH)	<b>BASIC COMPUTATION FOR PHYSICS</b>	<b>19EPH63A</b>
SEMESTER - VI		<b>HRS/WK-4</b>
ELECTIVE – III Option(I)		<b>CREDIT- 3</b>

**OBJECTIVE:**

To study appreciation programme for the common man, uses of computer for basis purpose, introduction to Origin software and Adobe photoshop.

**COURSE OUTCOMES:**

**At the end of the Course the students should be able to exhibit**

**CO1:**Impart basic level appreciation programme for the common man

**CO2:** Use the computer for basic purposes of preparing his personnel/business letters

**CO3:**Understand the usage of spread sheet

**CO4:** Be familiar with making small presentations

**CO5:** Apply the knowledge of Origin software & Adobe Photoshop

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER - VI	COURSE CODE: 19EPH63A					COURSE TITLE: BASIC COMPUTATION FOR PHYSICS						Hours: 4	Credits: 3
Course Outcomes COs	Programme Outcomes POs					Programme Specific Outcomes PSOs						Mean Score of CO's	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	3.2	2.8	4.1	3.5	3	2.8	3.5	3.1	4	3.4	3.2	3.32	
CO2	3.5	3.2	3	3	3.5	3.6	4	3.6	3	2.6	3.5	3.31	
CO3	3.5	4.2	3.2	2.8	3	3.2	3	3.5	3.7	3.5	3.2	3.34	
CO4	3.2	3.6	3	4	3	3.5	3.5	2.8	3.5	3.1	3.6	3.34	
CO5	4.1	3.5	3.7	3.2	3.5	2.5	3.5	3	4.1	3.2	3.5	3.43	
Mean Overall Score												3.34	

**Result: The Score for this course is 3.34 (High)**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High
<b>Value Scaling</b>					
Mean Score of COs= $\frac{\text{Total Values}}{\text{Total No. of POs \& PSOs}}$			Mean Overall Score of COs= $\frac{\text{Total Mean Scores}}{\text{Total No. of COs}}$		

This course is having **High association** with Programme Outcome and Programme Specific

---

Outcome

**UNIT - I (12 Hours)**

**Computer, Communications And Collaboration:** Introduction - Components of Computer System -Concept of Hardware and Software -Application Software-Systems software-Concept of computing, data and information- Applications of IECT - e-governance - Connecting keyboard, mouse, monitor and printer to CPU - Checking power supply-Operating system -The User Interface -Task Bar-Icons-Menu-Running an Application. Introduction- Basics of E-mail- Using E-mails -Opening Email account-Mailbox: Inbox and Outbox -Creating and sending a new E-mail - Replying to an E-mail message -Forwarding an E-mail message -Sorting and Searching emails-document collaboration -Netiquettes

**UNIT - II (12 Hours)**

**Understanding Word Processing:** Introduction-Opening Word Processing Package -Menu Bar-Using The Help -Using The Icons Below Menu Bar-Opening and closing Documents - Opening Documents- Save and Save as -Page Setup -Print Preview -Printing of documents - Text Creation and manipulation -Document Creation -Editing Text - Text Selection -Cut, Copy and Paste -Spell check-Thesaurus -Formatting the Text- Font and Size selection -Alignment of Text - Paragraph Indenting -Bullets and Numbering -Changing case -Table Manipulation - Draw Table -Changing cell width and height -Alignment of Text in cell -Delete / Insertion of row and column -Border and shading

**UNIT - III (12 Hours)**

**Using Spread Sheet:** Introduction -Elements of Electronic Spread Sheet-Opening of Spread Sheet-Addressing of Cells-Printing of Spread Sheet-Saving Workbooks-Manipulation of Cells -Entering Text, Numbers and Dates -Creating Text, Number and Date Series- Editing Worksheet Data-Inserting and Deleting Rows, Column -Changing Cell Height and Width-Formulas and Function-Using Formulas-Function

**UNIT - IV (12 Hours)**

**Making Small Presentations:** Introduction - Using PowerPoint -Opening A PowerPoint Presentation- Saving A Presentation -Creation of Presentation-Creating a Presentation Using a Template-Creating a Blank Presentation-Entering and Editing Text-Inserting And Deleting Slides in a Presentation-Preparation of Slides-Inserting Word Table or An Excel Worksheet- Adding Clip Art Pictures-Inserting Other Objects-Resizing and Scaling an Object -Presentation of Slides-Viewing A Presentation-Choosing a Set Up for Presentation-Printing Slides And

---

Handouts-Slide Show -Running a Slide Show-Transition and Slide Timings - Automating a Slide Show

**UNIT - V**

**(12 Hours)**

**Origin Software:** Origin 8-Data analysis and Graphing workspace-Workbook-Worksheet& Worksheets column-Importing and Exporting data-Graphing: Customizing and Formatting the graph-Fitting analysis

**TEXT BOOKS:**

1. Lisa Ruffolo Dolores Wells, Computer Literacy BASICS ,Course Technology Inc, 2014.
2. Peter Weverka, Office 365 All-in-One,2019

**REFERENCE BOOKS:**

1. Fundamentals of Computers by ReemaThareja from Oxford University Press
2. Photoshop: Beginner's Guide for Photoshop - Digital Photography, Photo Editing, ColorGrading& Graphic...19 February 2016 by David Maxwell.

III B.Sc (PH)	<b>ENERGY PHYSICS</b>	<b>19EPH63B</b>
SEMESTER - VI		<b>HRS/WK-4</b>
ELECTIVE – III Option(II)		<b>CREDIT- 3</b>

**OBJECTIVE:**

To study various conventional and non conventional energy sources, know about the biomass energy, geothermal energy.

**COURSE OUTCOMES:**

**At the end of the Course the students should be able to exhibit**

**CO1:** Study about the Conventional Energy Sources

**CO2:** Learn about the Non-Conventional Energy Sources

**CO3:** Acquire Knowledge of Biomass energy

**CO4:** Be familiar with the geothermal energy

**CO5:** Apply the knowledge of Energy storage and impacts of Non-conventional energy

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER - VI	COURSE CODE: 19EPH63B					COURSE TITLE: ENERGY PHYSICS							Hours: 4	Credits :3
Course Outcomes COs	Programme Outcomes POs					Programme Specific Outcomes PSOs							Mean Score of CO's	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6			
CO1	3.2	3.8	4.1	3.5	3	2.8	3.5	3.1	4	3	3.2	3.38		
CO2	3.5	3.2	3.2	3	3.5	3.6	4	3.6	3	2.6	3.8	3.36		
CO3	3.5	4.1	3.2	2.6	3	3.2	3	3.5	3.5	3.5	3	3.28		
CO4	3.2	3.8	3	4	3	4	3.5	2.8	3.5	3	3.6	3.4		
CO5	4	3.5	3.5	3.2	3.5	2.5	3.5	3	4	3	3.5	3.38		
Mean Overall Score												3.36		

**Result: The Score for this course is 3.36 (High)**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High
<b>Value Scaling</b>					
Mean Score of COs = $\frac{\text{Total Values}}{\text{Total No. of POs \& PSOs}}$			Mean Overall Score of COs = $\frac{\text{Total Mean Scores}}{\text{Total No. of COs}}$		

This course is having **High association** with Programme Outcome and Programme Specific Outcome

---

**UNIT – I** (12 hours)

**Conventional Energy Sources:** World's reserve of commercial energy sources and their availability-various forms of energy- renewable and conventional energy systems- comparison and natural gas – availability –statistical details-applications- merits and demerits

**UNIT- II** (12 hours)

**Non-Conventional Energy Sources:** Renewable energy sources- solar energy- nature of solar radiation- components-solar heaters- crop dryers- space cooling-solar ponds-solar cookers- water desalination- photovoltaic generation basics- merits and demerits of solar energy

**UNIT- III** (12 hours)

**Biomass energy:** Biomass energy-classification- photosynthesis- biomass conversion process- gobar gas plants- wood gasification- ethanol from wood- advantages and disadvantages of biomass as energy source

**UNIT – IV** (12 hours)

**Geothermal energy:** Geothermal energy- wind energy- ocean thermal energy conversion (OTEC)-energy from waves and tides (basic ideas, nature, applications, merits and demerits)

**UNIT – V** (12 hours)

**Energy storage and impacts of Non-conventional energy:** Conversion of energy- patterns of energy consumption in domestic, industrial, transportation, agricultural sectors- conservation principles in these sectors- energy crisis and possible solutions- energy options for the developing countries- energy storage and hydrogen as a fuel (basics)-impact due to non-conventional energy sources-global warming

**TEXT BOOKS:**

1. Rajamaanar, 2004, Environmental Studies.

**REFERENCE BOOKS:**

1. Sukhatme, Solar Energy, McGraw-Hill Inc., US, 2<sup>nd</sup> Revised Edition, 1997.

III B.Sc (PH)	<b>PROJECT</b>	JPH601
SEMESTER - VI		HRS/WK-3
PROJECT		CREDIT-3

### Project on Electronics and Recent Trends in Physics

#### FORMAT FOR PREPARING PROJECT REPORT

##### Arrangement of contents

1. Title Page
2. Bonafide Certificate
3. Acknowledgement
4. Table of contents
5. Abstract
6. Chapters of the Report
7. References
8. Appendices, if any

Appendices should be named as APPENDIX –A

APPENDIX -B

-----

#### BINDING SPECIFICATION

- Report should be bound using flexible cover of thick white art paper.
- The Spine for the bound volume should be 2cms width.
- The Cover should be printed in block letters.

#### MARGIN SPECIFICATION

Top : 4 cms  
 Bottom : 3 cms  
 Left : 4.5 cms  
 Top : 2.5 cms

#### PAGE NUMBERING

All Page numbers should be typed without punctuation on the bottom-center portion of the page. The Preliminary pages (table of contents and abstract) should be numbered in lowercase roman literals.

<b>III B.Sc (PH)</b>	<b>SOFT SKILLS</b>	
<b>SEMESTER – VI</b>		<b>HRS/WK-2</b>
<b>CORE</b>		<b>CREDIT- 1</b>

### **UNIT-I: READING COMPREHENSION:**

Introduction to variety of reading passages- Key to comprehension- tackling questions- techniques for answering comprehension questions- Skimming-Scanning- Intensive reading- Extensive reading.

### **UNIT -II: VOCABULARY AND GRAMMAR**

Synonyms- Antonyms- Analogy- Sentence Completion-Basics of grammar-Parts of speech-Tense form- articles etc- identifying errors

### **UNIT-III: WRITING SKILLS**

Basics of writing- Writing paragraphs- writing research articles- report writing- writing a CV- responding to the task-coherence and cohesion -Grammatical range and accuracy- planning and preparation- writing general essays- descriptive writing

### **UNIT-IV: PUBLIC SPEAKING AND PRESENTATION SKILLS**

The power of public speaking-Developing Confidence-Planning- Preparation- Successful and effective delivery of speech

Types of presentation- time management during presentation- language and choice of words- voice modulation-aids- drawing audience active participation- brainstorming sessions and feedback- modern etiquette.

### **UNIT-V: GROUP DISCUSSION AND INTERVIEWS**

Types of group discussion - techniques in group discussion - tips for group discussion-Common interview questions - attitude and effort – body language - types of interviews – thank you notes and follows ups.

### **TEXTBOOKS**

1. Wren & Martin, High School English Grammar & Composition, S Chand & Co Ltd.
2. Arun Sharma, How to Prepare for Verbal Ability and Reading Comprehension for CAT, 9th Edition, 2020.
3. ShaileshPatil, Handbook on Public Speaking, Presentation & Communication Skills
4. SheetalDesarda, Master the Group Discussion & Personal Interview: Complete Discussion on the topics asked by reputed B-schools & IIMs, 2015.

---

<b>III B.Sc (PH)</b>	<b>GENERAL PRACTICAL</b>	<b>PHP505</b>
<b>SEMESTER –V &amp; VI</b>		<b>HRS/WK - 3</b>
<b>CORE – PRACTICAL - III</b>		<b>CREDIT - 2</b>

**(Any 10 out of 15 experiments)**

1. Young's modulus – Koenig's method – Non uniform bending.
2. Young's modulus – Koenig's method – Uniform bending
3. Newton's rings – R1, R2 and  $\mu$  of a convex lens.
4. Spectrometer  $i - i'$  curve.
5. Spectrometer – Narrow angled prism -  $\mu$  of the prism.
6. Spectrometer – Cauchy's constant.
7. Potentiometer – Conversion of galvanometer into voltmeter.
8. Potentiometer – EMF of a thermocouple.
9. BG comparison of EMFs.
10. BG – Absolute capacitance of a capacitor.
11. BG – Comparison of capacitors.
12. BG – Comparison of mutual inductance.
13. Thermal conductivity of bad conductor – Forbe's method.
14. LCR Studies- Two Resistors- Two Capacitors – Two Inductors
15. FET - Field along the axis of a circular coil - Vibration magnetometer.



---

<b>III B.Sc (PH)</b>	<b>ELECTRONICS PRACTICAL</b>	<b>PHP606</b>
<b>SEMESTER –V &amp; VI</b>		<b>HRS/WK - 3</b>
<b>CORE – PRACTICAL - IV</b>		<b>CREDIT - 2</b>

**(Any 10 out of 14 experiments)**

1. Construction of a Full wave rectifier – Solid state bridge using four diodes.
2. 5V – IC regulated power supply – Characteristics (IC 7805).
3. RC – Coupled amplifier using transistor – Single stage (voltage gain and variation with load).
4. Colpitt's oscillator.
5. NAND, NOR – Universal gates.
6. Half adder and Full adder – Mixture of gates.
7. Half subtractor and Full subtractor – Mixture of gates.
8. RS, D-flip flop, Clocked RS flip flop using NAND gates only.
9. Verification of De Morgan's theorem.
10. Basic logic gates using transistor – AND, OR & NOT gates.
11. OP AMP – Inverting, Non-inverting, Summing, Difference amplifier, Voltage follower, Averager.
12. FET characteristics.
13. IC regulated power supply
14. Mod counter – IC 7490.

II B.Sc (CH)	ALLIED PHYSICS	APH301/401
SEMESTER – III/IV		HRS/WK-5
ALLIED		CREDIT- 4

**OBJECTIVE:**

To study various concepts of physics.

**COURSE OUTCOMES:**

At the end of the Course the students should be able to exhibit

CO1: Study about Bending of beams and sound

CO2: Learn concepts of Electricity and Magnetism

CO3: Using the computers and enjoy in the world of Information Technology

CO4: Be familiar with Interference and optical activity

CO5: Apply the knowledge of Quantum mechanics and Electronics

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER - III/IV	COURSE CODE: APH301/401					COURSE TITLE: ALLIED PHYSICS						Hours: 5	Credits: 4
Course Outcomes COs	Programme Outcomes POs					Programme Specific Outcomes PSOs						Mean Score of CO's	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1		3	2.5	4.1	3.5	3	2.5	3	3.1	4	3.2	3.2	
CO2	3.3	3.2	3	3	3.5	2.8	4	3.6	3	2.3	3.5	3.2	
CO3	3.5	4.2	3.5	2.8	3	3.2	3.5	3.5	3.7	4	3.2	3.46	
CO4	3.2	3.8	3	4.2	3	3.5	3.5	2.8	3.6	3.5	3.6	3.42	
CO5	4.3	3.5	3.7	3.2	3.8	2.5	3.5	3.2	4.3	3.2	3.5	3.51	
Mean Overall Score												3.36	

**Result: The Score for this course is 3.36 (High)**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High
<b>Value Scaling</b>					
Mean Score of COs = $\frac{\text{Total Values}}{\text{Total No. of POs \& PSOs}}$			Mean Overall Score of COs = $\frac{\text{Total Mean Scores}}{\text{Total No. of COs}}$		

This course is having **High** association with Programme Outcome and Programme Specific Outcome

---

**UNIT- I: PROPERTIES OF MATTER & ACOUSTICS (15 hours)**

Bending of beams: Non uniform bending-Torsion of a wire-Torsional pendulum.

Sound: Transverse vibrations of a stretched string- expression for the velocity of transverse wave – laws of transverse vibrations- A.C frequency measurement using sonometer- velocity of sound in a gas- **Ultrasonics-production and uses.**

**UNIT- II: ELECTRICITY & MAGNETISM (15 hours)**

Capacitor- energy of charged capacitors- loss of energy due to sharing of charges DC circuits – growth and decay of charge containing resistance and capacitor (RC) circuit & inductance and resistance (LR) circuit - potentiometer-measurement of internal resistance of a cell and unknown resistances – Moment, Tan C and pole strength of a magnet

**UNIT- III: OPTICS (15 hours)**

Interference-Wedge shaped film-Air wedge-Description- Test for Optical flatness of glass plate-Determination of diameter of a thin wire by air wedge-spherical aberration **minimizing spherical aberration by using two thin lenses in contact-chromatic aberration- achromatic combination of two thin lenses in contact- optical activity-specific rotatory power-polarimeter**

**UNIT- IV: RELATIVITY & QUANTUM MECHANICS (15 hours)**

Elements of relativity and Postulates of theory of relativity- Lorentz transformation equations- derivation Addition of velocities-twin paradox Minkowski's four dimensional space.

Quantum mechanics: De Broglie's waves - Uncertainty principle- postulates of wave mechanics- - Schrödinger's equation (Time dependent one dimensional) - application to a particle in a box.

**UNIT- V: ELECTRONICS (15 hours)**

Diodes, transistors, basic logic gates, construction of AND, OR using diodes and NOT using transistor- **IC-SSI LSI MSI-VLSI IC fabrication.**

**TEXTBOOKS**

1. Principle of physics-BrijlalSubramaniyam
2. R. Murugesan, Allied Physics,S. Chand Publishing, 2005.
3. BrijlalSubramaniyam,Text book of Sound, Vikas Publishing, 2nd Revised Edition.
4. V.K.Metha.S Chand, Principle of Electronics, 7th Revised Edition, 2005.

---

<b>YEAR – II</b>	<b>ALLIED PRACTICAL</b>	<b>APHP301/401</b>
<b>SEMESTER – III &amp; IV</b>		<b>HRS/WK - 3</b>
<b>ALLIED</b>		<b>CREDIT - 2</b>

### LIST OF PRACTICALS

(Any TEN out of the Thirteen experiments can be selected)

1. Determination of Young's modulus –non-uniform bending -Pin and microscope.
2. Determination of Rigidity modulus- Torsional pendulum (without masses).
3. Determination of Rigidity modulus – Static torsion
4. Sonometer –frequency of tuning fork.
5. Sonometer – A.C frequency - Steel and Brass wire.
6. Air wedge – thickness of a wire.
7. Spectrometer – Grating-Minimum deviation
8. Potentiometer – Measurement of Internal resistance of a cell.
9. Figure of merit of a galvanometer (Table galvanometer).
10. Construction of AND, OR NOT gates using diodes and transistors.
11. NAND gate as a universal gate.
12. Field along the axis of a circular coil-deflection magnetometer-BH and M- Tan C.
13. RS- Flip flop, Clocked RS Flip flops.

## NON-MAJOR ELECTIVE SYLLABUS

### COURSE OVERVIEW

The Electrical and Electronic Fundamentals course focuses on the basic concepts and skills that students will require when they work with electrical equipment in a residential location. The course discusses the fundamental principles of electricity and electronics and the function of various devices such as resistors, capacitors, Transformers, diodes and transistors. Different types of circuits and their applications are also discussed. Students will use electrical test equipment and diagnostic tools. They will also learn about safety measures, codes, and rules and regulations that must be followed for preventing mishaps.

UG	<b>ELECTRICAL AND ELECTRONIC FUNDAMENTALS</b>	3NPHEE
SEMESTER – III		HRS/WK-3
NME		CREDIT- 2

### OBJECTIVE:

To study the basic concepts and applications of electrical and electronics.

### COURSE OUTCOMES:

**At the end of the Course the students should be able to exhibit**

**CO1:** Students learn the knowledge of principles behind the electricity

**CO2:** Students learn to analyze the functions of series and parallel circuits

**CO3:** Students understands the flow of alternative current through the components

**CO4:** Students learn to identify the use of electronic components in the circuits

**CO5:** Students apply the knowledge of electrical and electronic components in the circuits

**Relationship Matrix Course Outcomes, Programme Outcomes and Programme Specific Outcomes**

SEMESTER – III	COURSE CODE:3NPHEE					COURSE TITLE: ELECTRICAL AND ELECTRONIC FUNDAMENTALS						Hours: 3	Credits: 2
Course Outcomes Cos	Programme Outcomes POs					Programme Specific Outcomes PSOs						Mean Score of CO's	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6		
CO1	4	4	3	4	4	3	5	5	4	3	5	3.98	
CO2	3	5	3	5	4	3	5	4	4	5	3	4	
CO3	4	4	4	5	3	4	4	4	5	3	3	3.91	
CO4	4	5	5	4	3	4	4	5	5	4	4	4.26	
CO5	4	4	3	5	5	4	5	3	5	5	4	4.27	
Mean Overall Score												4.08	

**Result: The Score for this course is 4.08 (Very High)**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High
<b>Value Scaling</b>					
Mean Score of COs = $\frac{\text{Total Values}}{\text{Total No. of POs \& PSOs}}$			Mean Overall Score of COs = $\frac{\text{Total Mean Scores}}{\text{Total No. of COs}}$		

This course is having **VeryHigh** association with Programme Outcome and Programme Specific Outcome

### UNIT I- BASICS OF ELECTRICITY

Voltage - Current Flow--Resistance-Ohm's Law -Resistors in Series- Resistor colour coding scheme Capacitor-Principle of a capacitor-Types and uses-Multimeter (Purpose and usage only)-Continuity test-Resistance measurement using multimeter-Test procedure for checking capacitors: Resistance measurement and Spark test.

### UNIT II –DC SERIES AND PARALLEL CIRCUIT FUNDAMENTALS

DC Series circuit- Total resistance in a series circuit-voltage drop (IR drop)-Polarity of voltage drop-Resistors in series and voltage division technique-Short circuits & Open circuit in series connection-

DC Parallel circuit-Total resistance in parallel circuit-Resistances in parallel and current division technique –Short circuit &Opens in parallel circuit

### UNIT III- AC CONCEPTS

Alternating emf-Alternating current-Concept of three phase AC-Line and Phase voltages-Electric power-Units of electric power – Kilo watt hour- Advantages of AC- Transformers (Principle only) -Circuit Breakers –types of circuit breakers- The MCB Circuit Breaker-Desirable Characteristics of Fuse elements, Types of Fuses -Protection against lightning - Lightning arresters.

### UNIT IV-ELECTRONIC DEVICES AND THEIR APPLICATIONS

Diodes(Principle only)-Converting AC in to DC-Rectifiers (Principle only)-Zener diode(Principle only)-Voltage fluctuation and its effect-Voltage stabilizers(Principle only)-Testing diodes and Zener diodes using multimeter-Microphone(Principle only) -Amplification-Amplifiers(definition and use only)-Gain of amplifiers- Loud speaker(Principle only)- Solar cells(Principle only) - Integrated circuits –merits and limitations.

---

## **UNIT-V- INTRODUCTION TO DIGITAL ELECTRONICS**

Logic gates, Flip Flops, Encoder, Decoder, Multiplexer, De multiplexer, A/D, D/A converters, IC.

### **TEXT BOOKS**

1. Bernard Grob, Basic Electronics, 5th Edition, McGraw Hill Kogakusha Ltd., New Delhi.
2. R. S. Sedha, A Text Book of Applied Electronics, S. Chand & Company Ltd., New Delhi.
3. Maini A. K. , Electronics & Communications simplified, Khanna Publisher, New Delhi, 1993.
4. Honest, Earl Boysen, Harry Kybett, Complete Electronics Self-Teaching Guide with Projects, John Wiley & Sons, 2012.

### **REFERENCE BOOKS**

1. G. Randy Slone, Electricity and Electronics, McGraw Hill publishers, 2000.
2. Dale R. Patrick, Stephen W. Fardo, Electricity and Electronics Fundamentals, Fairmont Press, 2008.