Programme Code:	BSC	Programme Title:	Bachelor of Science	
Course Code:	20UPS101	**Title**	**Batch:**	2020-2023
		Core I: Properties of Matter	**Semester:**	I
Hrs/Week:	6		**Credits:**	3

Course Objective

- To understand the basic concepts of gravitation and to get exposure to the properties of liquids and solids

Course outcomes

K1	CO1	To understand the dynamics and gravitation
K2	CO2	To understand the applications of the elastic properties of solids
K3	CO3	To explain the molecular theory of surface tension, viscosity and diffusion
K4	CO4	Familiarize with general terms in acoustics like intensity, loudness, reverberation etc, and study in detail about production, detection, properties and uses of ultrasonic waves

Syllabus

Unit	Content	Hrs
I	**GRAVITATION** Kepler's law- Newton's law of gravitation – Density of earth - Gravitational Constant by Boy's method – Gravitational field and potential – Potential and field intensity due to a spherical shell and solid sphere (Inside and outside) –Potential and intensity at a point due to circular disc – Intensity and potential of the gravitational field at a point due to an infinite plane- Compound pendulum – Earth Quakes – Seismic waves – Seismology – Determination of epicenter and focus – Modern application of seismology.	15
II	**ELASTICITY** Modulus of Elasticity –Relation between the elastic constants - Determination of rigidity modulus: Static torsion method (Searle's method - scale and telescope) –Twisting couple on a cylinder- Strain energy in twisted cylinder - Torsional oscillation of a body – Determination of Rigidity modulus by Torsional pendulum (Dynamic torsion method) – Expression for the bending moment –Depression of the loaded end of a cantilever – Measurement of Young's modulus: Cantilever depression – Measurement of Young's modulus by bending of beam (Non uniform and uniform bending)- Searle's method to determine the rigidity modulus	16
III	**VISCOSITY** Bernoulli's theorem – Applications: Velocity of efflux of a liquid (Torricellis theorem), Velocity of efflux of a gas - Poiseuille's equation for flow of a liquid through a horizontal capillary tube – Experimental determination of a viscosity of a liquid by Poiseuille's method – Motion in a viscous medium – Stokes law – Determination of coefficient of viscosity of a liquid : Stokes falling body viscometer , rotation viscometer – Comparison of viscosities (Ostwald Viscometer) – Variation of viscosity with temperature – Viscosity of gases : Rankine's method for air	16
IV	**SURFACE TENSION :** Properties of surface tension –Excess pressure inside a liquid drop and soap bubble - Experimental study of variation of surface tension with temperature –Determination of surface tension , Jaeger's experiment, drop weight method and capillary rise method – Experiment to determine the interfacial tension between water and kerosene –Applications of surface tension . **DIFFUSION AND OSMOSIS** Diffusion –Fick's law – Graham's law of diffusion of gases –	15

	Osmosis and osmotic pressure – Experimental determination of Osmotic pressure (Berkeley and Hartley method) – Laws of Osmotic pressure –Osmosis and vapour pressure of a solution – Osmosis and boiling point of a solution		
V	**SOUND:** Velocity of transverse waves along a stretched string (I method) – Laws of transverse vibration of strings – Verification of the Laws of transverse vibration of strings – Melde's experiment – Resonance – Musical sound and noise – Speech- Human voice – Human ear – Characteristic of Musical sound- Intensity of sound – Measurement of intensity of sound – Decibel – Bel – Phon (Definiton only) – Acoustics – Reverberation – Sabine's Reverberation formula – Determination of Absorption coefficient – Factors affecting, Acoustics of Buildings – Sound distribution in an auditorium – Requisites for Good Acoustics – Ultrasonics – Production of Ultrasonics : Magnetostriction Oscillator – Piezo electric oscillator – Detection of Ultrasonics- Acoustic grating – Application.		16
Total contact hours			78

- *Italic font denotes self study*

Additional activities

Seminar, Assignment, Experience discussion, PPT

Text Book
- Mathur D.S. (2003). *Elements Of Properties Of Matter*. Shyam Lal Charitable Trust, S. Chand & company Ltd, New Delhi, (Units I - IV).
- Brijlal & Subramaniam. N, (2002). *Textbook of Sound*. Vikas Publications house, New Delhi. (Unit V)
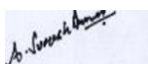
Reference Books
- Brijlal & Subramaniam, N, (2000). *Properties of Matter*. Vikas Publications house,   New Delhi.
- Murugesan R. (1995). *Properties of Matter*. S.Chand & Company Ltd,   New Delhi.

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	H	M	M
CO2	H	H	H	M	L
CO3	H	M	H	H	M
CO4	H	H	H	M	M

 H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Dr. A. Suresh Kumar Signature:	Name: Dr. V. Sathyabama Signature:	Name: Mr. K. Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSc	Programme Title:		Bachelor of Science	
Course Code:	20UPS202	**Title**		**Batch:**	2020-2023
		Core II: Heat & Thermodynamics		**Semester:**	II
Hrs/Week:	5			**Credits:**	5

Course Objective

- To understand of the fundamental laws and principles of thermodynamics and heat transfer

Course outcomes

K1	CO1	To recognize the difference between heat and temperature
K2	CO2	To understand the fundamental laws and principles of heat transfer and theory of gases
K3	CO3	To acquire working knowledge on low temperature physics and its domestic applications
K4	CO4	To analyse and evaluate various thermodynamic cycles used for energy productions

Syllabus

Unit	Content	Hrs
I	**KINETIC THEORY OF GASES** Kinetic theory of gases – Concept of ideal or perfect gas – Kinetic model: Postulates of kinetic theory of gases – Expression for the pressure exerted by a gas- Estimation of rms speeds of molecules - Derivation of gas equation - Maxwell's law of distribution of velocities - Experimental verification - Degrees of freedom and Maxwell's law of equipartition of energy – Vander waal's equation of state - Critical constants-Quantum theory of specific heat : Specific heat of solids – Dulong and Petits law – Variation of specific heat of diatomic gases with temperature	13
II	**TRANSMISSION AND RADIATION OF HEAT** Conduction, convection and radiation – Coefficient of Thermal conductivity - Thermal diffusivity-Steady state- Lee's disc method of determining thermal conductivity of bad conductor-Searles method- Forbe's method - Radial and cylindrical flow of heat - Stefan's law and experimental verification - Determination of Stefan's constant - Blackbody - Properties of thermal radiation - Distribution of energy in the spectrum of a black body.	13
III	**LOW TEMPERATURE PHYSICS** Porous Plug experiment and theory - Cascade process - Liquefaction of Oxygen - Air (Linde's process) - Hydrogen (Cascade process) - Liquefaction of Helium - K.Onnes method - Helium I and Helium II - Production of low temperature - Conversion of magnetic temperature to Kelvin temperature - Adiabatic demagnetization	13
IV	**THERMODYNAMICS I** Zeroth law of thermodynamics – Quasistatic process – Concept and comparison of heat and work - First law of thermodynamics - Isothermal and Adiabatic process - isochoric process- isobaric process - Work done during Isothermal and Adiabatic process - Reversible and Irreversible process - Second law of thermodynamics - Carnot's reversible engine - Carnot's theorem	13
V	**THERMODYNAMICS II** Entropy – Change in entropy during reversible and irreversible process - Third law of thermodynamics - Temperature - Entropy diagram- entropy of perfect gas and zero point energy – Maxwell's thermo-dynamical relations – Helmoltz function – Gibb's function – Enthalpy -T-ds equation	13
	Total contact hours	65

- *Italic font denotes self study*

Additional activities

Seminar, Assignment, Experience discussion, PPT

Mapping

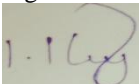| PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	H	M	H
CO2	H	M	H	H	M
CO3	M	H	H	H	H
CO4	H	M	H	M	H

H – High; M – Medium; L – Low

Text Book
- Brijlal and Subrahmanyam. (2000). *Thermodynamics and Statistical Mechanics.* Sultan & Chand & Co Ltd, NewDelhi, (Units I –V).

Reference Books
- Kakani S.L. (2001). *Thermodynamics and Statistical Mechanics*. Raj Publications, Jaipur.
- Singhal S.S. (2013) *Heat, Thermodynamics & Statistical Physics*. Pragathi Pragason, Meerut, 1st edition.

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Ms. S.Shanmugapriya Signature:	Name: Dr.V.Sathyabama Signature:	Name: Mr. K. Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

Programme code:	BSC	Programme Title :		Bachelor of Science	
Course Code:	20UPS203	**Title**		**Batch :**	2020-2023
		Core III: Physics Lab I		**Semester**	I & II
Hrs/Week:	3			**Credits:**	3

Course Objective

- To develop the skill to gain knowledge in Physics Lab I

Course Outcomes

K3	CO1	To recollect the basic principles taught
K4	CO2	To understand and apply the knowledge of theory to experiments
K5	CO3	To validate the experiment with theory

List of Experiments (Any fifteen):

1. Young's Modulus - Non uniform Bending - Pin and Microscope
2. Young's Modulus - Non uniform Bending - Koenig's method
3. Young's Modulus - Cantilever - Pin and Microscope
4. Young's Modulus - Uniform Bending - Scale and Telescope
5. Rigidity Modulus - Static Torsion
6. Rigidity Modulus and Moment of Inertia – Torsional Pendulum
7. Acceleration due to Gravity and Moment of Inertia - Compound pendulum
8. Surface Tension and Interfacial Tension - Drop weight method
9. Coefficient of Viscosity - Stoke's method
10. Coefficient of Viscosity - Searle's Viscometer
11. Verification of Laws of Transverse Vibrations and Frequency of a Fork – Sonometer
12. Viscosity of a Liquid - Capillary Flow - Variable Pressure head
13. Comparison of Viscosities of Liquids and Radii of Capillary tubes
14. Frequency of a Tuning Fork and Density of Solid and Liquid - Melde's String
15. Thermal Conductivity of a Bad Conductor - Lee's Disc
16. Specific Heat Capacity of a Liquid - Newton's Law of cooling
17. Specific Heat Capacity of a Liquid - Joule's Calorimeter
18. Refractive Index of a Prism - Spectrometer

Text Books
- Arora C.L. (2007). *Practical Physics*. S.Chand & Co, 19th Edition.
- Srinivasan M. L. Balasubramanian S. Ranganathan R. (2007). *A Text book of Practical Physics.* Sultan Chand. New Delhi.
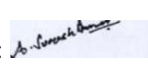
Reference Books
- Govindarajan S.R. Sundarajan S. (1959). *Practical Physics.* Roc house & sons Pvt Ltd.
- Dhanalakshmi A. Somasundaram S. *Practical Physics.* Apsara Publishers.
- Gupta S.L. Kumar V. (1999). *Practical Physics.* Pragati Prakashan, Meerut, 20th Edition.

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	H	H	H
CO2	H	H	H	H	L
CO3	H	H	M	H	H

H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Dr. A.Suresh Kumar	Name: Dr. Dr.V.Sathyabma	Name: Mr. K. Srinivasan	Name: Dr.R.Muthukumaran
Signature:	Signature:	Signature:	Signature:

Programme Code:	BSC	Programme Title:		Bachelor of Science	
Course Code:	20UPS304	**Title**		**Batch:**	2020-2023
		Core IV: Mathematical Physics		**Semester:**	III
Hrs/Week:	5			**Credits:**	5

Course objective

- To apply the concepts of Mathematics in Physics and to acquire the basic knowledge about mathematical methods

Course outcomes

K1	CO1	To enrich the knowledge about mathematical concepts in Physics
K4	CO2	Able to relate mathematics and physics to understand nature
K3	CO3	Able to apply skills of mathematical modeling in applied fields
K3	CO4	To implement numerical methods in research fields

Syllabus

Unit	Content	Hrs
I	**VECTORS** Gradient of a scalar field – Line, Surface and Volume integrals – Divergence of a vector function – Curl of a vector function and its physical significance – Important vector identities – Gauss divergence theorem – Stokes theorem – Curvilinear co-ordinates – Cylinderical co-ordinates (r,θ) - Spherical polar co-ordinates (r,θ,Φ) – Grad, Divergence and curl in terms of curvilinear, cylindrical and spherical polar co- ordinates	13
II	**MATRICES** Matrix – Definition – Types of matrices – Rank of matrix – transpose matrix and its properties – Conjugate of a matrix and its properties – Conjugate transpose and its properties – Symmetric and Anti symmetric matrices – Hermitian and skew Hermitian - Characteristic equation of a matrix - Eigen values, Eigen vectors - Cayley Hamilton theorem – *Dirac matrices*	13
III	**LAPLACE TRANSFORM** Laplace transform – Properties of Laplace transforms – Problems – Inverse Laplace transform : Properties of Inverse Laplace transform – Convolution theorem – Evaluation of Inverse Laplace transforms by convolution theorem - Problems	13
IV	**GROUP THEORY** Concept of a group - Abelian group - Generators of finite group - *Cyclic group* - Group multiplication table (Qualitative analysis) - Group of symmetry of a square - The Rearrangement theorem - Subgroups - Lagrange's theorem for a finite group - Cosets-Conjugate elements and classes - Product of classes - Complexes - Conjugate subgroups, Normal subgroups and factor groups - Isomorphism and Homomorphism - Permutation Groups	13
V	**NUMERICAL METHODS** Solution of algebraic and transcendental equations: The Bisection method -The iterative method - Method of false position - Newton-Raphson method - Solution of ODE: Taylor's series method - Euler's method - Runge Kutta II order method - Trapezoidal Rule - Simple problems	13
	Total contact hours	65

- *Italic font denotes self study*

Additional activities

Seminar, Assignment, Experience discussion, PPT

Text Books
- Sathyaprakash, (2005). *Mathematical Physics.* Sultan Chand & Sons, New Delhi, (Units I - IV).
- Sastry S.S. (2003). *Introductory Methods of Numerical Analysis.* 3rd Edition, Prentice Hall Of India, (Unit - V).

Reference Books
- Gupta B.D. (1989). *Mathematical Physics.* 3rd Edition, Vikas Publication House, Noida.
- Louis A.Pipes, Lawrence R.Harvill, (1970). *Applied Mathematics For Engineers And Physicists* - Mc Graw Hill Kogakusha Ltd, New Delhi.
- Chattopadhyay P.K. (1990). *Mathematical Physics.* Wiley Eastern Limited, New Delhi.
- Venkataram M.K. *Numerical Methods in Science and Engineering*. The National Publishing Company, New Delhi.
- Raman K.V. *Group Theory.* Tata McGraw - Hill publishing company Ltd, New Delhi.

- **Mapping**

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	H	H
CO2	M	H	H	H	M
CO3	H	M	M	H	M
CO4	M	M	M	M	H

H - High; M- Medium; L- Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Ms. N. Revathi Signature:	Name: Dr.V.Sathyabama Signature:	Name: Mr. K. Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSC	Programme Title:	Bachelor of Science	
Course Code:	20UPS3N1	Title	Batch:	2020-2023
		Non-Major Elective I: Principles of Physics – I	Semester:	III
Hrs/Week:	1		Credits:	2

Course Objective

- To create awareness and to develop basic skills about environment, energy resources and its application

Course outcomes

K1	CO1	To acquire basic knowledge on renewable energy sources
K2	CO2	To get the idea about astrophysics and and the energy resources
K3	CO3	To implement the environmental impacts on the concepts of physics
K4	CO4	To effectively use energy sources based on the required applications

Syllabus

Unit	Content	Hrs
I	**ATMOSPHERE** Cosmic Rays - Ozone Layer - CFCs role in depletion - Solar Wind and Earth – Lightning (conducting medium to Earth) - Fragmentary Rainbows - Measurement of Rain - Rain colour of clouds-Reason for continous stream-Cloud bursts-Artificial Rain - *Rainbows (Size, doubleness)*	3
II	**BASICS OF ELECTRONICS** Semiconductor-Types of Semiconductor – Diode – LED - Capacitor –-Rectifiers-Resistors – Transistors – Amplifiers -Integrated circuits	2
III	**APPLICATIONS OF SOLAR ENERGY** Introduction - Solar water heating- Space heating: Passive heating systems - Thermal storage wall – Roof storage - Solar cell principle – Solar cell modules - Applications of solar photovoltaic system	3
IV	**SPACE** Saturn rings - Measurement of temperature of planets and stars - Asteroids - Rotation of Earth - Shooting stars and comet s-Atmosphere of stellar bodies - Flat plane orbits of Planets	2
V	**HOME APPLIANCES** Microwave ovens - Pressure cooker - Richter scale - Humming sound in Tension wires - Curved Fan wings - Sodium vapour lamp in streets - Tube Lights: Role of chokes of Starter, Reason for no sharp shadows – Photocopier - *Thermostat*	3
Total contact hours		13

- *Italic font denotes self study*

Additional activities

Seminar, Assignment, Experience discussion, PPT

Text Books

- The Editor, (2006).*The Hindu Speaks on Scientific Facts*. Kasturi and Sons Ltd. Chennai, (Units I,IV,V)
- Rai G. D. (2002). *Non Conventional Sources of Energy*. Khanna Publishers, NewDelhi, (Units II – III)

Reference Books

- Richard P. Feynman, Robert B. Leighton, Matthew Sands, (2008). *The Feynman Lecture on Physics.* Narosa Publishing House, New Delhi.
- David Halliday, Robert Resnick, Jearl Walker, (2000). *Fundamentals of Physics.* John Wiley Publications. 6th Edition.

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	H	L	H
CO2	H	H	H	H	M
CO3	M	M	M	M	S
CO4	H	H	M	H	H

H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Ms.S.Yogeswari Signature:	Name: Dr.V.Sathyabama Signature:	Name: Mr. K.Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSc	Programme Title:		Bachelor of Science	
Course Code:	20UPS3N2	**Title**		**Batch:**	2020-2023
		Non-Major Elective I: Renewable Energy Sources-I		**Semester:**	III
Hrs/Week:	1			**Credits:**	2

Course Objective

- To develop the basic skills about various energy resources and its applications

Course outcomes

K1	CO1	To understand the Fundamental concept of various energy resources
K2	CO2	To implement the physical principles on the conventional and non-conventional sources to a device and its measurements.
K3	CO3	To harvest energy from various available sources

Unit	Content	Hrs
I	**GEOLOGY** Age of Fossil - Measurement of depth of ocean - Lava from Volcano - Monsoons – Seebergs - Radiation from Granites and Marbles - Earth's Magnetic properties	3
II	**HYDROLOGY** Coolness of mud pot water - Colour of Waterfall - Measurement of Quality of water in dams - Purity of Rain water - *Purity of mineral water in the Market*	3
III	**SOLAR RADIATION AND ITS MEASUREMENTS** Solar Constant - Solar Radiation at the earth's surface: Beam and diffuse solar radiation – Air mass – Attenuation of beam radiation – Solar radiation geometry: Latitude of location – Declination – Hour angle – Angstrom compensation Pyrheliometer	3
IV	**SOLAR ENERGY COLLECTORS** Physical principles of the conversion of solar radiation into heat - Flat plate liquid collector - Solar concentrators and receiver geometries (Basic types) - *Advantages and disadvantages of concentrating collectors over flat plate type collectors*	2
V	**SOLAR ENERGY STORAGE** Types of energy storage – Thermal storage - High temperature latent heat storage - Electrical storage - Storage in the form of fuel – Storage in the form of potential hydrogen energy	2
	Total contact hours	13

- *Italic font denotes self study*

Additional activities

Seminar, Assignment, Experience discussion, PPT

Text Book
- Rai G. D. (2002). *Non Conventional Sources of Energy*. Khanna Publishers, NewDelhi, (Units I – V).

Reference Books
- Rai G. D. *Solar Energy Utilization*. Khanna Publishers, NewDelhi.
- Garg H.P. Prakash J. *Solar Energy Fundamentals And Applications*. Tata McGraw Hill Publications, New Delhi.

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	H	M	H
CO2	H	H	H	H	M
CO3	H	M	M	M	H
CO4	H	M	M	H	H

H- High; M- Medium; L- Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Ms. S. Yogeshwari Signature:	Name: Dr. V. Sathyabama Signature:	Name: Mr. K. Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSC	Programme Title:		Bachelor of Science	
Course Code:	20UPS405	**Title**		**Batch:**	2020-2023
		Core V: Electricity & Magnetism		**Semester:**	IV
Hrs/Week:	5			**Credits:**	5

Course Objective

- To demonstrate the knowledge of electricity and magnetism in formulating and solving practical problems.

Course outcomes

K1	CO1	To acquire the knowledge on fundamental concepts of electric and magnetic field
K2	CO2	To understand the concept of electric field, potential and electromagnetic induction
K3	CO3	To implement the ideas for making the electrical devices such as capacitor, inductor, resistance, etc.,
K4	CO4	To evaluate the basic and advanced problems in the field of electromagnetic theory

Syllabus

Unit	Content	Hrs
I	**ELECTRIC FIELD AND POTENTIAL** Concept of charge - Electric Field (E) - Potential difference (V) - Relation between E and V - Equipotential surfaces - Poisson's and Laplace equations - Potential and field due to an electric dipole - Potential and field due to a quadrupole - Potential and field due to uniformly charged disc - Potential due to two concentric spherical shells of charge - Potential energy due to charge distribution – dipole in an electric field.	13
II	**CAPACITORS AND DIELECTRICS** Capacitors - Parallel plate capacitor - Cylindrical capacitor - Spherical capacitor - Guard ring capacitor - Energy stored in a capacitor - Force of attraction between capacitor plates - Dielectric constant - Polar and nonpolar molecules - Polarisation of dielectric - Capacity of a parallel plate capacitor partially and completely filled with dielectric - Electric polarization vector P - Electric displacement vector D - Relation between D, E and P - Dielectric susceptibility and permitivity - Physical meaning of polarization – Mechanism of polarization	13
III	**MAGNETOSTATICS AND MAGNETIC FIELD** Magnetic effect of current - Definition of magnetic field vector - Lorentz force - Force on a current carrying wire - Magnetic flux - Gauss law in magnetostatics - Torque on a current carrying coil in uniform magnetic field - Potential energy of a current loop - Ballistic galvanometer - Deadbeat condition - Comparison of emfs and capacitances - Biot Savart law- field due to steady current in a long straight wire - Interaction between two long parallel wire carrying currents - Magnetic field along the axis of a circular coil - Field along the axis of a solenoid - Magnetic dipole - Ampere's law - Applications of ampere's law: long wire – parallel conductors – solenoid - toroid	13
IV	**ELECTROMAGNETIC INDUCTION** Faraday's laws of Electromagnetic induction - Deduction of Faraday's laws from Lorentz's force - Self inductance - Calculation of self inductance for a solenoid - Energy stored in magnetic field - Mutual inductance - Energy stored in two interacting circuits - DC circuits : Simple RL circuit - Growth and decay of current - RC circuit - Charging and discharging of a condenser - Ideal LC circuit - Series LCR circuit - *Discharge of a condenser through inductance and resistance*	13

	MAXWELL'S EQUATIONS AND ELECTROMAGNETIC THEORY	
V	Basic equations - Types of current - Vacuum displacement current - Maxwell's equations - Maxwell's equations in free space - Electromagnetic waves in free space - Electromagnetic waves in isotropic non - conducting media - Refractive index - Impedence of dielectric media - Energy density of electromagnetic wave - Poynting theorem - Energy per unit volume.	13
	Total contact hours	65

- *Italic font denotes self study*

Additional activities

Seminar, Assignment, Experience discussion, PPT

Text Books
- Tewari K.K. (2002). *Electricity and Magnetism*. Sultan chand and Co Ltd, New Delhi. (Units I - V).

Reference Books
- Tayal T.C. (2001). *Electricity and Magnetism*. Himalaya publication house, Mumbai.
- Murugesan R. (1998). *Electricity and Magnetism*. S.Chand & Company Ltd, New Delhi.

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	H	M	H
CO2	H	M	H	H	M
CO3	M	H	H	M	L
CO4	H	M	L	M	H

H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Mr. T.Ponraj

Signature: | Name: Dr. V.Sathyabama

Signature: | Name: Mr. K.Srinivasan

Signature: | Name: Dr.R.Muthukumaran

Signature: |

Programme Code:	BSC	Programme Title:		Bachelor of Science	
Course Code:	20UPS4N3	**Title**		**Batch:**	2020-2023
		Non-Major Elective II: Principles of Physics –II		**Semester:**	IV
Hrs/Week:	1			**Credits:**	2

Course Objective

- To develop the scientific interests on the portable electronic devices for day to life

Course outcomes

K1	CO1	To recollect the basic knowledge about portable devices
K2	CO2	To understand the central concepts of electric and optical devices
K3	CO3	To apply the basic physical phenomena on the operating features of scientific devices
K4	CO4	To figure out the applications of the physical quantities

Syllabus

Unit	Content	Hrs
I	Battery –Types of Battery–Hot air balloons – Remote control in TV – Superconductor – *Nuclear reactors*	3
II	Photochromic glasses – Exhaust silencer – Optical fibers – Radar and Sonar – Fluorescent Lamps – Holograms – Touch screens	2
III	Earthquake measurement – Splitting of white light – GPS – Origin of Gravity – Use of Infrared spectroscopy – Static electricity – Three pin electric plugs – Electric line tester- Artificial teeth –Purity of Honey - Breath analyzers	2
IV	Introduction – Laser – Principle - Characteries – Elements of laser – Types of laser – Applications – Advantages – Disadvantages.	3
V	TFM on soap - Cell phones - Refrigerants and their use in refrigerators - Frost formation - Air Cooler & Conditioner - Black box in Planes - Speech synthesizers - Bullet proof glass - - Aeroplane not affected by lightning-Lie detector-Biological Weapon – Basics of computers- Super Computers - Computers Simulation- *Oil with Petrol for two wheelers*	3
Total contact hours		13

- *Italic font denotes self study*

Additional activities

Seminar, Assignment, Experience discussion, PPT

Text Book
- The Editor, (2006). *The Hindu Speaks on Scientific Facts*. Kasturi and Sons Ltd. Chennai, (Units I – V).

Reference Books
- Richard P. Feynman, Robert B. Leighton, Matthew Sands, (2008). *The Feynman Lecture on Physics.* Narosa Publishing House, New Delhi.
- David Halliday, Robert Resnick, Jearl Walker, (2000). *Fundamentals of Physics.* 6th Edition, John Wiley Publications.

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	M	M
CO2	M	M	H	H	H
CO3	H	H	H	M	M
CO4	H	H	H	M	H

H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Ms.S.Yogeswari Signature:	Name: Dr. V. Sathyabama Signature:	Name: Mr. K. Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSC	Programme Title:	Bachelor of Science	
Course Code:	20UPS4N4	Title	Batch:	2020-2023
		Non-Major Elective II : Renewable Energy Sources - II	Semester:	IV
Hrs/Week:	1		Credits:	2

Course Objective

- To enrich the fundamental scientific skills in inexhaustible sources of energies.

Course outcomes

K1	CO1	To recollect the various energy sources wind energy, bio mass energy and hydrogen energy
K2	CO2	To apply the basic physical concepts to develop the conversion technologies wet process, dry process and photosynthesis.
K3	CO3	To evaluate the influences of the energy sources on the scientific applications and its limitation.

Unit	Content	Hrs
I	**WIND ENERGY** Introduction- Nature of the wind – The power in the wind- Basic components of wind energy conversion system- Classification of WEC systems- *Direct heat applications.*	3
II	**ENERGY FROM BIOMASS** Introduction- Biomass conversion technologies- Wet processes – Dry processes - Photosynthesis – Classification of biogas plants.	3
III	**GEOTHERMAL ENERGY** Introduction- Estimates of geothermal power – Geothermal sources – Hydrothermal resources – Applications of geothermal energy.	2
IV	**ENERGY FROM OCEANS** Introduction- Ocean thermal electric conversion by open and closed cycles- Energy from tides- Basic principle of tidal power- Advantages and limitations of small scale hydroelectric.	3
V	**HYDROGEN ENERGY** Introduction – Properties of hydrogen – Electrolysis or the electrolytic production of hydrogen – Hydrogen storage – *Utilization of hydrogen gas.*	2
	Total contact hours	13

- *Italic font denotes self study*

Additional activities

Seminar, Assignment, Experience discussion, PPT

Text Book
- Rai,G.D. (2002). *Nonconventional Sources of Energy*, Khanna Publishers. New Delhi, (Units I – V).

Reference Books
- Rai G.D. *Solar Energy Utilization*, Khanna Publishers. New Delhi.
- Sulchatme S.P. *Principles of Thermal Collection and Storage*, Tata McGraw Hill Publication, New Delhi.

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	H	L	H
CO2	M	M	H	M	H
CO3	H	H	L	H	H
CO4	M	H	H	M	M

H- High; M- Medium; L- Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name:Ms.S.Yogeshwari Signature:	Name: Dr. V. Sathyabama Signature:	Name: Mr. K. Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSC	Programme Title:		Bachelor of Science
Course Code:	20UPS406	Title	Batch:	2020-2023
		Core VI: Physics Lab II	Semester:	III & IV
Hrs/Week:	3		Credits:	3

Course objective
- To understand the theory with hands-on experience.

Course outcomes

K3	CO1	Able to understand optics and electromagnetic field
K4	CO2	Able to determine earth's constant M & H
K5	CO3	Understanding the principles behind every experiments

List of Experiments (Any fifteen):

1. Calibration of Voltmeter (Low & High Range) – Potentiometer
2. Calibration of Ammeter(High Range) and Reduction Factor of T.G – Potentiometer
3. Temperature Coefficient & Resistance of a coil of wire - Potentiometer
4. E.M.F of a Thermocouple - Potentiometer
5. Figure of merit - Current & Voltage Sensitivity – Ballistic Galvanometer
6. Comparison of Resistances - Specific Resistance - Ballistic Galvanometer
7. Absolute capacity of a Condenser - Ballistic Galvanometer
8. Mutual Inductance of a Coil & Comparison of Mutual Inductance – Ballistic Galvanometer
9. Determination of H - Circular Coil carrying current –Vibration Magnetometer
10. Determination of M - Field along the axis of a Circular coil carrying current
11. Thickness of a Wire - Air wedge
12. Radius of curvature and Refractive index of a lens - Newton's Rings
13. Refractive Index of a Liquid - Spectrometer - Hollow Prism
14. Refractive Index of a Prism - Spectrometer - i-d curve
15. Refractive Index of a Prism - Spectrometer - i-i' curve
16. Wavelength of different colours of Mercury spectrum and Dispersive power of a Grating – Normal Incidence-Spectrometer
17. Refractive Index - Spectrometer - Small Angle Prism
18. Cauchy's Constants and Dispersive Power of a Prism - Spectrometer

Text Book
- Govindarajan S.R. Sundarajan S. (1959). *Practical Physics*. Roc house & sons Pvt Ltd.
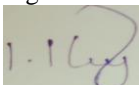
Reference Book
- Dhanalakshmi A. Somasundaram S. *Practical Physics*. Apsara Publishers, Book II.

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	H	M	H
CO2	M	H	H	H	H
CO3	M	H	H	H	H

H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Ms. S.Shanmugapriya Signature:	Name: Dr.V.Sathyabama Signature:	Name: Mr. K. Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSc	Programme Title:		Bachelor of Science	
Course Code:	20UPS507	**Title**		**Batch:**	2020-2023
		Core VII: Mechanics		**Semester:**	V
Hrs/Week:	3			**Credits:**	3

Course Objective

- To acquire a complete knowledge about mechanics and classical dynamics

Course outcomes

K1	CO1	To remember the principles of rigid body, statics and classical dynamics
K2	CO2	To understand the mechanics behind rigid body, projectiles and dynamics
K3	CO3	To apply these formalisms to obtain equations of motion for simple systems
K4	CO4	To represent these formalisms for mechanical systems

Syllabus

Unit	Content	Hrs
I	**Projectiles** Projectiles – Range – Expression for the range of projectile on the inclined plane – path of a projectile - Impulse – Direct and oblique impact – Expression for velocity after direct impact- Loss of kinetic energy due to direct impact of two smooth spheres **Friction** Force of friction –Limiting friction – Laws of friction –Angle of friction **Hydrostatics** Thrust on an immersed plane, Definition and determination of centre of pressure -Archimedes principle- Laws of floatation – Definition for metacentre and metacentric height.	13
II	**Hydrodynamics** Rate of flow of fluid - Streamline flow and turbulent flow (qualitative analysis) – Equation of continuity of flow–Bernoulli's theorem and its application **Rigid body dynamics** Rigid body–rotational and vibrational motion –Torque–moment of inertia – radius of gyration –kinetic energy of rotation– M.I. of a fly wheel– experimental determination–precession- Moment of inertia of diatomic molecule	13
III	**MECHANICS OF SYSTEM OF PARTICLES** Conservation theorem for a system of particle; Conservation theorem for linear momentum, angular momentum and energy - Constrained motion - Types of constraints with examples - Forces of constraints - Degrees of freedom - Generalized coordinates - Generalized notation for Displacement, Velocity, Acceleration, Momentum, Force and Potential - Limitations of Newton's Law	13
IV	**LAGRANGIAN FORMULATION** Delta-Variation process - Hamilton's principle - Deduction of Lagrange's equations of motion from Hamilton's principle - Principle of virtual work - D'Alembert's principle - Deduction of Lagrange's equations by D'Alembert's principle for both conservative system and non-conservative system - Deduction of Hamilton's principle from D'Alembert's principle - Deduction of Newton's second law of motion from Hamilton's principle - Applications of Lagrange's equation: Linear harmonic oscillator, Simple pendulum, *Compound pendulum.*	13
V	**HAMILTONIAN FORMULATION OF MECHANICS** View points of the new development - Phase space and the motion of systems - Hamiltonian - Hamilton's canonical equations of motion - Cyclic coordinates - Physical significance of H - Advantages of Hamiltonian approach - Deduction of canonical equations from variational principle - Applications of Hamilton's equations of motion; Simple Pendulum, Compound pendulum, Linear harmonic oscillator.	13

Total contact hours	65

- *Italic font denotes self study*

Additional activities

Seminar, Assignment, Experience discussion, PPT

Text Books

- Mathur D.S. (1996). *Mechanics*. S.Chand & Company Ltd, New Delhi, (Units I & II).

- Venkataraman M.K. (2014). *Dynamics*. Agasthiar Publications, Trichy, (Unit II).

- Mathur D.S. (2003). *Elements of Properties of Matter*. Shyam Lal Charitable Trust, New Delhi, (Unit II).

- Gupta, Kumar, Sharma, (2006). *Classical Mechanics*. 21st Edition, Pragati prakasan, Meerut, (Units II – V).

Reference Books

- Chakraborthy. B. K. *(2001.) Mechanics and General properties of matter*, (2001). Books & Allied (P) Ltd.
- Rajendran. V,Marikani. A. (1997) *Applied Physics for Engineers.* Tata Mc-Graw Hill, New Delhi.
- Herbert Goldstein, (1985). *Classical Mechanics*. 2nd Edition, Narosa publishing House, New Delhi.

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	H	H	H
CO2	M	H	H	M	H
CO3	H	L	M	H	H
CO4	M	H	H	H	M

H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Dr. S. Shanmuga Priya Signature:	Name: Dr. V.Sathyabama Signature:	Name: Mr. K.Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSC	Programme Title:		Bachelor of Science	
Course Code:	20UPS508	**Title**		**Batch:**	2020-2023
		Core VIII: Optics & Spectroscopy		**Semester:**	V
Hrs/Week:	5			**Credits:**	5

Course Objective

- To understand the mechanism of energy transfer and to impart knowledge in electromagnetic spectrum

Course outcomes

K1	CO1	To gain knowledge about fundamental properties of light, electromagnetic spectrum and splitting of spectral lines.
K2	CO2	To apply the energy transfer for absorption and emission spectra
K3	CO3	To determine structure of the molecules
K4	CO4	To evaluate bond angle and bond length etc.

Syllabus

Unit	Content	Hrs
I	**INTERFERENCE & DIFFRACTION** Theory of interference - Fresnel's biprism experiment - Determination of wavelength - Interference due to reflected light – Air wedge - Newton's rings - Determination of wavelength and refractive index of a liquid - Fresnel's explanation of rectilinear propagation of light - Fresnel's diffraction at a circular aperture - Fraunhofer diffraction at a single slit - Theory of the plane transmission grating - Determination of wavelength	13
II	**POLARISATION** Polarisation of transverse waves - Plane of polarization - Brewster's law and Brewster's window - Polarization by refraction - Double refraction - Principal section and principal plane - Nicol prism - Nicol prism as an analyser - Theory of circularly and elliptically polarised light - Optical activity - Fresnel's explanation of rotation - Specific rotation - *Laurent's half shade Polarimeter*	13
III	**MOLECULAR SPECTRA** Rotation of molecules **-** Rotational spectra of rigid diatomic molecule - Techniques and Instrumentation of Microwave Spectroscopy - Energy of a Vibrating diatomic molecule - Simple harmonic oscillator - Techniques and Instrumentation of Infrared Spectroscopy - Applications of Microwave & Infrared Spectroscopy (Basic ideas) - Raman effect and characteristics - Experimental study - Quantum theory of Raman effect	13
IV	**ATOMIC & NUCLEAR SPECTRA** Normal and Anomalous Zeeman effects - Experimental study of normal Zeeman effect - Lorentz Classical interpretation and Expression for the Zeeman shift - Quantum mechanical theory of Normal Zeeman effect - Paschen Back effect - Stark effect – Basic theory of NMR, ESR and NQR - Techniques and Instrumentation - Applications	13
V	**LASER & FIBER OPTICS** Laser characteristics - Einstein's coefficients - Population inversion - Pumping methods - Essential elements and Action of laser system - Ruby laser – He-Ne laser – *Applications: Holography and Lasers in medicine* Construction and types of optical fiber - Critical angle - Acceptance angle, Acceptance cone and Numerical aperture - Propagation of light through optical fiber - Optical fiber configurations - Fiber optic communication system	13
Total contact hours		65

- *Italic font denotes self study*

Additional activities

Seminar, Assignment, Experience discussion, PPT

Text Books
- Subramanyam N. Brijlal, *Waves and Oscillations*. S.Chand & Co, New Delhi, (Unit - I).
- Subrahmanyam. N. Brijlal, Avathanulu M.N. (2008). *A Textbook of Optics*. S.Chand and Co Ltd., New Delhi, (Units I – II & V).
- Colin N .Banwell, Elaine M. Mc Cash, (2004). *Fundamentals of Molecular Spectroscopy*. Tata McGraw-Hill, New Delhi, (Unit - III).
- Gupta S.L. Kumar V. Sharma R.C. (2001). *Elements of Spectroscopy*. 16th edition, Pragati Prakashan, Meerut, (Unit - IV).

Reference Books
- Halliday, Resnick, (1994). *Physics Part I & II*. 4th Edition, Wiley Eastern Ltd, New Delhi.
- Jenkins, White, (1981). *Fundamentals of Optics*. 4th Edition, Mc Graw-Hill., New York.
- Manas Chanda, (1982). *Atomic Structure and Chemical Bond*. 2nd edition, Tata McGraw Hill, New Delhi.
- Gurdeep Chatwal, Sham Anand, (1987). *Spectroscopy*. 3rd edition, Himalaya Publishers, Mumbai.

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	H	M	H
CO2	H	M	H	H	M
CO3	M	H	H	M	L
CO4	H	M	H	M	H

H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Dr. A. G. Kannan Signature:	Name: Dr. V. Sathyabama Signature:	Name: Mr. K. Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSC	Programme Title:		Bachelor of Science	
Course Code:	20UPS509	**Title**		**Batch:**	2020-2023
		Major Elective I: Basic Electronics & Circuit System		**Semester:**	V
Hrs/Week:	5			**Credits:**	5

Course Objective

- To understand the basic concepts of electronics and to implement the electronic circuits to various industrial applications.

Course outcomes

K1	CO1	To recollect the fundamental concepts and developments of electronics
K2	CO2	To understand the construction and operations of semiconductor devices
K3	CO3	To apply the knowledge of basic theorems in analog circuits
K4	CO4	To design electronic and optoelectronic circuits and interpret the output

Syllabus

Unit	Content	Hrs
I	**DC CIRCUITS AND ALTERNATING CURRENTS** DC Circuits: Current, Voltage, Resistance, Ohm's Law, Joule's Law, Resistors and Batteries - Series and Parallel Circuits - Networks - Kirchoff Rules - Thevenin's Theorem - Norton's Theorem - Maximum power transfer theorem – Proportional Voltage and Current formula - Ammeter, Voltmeter, Ohmmeter and Multimeter (Basic ideas) - Alternating currents: Frequency, Amplitude and Phase - RMS value and Power - Capacitance and Inductance - *Transformer*	13
II	**SEMICONDUCTOR DEVICES AND CIRCUITS** Semiconductor and Energy bands - Doped Semiconductor - PN Junction diode and Zener diode - Characteristics - Half wave, Full wave and Bridge rectifiers – Capacitance filter-Two pin regulated power supply - Voltage doublers - Clippers and Clampers - Transistor and action - Common base and Common emitter Configurations - Relations between α and β - Load line and Operating point - Stability **-** Voltage divider Self bias - JFET and its characteristics	13
III	**AMPLIFIERS & OSCILLATORS** Principle of amplification - Classification of amplifiers - Common emitter single stage amplifier and frequency response - Multistage amplifiers (Basic ideas) - Concept of feedback and Effect of negative feed back (qualitative) - Barkhausen criterion - Basic Oscillatory circuit and Classification of oscillators - Hartley, Colpitts and Phase shift Oscillators (Circuit operations)	13
IV	**OPERATIONAL AMPLIFIER** Typical stages of an Op Amp - Ideal Op Amp and characteristics - Input offset voltage, Offset current, Bias current and Slew rate (Definitions) - Inverting Op Amp - Noninverting Op Amp - Differential Op Amp - Scale and Phase changers - Adder and Averager – Subtractor, Differentiator and Integrator	13
V	**OPTOELECTRONIC DEVICES** Optical radiation - Flux and illumination - Structure, variation of resistance & speed response of a Photo detector - Photovoltaic cells - Photodiodes - Phototransistors - Light beam detector - Electronic slave flash control - Window detector - LED: Bar graph display, drivers and LED arrays - *Optically coupled isolator (Basic ideas)*	13
Total contact hours		65

- *Italic font denotes self study*

Additional activities

Seminar, Assignment, Experience discussion, PPT

Text Books
- James J.Brophy, (1990). *Basic Electronics for Scientists*. 5th Edition, McGraw Hill Publishing Company, New York, (Unit I).
- Sadasiva Biswal, (2001). *Basic Electronics (Vol.I).* Atlantic Publishers and Distributors, (Units II &III).
- Swaminathan Mathu, (1985). *Electronics: Circuits and Systems*. 1st Edition, Howard W.Sams & Co., Inc, New York, (Units IV&V).

Reference Books
- Narayana Rao B.V., (1994). *Principles of Electronics (Vol. I & II).* Wiley Eastern Limited & New Age International Limited, New York.
- Norman Lurch, *Fundamentals of Electronics*. 3rd Edition, John Wiley & Sons.
- Ramakant A.Gayakwad, (1997) *Op-Amps & Linear Integrated Circuits*. 3rd Edition, Prentice- Hall of India, New Delhi.

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	H	H	H
CO2	H	M	H	H	M
CO3	M	H	H	M	H
CO4	H	H	H	M	H

H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Ms. V. Yasodha Mahalakshmi Signature:	Name: Dr.V.Sathyabama Signature:	Name: Mr. K. Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSC	Programme Title:		Bachelor of Science	
Course Code:	20UPS510	**Title**		**Batch:**	2020-2023
		Major Elective II: Digital Circuit systems & Microprocessor		**Semester:**	V
Hrs/Week:	5			**Credits:**	5

Course objective

- To study the number system, Logic circuits and its application and to understand the architecture and instruction set of 8085 microprocessor

Course outcomes

K2	CO1	Understanding the operations of BCD numbers and memory allocation in computers
K5	CO2	Develop effective problem solving abilities
K4	CO3	Analyze electronic circuits
K3	CO4	Apply the concept of basic electronic devices to design various circuits

Syllabus

Unit	Content	Hrs
I	**NUMBER SYSTEMS AND CODES** Binary numbers - 1's and 2's complement - Addition - Subtraction - Multiplication - Division - Binary to Decimal conversion and vice versa - Octal numbers - Octal to Binary conversion and vice versa - Hexadecimal numbers - Hexadecimal to Binary conversion and vice versa - BCD - ASCII - Excess 3 code - Gray code **LOGIC GATES** Basic gates (OR, AND and NOT gates) - Universal building blocks (NAND and NOR gates)- XOR and XNOR gates	13
II	**THEOREMS OF BOOLEAN ALGEBRA & KARNAUGH MAP** Demorgan's theorems - Laws and theorems of Boolean algebra - Simplification of Boolean expressions using Boolean laws and theorems - Karnaugh map – Simplification of expressions using pairs, quads and octets - Sum of product method and simplifications - Don't care conditions - Product of sum method and simplifications	13
III	**ARITHMETIC PROCESSING CIRCUITS** Half and full adders - Half and full subtractors - Parallel binary adder and subtractor data processing circuits. **DATA PROCESSING CIRCUITS** Multiplexers - Demultiplexers - 1 - of - 16 decoder - BCD to decimal decoder - Seven segment decoders - Encoders	13
IV	**FLIP FLOPS , SHIFT REGISTERS** RS Flip Flop - D Flip Flop - Edge triggering - JK and Master slave Flip Flop - Serial in serial out - Serial in parallel out - Parallel in serial out - Parallel in parallel out shift register **COUNTERS** Asynchronous Mod 8 up and down counters - Decoding gates - Synchronous Mod 8 up and down counters - Mod 3, Mod 5 counters	13
V	**MICROPROCESSOR ARCHITECTURE AND PROGRAMMING** Organization of a Microcomputer system – Architecture of the 8085 - Microprocessor instruction set and computer languages - Overview of the 8085 instruction set: Data transfer, Arithmetical, Logical, Branch, Stack, I/O & Machine control groups - Addressing modes - Programming the 8085: The programming process - The stack and subroutines - Simple programming examples	13
Total contact hours		65

- *Italic font denotes self study*

<div align="center">**Additional activities**</div>

Seminar, Assignment, Experience discussion, PPT

Text Books
- Malvino A.P, Leach D.P. (2000). *Digital Principles and Applications*. 4th Edition, Tata Mc Graw Hill Publishing Company Ltd., New Delhi, (Units I - V).
- Swaminathan Madhu, (1985). *Electronic Circuits and Systems*. 1st Edition, Howard W. Sams & Co., Inc-A publishing subsidary of ITT, (Unit - V).

Reference Books
- Jacob Millman, Halkias C. (1985). *Integrated Electronics*. 1st Edition, Mc Graw Hill Publishing Company.

<div align="center">**Mapping**</div>

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	M	M	L
CO2	M	H	H	H	H
CO3	M	H	H	H	H
CO4	M	M	H	M	M

H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Ms.N.Revathi Signature:	Name: Dr.V.Sathyabama Signature:	Name: Mr. K.Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSC	Programme Title:		Bachelor of Science	
Course Code:	20UPS511	**Title**		**Batch:**	2020-2023
		Summer Internship or Vocational Training		**Semester:**	V
Hrs/Week:	-			Credits:	3

Verified by HOD	Checked by CDC	Approved by COE
Name: Dr.V.Sathyabama Signature:	Name: Mr. K.Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSC	Programme Title:	Bachelor of Science		
Course Code:	20UPS5S1	**Title**	Skill based Elective III: Mechanical Measurements	**Batch:**	2020-2023
				Semester:	V
Hrs/Week:	1			**Credits:**	2

Course Objective

- To enrich the basic foundation and inspire interest for the knowledge in Mechanical measurements

Course outcomes

K1	CO1	To understand the operational features, limitations and difficulties inherent in the instruments
K2	CO2	To apply the basic principle to develop the mechanical measurement systems
K3	CO3	To implement the operation and construction to infer the instrument characteristics
K4	CO4	To evaluate the accuracy, error and calibration of an instrument

Syllabus

Unit	Content	Hrs
I	**INSTRUMENT CHARACTERISTICS** **STATIC TERMS AND CHARACTERISTICS:** Range and span - Accuracy, error and correction – Calibration - Hysteresis - Dead zone – Drift – Sensitivity – Stability - Linearity - Back lash – Stiction **DYNAMIC TERMS AND CHARACTERISTICS:** Speed of response and measuring lag - Fidelity and dynamic error – Overshoot – Dead time and Dead zone - *Frequency response*	3
II	**TRANSDUCERS** Transducer description - Variable resistance transducer - Capacitance transducer - Photoelectric transducer - Piezo electric transducer	3
III	**PRESSURE MEASUREMENT** Terms - Piezometer - U tube double column monometer – Bourdon gauge - McLeod gauge - CRO for varying pressure measurement	3
IV	**FLOW MEASUREMENT** Nature of flow - Cup and Vane anemometers - Hotwire anemometer - Ultrasonic flow meter - Thermal flow meter – *Shadograph*	2
V	**FREQUENCY AND ACCELERATION MEASUREMENT** Frequency and time period – Lissajous figures- Vibration amplitude and acceleration- Piezoelectric accelerator.	2
Total contact hours		13

- *Italic font denotes self study*

Additional activities

Seminar, Assignment, Experience discussion, PPT

Text Books
- Kumar, D. S. (1997). *Mechanical Measurements And Control*. Metropolitan, Third Edition, New York, (Units I – IV).
- Sawhney A. K. Puneet Sawhney, (2004). *A Course in Mechanical Measurements And Instrumentation*. Dhanpat Rai & Co, 12th Edition, New Delhi, (Unit – V).

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	H	H
CO2	H	M	H	H	M
CO3	M	H	H	M	H
CO4	H	H	H	M	H

H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Ms. M. Gayathri Signature:	Name: Dr. V. Sathyabama Signature:	Name: Mr. K. Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSC	Programme Title:		Bachelor of Science	
Course Code:	20UPS5S2	**Title** Skill based Elective IV: Fundamentals of Biophysics	**Batch:**	2020-2023	
			Semester:	V	
Hrs/Week:	1		**Credits:**	2	

Course Objective

- To develop the basic knowledge about Biophysics and its Applications

Course outcomes

K1	CO1	To understand the physical principles of the biological phenomena.
K2	CO2	To apply the separation and physico-chemical techniques to study biological structure
K3	CO3	To implement the characteristics of a biological system using the concept of physics and chemistry
K4	CO4	To evaluate the physical and chemical properties of biological applications

Syllabus

Unit	Content	Hrs
I	**LAWS OF PHYSICS AND CHEMISTRY** Quantum Mechanics – Electronic structure of Atom – Molecular orbitals and Covalent bonds – Molecular Interactions – Strong and Weak interaction – Thermodynamics – Entropy and Enthalpy – *Free energy of a system*	3
II	**MOLECULAR ALPHABETS OF LIFE** Introduction to the molecular structure and function of Proteins, Nucleic acids, Carbohydrates and Lipids.	2
III	**BIOMOLECULAR SEPARATION TECHNIQUES** Chromatography: Column, Thin Layer, Ion exchange, Molecular exclusion and Affinity Chromatography – Electrophoresis – Gel Electrophoresis.	2
IV	**PHYSIOCHEMICAL TECHNIQUES** Ultra centrifugation – Viscosity – Light scattering measurements – Different types of Light microscopy – Basics of TEM, SEM – Introduction to X-ray crystallography and NMR.	3
V	**BIOMECHANICS AND NEURO-BIOPHYSICS** Mechanical properties of muscles – Biomechanics of cardiovascular system – The nervous system – Physics of membrane potentials – Sensory mechanisms – The Eye – *Physical aspects of hearing.*	3
	Total contact hours	13

- *Italic font denotes self study*

Additional activities

Seminar, Assignment, Experience discussion, PPT

Text Book
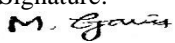- Vasantha Pattabhi,Gautham N. (2002). *Biophysics* Narosa Publishing House.New Delhi, (Units I-V).

Reference Book
- Rodney Cotterill, *Biophysics An Introduction*. John Wiley &Sons Ltd, England.

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	M	H	H
CO2	H	H	H	H	M
CO3	M	H	H	H	H
CO4	H	H	M	M	H

H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Ms. M. Gayathri Signature: M. Gaya	Name: Dr.V.Sathyabama Signature:	Name: Mr. K. Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

Programme code:	BSC	Programme Title :		Bachelor of Science
Course Code:	20UPS612	**Title**	**Batch :**	2020-2023
		Core IX: Relativity & Quantum Mechanics	**Semester**	VI
Hrs/Week:	5		**Credits:**	5

Course Objective

- To develop the skill to gain knowledge in Relativity & Quantum Mechanics

Course Outcomes

K1	CO1	To keep in mind the concepts and the consequences of special and general theory of relativity
K2	CO2	To understand the basic concepts of Quantum theory and the wave properties of particles
K3	CO3	To apply the wave equation to solve simple problems
K4	CO4	To interpret the different types of quantum numbers

Syllabus

Unit	Content	Hrs
I	**SPECIAL THEORY OF RELATIVITY** Galilean transformations and their limitations - Search for an absolute frame of reference: Michelson Morley experiment - Einstein's postulates and Lorentz transformations - Length contraction, Time dilation and Simultaneity – Variation of Mass with velocity - Mass-energy equivalence with experimental evidence	13
II	**GENERAL THEORY OF RELATIVITY** Relation between total energy, particle momentum and rest energy - Relativistic Doppler effect - Cerenkov radiation - World point and world line in Minkowski space - Inertial and gravitational mass - Principle of equivalence - Qualitative discussion of bending of light - *Precession of perihelion of mercury and gravitational red shift*	13
III	**QUANTUM MECHANICS** **WAVE PROPERTIES OF PARTICLES** Matter waves – Expression for de-Broglie wavelength – Phase velocity – Group velocity - Expression for group velocity – Experimental study of matter waves : G. P. Thomson's experiment - Heisenberg's Uncertainty principle and its illustrations: Gamma ray microscope & Diffraction of a beam of electrons by a slit - Postulates of wave mechanics - Properties of wave function	13
IV	**SCHRÖDINGERS EQUATION AND ITS APPLICATIONS** Time dependent and Time independent forms of Schrodinger equation - Free Particle - Infinite square well potential – Finite square potential well - The barrier penetration problem - *Linear Harmonic oscillator*	13
V	**QUANTUM THEORY OF HYDROGEN ATOM** Schrödinger's equation for the Hydrogen atom - Separation of variables- Solution of polar wave equation – Solution of Radial equation - Expression for the energy of the electron in the ground state – Significance of Quantum numbers : Principal Quantum number , Orbital Quantum number & Magnetic Quantum number - Electron probability density	13
Total contact hours		65

- *Italic font denotes self study*

<div align="center">**Additional activities**</div>

Seminar, Assignment, Experience discussion, PPT

Text Books
- Murugesan R. (2003). *Modern Physics*. 11th Edition, S.Chand, NewDelhi, (Units I - IV).
- Arthur Beiser, (1997). *Concepts of Modern Physics*. 5th Edition, Tata McGraw Hill, NewDelhi, (Unit V).

Reference Books
- Atam P.Arya, (1974). *Elementary Modern Physics*. 1st Edition, Addison Wesley.
- Mathews, Venkatesan, (2002). *A Text Book of Quantum Mechanics*, Tata McGraw Hill Company Ltd, New Delhi.
- Chatwal G.R. Anand S.K. (2006). *Quantum Mechanics*, Himalaya Publishing Company, New Delhi.

<div align="center">**Mapping**</div>

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	H	M	H
CO2	H	H	M	H	M
CO3	H	H	H	H	M
CO4	M	H	M	H	H

H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Dr.M.Karthika Signature:	Name: Dr.V.Sathyabama Signature:	Name: Mr. K. Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSC	Programme Title:		Bachelor of Science	
Course Code:	20UPS613	**Title**		**Batch:**	2020-2023
		Core X: Atomic & Nuclear Physics		**Semester:**	VI
Hrs/Week:	5			Credits:	5

Course Objective
- To understand the structure and properties of electron and the nucleus

Course outcomes

K1	CO1	Develop understanding about the electronic and nuclear structure of atoms
K2	CO2	Appreciate the influence of X-rays, atomic and nuclear physics on modern scientific developments
K3	CO3	Analyze the key areas in which atomic and nuclear physics affects our everyday living
K4	CO4	Apply various tools and techniques to examine and understand the processes within material industry and medical applications of nuclear phenomena

Syllabus

Unit	Content	Hrs
I	**PHOTOELECTRIC EFFECT** Introduction- Experimental investigations - Einstein's photoelectric equation - Millikan's experiment – Planck's hypothesis (Basic ideas) **STRUCTURE OF THE ATOM** Bohr atom model - Bohr's interpretation of Hydrogen atom – Spectral series of Hydrogen atom – Bohr's Correspondence principle - Critical potentials - Experimental determination of critical potentials: Franck and Hertz's method – Drawbacks of Bohr atom model- Sommerfeld model & Relativistic atom model - Hyperfine structure - Vector atom model - Quantum numbers - Coupling schemes - Pauli exclusion principle - *Electronic configuration of an atom* .	13
II	**X -RAYS** Origin of X rays - Production & detection - Properties - Diffraction of X rays (Laue spots) - Bragg's Law - Bragg's X ray Spectrometer - Determination of crystal structure by Powder crystal method - Continuous and Characteristic X ray spectrum - Mosley's Law and significance - Theory of Compton Scattering - Experimental verification - Applications of X rays (Basic ideas)	13
III	**NUCLEAR MODELS** Properties of nucleus - Binding energy of the nucleus and packing fraction - Nuclear stability - Nuclear models: Liquid drop model and Semi empirical mass formula - Shell model (Qualitative ideas). **RADIOACTIVITY** Natural radioactivity- The law of radioactive decay and decay rate - Half life and Mean life - Alpha decay: Determination of charge of the α particle- Range of α particles- Geiger – Nuttal law- Beta decay: Beta ray spectrum – Pauli's neutrino hypothesis -Non conservation of parity in Beta decay- Gamma decay: Origin of Gamma rays- Internal conversion.	13
IV	**NUCLEAR REACTIONS, DETECTORS AND ACCELERATOR** Nuclear reaction energy - Reaction cross section - Nuclear fission - Energy released in fission of U235 - Chain reaction - Fission reactor - Nuclear fusion - Fusion reaction - Advantages and problems of fusion. Ionization chamber: Simple Ionization chamber - Proportional counter - GM counter - Scintillation counter - Linear accelerator – Cyclotron.	13
V	**ELEMENTARY PARTICLES AND COSMIC RAYS** Fundamental forces in nature - Classification of elementary particles based on interactions - Conservation laws - Strange particle and Strangeness - Quarks - Quark model - Cosmic rays - Primary and Secondary cosmic rays - Cosmic ray showers - Positron - Pair production - Annihilation of matter - Mesons - Origin of cosmic rays.	13
Total contact hours		65

- *Italic font denotes self study*

Additional activities

Seminar, Assignment, Experience discussion, PPT

Text Books
- Rajam J.B. Prof.Louis De Broglie, (2000). *Atomic Physics,* Sultan Chand & Sons, New Delhi, (Units I & II).
- Raymond A. Serwey, Clement J. Moses & Curt Moyer, *Modern Physics.* 2nd edition, Saunders College Publishers, (Units III & IV).
- Atam P.Arya, *Elementary Modern Physics.* Addition – Wesley publishing Company, (Unit IV)
- Murugeshan R, (2009) *Modern Physics*, S. Chand and Company Ltd, 14th edition, New Delhi, (Unit V).

Reference Books
- Atam P.Arya, (1974). *Elementary Modern Physics.* 1st edition, Addision Wesley.
- Sehgal Chopra, (2004) *Modern Physics.* 9th edition Sultan Chand & Sons, New Delhi.
- Pandya M.L. Yadev R.P.S, *Elements of Nuclear Physics.* 5th editions, KedarNath RamNath Publications.
- Tayal D. C. (1987). *Nuclear Physics -* 4th edition, Himalaya Publishing House Publishers, New Delhi.

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	M	H
CO2	H	M	H	M	M
CO3	M	M	H	M	L
CO4	H	H	M	L	H

H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Mrs. Yasodha Mahalakshmi	Name: Dr.V.Sathyabama	Name: Dr.M.Durairaju	Name: Dr.R.Muthukumaran
Signature:	Signature:	Signature:	Signature:

Programme Code:	BSC	Programme Title:		Bachelor of Science
Course Code:	20UPS614	**Title**	**Batch:**	2020-2023
		Core XI: Condensed Matter Physics & Statistical Mechanics	**Semester:**	VI
Hrs/Week:	5		**Credits:**	5

Course objective

- To understand the electrical and magnetic properties of solids through classical and quantum statistics

Course outcomes

K1	CO1	Have knowledge of general structure, characteristics and behavior of matter in whichever phase they are in
K2	CO2	Have knowledge of effect of external application of force and torque and also understanding the underlying theory in it
K3	CO3	To find the application of above mentioned behavior in innovative research work
K4	CO4	Realize the conceptual understanding of the facts through implications of Quantum statistical concept.

Syllabus

Unit	Content	Hrs
I	**BONDING IN SOLIDS** Bonding in solids - Ionic bonding - Covalent bond - Metallic bond - Intermolecular bonds - Dispersion bonds - Dipole bonds - Hydrogen bonds (Formation and properties) **CRYSTAL PHYSICS** Lattice points and space lattice - Unit cells and lattice parameters - Crystal systems - Symmetry elements in crystals – Twenty three elements in a cubic crystal - The Bravais lattices - Metallic crystal structures : SC, BCC, FCC and HCP. Relation between the density of crystal material and lattice constant in a cubic lattice - Other cubic structures :Diamond, Zinc Blende, NaCl, CsCl -Directions, planes and Miller Indices - Reciprocal lattice (Construction only)	13
II	**ELECTRICAL PROPERTIES OF SOLIDS** Classical free electron theory of metals and its draw backs - Quantum theory of free electrons - Joule's law - Hall effect - Experimental determination of Hall coefficient - Band theory of solids - Electron in a periodic field of a crystal (the Kronig - Penney model) - Brillouin zones **MAGNETIC PROPERTIES OF SOLIDS** Different types of magnetic materials - Langevin's Classical theory of diamagnetism - Langevin's and Weiss theory of paramagnetism - Weiss molecular field theory of ferromagnetism - Domain theory of ferromagnetism – Hysteresis – Hard and soft Magnetic Materials – Anti-ferromagnetism -Ferrimagnetism –Application of magnetic materials- Ferroelectricity – Ferroelectric crystals	13
III	**SUPERCONDUCTIVITY** Properties of superconductors - Effects of magnetic field - Persistent current - Critical current - The Meissner effect - Isotope effect - London equation - Penetration depth - Type I and Type II superconductors - Electronic specific heat - Energy gap measurements - BCS theory – Quantum tunneling - Josephson tunneling (simple ideas only) - High temperature superconductors - *Applications of superconductivity (simple ideas only)*	13
IV	**CLASSICAL STATISTICAL MECHANICS** Phase space of a microscopic particle - Density of quantum states of energy of a particle - Volume occupied by a quantum state - Isolated system - Statistical equilibrium - Statistical postulates - Distribution function, entropy and probability - Maxwell - Boltzmann statistics and its application - Total internal energy - Specific heat at constant volume - Speed distribution - Most probable speed, average, root mean square speeds – *Doppler broadening of spectral lines*	13
V	**QUANTUM STATISTICAL MECHANICS** Bose-Einstein energy distribution - Basic postulates - B-E energy distribution function - B-E energy distribution law for continuous variation of energy - Planck's law of radiation - Fermi - Dirac energy distribution - Basic postulates - Energy distribution function - Fermi energy - Energy distribution curve - Expression for the Fermi Energy for electrons in a metal - Fermi temperature and Fermi velocity - Thermionic emission - Richardson Dushman equation – Comparison of M-B, B-E	13

and F-D statistics		
Total contact hours		65

- *Italic font denotes self study*

<div align="center">**Additional activities**</div>

Seminar, Assignment, Experience discussion, PPT

Text Books
- Pillai S.O. (2005). *Solid State Physics*. 6th Edition, New age international (P) Ltd, New Delhi, (Units I - III).
- Serway R. Moses C. Moyer C.A. (1997). *Modern Physics*. 2nd edition, Saunders college publishers, (Unit III).
- Kamal Singh, Singh S. P. (1985). *Elements Of Statistical Mechanics*. 1st Edition, S.Chand & Company Ltd, NewDelhi, (Units IV &V).

Reference Books
- Agarwal B.K. Melvin Eicher, (1975). *Statistical Mechanics*. Wiley Eastern Ltd, Bangalore.
- Gupta S.L. Kumar V. (1987). *Solid State Physics*. 6th Edition, K.Nath & Co., Meerut.

<div align="center">**Mapping**</div>

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	H	H
CO2	H	M	H	H	M
CO3	M	H	H	M	H
CO4	H	H	H	M	L

H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Dr. A. Suresh Kumar Signature:	Name: Dr. V. Sathyabama Signature:	Name: Mr. K. Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

Programme code:	BSC		Programme Title :	Bachelor of Science	
Course Code:	20UPS615		**Title**	**Batch :**	2020-2023
			Microprocessor Mechanisms & Programming in C	**Semester**	VI
Hrs/Week:	5			**Credits:**	5

Course Objective
To develop the skill to gain knowledge in Programming in C & Information Security

Course Outcomes (CO)

K1	CO1	To apply the knowledge of various instruction set of the Microprocessor Intel 8085 in solving simple programmes
K2	CO2	To remember the basic concepts of C programming language
K3	CO3	To understand the role of control statements in C
K4	CO4	To apply the concept of functions,structures and pointers in C

Syllabus

Unit	Content	Hrs
I	**MICROPROCESSOR ARCHITECTURE AND PROGRAMMING** Organization of a Microcomputer system – Architecture of the 8085 - Microprocessor instruction set and computer languages - Overview of the 8085 instruction set: Data transfer, Arithmetical, Logical, Branch, Stack, I/O & Machine control groups - Addressing modes - Programming the 8085: The programming process - The stack and subroutines - Simple programming examples	13
II	**INTERFACING MEMORY AND I/O DEVICES** Types of interfacing devices - Address decoding for input-input/output ports: programmable input ports - Programmable peripheral interface - Analog input devices: The AD 7820 analog to digital convertor – Interfacing the AD7820 - Analog output devices: the AD557 digital to analog converter - *Interfacing the AD557.* **APPLICATIONS OF MICROPROCESSOR** Temperature monitoring system (Brief description) - Closed loop process control: The process of growing synthetic Quartz (Qualitative ideas only)	13
III	**INTRODUCTION TO C** Basic Structure of C Programs - Character set - Key words and Identifiers - Constants - Variables - Data types – Declaration of variables: Primary type declaration – Declaration of storage class – Assigning values to variables – Defining symbolic constants - Arithmetic operators - Relational operators - Logical operators - Assignment operators - Increment and decrement operators - conditional operators – Operator precedence and Associativity - Formatted input & output statements	13
IV	**CONTROL STRUCTURES, ARRAYS & STRINGS** Simple if - if…else - Nesting of if...else - else if ladder - Switch - while - do…while – for : Simple for loops – Additional features – Nesting of for - Declaration and initialization of one & two dimensional arrays - Declaring and initializing string variables - String handling functions	13
V	**FUNCTIONS, STRUCTURES AND POINTERS** Elements of user-defined functions – Definition of functions - Return values and their types - Category of functions**:** No arguments and no return values - Arguments but no return values - Arguments with return values - Recursion - Defining a structure - Declaring structure variables - Accessing structure members - Structure initialization - Declaring and initializing pointers – Accessing a variable through its pointer – Pointer expressions – *Pointer increments and scale factor.*	13
Total contact hours		65

- *Italic font denotes self study*

Additional activities

Seminar, Assignment, Experience discussion, PPT

Text Books
- Aditya P.Mathur, (1997). *Introduction To Microprocessor*. 3rd Edition,Tata McGrawHill, New Delhi,(Units I & II).

- E.Balagurusamy, (2004). *Programming In Ansi C*. Tata McGraw Hill Publishing Company, New Delhi, (Units III - V).

Reference Books
- Ramesh S.Gaonkar, (1997). *Microprocessor Architecture, Programming And Applications With The 8085*. 3rd Edition, Penram International Publishing, India.
- Ravichandran.D, (1998). *Programming In C*. New Age International (P) Limited Publishers.
- Yashvant Kanetkar, (1995). *Let Us C*. 2nd Revised Edition, BPB Publications, New Delhi.

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	M	H
CO2	M	H	M	H	H
CO3	H	H	H	H	M
CO4	H	M	M	H	H

H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Dr. M.Karthika Signature:	Name: Dr.V.Sathyabama Signature:	Name: Mr. K. Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSC	Programme Title:		Bachelor of Science
Course Code:	20UPS6S3	Title	Batch:	2020-2023
		Skill based Elective II: Environmental Instrumentation	Semester:	VI
Hrs/Week:	1		Credits:	2

Course Objective

- To get adequate knowledge in thermal measurements and to understand the operational features, limitations and difficulties faced in the instrumentation

Course outcomes

K1	CO1	Understand the design and operation of instruments for measurements of various environmental factors.
K2	CO2	Analyze the systems in terms of the functional model.
K3	CO3	Develop knowledge to select and use appropriate instrumentation to gather data under varying environmental conditions.
K4	CO4	Apply the technical and analytical skills for interpretation of environmental data

Syllabus

Unit	Content	Hrs
I	**TEMPERATURE MEASUREMENTS** **Classification of temperature measuring devices** - Temperature scales - The ideal gas - Thermometer - Temperature measurement by mechanical effects - Temperature measurements by electrical effects : Electrical resistance thermometer - Thermistors - Thermoelectric effects - Quartz-crystal thermometer - *Liquid crystal thermography*	3
II	**RADIATION MEASUREMENTS** Radiation pyrometers – Blackbody conditions – Radiation reactive elements – Total radiation pyrometers – Infrared pyrometers – Optical pyrometers	3
III	**PRESSURE MEASUREMENTS:** Pressure measurement devices – Manometers: U tube manometer, Barometer –Measurement of High Pressure : Bridgmann Gauge- Low Pressure Measurements: McLeod Gauge- Ranges and applications of pressure measuring devices.	2
IV	**NUCLEAR RADIATION MEASUREMENTS** Detection of Nuclear radiation – Geiger Muller Counter – Ionisation chambers – The Scintillation counter – *Neutron detection.*	2
V	**AIR POLLUTION SAMPLING AND MEASUREMENTS** Units of pollution measurements – General air sampling train- gas sampling techniques – Sulfur dioxide measurements – Combustion products measurements – Opacity measurements	3
	Total contact hours	13

- *Italic font denotes self study*

Additional activities

Seminar, Assignment, Experience discussion, PPT

Text Books

- Sawhney A. K. Puneet Sawhney, (2004), *A Course in Mechanical Measurements and Instrumentation,* Dhanpat Rai & Co Pvt Ltd, (Units I & II).
- Jack P. Holman, (2000), *Experimental Methods for Engineers*, Tata McGraw Hill, New Delhi, (Units III - V).

Reference Books

- Rangan C. S. Sharma G. R. Mani V.S.V. (1983), *Instrumentation Devices and Systems*, Tata McGrawHill, New Delhi.

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	M	H
CO2	H	H	M	H	M
CO3	M	H	H	L	H
CO4	H	M	H	M	H

H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name:Mr. K.Raghul Kumar	Name: Dr.V. Sathyabama	Name: Mr. K. Srinivasan	Name: Dr.R.Muthukumaran
Signature:	Signature:	Signature:	Signature:

Programme Code:	BSC	Programme Title:		Bachelor of Science	
Course Code:	20UPS6S4	**Title** Skill based Elective II: Fundamentals of Astrophysics	**Batch:**	2020-2023	
			Semester:	VI	
Hrs/Week:	1		**Credits:**	2	

Course Objective

- To explore the basic knowledge and recent aspects of Space science, Quasars and Cosmology

Course outcomes

K1	CO1	To recollect the orgin and destiny of universe, astronomy, stars, quasars, cosmology etc.,
K2	CO2	To get the fundamental ideas of observational astronomy, stars, white dwarfs, nature of black holes and big bang theory.
K3	CO3	To implement the phenomena and processes associated with galaxy, stellar and formation of planetary systems, dark matter and energy
K4	CO4	To figure out the concept of red shift, expansion of universe, accelerating universe is essential for scientific and research applications

Syllabus

Unit	Content	Hrs
I	**OUR PLACE IN THE UNIVERSE** A tour of the Universe – Scale and Contents: Planets, Stars, Galaxies, Light years and the Interstellar medium	2
II	**OBSERVATIONAL ASTRONOMY** The Electromagnetic spectrum - Geometrical Optics: Ray Diagrams, Focal length, Magnification – Diffraction: Resolving Power, Airy Disc, Diffraction Limit – Telescopes: Reflecting, Refracting, Multi-wavelength.	3
III	**STARS** Stellar Parallax and the units of Stellar Distances– Saha's Equation of Thermal Ionization – Stellar temperature – Introduction to supernovae – Stellar remnants – White dwarfs – Neutron stars – *Black holes*	2
IV	**QUASARS** Constituents of Galaxies - General structure – Mass of the Galaxy – Cosmic Rays - External Galaxies: Classification and Spectra of Galaxy – *Active Galaxies and Quasars.*	3
V	**COSMOLOGY** Red shift and Expansion of the Universe – Hubble's Law – The Age of the Universe – The Big Bang – Introductory to Cosmology: The Cosmological Principle, Homogeneity and Isotropy, Olber's Paradox – Introductory to Cosmological Models: Critical Density, Geometry of Space, The fate of the Universe – Dark energy and the Accelerating Universe.	3
Total contact hours		13

- *Italic font denotes self study*

Additional activities

Seminar, Assignment, Experience discussion, PPT

Text Book

- Baidyanath Basu, Tanuka Chattopadhyay, Sudhindra Nath, (2010) *An Introduction to Astrophysics*. PHI Learning Private Limited. New Delhi, (Units I – V).

Reference Book

- Abhyankar, K.D. (1999). *Astrophysics of The Solar System*, University Press Limited. Hyderabad.

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	M	H
CO2	L	H	M	H	M
CO3	M	H	M	H	H
CO4	H	M	H	L	H

H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name:Mr. K.Raghul Kumar Signature:	Name: Dr.V. Sathyabama Signature:	Name: Mr. K. Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSC	Programme Title:		Bachelor of Science	
Course Code:	20UPS616	Title		Batch:	2020-2023
		Core XII: Electronics Lab		Semester:	V & VI
Hrs/Week:	3			Credits:	3

Course objective

- To provide a basic grounding in the field of Electronics and to serve as a hint for the student to the more advance techniques.

Course outcomes

K3	CO1	To gain knowledge of electronics
K4	CO2	To familiarize with the electronic circuits through experiment
K5	CO3	To understand the operation of amplifiers, oscillators etc

List of Experiments (Any fifteen):
1. Verification of Thevenin's theorem
2. Verification of Norton's theorem
3. Verification of Maximum power transfer theorem
4. Rectifier diode and Zener diode characteristics
5. Rectifiers and Filters
6. Voltage doubler
7. Two pin regulated power supply
8. Measurement of Band gap energy of Semiconductors
9. Transistor characteristics - Common Base mode
10. Transistor characteristics - Common Emitter mode
11. UJT – characteristics
12. Transistor voltage amplifier - Single stage
13. Hartley Oscillator
14. Square wave generator using 555 IC
15. Astable Multivibrator
16. Inverting and Non-inverting Operational amplifiers
17. Adder and Subtractor using Operational amplifiers
18. CRO Familiarization

Text Books
- Paul B.Zbar, Malvino, Miller, (1983). *Electronics: A Text- Lab Manual*. Mc.Graw Hill, New Delhi.
- Subramanian S.V. (1983). *Experiments in Electronics.* Macmillan India, Ltd, New Delhi.

Reference Books
- Paul B.Zbar, Joseph Sloop, (1997). *Electricity & Electronics Fundamentals: A Text-Lab Manual*. Mc.Graw Hill, New Delhi.
- Woollard G. (1984). *Practical Electronics*. 2nd Edition, Mc.Graw Hill, New Delhi.
- Bhargowa N.N. (1984). *Basic Electronics and Linear Circuits.* Tata Hill Publishing Co. Ltd.

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	M	M	M
CO2	M	H	H	H	H
CO3	M	H	H	H	H

H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Ms.M.Karthika Signature:	Name: Dr. V. Sathyabama Signature:	Name: Mr. K. Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSC	Programme Title:		Bachelor of Science	
Course Code:	20UPS617	**Title**		**Batch:**	2020-2023
		Core XIII: Digital & Microprocessor Lab		**Semester:**	V & VI
Hrs/Week:	3			**Credits:**	3

Course Objective

- To be acquainted with the basics and working of Electronic Digital circuits and Microprocessor.

Course outcomes

K3	CO1	Determine the behavior of a digital logic circuit
K4	CO2	Translate the Boolean equations/expressions to efficient combinational and sequential circuits.
K5	CO3	Write simple programmes to run an 8085 microprocessor.

List of Experiments (Any fifteen):

1. Study of Various logic gates using ICs and basic logic gates using discrete components
2. Study of NAND and NOR as Universal building blocks
3. Microprocessor - Addition and Subtraction
4. Construction and Study of Half and Full adders
5. Verification of Demorgan's theorems and problem solving through logic circuits
6. Microprocessor - 1's and 2's complement
7. Construction and Study of Half and Full Subtractors
8. Construction and Study of RS, D and JK flip-flops
9. Microprocessor - Multiplication
10. Construction and Study of Parallel binary adder
11. Construction and Study of Multiplexers and Demultiplexers
12. Microprocessor - Ascending and Descending orders
13. Construction and Study of Parallel binary Subtractor
14. Construction and Study of Shift registers
15. Microprocessor - Addition of an array of numbers and comparison of two numbers
16. Construction and Study of MOD 3 and MOD 5 up counters
17. Construction and Study of BCD to decimal decoder
18. Microprocessor - Division

Text Books
- Albert Paul Malvino, Donald P. Leech, (1987). *Digital Principle And Applications.* 3rd Edition, Mc.Graw Hill.
- Paul B.Zbar, Malvino, Miller, (1983). *Electronics: A Text- Lab Manual*. Mc.Graw Hill, New York.

Reference Books
- Leech, (1986). *Experiments In Digital Principles*. 3rd Edition, Mc.Graw Hill, New York.
- Paul B.Zbar, Malvino, Sloop, (1997). *Electricity & Electronics Fundamentals: A Text-Lab Manual.* Mc.Graw Hill.
- Woollard G. (1984). *Practical Electronics.* 2nd Edition,Mc.Graw Hill.
- Subramaniyan S.V. (1983). *Experiments In Electronics.* Macmillan India Ltd, New Delhi.
- Bhargowa N.N. (1984). *Basic Electronics And Linear Circuits*. Tata Hill Publishing Co Ltd, New Delhi.

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	M	H	H
CO2	H	H	M	M	H
CO3	M	M	H	H	H

H- High; M- Medium; L- Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Ms. N.Revathi Signature:	Name: Dr.V.Sathyabama Signature:	Name: Mr. K. Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

Programme code:	B.Sc.	Programme Title :		Bachelor of Science	
Course Code:	20UPS618	**Title**	**Batch :**	2020-2023	
		Core XIV: Computer Lab in C	**Semester**	VI	
Hrs/Week:	2		**Credits:**	2	

Course Objective

- To develop the skill to gain knowledge in C

Course Outcomes (CO)

K3	CO1	To keep in mind the basics of C programming
K4	CO2	To understand and become familiar with C programs
K5	CO3	To verify the concepts through simple programs

List of Programs:
1. Temperature Conversion
2. Largest /Smallest of three numbers
3. Quadratic equation
4. Fibonacci number
5. Armstrong number
6. Electric Power Consumption
7. Sum of n numbers
8. Ascending/Descending order
9. Matrix Addition/ Subtraction
10. Matrix multiplication
11. Sorting of names
12. Multiplication Table
13. Swapping of two numbers using function
14. Factorial of any number using recursion function
15. Pointer as function arguments

Text Book

- Balagurusamy E. (2004). *Programming In Ansi C.* Tata McGraw Hill Publishing Company, New Delhi.

Reference Books
- Ravichandran D. (1998). *Programming In C.* New Age International (P) Limited Publishers.
- Yashvant Kanetkar, (1995).*Let Us C.* 2nd Revised Edition, BPB Publications, New Delhi.

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	H	M	H
CO2	M	H	M	H	H
CO3	H	M	H	H	L

H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Dr. A. G. Kannan	Name: Dr.V.Sathyabama	Name: Mr. K. Srinivasan	Name: Dr.R.Muthukumaran
Signature:	Signature:	Signature:	Signature:

Programme Code:	BSC	Programme Title:		Bachelor of Science	
Course Code:	20UMS3A3/ 20UCY3A3	**Title** Physics for Mathematics and Chemistry - I	**Batch:**	2020-2023	
			Semester:	III	
Hrs/Week:	5		**Credits:**	4	

Course Objective

- To acquire the knowledge in concepts of applied physics

Course outcomes

K1	CO1	To understand the basic principles in mechanics
K2	CO2	Develop the knowledge in estimating the mechanical parameters
K3	CO3	To enhance the knowledge in applications
K4	CO4	Apply the principles of physics in mathematics and chemistry

Syllabus

Unit	Content	Hrs
I	**ELASTICITY** Stress and Strain – Different moduli of Elasticity – Poisson's ratio – Relation between angle of shear and linear strain – Work done in a strain – Relation between the elastic moduli- Determination of Poisson's ratio for rubber – Torsion of a cylinder – Expression for torque per unit twist – Work done in twisting a wire – Torsion oscillations of a body – Rigidity modulus by torsion pendulum (Dynamic torsion) – Bending of beam – Expression for bending moment – Uniform bending of a beam- *Measurement of Young's Modulus*	13
II	**GRAVITATION AND MOMENT OF INERTIA** Newton's law of gravitation - Kepler's laws of planetary motion - Gravitational potential and field – Potential and field due to a spherical shell – Potential and field due to a solid sphere – Variation of g with altitude – Variation of g with depth – Compound Pendulum - Variation of g with compound pendulum – Moment of inertia – Perpendicular axes and Parallel axes theorem – Moment of inertia of a circular disc.	13
III	**ACOUSTICS AND SOUND** Types of sound - Reverberation- Sabine's formula – Factors affecting the acoustics of building - Ultrasonics – Piezoelectric effect - Production of Ultrasonic waves - magnetostiction method – Piezoelectric crystal method – Properties of ultrasonics – Determination of velocity of ultrasonic waves in liquid – Sonar – Industrial applications – *Medical applications.*	13
IV	**LASERS** Characteristics of lasers – Absorption and Emission – Einstein's coefficients – Population inversion – Pumping methods – Components of laser - Production of laser: CO_2 laser – He-Ne laser – Nd: YAG laser – Semiconductor laser - Industrial and Medical applications.	13
V	**FIBER OPTICS** Optical fibre –Optical fibre system - Optical fibre cable -Total internal reflection – Propagation of light through an optical fibre – Critical angle – Acceptance angle – Numerical aperture – Classification of optical fibres – Types of fibres – Fibre optic communication system – fiber optic sensors – Temperature sensors – Displacement sensor.	13
Total contact hours		65

- *Italic font denotes self study*

Additional activities

Seminar, Assignment, Experience discussion, PPT

Text Book

- Murugesan R. (2016). *Properties of Matter*. S. Chand & Company Ltd, New Delhi, (Unit I – III).
- Subrahmanyam and Brijlal, Avadhanulu M.N. (2016). A Test Book of Optics. S. Chand & Company Ltd, New Delhi, (Unit IV & V)

Reference Books

- Mathur D.S. (2003). *Elements of Properties of Matter*. Shyam Lal Charitable Trust, New Delhi.
- Pedrotti L. & Pedrotti S. (2008). Introduction to Optics. Prentice Hall International Edition, New Delhi.
- Wayne Tomasi and Vincent F. Alisouskas. (1998). Telecommunications. Prentice Hall International Edition, New Delhi.

Mapping

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	H	H	M
CO2	M	H	M	M	H
CO3	H	H	M	H	L
CO4	M	L	H	H	M

H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Mr. T. Ponraj Signature:	Name: Dr. V. Sathyabama Signature:	Name: Signature:	Name: Dr.R.Muthukumaran Signature:

Programme code:	BSC	Programme Title :		Bachelor of Science	
Course Code:	20 UMS 4A4 / 20 UCY 4A4	**Title**		**Batch :**	2020-2023
		Physics For Mathematics & Chemistry- II		**Semester**	IV
Hrs/Week:	5			**Credits:**	4

Course Objective

- To develop the basic concepts of physics applied in chemistry and mathematics

Course outcomes

K1	CO1	To understand the basic concepts of physics in electricity, semiconductors, optics and digital electronics
K2	CO2	To differentiate analog and digital systems
K3	CO3	To gain an enhanced knowledge on number systems and logical expressions
K4	CO4	To convert the expressions into useful circuits

Unit	Content	Hrs
I	**ELECTRICITY AND MAGNETISM** Electric field, Intensity & Potential - Potential due to a charged conducting sphere - Capacitance - Parallel plate capacitor - Energy stored in a charged capacitor - Kirchoff's law - Wheatstone's bridge - Potentiometer - Measurement of Resistance & EMF - Calibration of Ammeter & Voltmeter - *Biot Savart law* - Field along the axis of a circular coil – Magnetic induction at a point due to straight conductor carrying current.	13
II	**WAVE OPTICS** Interference - Theory of interference - Young's double slit experiment – Condition for bright and dark fringes - Newton's rings - Condition for bright and dark rings – radius of dark fringes – spacing between fringes - Theory of plane transmission grating – Dispersive power of grating – prism and grating spectra – polarization – unpolarized and polarized light – types of polarization.	13
III	**SEMICONDUCTOR PHYSICS** Semiconductor - Intrinsic and Extrinsic semiconductors - Junction diode and Zener diode characteristics - Half & Full wave Rectifiers - Regulated power supply - Transistor and its action – Characteristics of common base, common emitter and common collector configurations - Relations between α and β	13
IV	**NUMBER SYSTEMS** Binary, octal, decimal, hexadecimal number systems, Binary Addition and Subtraction, Multiplication & Division – Conversion of number systems - one's complement and two's complement subtraction - BCD number system - Gray code - gray to binary and binary to gray conversion - Excess 3 code – *ASCII codes*	13
V	**LOGIC GATES AND CIRCUITS** OR, AND & NOT gates using Discrete components and ICs - NOR & NAND gates - Universal building blocks - Demorgan's theorems - XOR & XNOR gates - Laws and theorems of Boolean algebra - Simplification of Boolean expression - Half & full adders - Half & full subtractors	13
Total contact hours		65

- *Italic font denotes self study*

Additional activities

Seminar, Assignment, Experience discussion, PPT

Text Books

- Murugeshan R, (2008). *Electricity and Magnetism*, S.Chand & Company Ltd, New Delhi,   (Unit - I).
- Brijlal and Subramaniam, (1999). *A Text Books Of Optics*. S.Chand & Company Ltd, New Delhi, (Unit - II).
- Theraja B.L, (1998). *Basic Electronics Solid state*. S.Chand & Company Ltd, New Delhi,   (Units – III to V).
- Murugeshan R & Kiruthiga sivaprasath (2016). *Modern Physics*, S.Chand & Company Ltd, New Delhi, (Units – III to V).

Reference Books

- Brijlal and Subramaniam, (1987). *Electricity and Magnetism*, S.Chand & Company Ltd, New Delhi.
- Sadasiva Biswal, (2001). *Basic Electronics*. Atlantic Publishers and Distributors.
- Narayana Rao B.V. (1994). *Principles of Electronics*. Wiley Eatern Limited New Age International Limited.
- Malvino and Leech, (1986). *Digital Principles and Applications*. Tata Mc Graw Hill Publishing Company, New Delhi.

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	H	L
CO2	M	M	H	M	H
CO3	H	L	L	M	M
CO4	M	H	H	L	H

H-High; M-Medium; L-Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Mr.T.Ponraj Signature:	Name: Dr. V. Sathyabama Signature:	Name: Mr. K.Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSc	Programme Title:	Bachelor of Science		
Course Code:	20UMS4A5 / 20UCY4A5	**Title**	Batch:	2020-2023	
		Physics Lab For Mathematics & Chemistry	Semester:	III & IV	
Hrs/Week:	3		Credits:	4	

Course Objective

- To enable the student to gain practical knowledge

Course Outcomes

K3	CO1	To gain an in-depth knowledge and understanding of the functions of Potentiometer and Ballistic galvanometer
K4	CO2	To apply the concepts of physics on measurements and instrumentations of physical experiments
K5	CO3	To acquire enhanced practical skills in digital measurements

List of Experiments:

1. Refractive index of a Prism - Spectrometer
2. Refractive index of a Lens - Newton's Rings
3. Specific resistance of a Wire - Potentiometer
4. Horizontal Component of Earth's Magnetic Field (H) - Field along the axis of a Circular coil carrying current
5. Characteristics of PN Junction Diode
6. Basic Logic Gates - Discrete Components & ICs
7. Demorgan's Theorems and Problem solving in Boolean Algebra through Logic Circuits
8. Half & Full Adder
9. NAND as Universal building block
10. Refractive index of a Prism – i d Curve - Spectrometer
11. Wavelength of Mercury source – Grating - Normal incidence – Spectrometer
12. Calibration of Low range Voltmeter and Ammeter - Potentiometer
13. Magnetic Moment (M) - Field along the axis of a Circular coil carrying current
14. Characteristics of Zener Diode
15. Rectifiers & Filters
16. Two pin Regulated Power supply
17. Half & Full Subtractor
18. NOR as Universal building block.

Text Book
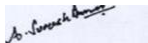- Govindarajan S.R. Sundarajan S. (1959). *Practical Physics*. Roc house & sons Pvt Ltd.

Reference Book
- Paul B.Zbar, Malvino, Miller, (1983). *Electronics: A Text- Lab Manual*. Mc.Graw Hill, New Delhi.

Mapping

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	H	H
CO2	M	M	H	H	H
CO3	H	H	H	M	M

H-High; M-Medium; L-Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Dr. A. Suresh kumar / Mr. T. Ponraj Signature:	Name: Dr. V. Sathyabama Signature:	Name: Mr. K. Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:

Name: Dr. A. Suresh kumar / Mr. T. Ponraj	Name: Dr. V. Sathyabama	Name: Mr. K. Srinivasan	Name: Dr.R.Muthukumaran

Programme Code:	BSC	Programme Title:		Bachelor of Science	
Course Code:	20UMS4A5 / 20UCY4A5	**Title**		**Batch:**	2020-2023
		Physics Lab For Mathematics & Chemistry		**Semester:**	III & IV
Hrs/Week:	3			**Credits:**	4

Course Objective

- To enable the student to gain practical knowledge in Physics instruments

Course Outcomes

K3	CO1	To gain a depth knowledge in Elasticity of rigid materials
K4	CO2	To apply the concepts of physics on measurements and instrumentations of physical experiments
K5	CO3	To acquire enhanced practical skills in analog and digital measurements

List of Experiments:

19. Young's modulus – Uniform bending - Pin and Microscope
20. Young's modulus – non-Uniform bending - Pin and Microscope
21. Rigidity Modulus and Moment of Inertia – Torsional Pendulum
22. Acceleration due to Gravity and Moment of Inertia - Compound pendulum
23. Wavelength of Mercury source – Grating - Normal incidence – Spectrometer
24. Refractive index of a Prism - Spectrometer
25. Refractive index of a Lens - Newton's Rings
26. Calibration of Low range Voltmeter and Ammeter - Potentiometer
27. Specific resistance of a Wire - Potentiometer
28. Horizontal Component of Earth's Magnetic Field (H) - Field along the axis of a Circular coil carrying current
29. Characteristics of PN Junction Diode
30. Characteristics of Zener Diode
31. Basic Logic Gates using ICs
32. NAND as Universal building block
33. NOR as Universal building block
34. Demorgan's Theorem verification using logic gate ICs
35. Half & Full Adder
36. Half & Full Subtractor

Text Book
- Govindarajan S.R. Sundarajan S. (1959). *Practical Physics*. Roc house & sons Pvt Ltd.

Reference Book
- Paul B.Zbar, Malvino, Miller, (1983). *Electronics: A Text- Lab Manual*. Mc.Graw Hill, New Delhi.

Mapping

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	H	M
CO2	M	M	H	M	H
CO3	H	H	H	M	M

H-High; M-Medium; L-Low

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