Programme Code:	BSC	Programme Title:	Bachelor of Science	
Course Code:	18UPS101	Title	Batch:	2018-2021
		Core I: Properties of Matter	Semester:	I
Hrs/Week:	3		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 recollect the physical properties of different states of matter
K2	CO2	To understand the applications of the elastic properties of solids
K3	CO3	To implement the knowledge of properties for the thermal expansion of solids
K4	CO4	To analyze the diffusion of gases in various media

Syllabus

Unit	Content	Hrs
I	**GRAVITATION** Kepler's laws - Newton's law of gravitation - Gravitational constant : Boy's Method - Gravitational field and Gravitational potential - Potential energy - Escape velocity - Equipotential surface - Earthquakes - Seismic waves - *Applications of Seismology*	8
II	**ELASTICITY** Stress and Strain - Hooke's law - Types of Elasticity - Relation connecting the Elastic constants - Poisson' s ratio - Torsional pendulum - Determination of Moment of Inertia : The Inertia Table - Bending of beams - Bending moment – Depression of a beam Supported at the ends	8
III	**VISCOSITY** Viscosity - Coefficient of viscosity - Poiseuille's equation for the flow of liquid through a horizontal capillary tube – Experimental determination of coefficient of viscosity for a liquid - Motion in a viscous medium: Stoke's law - Determination of coefficient of viscosity of highly viscous liquid - Stoke's method	8
IV	**SURFACE TENSION** Surface tension - Surface energy - *Excess pressure inside a liquid drop and soap bubble* - Determination of surface tension of a bubble - Capillary rise - Energy required to raise a liquid in a capillary tube - Experimental study of variation of surface tension with temperature	8
V	**DIFFUSION AND OSMOSIS** Diffusion - Fick's law - Graham's law of diffusion of gases - Osmosis and osmotic pressure - Laws of osmotic pressure - Experimental determination of osmotic pressure	7
Total contact hours		39

- *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, New Delhi, (Units I - V).

Reference Books

- Brijlal & Subramaniam, (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	S	M	S	H	M
CO2	H	H	S	H	M
CO3	M	M	S	S	M
CO4	M	S	S	M	H

S – Strong; H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Mr.T.Ponraj Signature:	Name: Dr.K.Kandaswamy Signature:	Name: Dr.M.Durairaju Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSC	Programme Title:	Bachelor of Science	
Course Code:	18UPS102	Title	Batch:	2018-2021
		Core II: Mechanics & Sound	Semester:	I
Hrs/Week:	5		Credits:	3

Course Objective

- To acquire a complete knowledge about mechanics and sound

Course outcomes

K1	CO1	To remember the principles of rigid body, statics, dynamics and sound
K2	CO2	To understand the mechanics behind rigid body, projectiles and dynamics
K3	CO3	To analyze the characteristics of sound and requisites of good acoustics
K4	CO4	To solve problems based on dynamics

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.	7
II	**Statics and Dynamics** Force of friction –Limiting friction – Laws of friction –Angle of friction - Definition and determination of centre of pressure – Expression for centre of pressure of a rectangular lamina with one side on the surface of the liquid – Laws of floatation–Definition for metacentre and metacentric height. **Hydrodynamics** Steady or streamline flow and turbulent flow (qualitative analysis) – Lines and tubes flow – Equation of continuity of flow–Bernoulli's theorem.	8
III	**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 (qualitative analysis).	8
IV	**Sound** Classification of Sound - Musical sound and Noise – Speech – Human voice – Human Ear – Characteristic of Musical Sound – Intensity of Sound – Measurement of Intensity of Sound – Decibel – Phon(Definitions only) – Velocity of Transverse waves along a stretched string – Laws of transverse vibration of strings – Melde's experiment – Resonance.	8
V	**Acoustics and Ultrasonics** Introduction – Reverberation – Sabine's Reverberation formula (qualitative analysis) – Determination of Absorption coefficient – Factors affecting Acoustics of buildings - Requisites for good acoustics in auditorium – Ultrasonics – Production of Ultrasonics: Piezoelectric oscillator – *Detection of Ultrasonic waves* – Acoustic grating - *Applications of Ultrasonics: Depth of the sea and non-destructive testing*	8
Total contact hours		39

- *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 & III).
- Venkataraman M.K. (2014). *Dynamics*. Agasthiar Publications, Trichy, (Unit II).
- Brijlal. N. Subramaniam. (2002). *Text Book of Sound*. Vikas Publications house Pvt Ltd, NewDelhi, (Unit IV & 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.
- Mathur D.S. (2003). *Elements Of Properties Of Matter*. Shyam Lal Charitable Trust, New Delhi,

Mapping

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

S – Strong; H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: S.Shanmuga Priya Signature:	Name: Dr.K.Kandaswamy Signature:	Name: Dr.M.Durairaju Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSC	Programme Title:	Bachelor of Science	
Course Code:	18 UPS203	Title	Batch:	2018-2021
		Core III: 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	**THERMOMETRY AND SPECIFIC HEATS** Concept of heat and temperature - Thermoelectric thermometer - Absolute zero and Ice point - Low temperature measurement - High temperature measurement - Specific heat of a gas – C_p & C_v- Determination of C_v by Joule's differential steam calorimeter - Determination of C_p by continuous flow electrical method - Dulong and Petit's law - *Variation of Specific heat and Atomic heat with temperature.*	13
II	**KINETIC THEORY OF GASES** Kinetic theory of gases - Postulates - 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 - Corresponding states of matter	13
III	**TRANSMISSION AND RADIATION OF HEAT** Thermal conductivity - Forbe's method - Radial and cylindrical flow of heat - Thermal conductivity of rubber - 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
IV	**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 - *Electrolux refrigerator*	13
V	**THERMODYNAMICS** Zeroth law of thermodynamics - Thermal equilibrium - Comparison of heat and work - First law of thermodynamics - Isothermal and Adiabatic process - Work done during Isothermal and Adiabatic process - Reversible and Irreversible process - Carnot's reversible engine - Carnot's theorem - Second law of thermodynamics - Entropy : Reversible and Irreversible process - Third law of thermodynamics - Temperature - Entropy diagram	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	S	H	M	H
CO2	H	M	S	H	M
CO3	M	H	H	S	S
CO4	S	M	S	M	H

S – Strong; 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: Mr. T.Ponraj Signature:	Name: Dr.K.Kandaswamy Signature:	Name: Dr.M.Durairaju Signature:	Name: Dr.R.Muthukumaran Signature:

Programme code:	BSC	**Programme Title :**	Bachelor of Science	
Course Code:	18UPS204	**Title**	**Batch :**	2018-2021
		Core IV: 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	S	S	S	S	H
CO2	S	H	S	H	H
CO3	H	H	S	H	S

S – Strong; H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Dr.M.Karthika Signature:	Name: Dr.K.Kandaswamy Signature:	Name: Dr.M.Durairaju Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSC	Programme Title:	Bachelor of Science	
Course Code:	18UPS3N1	Title	Batch:	2018-2021
		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	**INTRODUCTION TO ENERGY SOURCES** Conventional energy sources: Coal – Gas – Water – Agriculture and organic waste – Non conventional sources: Solar energy – Renewable energy resources	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	S	H	S	S
CO2	S	H	S	H	M
CO3	M	S	S	M	S
CO4	S	S	S	H	H

S – Strong; H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Ms.S.Yogeshwari Signature:	Name: Dr.K.Kandaswamy Signature:	Name: Dr.M.Durairaju Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSC	**Programme Title:**	Bachelor of Science	
Course Code:	18UPS3N2	**Title**	**Batch:**	2018-2021
		Non-Major Elective I: Renewable Energy Sources	**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	S	S	H	S	S
CO2	S	H	S	H	M
CO3	S	S	S	M	S
CO4	S	S	S	H	H

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Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Ms.S.Yogeshwari Signature:	Name: Dr.K.Kandaswamy Signature:	Name: Dr.M.Durairaju Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSC	**Programme Title:**	Bachelor of Science	
Course Code:	18UPS305	**Title**	**Batch:**	2018-2021
		Core V: Electricity & Magnetism	**Semester:**	III
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.	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 - *Dielectric strength*	13
III	**MAGNETOSTATICS AND MAGNETIC FIELD** Magnetic effect of current - 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 - Application to a current carrying conductor and solenoid	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

V	**MAXWELL'S EQUATIONS AND ELECTROMAGNETIC THEORY** Basic equations - Types of current - Vacuum displacement current - Maxwell's equations (No derivations) - 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 (statement only) - 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	S	H	M	H
CO2	H	M	S	H	M
CO3	M	H	H	S	S
CO4	S	M	S	M	H

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Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Mr.T.Ponraj Signature:	Name: Dr.K.Kandaswamy Signature:	Name: Dr.M.Durairaju Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSC	**Programme Title:**	Bachelor of Science	
Course Code:	18UPS4N3	**Title**	**Batch:**	2018-2021
		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	Electric train – Leak proof battery –Hot air balloons – Remote control in TV –Superconductivity – *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	2
IV	Refrigerants and their use in refrigerators - Frost formation - Air Cooler & Conditioner - Black box in Planes - Speech synthesizers - Lie detector - Pencil eraser - Bullet proof glass - Dry cleaning - Aeroplane not affected by lightning - Mosquito mats - Unleaded Petrol and two wheelers - *Oil with Petrol for two wheelers*	3
V	TFM on soap - Cell phones - Cordless phones - Tubeless tyres - Radial & Ordinary tyres- Non linear editing - Tear gas - Smell of Dust bin - Biological Weapon -Super Plasticizers in concrete - Super Computers - Computers Simulation -Artificial teeth – Aqualung - Purity of Honey - Breath analyzers	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	S	H	S	S	S
CO2	M	S	S	H	S
CO3	S	H	H	S	S
CO4	S	S	S	M	H

S – Strong; H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name:Ms.S.Yogeshwari Signature:	Name: Dr.K.Kandaswamy Signature:	Name: Dr.M.Durairaju Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSC	Programme Title:	Bachelor of Science	
Course Code:	18UPS406	Title	Batch:	2018-2021
		Core VI: Optics & Spectroscopy	Semester:	IV
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 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** Characteristics of wave motion - Transverse and longitudinal wave motion - Theory of interference - Fresnel's biprism experiment - Determination of wavelength - Interference due to reflected light - Colours of thin films - Air wedge - Testing the planeness of surfaces - Newton's rings - Determination of wavelength and refractive index of a liquid	13
II	**DIFFRACTION** Fresnel's explanation of rectilinear propagation of light - Zone plate - Zone plate as converging lens - Fresnel's diffraction at a circular aperture - Fraunhofer diffraction at a single slit - Theory of the plane transmission grating - Determination of wavelength	13
III	**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
IV	**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
V	**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 – NMR: Splitting of nuclear level in a magnetic field – Block diagram of NQR spectrometer – ESR: Interaction with magnetic field - Block diagram of ESR spectrometer	13
Total contact hours		65

- *Italic font denotes self study*

Additional activities

Seminar, Assignment, Experience discussion, PPT

Text Books

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

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.
- Subramanyam N. Brijlal, *Waves And Oscillations*. S.Chand & Co, New Delhi.

Mapping

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

S – Strong; H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Dr.K.Kandaswamy Signature:	Name: Dr.K.Kandaswamy Signature:	Name: Dr.M.Durairaju Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSC	Programme Title:	Bachelor of Science	
Course Code:	18UPS407	Title	Batch:	2018-2021
		Core VII: 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	S	M	S	M	S
CO2	M	S	H	S	H
CO3	M	S	S	S	S

S – Strong; H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Ms.N.Revathi Signature:	Name: Dr.K.Kandaswamy Signature:	Name: Dr.M.Durairaju Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSC	**Programme Title:**	Bachelor of Science	
Course Code:	18UPS508	**Title**	**Batch:**	2018-2021
		Core VIII: Classical Dynamics	**Semester:**	V
Hrs/Week:	5		**Credits:**	5

Course Objective

- To understand the fundamental concepts in the dynamic of a particle and system of particles.

Course outcomes

K1	CO1	To recollect the mechanics of a particle
K2	CO2	To define and demonstrate knowledge of the different formalisms in classical dynamics of a system
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	**MECHANICS OF A PARTICLE** Linear momentum - Angular momentum-Work- Power- Kinetic energy Conservative forces- Potential energy- Conservation theorem for linear momentum Conservation theorem for angular momentum - Conservation theorem for energy - Motion of a particle under time dependent applied force –Motion of a free electron in oscillating field - Motion of a particle under damping forces - Motion of a particle under central force – Application to Projectile and simple harmonic vibrations	13
II	**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
III	**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
IV	**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

V	**HAMILTON - JACOBI FORMULATION** Canonical or contact Transformations: Point Transformation, Canonical Transformation, Generating Function (Four forms) - Advantage of Canonical Transformations - Hamilton Jacobi method - Harmonic Oscillator problem by Hamilton Jacobi method - Hamilton Jacobi equation for Hamilton's Characteristic function.	13
Total contact hours		65

- *Italic font denotes self study*

Text Books

- Gupta S.N. (1970). *Classical Mechanics*. Meenakshi Prakashan Publications, Meerut, (Unit I).
- Gupta, Kumar, Sharma, (2006). *Classical Mechanics*. 21st Edition, Pragati prakasan, Meerut, (Units II – V).

Reference Books

- Herbert Goldstein, (1985). *Classical Mechanics*. 2nd Edition, Narosa publishing House, New Delhi.

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Ms.K.V.Jayasree Signature:	Name: Dr.K.Kandaswamy Signature:	Name: Dr.M.Durairaju Signature:	Name: Dr.R.Muthukumaran Signature:

Programme code:	BSC	**Programme Title :**	Bachelor of Science	
Course Code:	18UPS509	**Title**	**Batch :**	2018-2021
		Core IX: Relativity & Quantum Mechanics	**Semester**	V
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** de-Broglie waves – The de-Broglie wavelength – Expression for group velocity – Experimental study of matter waves : Davisson and Germer'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 - Particle in a box: Infinite square well potential - Potential step - The barrier penetration problem - Linear Harmonic oscillator - *The rigid rotator*	13
V	**QUANTUM THEORY OF HYDROGEN ATOM** Schrödinger's equation for the Hydrogen atom - Separation of variables- 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*

Additional activities

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.

Mapping

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

S – Strong; H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Dr.M.Karthika Signature:	Name: Dr.K.Kandaswamy Signature:	Name: Dr.M.Durairaju Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSC	**Programme Title:**	Bachelor of Science	
Course Code:	18UPS510	**Title**	**Batch:**	2018-2021
		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*. 1stEdition, 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	S	H
CO2	S	M	S	H	M
CO3	M	H	H	M	S
CO4	H	S	H	M	H

S – Strong; H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Dr.K.Kandaswamy Signature:	Name: Dr.K.Kandaswamy Signature:	Name: Dr.M.Durairaju Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSC	**Programme Title:**	Bachelor of Science	
Course Code:	18UPS511	**Title**	**Batch:**	2018-2021
		Major Elective II: Digital Principles and its applications	**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, octal, decimal, hexadecimal number system: Addition, 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
II	**LOGIC GATES** OR, AND and NOT gates - NAND and NOR gates - Universal building blocks - XOR and XNOR gates - Demorgan's theorems - Laws and theorems of Boolean algebra - Simplification of Boolean expressions - Karnaugh map - Pairs, quads and octets - Sum of product method and simplifications - Don't care conditions - *Product of sum method and simplifications*	13
III	**ARITHMETIC AND DATA PROCESSING CIRCUITS** Half and full adders - Half and full subtractors - Parallel binary adder and subtractor - Multiplexers - Demultiplexers - 1 - of - 16 decoder - BCD to decimal decoder - Seven segment decoders - Encoders	13
IV	**FLIP FLOPS, REGISTERS AND COUNTERS** 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 -Asynchronous Mod 8 up and down counters - Decoding gates - Synchronous Mod 8 up and down counters - Mod 3, Mod 5, and Mod 10 counters - Presettable counter - Digital clock	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*

Additional activities

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 - IV).
- Aditya P.Mathur, (1997). *Introduction To Microprocessor*. 3rd Edition,Tata McGrawHill, New Delhi,(Units V).

Reference Books

- Ramesh S.Gaonkar, (1997). *Microprocessor Architecture, Programming And Applications With The 8085*. 3rd Edition, Penram International Publishing, India.

Mapping

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

S – Strong; H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Ms.N.Revathi Signature:	Name: Dr.K.Kandaswamy Signature:	Name: Dr.M.Durairaju Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSC	**Programme Title:**	Bachelor of Science	
Course Code:	18UPS5S1	**Title**	**Batch:**	2018-2021
		Skill based Elective I: Mechanical Measurements	**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	**MEASUREMENT OF DENSITY AND HUMIDITY** Hydrometer – Density measurement using LVDT – Electrical Hygrometers – Sling Psychrometer	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	S	S	H	S	H
CO2	H	M	S	H	M
CO3	M	H	H	M	S
CO4	S	S	S	M	H

S – Strong; H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Mr. P.Sivaraj Signature:	Name: Dr.K.Kandaswamy Signature:	Name: Dr.M.Durairaju Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSC	**Programme Title:**	Bachelor of Science	
Course Code:	18UPS5S2	**Title**	**Batch:**	2018-2021
		Skill based Elective I: Fundamentals of Biophysics	**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	S	M	S	H
CO2	S	H	S	H	M
CO3	M	H	H	H	S
CO4	S	S	M	M	H

S – Strong; H – High; M – Medium; L – Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Mr. P.Sivaraj Signature:	Name: Dr.K.Kandaswamy Signature:	Name: Dr.M.Durairaju Signature:	Name: Dr.R.Muthukumaran Signature:

Programme code:	BSC	Programme Title :	Bachelor of Science	
Course Code:	18 UPS 3A1	Title	Batch :	2018-2021
		Allied:Physics For Mathematics & Chemistry- I	Semester	III
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 - Determination of M & H - Electromagnetic induction	13
II	**WAVE OPTICS** Young's double slit experiment - Coherent sources - Theory of interference fringes - Interference due to reflected light (Thin films) - Colour of thin films - Newton's rings - Determination of λ and μ - Theory of plane transmission grating - Determination of λ of Mercury light - Plane polarized light - Nicol prism as Analyzer and Polarizer - Optical activity - Laurent's half shade Polarimeter	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 - Common base and common emitter configurations - Relations between α and β	13
IV	**NUMBER SYSTEMS** Binary, octal, decimal, hexadecimal number system: Addition, 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, (Unit - III).
- Malvino and Leech, (1986). *Digital Principles and Applications*. Tata Mc Graw Hill Publishing Company, New Delhi (Units IV & 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.

Mapping

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

S-Strong; H-High; M-Medium; L-Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Mr.A.G.Kannan Signature:	Name: Dr.K.Kandaswamy Signature:	Name: Dr.M.Durairaju Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSC	**Programme Title:**	Bachelor of Science	
Course Code:	18UPS4A2	**Title**	**Batch:**	2018-2021
		Allied: Physics For Mathematics & Chemistry- II	**Semester:**	IV
Hrs/Week:	5		**Credits:**	4

Course Objective

- To develop basic knowledge in the field of fiber optics, atomic, nuclear and quantum physics

Course outcomes

K1	CO1	To understand the structure of atom and Nucleus
K2	CO2	Gain a basic knowledge of Quantum physics and special theory of relativity
K3	CO3	To get an insight in to the field of laser and fiber optics
K4	CO4	To appreciate the beauty of physics

Syllabus

Unit	Content	Hrs
I	**ATOMIC PHYSICS** Discharge of electricity through rarified gases - Cathode rays - Properties - Determination of charge of electron by Millikan's oil drop method -Positive rays - Thomson parabola method - Rutherford atom model - Bohr atom model - Hydrogen spectral series - Critical potentials - Sommerfield atom model - Vector atom model (qualitative) - *Pauli's exclusion principle*	13
II	**NUCLEAR PHYSICS** Basic properties of nucleus - Binding energy, Mass defect and Nuclear force - Liquid drop model - Law of radioactivity - Half life and Mean life - Radioactive dating - α, β and γ decay process (Basic ideas) - Nuclear fission - Chain reaction & Atom bomb - Nuclear reactors - Nuclear fusion & Sources of stellar energy - Thermonuclear reactions & Hydrogen bomb	13
III	**QUANTUM PHYSICS** Black body radiation and Planck's hypothesis - Photoelectric phenomena and Experimental investigations - Einstein's equation and Millikan's experiment - De Broglie's concept of Matter waves and De Broglie wavelength – G.P.Thomson Experiment - Uncertainty Principle - Postulates of wave mechanics - Wave function and significance - Schrodinger equation (one dimensional) - Eigen values and Eigen functions	13
IV	**SPECIAL THEORY OF RELATIVITY** Frames of reference - Newtonian Relativity - Michelson Morley experiment and explanation for negative results - Postulates of special theory of relativity - Lorentz transformation - Time dilation - Length contraction - Addition of velocities - Variation of mass with velocity - Equivalence of mass and energy	13
V	**LASER OPTICS** Concept of energy levels - Einstein's coefficients (qualitative) -Population inversion - Pumping methods - Essential elements and Action of laser system - Characteristics - *Holography and Lasers in medicine (Basic ideas)* **FIBER OPTICS** Construction and types of optical fiber - Critical angle - Propagation of light	13

	through optical fiber - Optical fiber configurations - Acceptance angle, Acceptance cone and Numerical aperture - Fiber optic communication system	
Total contact hours		65

- *Italic font denotes self study*

Additional activities

Seminar, Assignment, Experience discussion, PPT

Text Books

- Murugesan R. (2001). *Modern Physics*. S.Chand & Company Ltd, New Delhi, (Units I - IV).
- Brij Lal Subramanyam N. and Avadhanulu M.N, "A Text Book of Optics" . S.Chand & Company Ltd, New Delhi, (Unit – V)

Reference Books

- Arthur Beiser, (2003). Concepts of *Modern Physics*. Addison Wesley Pvt Ltd.
- Raymond.A.Serway, (2007). *Physics For Scientists And Engineers*. Saunders College Publishing (Harcourt Brace College Publishers).
- Pedrotti L. & Pedrotti S. (2008). *Introduction To Optics*. Prentice Hall international Edition, New Delhi..
- Wayne Tomasi and Vincent F.Alisouskas. (1988). *Telecommunications*. Prentice Hall International, New Delhi.

Mapping

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

S-Strong; H-High; M-Medium; L-Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Mr.A.G.Kannan Signature:	Name: Dr.K.Kandaswamy Signature:	Name: Dr.M.Durairaju Signature:	Name: Dr.R.Muthukumaran Signature:

Programme Code:	BSC	Programme Title:	Bachelor of Science	
Course Code:	18UPS4A3	Title	Batch:	2018-2021
		Allied: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	S	M	H	S
CO2	M	M	H	S	H
CO3	H	S	S	M	M

S-Strong; H-High; M-Medium; L-Low

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Mr.A.G.Kannan Signature:	Name: Dr.K.Kandaswamy Signature:	Name: Dr.M.Durairaju Signature:	Name: Dr.R.Muthukumaran Signature: