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:	18UPS4N4	**Title**	**Batch:**	2018-2021
		Non-Major Elective II : Renewable Energy Sources Paper – 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	S	M	H	L	S
CO2	M	M	S	M	H
CO3	H	H	L	S	S
CO4	M	S	H	M	M

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:	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:	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:	18UPS6S3	**Title**	**Batch:**	2018-2021
		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** 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	**THERMAL MEASUREMENTS** Detection of thermal radiation – Measurement of emissivity – Reflectivity and Transmissivity measurements – Solar radiation measurements	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	S	H	M	H
CO2	S	H	S	H	M
CO3	M	H	H	S	S
CO4	S	M	S	M	H

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

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Dr.T.E.Manjulavalli 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:	18UPS6S4	**Title**	**Batch:**	2018-2021
		Skill based Elective II: Fundamentals of Astrophysics	**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** Properties of stars – Stellar structure and Evolution – 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.

Mapping

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

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

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: 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:	18UPS612	**Title**	**Batch:**	2018-2021
		Core X: Mathematical Physics	**Semester:**	VI
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	S	S	S	S	S
CO2	M	S	S	S	M
CO3	S	M	M	S	M
CO4	M	M	M	M	S

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

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: 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:	18UPS613	**Title**	**Batch:**	2018-2021
		Core XI: 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	**CONCEPT OF ELECTRON** Charge of electron by Millikan's oil drop method - J.J Thomson's method to determine e/m - Positive rays - Isotopic constitution of elements - Photoelectric effect - Experimental investigations - Einstein's equation - Millikan's experiment. **STRUCTURE OF THE ATOM** Bohr's theory of Hydrogen atom - Excitation & Ionisation potentials - Experimental verification of discrete atomic energy levels - Correspondence principle - Sommerfeld model & Relativistic effects - 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** The law of radioactive decay and decay rate - Half life and Mean life - Alpha decay: spontaneous decay - General characteristics - Beta decay: Condition for spontaneous decay - Characteristics of beta ray spectra - Gamma decay: Gamma ray emission - 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).
- Murugeshan R, (2009) *Modern Physics*, S. Chand and Company Ltd, 14th edition, New Delhi, (Unit II - 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.
- Raymond A. Serwey, Clement J. Moses & Curt Moyer, *Modern Physics.* 2nd edition, Saunders College Publishers.
- Atam P.Arya, *Elementary Modern Physics.* Addition – Wesley publishing Company
- Tayal D. C. (1987). *Nuclear Physics* - 4th edition, Himalaya Publishing House Publishers, New Delhi

Mapping

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

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

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name: Mrs.K.V. Jayashree 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:	18UPS614	Title	Batch:	2018-2021
		Core XII: 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 - The Bravais lattices - Metallic crystal structures - Relation between the density of crystal material and lattice constant in a cubic lattice - Other cubic structures - 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 - Antiferromagnetism - Ferrimagnetism	13
III	**SUPERCONDUCTIVITY** Properties of superconductors - Effects of magnetic field - Persistent current - Critical current - The Meissner effect - Isotope effect - Penetration depth - Type I and Type II superconductors - Electronic specific heat - Energy gap measurements - BCS theory - 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 and F-D statistics*	13
Total contact hours		65

- *Italic font denotes self study*

Additional activities

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).
- 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.
- Serway R. Moses C. Moyer C.A. (1997). *Modern Physics*. 2nd edition, Saunders college publishers.

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: 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:	18UPS615	**Title**	**Batch :**	2018-2021
		C Programming & Information Security	**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 remember the basic concepts of C programming language
K2	CO2	To understand the role of control statements in C
K3	CO3	To apply the concept of functions,structures and pointers in C
K4	CO4	To review the need for information security

Syllabus

Unit	Content	Hrs
I	**INTRODUCTION TO C** Basic Structure of C Programs - Character set - Key words and Identifiers - Constants - Variables - Data types – Declaration of variables – Assigning values to variables – Defining symbolic constants - Arithmetic operators - Relational operators - Logical operators - Assignment operators - Increment and decrement operators - conditional operators - Precedence of operators - *Formatted input & output statements*	13
II	**CONTROL STRUCTURES, ARRAYS & STRINGS** Simple if - if…else - Nesting of if...else - else if ladder - Switch - while - do…while - for statements - Declaration and initialization of one & two dimensional arrays - Declaring and initializing string variables - String handling functions	13
III	**FUNCTIONS, STRUCTURES AND POINTERS** 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 - Pointers as function arguments - Pointers and structures	13
IV	**INFORMATION SECURITY** Components of Communications System – Transmission Media. Protocol – Definition – Introduction to TCP / IP – Wireless Network – Basics of Internet. Types of Attack: Phishing, Spoofing, Impersonation, Dumpster diving – Information Security Goals. Information Security Threats and Vulnerability: Spoofing Identity, Tampering with data, Repudiation, Information Disclosure, Denial of Service, Elevation of Privilege.	13
V	Authentication – Password Management – E-Commerce Security – Windows Security. Network Security: Network Intrusion and Prevention Systems – Firewalls – Software Security. Web Security: User authentication, Authentication – Secret and Session Management, Cross Site Scripting, Cross Site Forgery, SQL Injection. Computer Forensics – *Steganography*.	13
Total contact hours		65

- *Italic font denotes self study*

Additional activities

Seminar, Assignment, Experience discussion, PPT

Text Books

- E.Balagurusamy, (2004). *Programming In Ansi C*. Tata McGraw Hill Publishing Company, New Delhi, (Units I- III).
- Michael E. Whitman, Herbert J. Mattord, *Principles of Information Security*, Cenage Learning, 4th Edition.(IV- V).

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	S	H	S	H
CO2	S	S	S	H	H
CO3	S	H	H	H	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: 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:	18UPS616	Title	Batch:	2018-2021
		Core XIII: 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 get elementary knowledge of components used in concepts of electronic circuits
K4	CO2	To get familiarize with the electronics through experiment
K5	CO3	To understand the function 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. JFET – characteristics
12. Transistor voltage amplifier - Single stage
13. Hartley Oscillator
14. Colpitts Oscillator
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	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.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:	18UPS617	**Title**	**Batch:**	2018-2021
		Core XIV: 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	S
CO2	H	S	M	M	S
CO3	M	M	H	H	S

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

Designed by	Verified by HOD	Checked by CDC	Approved by COE
Name:Dr.T.E.Manjulavalli 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:	18UPS618	Title	Batch :	2018-2021
		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. Ascending/Descending order
8. Matrix Addition/ Subtraction
9. Matrix multiplication
10. Sorting of names
11. Multiplication Table
12. Function with arguments and with return values
13. Recursion function
14. Pointer to Structure
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**	**S**	**H**	**S**	**H**
CO2	**S**	**H**	**S**	**H**	**H**
CO3	**H**	**H**	**H**	**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: