#### **B.Sc PHYSICS**

							MADI	KC		
SEM	PART	COURSE CODE	TITLE OF THE COURSE	NATURE OF COURSE	HI	CP	EX HRS	CIA	ESE	TOTAL
	Ι	23UTAM101/ 23UHIN101/ 23UFRE101	TAMIL/HINDI/FRENCH I	LAN	6	3	3	25	75	100
	II	23UGEN101 23UAEN101	GENERAL ENGLISH I ADVANCED ENGLISH I	ENG	6	3	3	25	75	100
Ι	III	23UPS1C01	CORE:HEAT AND THERMODYNAMICS	CC	3	4	3	25	75	100
	III	23UPS1C02	CORE: MECHANICS, PROPERTIES OF MATTER AND SOUND	CC	3	4	3	25	75	100
	III	23UPS2CP1	CORE PRACTICAL I (Skill Development)	CC	3					
	III	23UMA1A07	ALLIED MATHEMATICS I	GEN	7	5	3	25	75	100
	IV	15UVAL101	VALUE EDUCATION	AEC	2	2	2		50	50
	Ι	23UTAM202/ 23UHIN202/ 23UFRE202	TAMIL/HINDI/FRENCH II	LAN	6	3	3	25	75	100
	Π	23UGEN202 23UANG202	GENERAL ENGLISH II ADVANCED ENGLISH II	ENG	6	3	3	25	75	100
Π	III	23UPS2C03	CORE: ELECTRICITY AND MAGNETISM	CC	6	4	3	25	75	100
	III	23UPS2CP1	CORE PRACTICAL I (Skill Development)	CC	3	4	3	40	60	100
	III	23UMA2A10	ALLIED MATHEMATICS II	GEN	7	5	3	25	75	100
	IV	21UENS202	ENVIRONMENTAL STUDIES	AEC	2	2	2		50	50
III	Ι	23UTAM303/ 23UHIN303/ 23UFRE303	TAMIL/HINDI/FRENCH III	LAN	6	3	3	25	75	100

#### (FOR THE CANDIDATES ADMITTED FROM 2023..... ONWARDS)

	II	23UGEN303 23UAEN303	GENERAL ENGLISH III ADVANCED ENGLISH III	ENG	6	3	3	25	75	100
	III	23UPS3C04	CORE: OPTICS	CC	5	5	3	25	75	100
	III	23UPS4CP2	CORE PRACTICAL II (Skill Development)	CC	2					
	III	23UCH3A01	ALLIED CHEMISTRY I	GEN	4	3	3	20	55	75
	III	23UCH4AP1	ALLIED CHEMISTRY PRACTICAL	GEN	2					
	IV	23UBTA301/ 23UATA301/	BASIC TAMIL I /ADVANCED TAMIL I	AEC	2	2	3	25	25	50
		21UGEA303	GENERAL AWARENESS		2	2	2		50	50
	IV	23UPS3SB1	SKILL BASED I - BIOMEDICAL INSTRUMENTATION ( <i>Employability</i> )	SEC	3	2	3	25	75	100
	IV	21UNCCWS1	WOMEN STUDIES	AEC					50	50
	Ι	23UTAM404/ 23UHIN404/ 23UFRE404	TAMIL/ HINDI/FRENCH IV	LAN	6	3	3	25	75	100
	II	23UGEN404 23UAEN404	GENERAL ENGLISH IV ADVANCED ENGLISH IV	ENG	6	3	3	25	75	100
	III	23UPS4C05	CORE: ATOMIC PHYSICS AND SPECTROSCOPY	CC	5	5	3	25	75	100
	III	23UPS4CP2	CORE PRACTICAL II (Skill Development)	CC	2	4	3	40	60	100
IV	III	23UCH4A02	ALLIED CHEMISTRY II	AC	4	3	3	20	55	75
	III	23UCH4AP1	ALLIED CHEMISTRY PRACTICAL	AC	2	4	3	20	30	50
	IV	23UBTA402/ 23UATA402	BASIC TAMIL II/ ADVANCED TAMIL II	AEC	2	2	3	25	25	50
		21UHUR404	HUMAN RIGHTS		2	2	2		50	50
	IV	23UPS4SB2	SKILL BASED II PHYSICS IN EVERYDAY LIFE (Skill Development)	SEC	3	2	3	25	75	100
v	III	23UPS5C06	CORE: MATHEMATICAL PHYSICS AND CLASSICAL MECHANICS	CC	4	5	3	25	75	100

	III	23UPS5C07	CORE: ELECTRONICS ( <i>Employability</i> )	CC	4	5	3	25	75	100
	III	23UPS5C08	CORE: SOLID STATE PHYSICS	CC	4	5	3	25	75	100
	III	23UPS5E01 OR 23UPS5E02	ELECTIVE:DIGITALELECTRONICS(Employability & Entrepreneurship)(OR)ELECTIVE:INDUSTRYAUTOMATIONANDAPPLICATIONS(Employability)	DSE	4	4	3	25	75	100
	III	23NPS5E02	NME: PRINCIPLES OF PHYSICS	GE	4	4	3	25	75	100
	III	23UPS6CP3	CORE PRACTICAL III GENERAL (Skill Development)	CC	2					
	III	23UPS6CP4	COREPRACTICALIVELECTRONICS(Skill Development)	CC	2					
	IV	23UPS5SB3	SKILL BASED III - ENERGY PHYSICS ( <i>Employability</i> )	SEC	3	2	3	25	75	100
	IV	23UPSSB01	SKILL BASED I - HOME APPLIANCES – WORKING	SEC	3	2	3	25	75	100
	III	23UPS6C09	CORE: QUANTUM MECHANICS AND RELATIVITY	CC	7	5	3	25	75	100
	III	23UPS6C10	CORE: NUCLEAR PHYSICS	CC	7	5	3	25	75	100
	III	23UPS6E01 OR 23UPS6E02	ELECTIVE:COMPUTERPROGRAMMING IN C (or)( <i>Employability</i> )ELECTIVE: INSTRUMENTATION( <i>Employability</i> )	DSE	4	4	3	25	75	100
	III	23UPS6CP3	CORE PRACTICAL - III GENERAL (Skill Development)	CC	3	4	3	40	60	100
VI	III	23UPS6CP4	CORE PRACTICAL - IV ELECTRONICS (Skill Development)	CC	3	4	3	40	60	100
	IV	23UPS6SB4	SKILL BASED IV - OPTICAL FIBRES AND FIBRE OPTIC COMMUNICATION SYSTEMS ( <i>Employability</i> )	AEC	3	2	3	25	75	100
	IV	23UPSSB01	SKILL BASED II - HOME APPLIANCES – WORKING	AEC	3	2	3	25	75	100
	v		CO-CURRICULAR ACTIVITIES (NSS/NCC/SPORTS/NECTAR/RSP/ YRC/AICUF/Chetna Women Cell)		-	1		-	-	50

19U	CYS605	Cyber Security		2		50	50
		SWAYAM/MOOC/NPTEL COURSE		2			
		Total	180	140 +2 +2			3800 +50

#### **SEMESTER: I**

#### COURSE CODE: 23UPS1C01

#### **CORE 1: HEAT AND THERMODYNAMICS**

#### **OBJECTIVES**

- To understand the basic principle of calorimetry and laws of thermodynamics
- To understand the concepts of entropy

#### **COURSE OUTCOMES**

#### At the end of the course the student will be able to:

CO1	Determine the specific heat capacity of liquids and gases	K1
CO2	Demonstrate the concept of transmission of heat by Lee's disc method	K3
CO3	Relate transport phenomena of heat using Vander Waal's constant and critical constants	К3
CO4	Apply the laws of thermodynamics in Carnot's engine	K3
CO5	Solve Maxwell's thermodynamic relations from the concept of entropy	K3

#### Credits: 4

#### **Instructional Hours: 45**

#### **UNIT I: Calorimetry (K1)**

Definitions – Newton's law of cooling – specific heat of a liquid – two specific heats of a gas – Mayer's relation– experimental determination of  $C_v$ – Joly's method -  $C_p$ – Regnault's method– Dulong and Petit's law – variation of specific heat and atomic heat with temperature.

# (Beyond Curriculum: Specific heat of a liquid – Joule's Electrical method, Callendar and Barnes' continuous flow method - Calorific value of fuels, bell Calorimeter)

#### **UNIT II: Transmission of heat (K3)**

Conduction – co-efficient of thermal conductivity – determination of thermal conductivity – Lee's disc method for bad conductors – Radiation – black body radiation – the distribution of energy in the spectrum of a black body – derivation of Planck's law of radiation – definition of Wien's Law – Rayleigh - Jean's Law – Stefan's law – experimental determination of Stefan's constant.

(Self study: Black body radiation)

#### UNIT III: Transport phenomena (K3)

Mean free path – transport phenomena – diffusion – viscosity and thermal conduction of gases – Vander Waal's equation – relation between Vander Waal's constant and critical constants – Porous plug experiment -theory – inversion temperature – properties of Helium I and Helium II.

#### **UNIT IV: Laws of Thermodynamics (K3)**

First law of thermodynamics – isothermal and adiabatic process – gas equation during an adiabatic process – work done during an adiabatic expansion of gas – second law of thermodynamics – Carnot's engine – working – efficiency – Carnot's refrigerator – Carnot's Theorem.

#### (Self study: Second law of thermodynamics)

#### **UNIT V: Concept of entropy (K3)**

Entropy – change in entropy in a reversible process and irreversible process – temperature entropy diagram – entropy of a perfect gas – increase of entropy in an irreversible process – Thermo dynamic functions – Maxwell's thermodynamics relation and applications – Clausius-Clapeyron equation. MAPPING OF CO'S WITH POs/PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	1	1	3	2	1	2	2	1	3	3	3
CO2	3	3	2	3	1	2	2	2	2	2	3	3	3	3
CO3	3	2	1	2	1	1	1	1	1	1	2	3	3	1
CO4	3	3	2	3	1	2	2	2	2	2	2	3	3	3
CO5	3	2	2	2	1	1	2	1	1	1	1	3	3	1

( Correlation : 3 – High; 2 – Medium; 1 – Low )

#### (9 hours)

## (9 hours)

#### (9 hours)

#### **ASSESSMENT TOOLS**

S. No.	Assessment Methods	Frequency of Assessment
1	End Semester Examination	Once in a semester
2	CIA I	Once in a semester
3	CIA II	Once in a semester
4	Model	Once in a semester
5	Assignment (Unit I & II)	Twice in a semester
6	Seminar (Unit III & IV)	Twice in a semester
7	Other component (Quiz)	Once in a semester
	(Unit V)	

#### **TEXT BOOKS:**

- Murugesan R and KiruthigaSivaprasath. (2012). Thermal Physics. (3<sup>rd</sup> edition), S. Chand and Company Ltd, New Delhi.
- 2. BrijlalSubramaniam N and Hemine P.S. (2016). Heat and Thermodynamics. S. Chand and Company Ltd, New Delhi.
- Jayaraman D and Ilangovan K.(2009). Thermal Physics and Statistical Mechanics. (1<sup>st</sup> edition), Sri Viswanathan (Printers & Publishers) Pvt. Ltd, Chennai.

#### **REFERENCE BOOKS:**

- 1. Devaraj Singh, GiridharMishra and Raja Ram Yadav. (2016).Thermal Physics, Kinetic theory and Thermodynamics. Narosa Publishing house Pvt. Ltd., New Delhi.
- Saxena A K. (2016). An Introduction to Thermodynamics and Statistical Mechanics. (2<sup>nd</sup> edition), Narosa Publishing house Pvt. Ltd, New Delhi.
- 3. Mathur D.S, (2002). Heat and Thermodynamics. S. Chand and company Ltd, New Delhi.

#### **BLENDED LEARNING**

Unit IV - Laws of Thermodynamics									
Торіс	Links								
First law of thermodynamics –									
isothermal and adiabatic process, second law of	https://youtu.be/8WgvLO6_JOQ								
thermodynamics									
Carnot's cycle	https://youtu.be/qdbG3tXPuSc								
Carnot's refrigerator	https://youtu.be/DXP4iD0WJRg								

Course Designed by	Verified by HOD
Name: Dr. R. Amutha	Name: Dr. R. Amutha
Signature:	Signature:
Checked by CDC	Approved by Principal
Name: Dr.G.Chitra	Name: Rev. Sr. Dr. Mary Fabiola
Signature:	Signature:

#### **SEMESTER: I**

#### COURSE CODE: 23UPS1C02

#### **CORE 2: MECHANICS, PROPERTIES OF MATTER AND SOUND**

#### **OBJECTIVES**

- To learn motion of bodies and sound waves
- To acquire basic knowledge of mechanics, properties of matter and gravitation
- To know how to apply the conservation of rotational motion

#### **COURSE OUTCOMES**

#### At the completion of the course the student will be able to:

CO1	Explain the concept of impact in the case of two smooth spheres using direct and oblique method.	K1
CO2	Find the moment of inertia for different regular shapes like sphere, circular ring, rectangular lamina and cylinder.	K2
CO3	Determine the young's modulus of elasticity using uniform bending method.	K2
CO4	Explain the variation of surface tension with temperature using Jaeger 's experiment	К2
CO5	Explain the production of ultrasonic waves using Piezo electric method.	K2

#### Credits: 4

#### **Instructional Hours: 45**

#### **UNIT I: Conservation Laws and Friction (K1)**

Newton's laws of motion – Force- Impulse of a force - law of conservation of linear momentum –Collision – Elastic and in elastic collision – Fundamental principles of impact – coefficient of restitutiondirect and oblique impact between two smooth spheres– final velocity and loss of kinetic energy due to direct impact – motion of a particle in a vertical circle – friction – laws static of friction – angle of friction – cone of friction - Experimental method for determining coefficient of friction between two surfaces.

#### (Self study: friction)

#### UNIT II: Motion of rigid body (K2)

#### (9 hours)

Moment of inertia (M.I.) – parallel and perpendicular axes theorem – M.I of a circular ring, disc, solid sphere, hollow sphere, hollow cylinder and solid cylinder about all axes – Kinetic Energy of the rotating body -torque and angular momentum – relation between them – conservation of angular momentum.

#### **UNIT III: Gravitation and Elasticity (K2)**

**Gravitation:** Kepler's law of planetary motion – Newton's laws of gravitation – Boy's method for G – gravitational potential – gravitational field at a point due to spherical shell – variation of 'g' with latitude, altitude and depth - compound pendulum 'g'- Kater's pendulum.

**Elasticity:** Elasticity – Stress, Strain - Hooke's law – Elastic modului – Poisson's ratio – relation between them – expression for bending moment – cantilever – depression of the loaded end of a cantilever - determination of Young's modulus by uniform and non-uniform bending –I section girders.

#### UNIT IV: Surface Tension and Viscosity (K2)

**Surface Tension:** Definition and dimension of surface tension – excess of pressure over a curved surface – variation of S.T. with temperature – Determination of surface tension, drop weight method, interfacial surface tension between two liquids - Jaeger's experiment.

**Viscosity:** Definition – coefficient of viscosity( $\eta$ ) – streamline and turbulent flow - Poiseuille's formula for the flow of liquid through a capillary tube – correction to Poiseuille's formula- Searle's Viscometer-rotating cylinder method for finding  $\eta$ .

(Beyond Curriculum: Poiseuille's method for determining coefficient of viscosity of a liquid, Terminal velocity and Stokes' formula, Stoke's method for the coefficient of viscosity of a viscous liquid, friction and lubrication)

#### UNIT V: Sound (K2)

#### (9 hours)

Simple harmonic motion –composition of two S.H.M. and beats - properties of beats \* - progressive waves – properties \*– stationary waves —Melde's experiment for the frequency of electrically maintained tuning fork – transverse and longitudinal modes – Acoustics – reverberation – Sabine's reverberation formula – factors affecting the acoustics of building - Ultrasonics – production – Piezo electric method – properties and application.\*

\*qualitative ideas only

(Self study: Simple Harmonic motion)

#### (9 hours)

#### MAPPING OF CO'S WITH PO's/PSO's

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	2	3	1	2	1	3	2	1	1	1	2	3
CO2	1	3	2	1	2	1	3	1	1	3	1	1	1	1
CO3	3	3	2	2	2	3	1	1	2	2	1	1	2	2
CO4	1	2	2	2	2	1	2	2	1	1	1	1	1	1
CO5	2	1	2	3	1	3	2	1	3	1	2	3	1	1

( Correlation : 3 – High; 2 – Medium; 1 – Low )

#### ASSESSMENT TOOLS

S. No.	Assessment Methods	Frequency of Assessment
1	End Semester Examination	Once in a semester
2	CIA I	Once in a semester
3	CIA II	Once in a semester
4	Model	Once in a semester
5	Assignment (Unit I & II)	Twice in a semester
6	Seminar (Unit III & IV)	Twice in a semester
7	Other component (Presentation)	Once in a semester
	(Unit V)	

#### **TEXT BOOKS:**

- Brijlal Subramaniam N. (1982). Properties of Matter .( 2<sup>nd</sup> edition), Eurasia publishing House Pvt. Ltd, New Delhi.
- BrijlalSubramaniam N. (2005). Text Book of Sound. (2<sup>nd</sup> edition), S Chand& Co Pvt Ltd, New Delhi.
- Murugesan R. (2002). Mechanics, Properties of matter and sound. (1<sup>st</sup> edition), S.Chand & Co Pvt Ltd, New Delhi.

#### **REFERENCE BOOKS:**

- Duraipandian P and Muthamizh Jaya prakasam. (1979). Mechanics. (4<sup>th</sup> edition), S.Chand and Co. New Delhi.
- Harnamsingh and Hans H K. (1973). Mechanics, and Properties of matter. (4<sup>th</sup> edition), Frank Brother &Co.
- 3. Mathur D.S. (2010). Elements of Properties of Matter. (1<sup>st</sup> edition), Shyamlal charitable trust.
- 4. Mathur D.S. (2012). Mechanics. (1<sup>st</sup> edition), S. Chand and Co Pvt. Ltd, New Delhi.

#### **BLENDED LEARNING**

Unit V - Sound	
Торіс	Links
Simple harmonic motion, beats, stationary waves, longitudinal and stationary waves	https://nptel.ac.in/courses/115/106/115106119
ultrasonics – production – Piezo electric method, properties and application	https://nptel.ac.in/courses/122/103/122103011/

Course Designed by	Verified by HOD
Name: Mrs. W. Maria Therease Ramya	Name: Dr. R. Amutha
Signature:	Signature:
Checked by CDC	Approved by Principal
Name: Dr.G.Chitra	Name: Rev. Sr. Dr. Mary Fabiola

Signature:	Signature:

#### **SEMESTER: II**

#### COURSE CODE: 23UPS2C03

#### **CORE 3: ELECTRICITY AND MAGNETISM**

#### **OBJECTIVES**

- Gain knowledge about Gauss theorem and capacitors
- Acquire basic knowledge of magnetic properties and electromagnetic induction

#### **COURSE OUTCOMES**

#### At the end of the course the student will be able to:

CO1	Explain Gauss theorem and give its application	K2
CO2	Distinguish the magnetic materials based on their properties	K2
CO3	Explain thermo electricity using laws of thermo e.m.f	K2
CO4	Explain transient currents for different circuits	K2
CO5	Discuss electromagnetic induction in varies coils	K2

#### Credits: 4

#### **Instructional Hours: 90**

#### UNIT I: Gauss theorem and Capacitance (K2)

**Gauss theorem and its applications:** Normal electric induction – Gauss theorem – proof – application of Gauss theorem – electric intensity at a point immediately adjacent to a charged conductor – mechanical force experienced by unit area of a charged surface – energy stored in unit volume of an electric field.

### (18 hours)

**Capacitance and Capacitors:** Spherical capacitor – cylindrical capacitor, force of attraction between charged plates of a capacitor – capacity of a parallel plate capacitor – effect of introducing a dielectric slab between the plates – Guard ring condenser – polarization in dielectric materials.

#### (Self study: capacity of a parallel plate capacitor)

#### **UNIT II: Magnetic Properties of materials (K2)**

Magnetic field B – magnetization M– magnetic field intensity H– relation between the three magnetic vectors B, H, M- magnetic susceptibility and magnetic permeability - magnetic hysteresis coercivity - retentivity(basic ideas) - area of the hysteresis loop - electron theory of magnetism -Langevin's theory of diamagnetism – dia, para, ferromagnetism and their properties – importance of hysteresis curves-choice of magnetic materials.

#### (Self study: dia, para, ferromagnetism and their properties)

#### **UNIT III: Thermo Electricity (K2)**

Seebeck effect – laws of thermo e.m.f – Peltier effect; Peltier Co-efficient – determination of Peltier co-efficient – Thomson effect – Thomson Co-efficient – e.m.f generated in a thermocouple taking both Peltier effect and Thomson effect in the metals - thermoelectric power -thermodynamics of thermocouple – thermoelectric diagram- its uses.

#### **UNIT IV: Transient currents (K2)**

Growth and decay of current in an inductive – resistive circuit – charging and discharging of a capacitor through a resistance – charging and discharging of capacitor through an inductance – torque on a current carrying loop – theory of moving coil ballistic galvanometer- condition for deadbeat and ballistic (basic ideas).

(Beyond Curriculum: current and voltage sensitivities of a moving-coil galvanometer, measurement of charge sensitiveness (Figure of merit of a B.G), Uses of balastic galvanometer, comparison of two capacitance using BG, comparison of emf of two cells using BG.)

#### **UNIT V: Electromagnetic Induction (K2)**

A conducting rod moving through a uniform magnetic field – inductance in series – in parallel - self inductance of coaxial cylinders - self inductance of a toroidal coil of rectangular cross section - self inductance of a toroidal coil of circular cross section - energy stored in magnetic field- time varying

#### (18 hours)

(18 hours)

#### (18 hours)

#### (18 hours)

magnetic field- rotating magnetic field ( principle of an AC induction motor) – single phase induction motor.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	3	2	2	1	3	3	2	2	3	2
CO2	3	3	2	2	2	2	2	1	2	2	2	2	3	2
CO3	3	3	3	1	3	2	2	1	3	3	2	2	3	3
CO4	2	2	2	1	2	1	2	1	2	3	2	2	3	3
CO5	2	2	1	2	1	2	2	1	1	2	2	2	3	2

#### MAPPING OF CO'S WITH POs / PSOs

(Correlation: 3 – High; 2 – Medium; 1 – Low)

#### **ASSESSMENT TOOLS**

S. No.	Assessment Methods	Frequency of Assessment
1	End Semester Examination	Once in a semester
2	CIA I	Once in a semester
3	CIA II	Once in a semester
4	Model	Once in a semester
5	Assignment (Unit I & II)	Twice in a semester
6	Seminar (Unit III & IV)	Twice in a semester
7	Other component (Presentation)	Once in a semester
	(Unit V)	

#### **TEXT BOOKS:**

- 1. Brijlal and Subramaniam N. (2000). Electricity and Magnetism. (20th edition), Ratan Prakashan Mandir.
- 2. Murugesan R. (2015). Electricity and Magnetism. (9<sup>th</sup> edition), S. Chand and Company Ltd., New Delhi.

#### **REFERENCE BOOKS:**

- Vasudeva D N. (2007). Electricity and Magnetism. (12<sup>th</sup> edition), S. Chand and Company Ltd.New Delhi.
- 2. Tewari K K. (2013). Electricity and Magnetism. S. Chand and Company Ltd, New Delhi.
- 3. Chatterjee S K. (2014). Fundamental of Electricity and Magnetism. PHI Learning Pvt. Ltd.

#### **BLENDED LEARNING**

Unit V - Electromagnetic Induction							
Торіс	Links						
self inductance, time varying magnetic field, rotating magnetic field	https://youtu.be/QfAr7RNIRPA						
induction motor	https://youtu.be/dZyO5gcWP-o						

inductance in series, inductance in parallel	https://www.youtube.com/playlist?list=PLyQS
	N7X0ro2314mKyUiOILaOC2hk6Pc3j

Course Designed by	Verified by HOD
Name: Dr. R. Amutha	Name: Dr. R. Amutha
Signature:	Signature:
Checked by CDC	Approved by Principal
Name: Dr.G.Chitra	Name: Rev. Sr. Dr. Mary Fabiola
Signature:	Signature:

#### **SEMESTER: II**

#### COURSE CODE: 23UPS2CP1 CORE PRACTICAL I: GENERAL (Skill Development)

(Examination at the end of second semester) any twelve experiments only

#### **OBJECTIVES**

- develop the experimental skills in Mechanics and Properties of Matter
- gain knowledge about the experiments based on Electricity and Magnetism and diodes
- motivate the students to apply the experimental techniques in Optics and Sound

CO1	To examine Mechanics, Properties of Matter, Electricity, Magnetism, Sound and Optics related experiments	K4
CO2	To calculate the values obtained from the experiment and show the results through record representation	К3

#### Credits: 4

**Instructional Hours: 45** 

1. Compound Pendulum – Determination of g, k and I.

- 2. Comparison of Viscosities Poisseulle's Method
- 3. Young's Modulus Non- Uniform bending Pin and Microscope method.
- 4. Young's Modulus Uniform bending scale and telescope optic lever method.

- 5. Rigidity modulus Static Torsion method.
- 6. Sonometer A.C. frequency.
- 7. Spectrometer Refractive index of solid prism.
- 8. Spectrometer Refractive index of liquid prism (Hollow Prism).
- 9. Spectrometer (i-d) Curve.
- 10. Moment of magnet Tan C Position.
- 11. Characteristics of a Junction Diode.
- 12. Potentiometer Specific Resistance of a wire.
- 13. Potentiometer Low range voltmeter calibration.
- 14. Melde's Strings Determination of frequency of the fork.
- 15. Stoke's method Determination of viscosity of a highly viscous liquid.
- 16. Surface tension of a liquid Capillary rise method.
- 17. Latent heat of fusion of ice.

#### MAPPING OF CO'S WITH POs/PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	3	2	3	1	2	3	3	3	3	3	3
CO2	3	3	2	3	2	3	1	2	3	3	3	3	3	3

(Correlation: 3 – High; 2 – Medium; 1 – Low)

#### **ASSESSMENT TOOLS**

1	End Semester Examination	Once in a year
2	Test 1	Once in a year
3	Test II	Once in a year
4	Observation Note	Once in a year
5	Record Note	Once in a year

#### **TEXT BOOKS**

- 1. Dr. R. Sathyamoorthy, Dr. P. Padmavathy, Dr. S. Somasundaram. (2015). Practical Physics. (Revised edition), Apsara Publications, Tiruchirapalli-17.
- M.N. Srinivasan, S. Balasubramaniam, R.Ranganathan. (2015). A text Book of Practical Physics. Sulthan Chand & sons, New Delhi.

#### **REFERENCE BOOK:**

 Dr. S. L. Guptha, Dr. V. Kumar. (2013). Practical Physics. (Twenty Eighth Edition), Pragathi Prakashan, Meerut.

#### **BLENDED LEARNING**

Торіс	Links
Experimental physics 1	https://youtu.be/m6E1NN4A-9s
Experimental physics 2	https://youtu.be/q5ol5jvSe1o
General physics Experiments	https://youtube.com/playlist?list=PLuiPz6iU
	5SQ8-rZn_LgLofRX7n8z4tHYK
Spectrometer refractive index	https://youtu.be/-rSPEFQMKFg
Youngs modulus uniform bending	https://youtu.be/rkiMpF4r2Jk
Junction and zener diode	https://youtu.be/TXjHWGngsME

Course Designed by	Verified by HOD
Name: Dr. R. Amutha	Name: Dr. R. Amutha
Signature:	Signature:
Checked by CDC	Approved by Principal
Name: Dr.G.Chitra	Name: Rev. Sr. Dr. Mary Fabiola
Signature:	Signature:

## SEMESTER: III COURSE CODE: 23UPS3C04 TITLE OF THE COURSE: CORE 4: OPTICS

#### (Employability)

#### **OBJECTIVES**

- To provide a knowledge of the behaviour of light
- To in still interest in the concepts of physical and geometrical optics

#### **COURSE OUTCOMES**

#### At the end of the course the student will be able to:

CO1	Explain the aberrations occurs in prism and lens	K2
CO2	Discuss the interference phenomena using experimental methods	K2
CO3	Distinguish between Fresnel and Fraunhofer diffraction	K2
CO4	Explain the production and deduction of plane, circularly and elliptically	К2
	polarized light using the laws of polarization	112
CO5	Explain the types of lasers by knowing the principle of laser action.	K2

#### **Syllabus**

#### **Instructional Hours: 60**

#### UNIT I: Geometrical Optics (K2)

Introduction – aberrations – spherical aberrations in lens – coma – astigmatism – chromatic aberration – dispersion by a prism – Cauchy's dispersion formula – dispersive power, achromatism in prism – deviation without dispersion – dispersion without deviation – chromatic aberrations in a lens – circle of least confusion – achromatic lens – condition for achromatism of two thin lenses separated by a finite distance.

#### **Physical Optics**

Credits: 5

#### **UNIT II: Interference (K2)**

Introduction – coherent sources - Fresnel's Biprism – interference in thin films due to reflected light – fringes due to wedge shaped thin film – Newton's rings – refractive index of the liquid – Michelson interferometer – determination of wavelength of monochromatic light – difference in wavelength between two neighbouring spectral lines.

## (12 hours) m = chrom

#### (12hours)

#### (Self Study: Newton's rings)

#### **UNIT III: Diffraction (K2)**

Fresnel's assumptions – rectilinear propagation of light – half period zone – zone plate – action and construction – comparison with a convex lens – Fresnel and Fraunhofer diffraction –Fraunhoffer diffraction at a single slit – diffraction grating – resolving power & dispersive power of grating.

#### **UNIT IV: Polarization (K2)**

Double Refraction – Huygen's explanation – optic axis in the plane of incidence, inclined and perpendicular to the crystal surface – production and detection of plane, circularly and elliptically polarized light – optical activity – Fresnel's explanation – specific rotation – half shade polarimeter.

#### (Self Study: Double Refraction)

#### **UNIT V: Quantum Optics (K2)**

Light quanta and their origin – resonance radiation – metastable states – population inversion – optical pumping – spontaneous and stimulated emission – Einstein's coefficient– resonant cavities – threshold condition for laser – Ruby, He-Ne, CO<sub>2</sub> laser – **Hologram -Principle, construction of hologram, reconstruction of hologram - applications** 

# (Beyond the Curriculum: Applications in material processing (laser welding, laser cutting), Medical application)

#### **TEXT BOOKS:**

- Brijlal and Subramaniam N. and Avadhanulu. (2007). Text book of Optics. (23<sup>rd</sup> edition), S. Chand and Company Ltd., New Delhi.
- Murugesan R. and Er. Kiruthiga Sivaprasath. (2016). Modern Physics. (18<sup>th</sup> edition), S.Chand and Company Ltd., New Delhi.
- Murugesan R. and Er. Kiruthiga Sivaprasath. (2012). Optics and Spectroscopy. (8<sup>th</sup> edition), S. Chand and Company Ltd., New Delhi.

#### **REFERENCE BOOKS:**

- 1. Devaraj Sing. (2010). Fundamentals of Optics. PHI Learning private Ltd.
- 2. Anchal Drivastava. Shukla R K. and Pandya T P. (2011), Introduction to Optics. (1<sup>st</sup> edition), New Age International publishers.
- 3. Thyagarajan K. and AjoyGhatak. (2011). Lasers. (2<sup>nd</sup> edition), Macmillan publishers India Ltd.
- 4. Ajoy Ghatak. (2017). Optics. (6<sup>th</sup> edition), Mc Graw Hill education (India) private Ltd.

#### (12 hours)

#### (12 hours)

#### (12 hours)

#### **BLENDED LEARNING**

Unit IV – Polarization							
Торіс	Links						
Double Refraction, optic axis in the plane of incidence,	https://youtu.be/Pt5wvYyguq0						
inclined and perpendicular to the crystal surface							
Huygen's explanation	https://youtu.be/PEXSH8dB-Uk						
production and detection of plane, circularly and	https://youtu.be/Q6KKxtBgbNY,						
elliptically polarized light	https://youtu.be/pjuo8pexI70						
optical activity, Fresnel's explanation, specific rotation,	https://youtu.be/HZSUnclabKE						
half shade polarimeter							

#### MAPPING OF CO'S WITH PO's and PSO's

	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	<b>PO9</b>	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	1	1	1	2	1	2	2	2	2	3	2
CO2	3	2	2	1	1	1	1	1	2	2	2	2	3	2
CO3	3	1	2	1	1	1	1	1	2	2	2	2	3	3
CO4	3	2	2	1	1	1	2	1	2	2	3	2	3	3
CO5	3	2	3	3	1	3	3	2	2	2	3	2	3	3

(Correlation: 3 – High, 2 – Medium, 1 – Low)

#### ASSESSMENT TOOLS

S. No.	Assessment Methods	Frequency of Assessment
1	End Semester Examination	Once in a semester
2	CIA I	Once in a semester
3	CIA II	Once in a semester
4	Model	Once in a semester
5	Assignment (Unit I & II)	Twice in a semester
6	Quiz (Unit III & IV)	Twice in a semester
7	Biography (Unit V)	Once in a semester

Course Designed by: Dr. R. Amutha	Verified by HOD: Dr. R. Amutha
Checked by CDC: Dr. G. Chitra	Approved by: Principal

#### Members of Board of Studies:

Dr. G. Uma Devi Associate Professor Govt. Arts College, Coimbatore	Dr. S. Ramanathan Assistant Professor Sri Ramakrishna Mission Vidhyalaya Periyanaickenpalayam Coimbatore	Dr. V. Sathya Narayana Moorthy Assistant Professor PSG College of Arts and Science Coimbatore	Mr. S.P.Senthil Subramaniam Partner Mighty Electronics Equipments Corporation Coimbatore	Ms. H. Glory Renita (Alumna) Research Scholar CIT College Coimbatore

#### **SEMESTER – III**

#### COURSE CODE: 23UPS3SB1

#### TITLE OF THE COURSE: SKILL BASED – BIOMEDICAL INSTRUMENTATION

#### (Skill Development)

#### **OBJECTIVES**

- To learn about human physiology
- To learn the advancements in biomedical instruments

#### **COURSE OUTCOMES**

#### At the end of the course the student will be able to:

CO1	Explain transport of ions through cell membrane and different systems of human body	K2
CO2	Discuss the types of electrodes	K2
CO3	Describe the active and passive transducers	K2
CO4	Describe the electrocardiography and electroencephalography	K2
CO5	Explain lasers in medicine, Thermography and Computer Tomography	K2

#### **Syllabus**

#### Credits: 2

#### **Instructional Hours: 45**

#### UNIT I: Human physiological systems (K2)

Cells and their structure – transport of ions through cell membrane – resting and action potential – characteristics of resting potential – bio-electric potentials – nerve tissues and organs – different systems of human body – skeletal, circulatory, respiratory, digestive, excretory and regulatory systems.

(Self Study: different systems of human body – skeletal, circulatory, respiratory, digestive, excretory and regulatory systems)

#### **UNIT II: Biopotential Electrodes (K2)**

Components of the biomedical instrument system – electrodes – half cell potential, electrode paste, electrode material – types of electrodes - microelectrodes – depth and needle electrodes – surface electrodes – chemical electrodes.

#### (9 hours)

#### **UNIT III: Transducers (K2)**

Transducers – types – active transducers – magnetic induction type – piezoelectric type – photovoltaic type – thermoelectric type – passive transducers – strain gauge – strain gauge as a pressure transducer – photoelectric type resistive transducers – capacitive transducers – inductive transducers – LVDT.

#### **UNIT IV: Biopotential recorders (K2)**

Characteristics of recording system – writer and pen damping effects – electrocardiography – origin of cardiac action potential – ECG lead configuration – ECG recording setup – electroencephalography – origin of EEG – brain waves – placement of recorders – EEG recording setup.

#### UNIT V: Advances in biomedical instrumentations (K2) (9 hours)

Computers in medicine – lasers in medicine – laser instrumentation – photothermal applications – photochemical applications – endoscopes – Thermography: Infrared thermography – liquid crystal – microwave – medical applications – Computer Tomography (CT): block diagram of CT scanner – data presentation- scan artifacts – application of CT.

#### (Self Study: lasers in medicine)

#### **TEXT BOOK:**

 Arumugam M. (2015). Biomedical instrumentation. (2<sup>nd</sup> edition), Anuradha Publications, Chennai.

#### **REFERENCE BOOKS:**

- Khandpur R S. (1990). Hand book of Biomedical Instrumentation. (3<sup>rd</sup> edition), McGraw Hill Education (India) Private Ltd. New Delhi.
- Cromwell, Weibel J and Pfeiffer. (1980). Biomedical instrumentation and measurements. (2<sup>nd</sup> edition), Prentice Hall.
- 3. Cooper. Osseltton and Shaw. (1987). EEG Technologies. (2<sup>nd</sup> edition), Butterworths.
- Aston. (1990). Principles of Biomedical Instrumentation and Measurements. Merrill publishing Co.

#### (9 hours)

#### (0 k -- ...)

#### **BLENDED LEARNING**

#### **UNIT IV: Biopotential recorders**

UNIT IV. Diopotential recorders									
Торіс	Links								
Electrocardiography, origin of cardiac									
action potential, ECG lead									
configuration, ECG recording setup,	. https://onlinecourses.nptel.ac.in/noc21_ee17/preview								
origin of EEG, brain waves, placement									
of recorders and EEG recording setup.									
Characteristics of recording system	https://onlinecourses.pptel.ac.in/noc20_ee40/preview								
machine learning	nups.//onnnecourses.npter.ac.nl/noc20_ee40/preview								

٦

#### MAPPING OF CO'S WITH POs / PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	2	2	2	1	1	2	2	1	2	3	2
CO2	3	3	2	2	2	2	1	1	2	2	2	2	3	3
CO3	3	3	2	2	2	2	1	1	2	2	2	2	3	3
CO4	3	3	2	3	2	2	1	1	2	2	2	2	3	3
CO5	3	3	2	3	2	2	1	1	2	2	2	2	3	3

(Correlation: 3 – High, 2 – Medium, 1 – Low)

#### **ASSESSMENT TOOLS**

S. No.	Assessment Methods	Frequency of Assessment
1	End Semester Examination	Once in a semester
2	CIA I	Once in a semester
3	CIA II	Once in a semester
4	Model	Once in a semester
5	Assignment (Unit I & II)	Twice in a semester
6	Quiz (Unit III & IV)	Twice in a semester
7	Quiz (Unit V)	Once in a semester

Course Designed by: Dr. R. Amutha	Verified by HOD: Dr. R. Amutha
Checked by CDC: Dr. G. Chitra	Approved by:
	Principal

#### Members of Board of Studies:

Dr. G. Uma Devi	Dr. S. Ramanathan	Dr. V. Sathya Narayana Moorthy	Mr. S.P.Senthil	Ms. H. Glory Renita (Alumna)
Associate	Sri Ramakrishna Mission	Assistant	Partner	Research Scholar
Professor Covt Arts	Vidhyalaya	Professor	Mighty Electronics	CIT College
College	Periyanaickenpalayam	PSG College of	Equipments	Coimbatore
Coimbatore	Coimbatore	Arts and Science	Corporation	
Combutore		Coimbatore	Coimbatore	

#### SEMESTER - IV

#### COURSE CODE: 23UPS4C05

#### TITLE OF THE COURSE: CORE 5: ATOMIC PHYSICS AND SPECTROSCOPY

#### (*Employability*)

#### **OBJECTIVES**

- To learn the behaviour of atom in various states
- To learn the impact of magnetic fields on spectra

#### **COURSE OUTCOMES**

#### At the end of the course the student will be able to:

CO1	Analyze the positive rays using Thomson's parabola method	K1
CO2	Describe the structure of the atom using Bohr and Vector atom model	K1
CO3	Explain magneto optical properties of spectrum from the Stern and Gerlach experiment and Zeeman effect	K2
CO4	Explain Millikan's experiment and photo electric cells using the laws of photoelectric emission	K2
CO5	Express the shift in wavelength of X-ray beam using Compton effect	K2

#### **Syllabus**

#### **Instructional Hours: 60**

#### **UNIT I: Positive Rays (K1)**

Credits: 5

Positive rays – discovery – properties – positive ray analysis – Thomson's parabola method – action of electric and magnetic fields – determination of e/m – determination of mass – discovery of stable isotopes – limitations – Aston's mass spectrograph –Bainbridge mass spectrograph – uses of mass spectrograph.

#### UNIT II: Structure of the Atom (K1)

Theory of alpha scattering – Rutherford scattering formula – experimental verification - The Bohr atom model – critical potentials – method of excitation of atoms – experimental determination of critical potentials by Davis and Goucher's method – Sommerfeld's relativistic model – vector atom model – quantum numbers associated with vector atom model – coupling schemes (LS, JJ coupling) – Pauli's exclusion principle – periodic classification of elements.

(Self Study: Bohr atom model)

#### (12 hours)

(12 hours)

#### **UNIT III: Magneto Optical Properties of Spectrum (K2)**

Magentic dipole moment due to orbital motion of the electron – magnetic dipole moment due to spin – The Stern and Gerlach experiment – optical spectra – fine structure of the sodium D line – Zeeman effect – Lorentz classical theory – expression for the Zeeman shift – Larmor's theorem – quantum mechanical explanation of the normal Zeeman effect.

(Beyond the Curriculum: Paschen-Back Effect, Stark Effect, Fine structure of H alpha line, Anamolous zeeman effect)

#### **UNIT IV: Photoelectric Effect (K2)**

Introduction – Richardson and Compton experiment – relation between photoelectric current and retarding potentials – relation between velocity of photo electrons and the frequency of light – laws of photoelectric emission – failure of electromagnetic theory – Einstein's Photoelectric equation – experimental verification – Millikan's Experiment – photoelectric cells – photo emission cell – photo voltaic cell – photoconductive cell – applications of photoelectric cell.

#### (Self Study: Laws of photoelectric emission)

#### UNIT V: X-ray Spectra (K2)

X-ray – production – properties – continuous and characteristics X-ray spectrum – Mosley's law – Compton effect – expression for change of wave length –X-ray diffraction –Bragg's law – Bragg's spectrometer – polarization of X-rays – scattering of X-rays (Thomson's formula) –qualitative ideas only.

#### **TEXT BOOK:**

 Murugesan R. and Kiruthiga Sivaprasath. (2016). Modern Physics. (18<sup>th</sup> edition), S. Chand and Company Ltd, New Delhi.

#### **REFERENCE BOOKS:**

- 1. Rajam JB. (2009). Atomic Physics. (20<sup>th</sup> edition), S. Chand and Company Ltd, New Delhi.
- 2. Saxena AK.(2014). Principles of Modern Physics. (4<sup>th</sup> edition), Narosa Publishing House.
- Subrahmanyam N, Brij Lal and Jivan Seshan. (2012), Atomic and Nuclear Physics. (11<sup>th</sup> edition), S. Chand and Company Ltd, New Delhi.

#### **BLENDED LEARNING**

Unit V - X-ray Spectra				
Торіс	Links			
X - ray spectra basics	https://youtu.be/Nos_SQ2DpRw			

#### (12 hours)

#### (12 hours)

#### (12 hours)

properties of X – ray	https://youtu.be/iPTZJy0lios
Compton effect	https://youtu.be/p0eH4_o34Kk
X - ray diffraction	https://youtu.be/Z5aCuGxUPpI
Bragg's law	https://youtu.be/CloyPjAtXyQ
X - ray scattering	https://youtu.be/4MKc2hdz_GQ

### MAPPING OF CO'S WITH PO's and PSO's

	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	2	2	2	1	3	2	2	2	3	3
CO2	3	3	3	2	2	2	1	1	2	2	2	2	3	2
CO3	3	3	3	2	2	2	1	1	2	2	2	2	3	1
CO4	3	3	2	3	2	2	2	1	3	2	2	2	3	2
CO5	2	3	1	3	2	3	2	1	2	3	3	2	3	3

(Correlation: 3 – High, 2 – Medium, 1 – Low)

#### ASSESSMENT TOOLS

S. No.	Assessment Methods	Frequency of Assessment
1	End Semester Examination	Once in a semester
2	CIA I	Once in a semester
3	CIA II	Once in a semester
4	Model	Once in a semester
5	Assignment (Unit I & II)	Twice in a semester
6	Quiz (Unit III & IV)	Twice in a semester
7	Quiz (Unit V)	Once in a semester

Course Designed by: Dr. R. Amutha	Verified by HOD: Dr. R. Amutha
Checked by CDC: Dr. G. Chitra	Approved by:

Principal
Timupai

#### Members of Board of Studies:

Dr. G. Uma	Dr. S. Ramanathan	Dr. V. Sathya	Mr. S.P.Senthil	Ms. H. Glory
Devi	Assistant Professor	Narayana Moorthy	Subramaniam	Renita (Alumna)
Associate	Sri Ramakrishna Mission	Assistant	Partner	Research Scholar
Professor Court Arts	Vidhyalaya	Professor	Mighty Electronics	CIT College
College	Periyanaickenpalayam	PSG College of	Equipments	Coimbatore
Coimbatore	Coimbatore	Arts and Science	Corporation	
		Coimbatore	Coimbatore	

#### SEMESTER – IV

#### COURSE CODE: 23UPS4SB2

### TITLE OF THE COURSE: SKILL BASED – PHYSICS IN EVERYDAY LIFE

#### (Skill Development)

#### **OBJECTIVES**

- To acquire knowledge about fire safety
- To learn the operation of mixer grinder, grinder, fan

#### **COURSE OUTCOMES**

#### At the completion of the course the student will be able to:

CO1	Explain the fire classifications	K2
CO2	Summarize the tools and aids for servicing	K2
CO3	Describe the soldering techniques	K2
CO4	Explain the mechanical components	K2
CO5	Apply the knowledge to diagnosis the problem of electric water heater	К3

#### **Syllabus**

#### **Instructional Hours: 45**

#### UNIT I: Fire prevention and protection (K2)

Credits: 2

Classifications of fires – extinguishing agents – water – water use on special hazards – carbon dioxide – halogenated agents – dry chemicals – foam extinguishing agents – combustible metal extinguishing agents – labeling – maintenance, inspection and testing.

#### UNIT II: Tools and Aids for Servicing and Maintenance (K2)

Hand Tools – pliers – cutters – wrenches (spanners) – screw drivers – nut drivers – hacksaw – drills – Files – Other workshop tools.

(Self Study: Cutters)

#### **UNIT III: Soldering Techniques (K2)**

#### (9 hours)

#### (9 hours)

Soldering tools - soldering material - soldering procedure - soldering technique - replacement of components - good and bad soldering joints - de-soldering technique - safety precautions.

#### (Self Study: Soldering technique)

#### **UNIT IV: Mechanical and Electro-Mechanical Components (K2)**

Mechanical components - fuses and fuse holders - switches - wires and cables - connectors circuit boards - transformers - motors - electro-magnetic relays - batteries and battery chargers.

#### Unit V: Electric water heater (K3)

Principles of operation - safety first - electric water heaters in general - electric water heater maintenance - step-by-step troubleshooting by symptom diagnosis - repair procedures - upper thermostat - lower thermostat - heating element.

#### **TEXT BOOK:**

1. Lon H Ferguson and Christopher A Janicak. (2005). Fundamentals of fire protection for the safety professional. Government Institutes, an imprint of The Scarecrow Press. USA.

#### **REFERENCE BOOKS:**

- 1. Hans L R. and Anwani M L. Dhanpat Rai. (2016) Basic shop practicals in electrical engineering, Dhanpat Rai and Co. Pvt. Ltd., New Delhi.
- 2. Khandpur R S. (2007). Troubleshooting Electronic Equipment. Mc Graw Hill, New York, Chicago.
- 3. Eric Kleinert. (2013). Troubleshooting and Repairing Major Appliances. (3rd Edition), Mc Graw Hill, New York, Chicago.

UNIT IV: Mechanical and Electro-Mechanical Components			
Торіс	Links		
fuse and fuse holders	https://youtu.be/DgcyV1b0O8o		
wires and cables	https://youtu.be/dOvz9hld27s		
circuit board	https://youtu.be/Z2LgmIGE2nI		
transformer	https://youtu.be/NkRk_xaRwjg		
battery and charging battery	https://youtu.be/tyeSahlzt3Y		

#### **BLENDED LEARNING**

(9 hours)

#### MAPPING OF CO'S WITH POs/PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	2	3	2	1	2	2	2	2	2	1
CO2	2	1	1	2	2	2	2	1	2	2	2	2	2	2
CO3	2	2	2	2	2	2	2	1	2	2	2	2	1	2
CO4	2	2	2	2	2	2	2	1	2	2	2	2	2	2
CO5	2	2	2	2	2	2	2	1	2	2	2	2	1	2

(Correlation: 3 – High, 2 – Medium, 1 – Low)

#### ASSESSMENT TOOLS

S. No.	Assessment Methods	Frequency of Assessment
1	End Semester Examination	Once in a semester
2	CIA I	Once in a semester
3	CIA II	Once in a semester
4	Model	Once in a semester
5	Assignment (Unit I & II)	Twice in a semester
6	Quiz (Unit III & IV)	Twice in a semester
7	Quiz (Unit V)	Once in a semester

Course Designed by: Ms. R. Leethiyal	Verified by HOD: Dr. R. Amutha			
Checked by CDC: Dr. G. Chitra	Approved by:			
	Principal			
Dr. G. Uma	Dr. S. Ramanathan	Dr. V. Sathya	Mr. S.P.Senthil	Ms. H. Glory
-------------------------	-------------------------	------------------	--------------------	------------------
Devi	Assistant Professor	Narayana Moorthy	Subramaniam	Renita (Alumna)
Associate	Sri Ramakrishna Mission	Assistant	Partner	Research Scholar
Professor Court Arte	Vidhyalaya	Professor	Mighty Electronics	CIT College
College	Periyanaickenpalayam	PSG College of	Equipments	Coimbatore
Coimbatore	Coimbatore	Arts and Science	Corporation	
		Coimbatore	Coimbatore	

#### **SEMESTER: IV**

#### **COURSE CODE: 23UPS4CP2**

#### TITLE OF THE COURSE: CORE PRACTICAL II: GENERAL (Skill Development)

(Examination at the end of Fourth Semester) Any twelve experiments only

#### **OBJECTIVES**

- develop the experimental skills in Mechanics and Properties of Matter
- gain knowledge about the experiments based on Electricity and Magnetism and diodes
- motivate the students to apply the experimental techniques in Optics, Sound and heat

CO1	To examine Mechanics, Properties of Matter, Electricity, Magnetism,	K/			
	Sound, Heat, Diode and Optics through experiments.				
CO2	To calculate the values obtained from the experiment and show the	K3			
	results through record representation	KJ			

#### Credits: 4

#### **Instructional Hours: 30**

- 1. Rigidity Modulus Torsional Pendulum with & without symmetrical masses.
- 2. Quincke's method Surface Tension of a liquid.
- 3. Specific heat capacity Newton's law of cooling Spherical calorimeter
- 4. Characteristics of zener diode.
- 5. Newton's rings Radius of curvature
- 6. Spectrometer Grating Minimum deviation & dispersive power
- 7. Spectrometer Grating Normal Incidence- determination of  $\lambda$
- 8. Spectrometer Dispersive Power-prism
- 9. Potentiometer calibration of low range ammeter.
- 10. Specific heat capacity of a liquid- Joule's calorimeter.
- 11. Co-efficient of thermal conductivity of a bad conductor Lee's disc method.
- 12. Surface tension and interfacial surface tension by drop weight method.

- 13. Air wedge Thickness of wire.
- 14. Spectrometer  $\mu$  prism Cauchy's constant.
- 15. Meter bridge temperature co-efficient of resistance.
- 16. Post office box Specific resistance.
- 17. Kundt's tube determination of frequency.
- 18. Field along the axis of a coil determination of magnetic flux.
- 19. Velocity of sound in air Resonance column method.

#### **TEXT BOOKS**

- 1. Dr. R. Sathyamoorthy, Dr. P. Padmavathy, Dr. S. Somasundaram. (2015). Practical Physics. (Revised edition), Apsara Publications, Tiruchirapalli-17.
- M.N. Srinivasan, S. Balasubramaniam, R.Ranganathan. (2015). A text Book of Practical Physics. Sulthan Chand & sons, New Delhi.

#### **REFERENCE BOOKS:**

 Dr. S. L. Guptha, Dr. V. Kumar. (2013). Practical Physics. (Twenty Eighth Edition), Pragathi Prakashan, Meerut.

#### **BLENDED LEARNING**

Торіс	Links
Experimental physics 1	https://youtu.be/m6E1NN4A-9s
Experimental physics 2	https://youtu.be/q5ol5jvSe1o
General physics Experiments	https://youtube.com/playlist?list=PLuiPz6iU5SQ8-
	rZn_LgLofRX7n8z4tHYK
Spectrometer refractive index	https://youtu.be/-rSPEFQMKFg
Youngs modulus uniform bending	https://youtu.be/rkiMpF4r2Jk
Junction and zener diode	https://youtu.be/TXjHWGngsME
Newton's ring	https://youtu.be/lmW-7z4GD68

#### MAPPING OF CO'S WITH PO's and PSO's

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	<b>PSO1</b> 1	PSO2
--	-----	-----	-----	-----	-----	-----	-----	-----	-----	------	------	------	---------------	------

CO1	3	3	2	3	2	3	1	2	3	3	3	3	3	3
CO2	3	3	2	3	2	3	1	2	3	3	3	3	3	3

(Correlation: 3 – High, 2 – Medium, 1 – Low)

## ASSESSMENT TOOLS

1	End Semester Examination	Once in a year
2	Test 1	Once in a year
3	Test II	Once in a year
4	Observation Note	Once in a year
5	Record Note	Once in a year

Course Designed by: Mrs. W. Maria Therease Ramya	Verified by HOD: Dr. R. Amutha
Checked by CDC: Dr. G. Chitra	Approved by: Principal

Dr. G. Uma Devi	Dr. S. Ramanathan	Dr. V. Sathya	Mr. S.P.Senthil	Ms. H. Glory
	Assistant Professor	Narayana Moorthy	Subramaniam	Renita (Alumna)
Associate	Sri Ramakrishna Mission	Assistant	Partner	Research Scholar
Professor Govt Arts	Vidhyalaya	Professor	Mighty Electronics	CIT College
College	Periyanaickenpalayam	PSG College of	Equipments	Coimbatore
Coimbatore	Coimbatore	Arts and Science	Corporation	
		Coimbatore	Coimbatore	

#### **SEMESTER: V**

#### COURSE CODE: 23UPS5C06

## TITLE OF THE COURSE: CORE 6: MATHEMATICAL PHYSICS AND CLASSICAL MECHANICS

#### (Skill Development)

#### **OBJECTIVES**

- To develop the problem solving ability.
- To motivate the students to apply matrices or solving problems in spectroscopy, nuclear physics etc.,

#### **COURSE OUTCOMES**

#### At the completion of the course the student will be able to

CO1	Apply integration of vectors to simple problems	К3
CO2	Solve problems in matrices using Cayley – Hamilton theorem	К3
CO3	Simplify problems using special functions	K3
CO4	Recall D' Alembert's Principle and Lagrange's equation of motion	K1
CO5	Explain the equation of motion of linear harmonic oscillator and simple pendulum using Hamiltonian function	K2

#### Syllabus

#### Credits: 5

## **Instructional hours: 60**

#### **UNIT I: Vector Calculus (K3)**

Operator – divergence – second derivative of vector functions or fields – the Laplacian operator – curl of a vector – line integral – line integral of a vector field around an infinitesimal rectangle – curl of conservative field – surface integral – volume integral (without problem) – Gauss's divergence theorem and it's proof in the simple problems – Stoke's theorem and its proof with simple problem.

#### **UNIT II: Matrices (K3)**

Introduction – special types of matrices – transpose of a matrix – the conjugate of a matrix – conjugate transpose of a matrix – symmetric and anti-symmetric – Hermitian and Skew Hermitian – orthogonal and unitary matrices – properties – characteristics equation – roots and characteristics vector – diagonalization of matrices – Cayley – Hamilton theorem – problems.

#### (Self Study: Transpose of a Matrix)

#### **UNIT III: Special Functions (K3)**

Definition – the beta function – gamma function – evaluation of beta function – other forms of beta function – evaluation of gamma function – other forms of gamma function – relation between beta and gamma functions – problems.

#### UNIT IV: Classical Mechanics – I (K1)

Constraints and degrees of freedom – generalized coordinates – generalized displacement – velocity – acceleration – momentum – force – potential energy – D'Alembert's principle – Lagrangians equation from D'Alembert's principle – application of Lagrange's equation of motion to linear harmonic oscillator, simple pendulum.

## (Beyond the Curriculum: Application of Lagrange's equation - Atwood's Machine, A bead sliding on a uniformly rotating wire, Compound pendulum, spherical pendulum)

#### UNIT V: Classical Mechanics – II (K2)

Phase space – Hamiltonian function – Hamiltonian Principle – Hamilton's canonical equations of motion–physical significance of H – applications of Hamiltonian equations of motion to simple pendulum and linear harmonic oscillator.

#### (Self Study: Applications of Hamiltonian equations of motion to simple pendulum)

#### **TEXT BOOKS:**

- Satya Prakash (2012). Mathematical Physics including Classical Mechanics. (6<sup>th</sup>edition), Sultan Chand & Sons, New Delhi.
- Gupta S L & Kumar V & Sharma H V (2015) .Classical Mechanics.(27<sup>th</sup> edition), Pragati Prakashan, Meerut.

#### **REFERENCE BOOKS:**

1. Gupta B D (1993). Mathematical Physics. (2<sup>nd</sup>edition), Vikas Publications, New Delhi.

## (12 hours)

#### (12 hours)

#### (12 hours)

- Satya Prakash (2012). Mathematical Physics including Classical Mechanics.(6<sup>th</sup>edition), Sultan Chand & Sons, New Delhi.
- 3. <u>Rajput</u> B S (2011). Mathematical Physics.(24<sup>th</sup> edition), Pragati Prakashan, Meerut.
- Dass H K and Rama Verma.(2011). Mathematical Physics.(6<sup>th</sup> edition), S. Chand & company Pvt. Ltd, New Delhi.
- Gupta A B. (2013). Fundamental of Mathematical Physics.(5<sup>th</sup> edition), Book and Allied Pvt. Ltd, Kolkata.

#### **BLENDED LEARNING**

Unit V - Classical Mechanics	
Торіс	Links
Hamiltion's principle	https://www.youtube.com/watch?v=SZbNx4VfMzg
Phase space	https://nptel.ac.in/courses/115/103/115103115/
Hamilton's canonical equations of motion	https://nptel.ac.in/courses/115/103/115103115/

#### Mapping of CO's with PO's and PEO's

	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	1	2	1	1	2	1	3	2	1	2	3	1
CO2	3	3	2	1	3	3	2	3	2	1	3	2	1	3
CO3	3	3	3	1	1	2	3	2	1	2	3	1	2	2
CO4	1	1	1	3	1	1	3	1	3	1	3	2	1	1
CO5	1	2	2	1	3	2	2	1	3	1	3	1	1	3

(Correlation: 3 – High, 2 – Medium, 1 – Low)

#### ASSESSMENT TOOLS

S. No.	Assessment Methods	Frequency of Assessment
1	End Semester Examination	Once in a semester
2	CIA I	Once in a semester
3	CIA II	Once in a semester
4	Model	Once in a semester
5	Assignment (Unit I & II)	Twice in a semester

6	Seminar (Unit III & IV)	Twice in a semester
7	Problem Solving (Unit V)	Once in a semester

Course Designed by: Mrs. W. Maria Therease	Verified by HOD: Dr. R. Amutha
Ramya	
Checked by CDC: Dr. G. Chitra	Approved by:
	Principal

Dr. G. Uma Devi Associate	Dr. S. Ramanathan Assistant Professor	Dr. V. Sathya Narayana Moorthy	Mr. S.P.Senthil Subramaniam	Ms. H. Glory Renita (Alumna)
Professor Govt. Arts College, Coimbatore	Vidhyalaya Periyanaickenpalayam Coimbatore	Assistant Professor PSG College of Arts and Science Coimbatore	Mighty Electronics Equipments Corporation Coimbatore	CIT College Coimbatore

## SEMESTER: V COURSE CODE: 23UPS5C07 TITLE OF THE COURSE: CORE 7: ELECTRONICS (Employability)

#### **OBJECTIVES**

• To acquire knowledge and apply it to various electronics instruments

• To the development of the electronic instruments.

#### **COURSE OUTCOMES**

#### At the completion of the course the student will be able to

C01	Explain the applications of diodes (Zener and LED) using the semiconductors)	K2
CO2	Classify the types of the amplifier	К3
CO3	Explain the oscillators using the fundamental principles of oscillations	K2
CO4	Apply the solid state switching circuits using transistors	К3
CO5	Explain wave shaping circuits using operational amplifiers	K2

#### Syllabus

#### **Instructional hours: 60**

#### Credits: 5

#### UNIT I: Semi conductors (K2)

Semiconductor – intrinsic semiconductor – extrinsic semiconductor – n type semiconductor p type semiconductor – pn junction – biasing a pn junction – volt- ampere characteristics of pn junction – Zener diode – Zener diode as a voltage stabilizer – Transistor connections – common base connection – characteristics of common base connection – common emitter connection – characteristics of common emitter connection.

#### (Self Study: Intrinsic semiconductor, Extrinsic semiconductor)

#### **UNIT II: Amplifiers (K3)**

Single stage transistor amplification – graphical demonstration of transistor amplifier - characteristics of an amplifier – classification of amplifiers -feed back amplifier – feed back and related terms (block diagram of a feed back amplifier – transfer gain of an amplifier with feed back) – emitter follower circuit – an example of negative feedback.

(Beyond the Curriculum: Voltage gain, voltage gain stability, Voltage gain CE amplifier, voltage gain CE amplifier without  $C_E$ )

**UNIT III: Oscillators (K2)** 

#### (12 hours)

#### (12 hours)

Introduction – types of oscillator – fundamental principle of oscillator – concept of feedback oscillator – Barkhausen criterion - Hartley oscillator – Colpitts oscillator – phase shift oscillator – Wien bridge oscillator – frequency response of crystal - crystal oscillator (circuit operation, advantages and disadvantages)

#### UNIT IV: Solid state switching circuits (K3)

Introduction –switching circuit – Electronic switches - important terms – collector leakage current – saturation collector current – switching transistors – switching action of a transistor – OFF region – ON region – active region. multivibrator – types of multivibrator – transistor astablemultivibrator – circuit details –operation – ON or OFF time – transistor mono stable multivibrator –circuit details – operation – transistor bistablemultivibrator – circuit details – operation.

#### **UNIT V: Wave Shaping Circuits (K2)**

#### (12 hours)

(12 hours)

Differentiating circuit – output waveforms – integrating circuit – output waveforms-important applications of diodes – clipping circuit – positive clipper – biased clipper – combination clipper – applications of clipper – clamping circuits – basic idea of a clamper – positive clamper – operation – negative clamper.

#### (Self Study: Applications of clipper)

#### **TEXT BOOKS:**

- Metha V.K & Metha Rohit (2014), Principles of Electronics ed11. (11<sup>th</sup> edition), S Chand & Company Pvt. Ltd, New Delhi.
- Chattopadhyaya D (1994). Foundation of Electronics. (2<sup>nd</sup> edition), Wiley Eastern private Ltd, New Delhi.

#### **REFERENCE BOOKS:**

- Millman J & Halkias C. C.(2010).Integrated Electronics.(2<sup>nd</sup>edition),Tata Mc Graw Hill Publishing Co Ltd, New Delhi.
- Millman and Halkias (2008). Millman's Electronics devices and Circuits. (3<sup>rd</sup> edition), Mc Graw Hill Education(India) private Ltd, New Delhi.
- Sedha R.S (2013).Text book of Applied Electronics. (4<sup>th</sup>edition), S Chand & Company Pvt. Ltd, New Delhi.
- 4. Theraja, BL (2006).Basic Electronics.(8thedition), S Chand & Co, New Delhi.

#### **BLENDED LEARNING**

#### Unit V - Wave Shaping Circuits

Торіс	Links	
Differentiating circuit -output waveforms	https://youtu.be/YH0GVZPR9b8	
Integrating circuit -output waveforms	https://youtu.be/UM2LTDC04CA	
Application of diodes	https://youtu.be/qhXZuVFhVzo	
clipping circuit -positive clipper -Negative clipper	https://youtu.be/YchyppCoSyc	
-clamping circuit -positive clamper -Negative clamper		

## Mapping of COs with PO's and PEO's

	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	2	2	2	2	1	1	2	1	1	2	1	2
CO2	2	2	1	3	1	1	2	2	2	3	2	2	2	2
CO3	3	3	2	3	3	2	1	1	1	3	3	1	3	1
CO4	3	3	3	2	1	1	2	1	2	2	2	3	2	1
CO5	3	2	3	1	2	3	2	2	2	2	1	3	2	2

(Correlation : 3 – High, 2 – Medium, 1 – Low)

#### ASSESSMENT TOOLS

S. No.	Assessment Methods	Frequency of Assessment
1	End Semester Examination	Once in a semester
2	CIA I	Once in a semester
3	CIA II	Once in a semester
4	Model	Once in a semester
5	Assignment (Unit I & II)	Twice in a semester
6	Seminar (Unit III & IV)	Twice in a semester
7	Chart Making (Unit V)	Once in a semester

Course Designed by: Mrs. X. Mary Josephine	Verified by HOD: Dr. R. Amutha

Dr. G. Uma Devi Associate Professor Govt. Arts College, Coimbatore	Dr. S. Ramanathan Assistant Professor Sri Ramakrishna Mission Vidhyalaya Periyanaickenpalayam Coimbatore	Dr. V. Sathya Narayana Moorthy Assistant Professor PSG College of Arts and Science Coimbatore	Mr. S.P.Senthil Subramaniam Partner Mighty Electronics Equipments Corporation Coimbatore	Ms. H. Glory Renita (Alumna) Research Scholar CIT College Coimbatore

#### **SEMESTER: V**

## COURSE CODE: 23UPS5C08 TITLE OF THE COURSE: CORE 8: SOLID STATE PHYSICS (Employability)

#### **OBJECTIVES**

- To acquire knowledge of various bond theory
- To know the method of forming different alloys, conducting materials.
- To motivate the students in order to apply the principles of bond theory in their research studies.

#### **COURSE OUTCOMES**

#### At the completion of the course the student will be able to:

CO1	Explain the different types of crystal structure on the basis of lattice system.	K2
CO2	Discuss the optical properties of solids.	K2
CO3	Explain Langevin's theory of diamagnetism and paramagnetism by using classical theory.	K2
CO4	Explain Sommerfeld model by using free electron theory.	К2
CO5	Explain Meissner effect, isotopes effect and thermodynamic effect from superconductors.	К2

#### **Syllabus**

#### **Instructional Hours: 60**

#### UNIT I: Crystallography (K2)

Credits: 5

Distinction between crystalline and amorphous solids– different features of the crystal – crystal lattice – basis– crystal structure – unit cell – number of lattice points per unit cell– Bravais lattices– miller indices – elements of symmetry– structure of KCl and NaCl crystal – atomic packing – atomic radius – lattice constant and density– crystal structure (sc, hcp, sssfcc, bcc.) classification of imperfections – crystallographic imperfections – point defect, line defect ( in brief only).

(Self Study: Unit cell & Number of lattice points per unit cell)

#### UNIT II: Band theory of solids (K2)

Classification of solids – basics of band theory – optical properties of solids – specific heat capacity of solids – Dulong and Pettit's law (classical theory) – Einstein's theory of specific heat of solids – Fermi levels.

#### UNIT III: Magnetic properties of materials (K2)

Introduction – Langevin's theory of diamagnetism – Langevin's theory of paramagnetism – ferro magnetism – Weiss theory of ferro magnetism – nuclear magnetic resonance – ferro electricity – ferro electric crystals – quantum theory of para magnetism – cooling by adiabatic demagnetization of a paramagnetic salt.

#### **UNIT IV: Free electron theory (K2)**

Drude Lorentz theory – explanation of Ohm's law – electrical conductivity – thermal conductivity – Wide-Mann and Franz ratio – Sommerfeld model –Schottky effect – Hall effect – Hall voltage and Hall coefficient – mobility and Hall angle – importance of Hall effect– experimental determination of Hall coefficient.

#### (Self Study: Explanation of Ohm's law)

#### **UNIT V: Dielectrics (K2)**

Dielectric constant and displacement vector– Clausius-Mossotti relation – atomic or molecular polarizability – types of polarizability. Superconductivity – phenomena – magnetic properties – super conductor – Meissner effect – type – I and Type – II superconductors – BCS theory.

(Beyond the Curriculum: Thermodynamic Effects (Entropy, Specific heat, Thermal conductivity, Josephson effect))

#### **TEXT BOOKS:**

- Gupta S.L. and Kumar V. (2014). Solid State Physics. (9<sup>th</sup> edition), K.Nath & Co educational publishers, Meerut.
- Murugeshan R. and Kiruthiga Sivaprakash. (2014). Modern Physics. (15<sup>th</sup> edition), S.Chand& company Pvt. Ltd, New Delhi.

#### **REFERENCE BOOKS:**

- 1. Charles Kittel. (2015). Introduction to Solid State Physics. (8th edition), Wiley India Pvt.Ltd.
- 2. Ilangovan K. (2007). Solid State Physics. (1<sup>st</sup> edition), S.Viswanathan (Printers & Publishers)

#### (12 hours)

## (12 hours)

#### (12 hours)

Pvt. Ltd, Chennai.

- 3. Pillai S.O. (2015). Solid State Physics. (7<sup>th</sup> edition), New age international publishers, Kerala.
- Singh R.J. (2012). Solid State Physics. (1<sup>st</sup> edition), Published by Dorling Kindersley Pvt. Ltd, Licensees of Pearson education in south Asia.
- Saxena P.N. and Gupta, R.C. (2014). Fundamentals of Solid State Physics. (14<sup>th</sup> edition), PragatiPrakashan, Meerut.

#### **BLENDED LEARNING**

Unit V – Dielectrics	
Торіс	Links
dielectric constant	https://youtu.be/etjZmdmrjSU
displacement vector	https://youtu.be/Zhm3NJIixPg
clausiss mossoti relation	https://youtu.be/LSNfBD1SdA4
types of Polarizability	https://youtu.be/NaQZMoYhG2s -
super conductivity	https://youtu.be/D-9M3GWoBrw
super conductor and Meissner effect	https://youtu.be/iUM7dWWqeeY

#### MAPPING OF CO'S WITH PO's and PSO's

	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	2	2	2	1	2	3	2	1	2	2	2
CO2	1	2	2	2	2	1	2	2	2	1	2	2	2	1
CO3	1	2	2	2	1	1	2	2	2	2	2	2	2	2
CO4	1	2	2	2	1	2	1	2	2	1	2	2	2	2
CO5	1	2	2	1	2	2	2	2	2	2	1	2	2	2

(Correlation: 3 – High, 2 – Medium, 1 – Low)

#### ASSESSMENT TOOLS

S. No.	Assessment Methods	Frequency of Assessment
1	End Semester Examination	Once in a semester
2	CIA I	Once in a semester
3	CIA II	Once in a semester
4	Model	Once in a semester

5	Assignment (Unit I & II)	Twice in a semester
6	Seminar (Unit III & IV)	Twice in a semester
7	Quiz (Unit V)	Once in a semester

Course Designed by: Dr. R. Amutha	Verified by HOD: Dr. R. Amutha
Checked by CDC: Dr. G. Chitra	Approved by: Principal

Dr. G. Uma	Dr. S. Ramanathan	Dr. V. Sathya	Mr. S.P.Senthil	Ms. H. Glory
Dev1	Assistant Professor	Narayana Moorthy	Subramaniam	Renita (Alumna)
Associate	Sri Ramakrishna Mission	Assistant	Partner	Research Scholar
Professor Covt Arts	Vidhyalaya	Professor	Mighty Electronics	CIT College
College	Periyanaickenpalayam	PSG College of	Equipments	Coimbatore
Coimbatore	Coimbatore	Arts and Science	Corporation	
		Coimbatore	Coimbatore	

#### **SEMESTER: V**

#### COURSE CODE: 23UPS5E01

#### TITLE OF THE COURSE: ELECTIVE: DIGITAL ELECTRONICS

#### (Entrepreneurship)

#### **OBJECTIVES**

- To acquire knowledge of number system and Boolean Algebra
- To study counters and memory devices

#### **COURSE OUTCOMES**

#### At the completion of the course the student will be able to:

CO1	Explain Binary Arithmetic and Codes by using number system.	K2
CO2	Explain De-morgan's theorems from basic law of Boolean algebra.	K2
CO3	Explain half adder, full adder and its subtraction by using arithmetic circuits.	K2
CO4	Explain shift register and counters by using flip flops.	K2
CO5	Explain RAM, ROM, PROM, EPROM and EEPROM from memory devices.	K2

#### **Syllabus**

#### Credits: 4

#### **Instructional Hours: 60**

#### UNIT I: Number system –Binary Arithmetic and Codes (K2)

(12 hours)

Binary numbers – octal numbers – hexadecimal numbers (conversion of one number system into other).

Arithmetic operation – binary addition – binary subtraction – 1's complement subtraction – 2's complement subtraction.

Codes – binary coded decimal – BCD addition and subtraction – weighted binary codes – non weighted codes – excess 3 codes – gray code- binary to gray code convertor – gray to binary convertor – error detection and correction codes – ASCII & EBCDIC Codes.

#### (Self Study: Conversion of one number system into other)

UNIT II: Boolean Algebra and minimization techniques (K2)

Boolean logic operation – basic laws of Boolean algebra – Boolean addition and multiplication – properties of Boolean algebra – De Morgan's theorems.

Minimization and Boolean expressions – minimization using algebraic methods – SOP and POS – minterm – maxterm – Karnaugh map (upto 4 variables only).

#### UNIT III: Logic gates and arithmetic circuits (K2)

OR, AND, NOT, NAND, NOR, ExOR ,ExNOR gates – universal building blocks – mixed logic symbols.

Arithmetic circuits - half adder – full adder – half subtractor – full subtractor – k-map simplification – parallel binary adder – parallel binary subtractor.

#### (Self Study: Logic Gates (OR, AND, NOT, NAND & NOR))

#### **UNIT IV: Flip-flops and their applications (K2)**

SR flip-flop – clocked SR flip-flop – D flip-flop – JK flip-flop – T flip-flop – triggering of flipflops - level triggering – edge triggering – master-slave JK flip-flop.

Applications: shift register: 3 and 4 bit shift register – counters – 4 bit ripple binary counters – MOD 3 counters – MOD 6 counters and decade counter (all MOD counters using JK flip-flop only).

#### UNIT V: A/D and D/A Converters, Memory Devices and Hobby Circuit (K2) (12 hours)

A/D converters- type simultaneous and counter type – D/A converters – weighted resistor type and – R-2R ladder type.

Memory devices: classification of memories - ROM – PROM, EPROM, EEPROM, RAM (Basic ideas only).

Hobby circuit: Electronic street light switch – smart emergency light – 5V regulated power supply.

#### **TEXT BOOK:**

 Salivahanan S. and Arivazhagan S. (1999). Digital circuits and design.(4<sup>th</sup> edition), Vikas publishing house Pvt. Ltd, Haryana.

#### **REFERENCE BOOKS:**

- Albert Paul Malvino and Donald P. Leach. (2001). Digital principle and applications. (4<sup>th</sup> edition), McGraw- Hill publishing company Ltd, US.
- Morris mano M. (2004). Digital logic and computer designed. (4<sup>th</sup> edition), Pearson Education, London.

#### (12 hours)

- 3. William H Gouthmann. (2001). Digital electronics (An introduction to theory and practice). (2<sup>nd</sup> edition), Prentice Hall of India pvt.Ltd, New Delhi.
- 4. Puri V.K. (2017). Digital electronics circuits and systems.(8<sup>th</sup> edition), McGraw Hill publishing company Ltd, US.

#### **BLENDED LEARNING**

UNIT V: A/D and D/A Converters, Memory Devices and Hobby Circuit				
Торіс	Links			
A/D converters introduction	https://youtu.be/TirvWsbqBUc			
simultaneous and counter type	https://youtu.be/xdoAB7jevk0			
D/A converters	https://youtu.be/kMGap-0XwGs			
weighted resistor type and – R-2R ladder type	https://youtu.be/LUMhObAm1Qs			
classification of memories	https://youtu.be/tas2eUavhRE			
ROM	https://youtu.be/YUQI39whYLg			

### MAPPING OF CO'S WITH PO's and PSO's

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	<b>PO8</b>	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	1	2	1	2	1	2	1	2	2	3	2
CO2	3	3	1	1	2	1	1	1	2	1	2	2	3	2
CO3	3	2	2	2	2	1	1	1	2	1	2	2	2	2
CO4	3	2	2	2	2	1	2	1	2	1	2	2	2	2
CO5	3	2	2	2	3	1	1	1	2	1	2	2	1	2

(Correlation: 3 – High, 2 – Medium, 1 – Low)

#### ASSESSMENT TOOLS

S. No.	Assessment Methods	Frequency of Assessment
1	End Semester Examination	Once in a semester
2	CIA I	Once in a semester
3	CIA II	Once in a semester
4	Model	Once in a semester
5	Assignment (Unit I & II)	Twice in a semester
6	Seminar (Unit III & IV)	Twice in a semester
7	Presentation (Unit V)	Once in a semester

Course Designed by: Mrs. X. Mary Josephine	Verified by HOD: Dr. R. Amutha
Checked by CDC: Dr. G. Chitra	Approved by:
	Principal

Dr. G. Uma Devi Associate Professor Govt. Arts College, Coimbatore	Dr. S. Ramanathan Assistant Professor Sri Ramakrishna Mission Vidhyalaya Periyanaickenpalayam Coimbatore	Dr. V. Sathya Narayana Moorthy Assistant Professor PSG College of Arts and Science Coimbatore	Mr. S.P.Senthil Subramaniam Partner Mighty Electronics Equipments Corporation Coimbatore	Ms. H. Glory Renita (Alumna) Research Scholar CIT College Coimbatore

### SEMESTER V COURSE CODE: 23UPS5E02 TITLE OF THE COURSE: ELECTIVE - INDUSTRY AUTOMATION AND ITS

#### APPLICATIONS

(*Employability*)

#### **OBJECTIVES**

- To explore the idea of office maintenance using computers.
- To discuss and develop practical skills in using internet and Google apps.
- To identify the internet of things and get awareness regarding hacking.

#### **COURSE OUTCOMES**

#### At the end of the course the student will be able to:

CO1	Understand the basics of windows and internet of things.	K2
CO2	Understand of ethical Hacking.	K2
CO3	Apply Internet of Things in everyday life	K4
CO4	Understand the basics of Google apps	K2
CO5	Understand the basics of Google playstore	K2

#### Syllabus

#### Credits: 4

#### Unit:I Windows (K2)

Definition of Operating System - Functions of OS - and types of OS - Desktop icons and their functions: My computer - My documents - My Network Place - Recycle Bin – Files - Folder - Local Disk Drive -CD/DVD Drive- Pen Drive - SD Card. **Basics of Networks:** LAN - WAN- MAN- Wireless- Home Networks – Connection oriented and connectionless services- DNS – Email.

(Self study: Email)

## Instructional Hours: 60

#### **Unit:II Ethical Hacking (K2)**

Introduction to Ethical Hacking – Hacker and Cracker. Fundamentals of Computer Fraud Foot printing and scanning – Malware Threats: Viruses and Worms - Trojans – Spyware - Malware Counter measures. **Connectivity Ports:** PS/2 keyboard and mouse port-USB OTG - Ethernet port - serial port - parallel port - HDMI port - VGA port - display port - USB A Type - USB B Type - USB C Type - Type A Mini and micro port - Type B Micro.

#### **Unit:III Internet of Things (K4)**

Introduction- Definition & characteristics of IOT- IOT in everyday life- Internet of everything. **IOT Applications**: Satellite system - Smart signals in cities and location sharing - smart satellites and radar - IOT in education - Development of India in IOT: Solar Plant System - ATM chip card system - IOT in health care industry - IOT in Wireless Devices. **Challenges in IOT**: Big Data Management -Connectivity challenges

#### Unit:IV Google Apps for Education (K2)

Basics of Google Docs -Google Sheets -Google Slides -Google Drive.

**Unit:V Google Applications (K2)** 

Basics of Google Play store - Google Calendar - Google Contacts - and Google Meet.

**Social Media Applications:** WhatsApp - Telegram - Facebook - Twitter- YouTube - Instagram. (*Self study: WhatsApp*)

#### **Text Books:**

- 1. Joyce Cox and Polly Urban. Quick Course in Microsoft Office. GOLGOTIA Publications.
- 2. Arshdeep Bahga and Vijay Madisetti. Internet of Things A hands on Approach. Universities press.
- Lakshay Eshan. (2018). Ethical Hacking: A Beginners Guide to Learning the World of Ethical Hacking. Shockwave Publishing.
- Kern Kelley (2016). The Google Apps Guidebook: Lesson- Activities and Projects Created by Students for Teachers Paperback. Tech Sherpas.

#### **Reference Books:**

 R.K. Taxali. (1998). PC Software for Windows Made Simple. Tata McGrawHill Publishing Company, US.

#### (12 hours)

(12 hours)

(12 hours)

- 2. Srinivasa K.G.- Siddesh G.M.-Hanumantha Raju R.- Cengage. (2018). Internet of Things-Learning India Pvt. Ltd.
- 3. Maciej Kranz, 2016, Building the Internet of Things, Wiley.

#### **BLENDED LEARNING**

Unit:V Google Applications					
Торіс	Links				
Google Docs	https://www.youtube.com/watch?v=xJiUTXGv3PE&vl=en				
Google Sheet	https://www.youtube.com/watch?v=FIkZ1sPmKNw				
Google Calendar and Google	https://youtu.be/PKuBtOuEa8				
Meet					
IOT	https://www.youtube.com/watch?v=UrwbeOIIc68				

#### MAPPING OF CO'S WITH POs/PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	3	1	3	2	2	2	1	2	1	2	2	2
CO2	2	1	2	2	2	2	3	2	2	2	3	2	3	1
CO3	2	3	3	1	3	2	2	2	2	1	2	2	2	1
CO4	3	2	2	2	3	1	2	3	1	2	1	2	2	2
CO5	2	2	3	2	3	2	3	2	2	2	3	2	2	1

(Correlation: 3 – High, 2 – Medium, 1 – Low)

#### ASSESSMENT TOOLS

S. No.	Assessment Methods	Frequency of Assessment
1	End Semester Examination	Once in a semester
2	CIA I	Once in a semester
3	CIA II	Once in a semester
4	Model	Once in a semester
5	Assignment (Unit I & II)	Twice in a semester
6	Quiz (Unit III & IV)	Twice in a semester
7	Quiz (Unit V)	Once in a semester

Course Designed by: Dr. R. Amutha	Verified by HOD: Dr. R. Amutha
Checked by CDC: Dr. G. Chitra	Approved by:
	Principal

Dr. G. Uma Devi	Dr. S. Ramanathan Assistant Professor	Dr. V. Sathya Narayana Moorthy	Mr. S.P.Senthil Subramaniam	Ms. H. Glory Renita (Alumna)
Associate Professor Govt. Arts College, Coimbatore	Sri Ramakrishna Mission Vidhyalaya Periyanaickenpalayam Coimbatore	Assistant Professor PSG College of Arts and Science	Partner Mighty Electronics Equipments Corporation	Research Scholar CIT College Coimbatore
Combatore		Coimbatore	Coimbatore	

#### SEMESTER - V

#### COURSE CODE: 23NPS5E02

#### TITLE OF THE COURSE: ELECTIVE - PRINCIPLES OF PHYSICS

#### **OBJECTIVES**

- To acquire knowledge of mechanics, waves
- To study heat, sound and optics

#### **COURSE OUTCOMES**

#### At the end of the course the student will be able to:

CO1	Recall the Newton's law of motion and its applications.	K1
CO2	Discuss about the characteristics and the uses of electromagnetic waves.	K2
CO3	Summarize the basic laws of Heat and kinetic theory of gases.	K2
CO4	Explain the nature of sound waves and acoustics of buildings.	K2
CO5	Discuss the defects of eye and scattering of light.	K2

#### **Syllabus**

#### **Instructional Hours: 60**

#### UNIT I: Mechanics (K1)

Credits: 4

Particle – rest and motion – motion in one, two, and three dimensions – position, displacement and distance – speed and velocity – acceleration – momentum – force – equation of motion – Newton's law of motion – applications of Newton's law of motion .

#### **UNIT II: Electromagnetic waves (K2)**

Characteristics – Hertz experiment – electromagnetic spectrum – uses – types of spectra – florescence – phosphorescence – Raman effect – application.

#### UNIT III: Heat (K2)

Heat energy – units – specific heat capacity – Newton's law of cooling – Boyle's law – Charle's law – gas equation – kinetic theory of gases – postulates – degrees of freedom – isothermal and adiabatic process.

#### UNIT IV: Sound (K2)

## (12 hours)

(12 hours)

#### (12 hours)

Transverse and longitudinal waves – relation between frequency, wavelength and velocity -Doppler effect (quantitative idea) applications – laws of transverse vibration of stretched strings – ultrasonics – applications – reverberation – acoustics of buildings.

#### UNIT V: Optics (K2)

(12 hours)

Lens – types – defects of eye – laws of reflection and refraction – conditions for total internal reflection – dispersion – scattering – Rayleigh scattering – colour of the sky – Raman effect.

#### **TEXT BOOK:**

1. Brijlal and Subramaniyam. (1997). Principles of Physics. (1<sup>st</sup> edition), S Chand & Company

#### **REFERENCE BOOKS:**

- Venkatesan ,Narayanamoorthy. (1965). Textbook of Mechanics Part I and Part II (1<sup>st</sup>edition ), National Publishing Company.
- Brijlal and Subramaniyam. (2001). Heat and Thermodynamics. (1<sup>st</sup> edition), Anmol publication-New Delhi.
- Brijlal and Subramaniyam. (1978). Textbook of Sound. (2<sup>nd</sup> edition), Vikas publication-Bangalore.

R. Murugesan and Kiruthiga Shivaprasath. (2006). Optics and Spectroscopy. (6<sup>th</sup> edition), S

Chand & Company.

#### **BLENDED LEARNING**

UNIT IV: Sound						
Торіс	Links					
Transverse and longitudinal waves	https://nptel.ac.in/courses/115/106/115106119/					
ultrasonics – applications	https://nptel.ac.in/courses/122/103/122103011/					
reverberation – acoustics of buildings	https://nptel.ac.in/courses/124/105/124105004/					

#### MAPPING OF CO'S WITH PO's/PSO's

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	2	1	1	1	2	2	2	2	1	1	2	1
CO2	3	1	2	1	2	2	2	3	1	3	2	1	3	2
CO3	2	3	3	1	2	2	1	1	2	1	2	1	3	2
CO4	2	2	1	2	3	2	3	2	1	1	2	3	1	2
CO5	3	2	1	2	2	2	1	3	2	1	3	2	2	3

## ( Correlation : 3 - High, 2 - Medium, 1 - Low)

#### ASSESSMENT TOOLS

S. No.	Assessment Methods	Frequency of Assessment
1	End Semester Examination	Once in a semester
2	CIA I	Once in a semester
3	CIA II	Once in a semester
4	Model	Once in a semester
5	Assignment (Unit I & II)	Twice in a semester
6	Quiz (Unit III & IV)	Twice in a semester
7	Quiz (Unit V)	Once in a semester

Course Designed by: Mrs. W. Maria Therease Ramya	Verified by HOD: Dr. R. Amutha
Checked by CDC: Dr. G. Chitra	Approved by: Principal
	i incipai

Dr. G. Uma	Dr. S. Ramanathan	Dr. V. Sathya	Mr. S.P.Senthil	Ms. H. Glory
Devi	Assistant Professor	Narayana Moorthy	Subramaniam	Renita (Alumna)
Associate	Sri Ramakrishna Mission	Assistant	Partner	Research Scholar
Professor Covt Arts	Vidhyalaya	Professor	Mighty Electronics	CIT College
College	Periyanaickenpalayam	PSG College of	Equipments	Coimbatore
Coimbatore	Coimbatore	Arts and Science	Corporation	
		Coimbatore	Coimbatore	

#### SEMESTER-V

#### COURSE CODE: 23UPS5SB3

#### TITLE OF THE COURSE: SKILL BASED - ENERGY PHYSICS

#### (Skill Development)

#### **OBJECTIVES**

- To acquire knowledge about solar energy
- To learn the application of solar energy
- To learn wind energy, ocean energy

#### **COURSE OUTCOMES**

#### At the completion of the course the student will be able to

CO1	Describe the various energy resources and prospects of renewable energy.	K2
CO2	Explain the solar radiation measurement techniques.	K2
CO3	Understand the effective utilization of solar energy.	K2
CO4	Calculate power in the wind.	К3
CO5	Explain the biomass conversion technologies.	K2

#### Credits: 2

#### **Instructional Hours: 45**

#### UNIT I: Introduction to energy sources (K2)

An introduction to energy sources –conventional energy sources – non conventional energy sources – renewable energy sources – advantages of renewable energy sources – obstacles to the implementation of renewable energy system – prospects of renewable energy – energy crisis – possible solutions.

#### (Self study: conventional energy sources)

#### **UNIT II: Solar radiation and solar collectors (K2)**

## Solar radiation and its measurements – solar constant – solar radiation at the earth's surface – beam and diffuse solar radiation – attenuation of beam radiation - solar radiation measurements – Pyrheliometers – Pyranometers– Solar energy collectors – physical principle of conversion of solar radiation into heat– flat plate collectors – concentrating collector – focusing type – Parabolic Trough reflector - selective absorbed coatings.

#### (9 hours)

(9 hours)

#### **UNIT III:** Application of solar energy (K2)

Solar water heating -solar electric power generation - solar photo voltaic - agricultural and industrial process heat – solar distillation – solar pumping – solar furnace – solar cooking – simple box type cooker – concentric parabolic type solar cooker.

#### UNIT IV: Wind energy (K3)

Basic principles of wind energy conversions – nature of the wind - power in the wind - basic components of wind energy conversion system (WECS) – advantages and disadvantages of WECS – types of wind machines – horizontal axis machines – vertical axis machines – applications of wind energy – environmental aspects.

#### UNIT V: Renewable energy sources, biomass and biogas (K2) (9 hours)

Energy from the ocean: ocean thermal electric conversion (OTEC) – tidal energy –geothermal energy.

Energy from biomass: biomass conversion technologies – wet and dry process – photosynthesis.

Biogas generation: advantages of anaerobic digestion – factors affecting the bio- digestion and generation of gas.

#### (Self study: biomass conversion technologies)

#### **TEXT BOOK:**

1. Rai G D. (2011).Non-conventional energy sources. (5<sup>th</sup>editition), Khanna publishers, India

#### **REFERENCE BOOKS:**

- 1. Sawney G.S. (2014). Non conventional energy sources. (2<sup>nd</sup> edition), PHI learning private Ltd, New Delhi.
- 2. Suhatme S.P. (2015). Solar energy. (18th reprint), McGraw Hill education (India) Private Ltd, US.
- 3. Tiwari G.N. (2013). Solar energy. (2<sup>nd</sup> revised edition), Narosa Publishing House.

Kothari D.P. (2009). Renewable Energy Sources and Emerging Technologies. (2<sup>nd</sup> reprint), PHI learning private Ltd, New Delhi.

#### **BLENDED LEARNING**

UNIT IV: Wind energy					
Торіс	Links				
Basic Principle of wind energy conversions	https://youtu.be/GExTwRNkQBg				
power in the wind	https://youtu.be/gMxPkVQYXz8				

#### (9 hours)

(9 hours)

Horizontal axis wind mill	https://youtu.be/NmL3qsfR811
types of wind machines	https://youtu.be/4a4XGu1mR5E

#### MAPPING OF CO'S WITH POs/PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	2	1	1	3	3	2	1	2	1	2	3	1
CO2	3	2	1	2	1	1	2	1	1	2	1	2	3	1
CO3	3	1	2	2	1	2	3	1	1	2	1	3	2	1
CO4	3	2	2	2	1	2	3	1	1	3	1	3	3	2
CO5	3	1	2	2	1	2	3	2	2	3	2	3	3	1

(Correlation: 3 – High, 2 – Medium, 1 – Low)

## ASSESSMENT TOOLS

S. No.	Assessment Methods	Frequency of Assessment
1	End Semester Examination	Once in a semester
2	CIA I	Once in a semester
3	CIA II	Once in a semester
4	Model	Once in a semester
5	Assignment (Unit I & II)	Twice in a semester
6	Quiz (Unit III & IV)	Twice in a semester
7	Quiz (Unit V)	Once in a semester

Course Designed by: Mrs. X. Mary Josephine	Verified by HOD: Dr. R. Amutha
Checked by CDC: Dr. G. Chitra	Approved by:
	Principal

Dr. G. Uma Devi Associate Professor Govt. Arts College, Coimbatore	Dr. S. Ramanathan Assistant Professor Sri Ramakrishna Mission Vidhyalaya Periyanaickenpalayam Coimbatore	Dr. V. Sathya Narayana Moorthy Assistant Professor PSG College of Arts and Science Coimbatore	Mr. S.P.Senthil Subramaniam Partner Mighty Electronics Equipments Corporation Coimbatore	Ms. H. Glory Renita (Alumna) Research Scholar CIT College Coimbatore

#### **SEMESTER: V**

#### SUBJECT CODE: 23IDSBPS1

# TITLE OF THE COURSE: SKILL BASED ELECTIVE IV: HOME APPLIANCES – WORKING

#### **OBJECTIVES**

- To acquire knowledge about fire safety
- To learn the operation of mixer grinder, grinder, fan

#### At the end of the course the student will be able to:

CO1	Explain Fire prevention and safety	K2
CO2	Discuss tools used by electrician in day-to-day life	K2
CO3	Distinguish room and table heaters	K2
CO4	Describe about mixer grinder, electric kettle, table fan and ceiling fan	K2
CO5	Explain earth tester, multimeter and resistance	K2

#### **Syllabus**

#### **Total Credit: 2**

#### **UNIT I:** Fire prevention and protection

Fire prevention and protection – causes of industrial fire – types and uses of fire fighting equipment – Fire Extinguishers– safety in use of electricity – Shock treatment – Advantages and disadvantages – Safety precautions

#### (Self study: types and uses of fire fighting equipment)

#### **UNIT II: Resistors and Cells**

Measurement of resistance – resistors – types of carbon resistors – resistance value - comparison of cells – cells in series – cells in parallel – to measure the internal resistance of a battery – use of hydrometer – method of use – to charge a battery by battery charger and to test a charged battery.

#### **UNIT III: Heaters and Washing machine**

#### **Instructional Hours: 45**

9 hours

9 hours

#### 9 hours

Heater – table heater – room heater – parts of a table heater – defects and remedies – room heater – parts of a room heater – defects and remedies – hot plate construction – to demonstrate practically - washing machine – parts – connection.

#### **UNIT IV: Domestic Appliances**

Mixer grinder – parts – circuit diagram – to demonstrate practically – electric iron – parts – defect in irons and their remedy – to open and study the iron – electric kettle – table fan and ceiling fan – defects in fans – to demonstrate practically.

#### **UNT V: Testing of Components**

Earthing and testing – plate earthing – pipe earthing – use of earth tester – multimeter – to measure resistance with multimeter – methods of measuring DC voltage – resistance colour code – resistance in series and parallel – testing of electronic components with multimeter – electrolytic condenser – inductors or coils – value.

(Self study: multimeter)

#### **TEXT BOOK:**

Hans L R and Anwani M L (2016). Basic shop practicals in electrical engineering. Dhanpat Rai & Co. (p) Ltd., New Delhi.

#### **REFERENCE BOOKS:**

- 1. Lon H Ferguson and Christopher A Janicak. (2005). Fundamentals of fire protection for the safety professional. Government Institutes, an imprint of The Scarecrow Press. USA.
- 2. Khandpur R S. (2007). Troubleshooting Electronic Equipment. Mc Graw Hill, New York, Chicago.
- Eric Kleinert. (2013). Troubleshooting and Repairing Major Appliances. (3<sup>rd</sup> Edition), Mc Graw Hill, New York, Chicago.

#### **BLENDED LEARNING**

UNIT IV: Domestic Appliances					
Торіс	Links				
mixer grinder	https://youtu.be/iNIxYznMdMs				
Electric Iron	https://youtu.be/boXKyfKf_Xc				
Electric kettle	https://youtu.be/uxNktCVCeVM				

#### 9 hours

#### 9 hours

#### MAPPING OF CO'S WITH PO's and PSO's

	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	3	2	2	2	2	2	2	2	2	2	1
CO2	2	2	2	1	2	2	2	2	2	2	2	2	2	2
CO3	2	2	2	2	2	1	2	2	2	2	2	2	1	2
<b>CO4</b>	2	2	2	2	2	2	2	2	2	2	2	2	2	2
CO5	2	3	2	2	2	1	2	2	2	2	2	2	1	2

(Correlation: 3 – High, 2 – Medium, 1 – Low)

#### ASSESSMENT TOOLS

S. No.	Assessment Methods	Frequency of Assessment
1	End Semester Examination	Once in a semester
2	CIA I	Once in a semester
3	CIA II	Once in a semester
4	Model	Once in a semester
5	Assignment (Unit I & II)	Twice in a semester
6	Seminar (Unit III & IV)	Twice in a semester
7	Quiz (Unit V)	Once in a semester

Course Designed by: Ms. R. Leethiyal	Verified by HOD: Dr. R. Amutha
Checked by CDC: Dr. G. Chitra	Approved by:
	Principal

Dr. G. Uma	Dr. S. Ramanathan	Dr. V. Sathya	Mr. S.P.Senthil	Ms. H. Glory
Devi	Assistant Professor	Narayana Moorthy	Subramaniam	Renita (Alumna)
Associate	Sri Ramakrishna Mission	Assistant	Partner	Research Scholar
Professor Cout Arts	Vidhyalaya	Professor	Mighty Electronics	CIT College
College	Periyanaickenpalayam	PSG College of	Equipments	Coimbatore
Coimbatore	Coimbatore	Arts and Science	Corporation	
		Coimbatore	Coimbatore	

#### **SEMESTER: VI**

#### COURSE CODE: 23UPS6C09

#### TITLE OF THE COURSE: CORE 9: QUANTUM MECHANICS AND RELATIVITY

#### (Skill Development)

#### **OBJECTIVES**

- To acquire knowledge and apply it to various physical problems.
- To develop the problem solving ability.
- To motivate the students to apply Schrödinger's equation for solving problems in wave mechanics, nuclear physics etc.,

#### **COURSE OUTCOMES**

#### At the completion of the course the student will be able to:

CO1	Explain the wave properties of matter from Davission and Germer's experiment.	K2
CO2	Explain the uncertainty principle from diffraction of electron through a slit experiment.	К3
CO3	Derive the Schrodinger 's wave equation using time dependent and independent concept.	К3
CO4	Derive three dimensional Schrodinger's wave equation for hydrogen atom using spherically symmetrical wave equation.	К4
CO5	Explain ether hypothesis using Michelson- Morley experiment.	K3

#### **Syllabus**

#### Credits: 5

#### **Instructional Hours: 105**

#### **UNIT I: Wave Properties of Matter (K2)**

Limitations of classical mechanics-Introduction to quantum mechanics – wave particleduality-De Broglie concept of matter waves-De Broglie wavelength associated with a particle of mass M and kinetic energy –concept of wavepacket-phase velocity and group velocity – analytical expression for a group of waves –relation between the phase velocity and group velocity — verification of De'Broglie relation – Davission and Germer's experiment – G P Thomson's experiments.

(Self study: DeBroglie waves)

#### (21 hours)
#### **UNIT II: Uncertainty Principle (K3)**

Introduction – uncertainty Principle – elementary proof – displacement and momentum – energy and time – physical Significance of Heisenberg's uncertainty principle –illustration – diffraction of electrons through a slit – gamma ray microscope thought experiment – application – non-existence of free electrons in the nucleus – size and energy in the ground state of hydrogen atom.

# **UNIT III: Schrödinger's Wave Equation (K3)**

Introduction – wave function for a free particle – Schrödinger's one dimensional wave equation– time-dependent and time independent – physical interpretation – limitation – normalization of wave function – operators – eigen function – eigen value – eigen equation – operator for momentum, kinetic energy and total energy – postulates of quantum mechanics – orthogonality of energy eigen function – proof – probability current density – Ehruenfest's theorem – statement and proof.

# (Beyond the Curriculum: Applications of Schrodinger's Equation – The particle in a box – Infinite square well potential, finite square potential well, Tunnel effect, linear harmonic oscillator) UNIT IV: Spherical Symmetrical systems (K4) (21 hours)

Three dimensional Schrodinger's wave equation –hydrogen atom – wave equation for the motion of a electron – separation of variables – azimuthal wave equation and its solution – radial wave equation and it's solution – polar wave equation and its solution – ground state of the hydrogen atom.

# UNIT V: Relativity (K3)

# Frame of reference-Galilean Transformation equation – ether hypothesis – Michelson-Morley experiment – explanation of the negative results – special theory of relativity – Lorentz transformation equation – length contraction – time dilation – addition of velocities – variation of mass with velocity – mass energy equivalence- elementary ideas of general theory of relativity.

# (Self study: Lorentz transformation equation)

#### **TEXT BOOKS:**

Kamal Singh, Singh S.P. (2005). Elements of Quantum Mechanics .S. Chand & co, New Delhi.
Murugesan R. (2014). Modern Physics. (3<sup>rd</sup> edition), S.Chand & co, New Delhi.

#### **REFERENCE BOOKS:**

1. Schiff I. (1986).Quantum Mechanics.(3<sup>rd</sup> edition), International student edition.

2. Richtmyer F.K.Etal. Introduction to Modern Physics.(6th edition), Tata McGraw Hill.

#### (21 hours)

(21 hours)

(21 hours)

- 3. Aruldhas G.(2016).Quantum mechanics. (2<sup>nd</sup> edition), PHI learning Pvt ltd, New Delhi.
- SathyaPrakash. (2015). Quantum Mechanics. (2<sup>th</sup> edition), Kedarnath Ramnath Publication, Delhi.

# **BLENDED LEARNING**

UNIT IV: Domestic Appliances				
Торіс	Links			
mixer grinder	https://youtu.be/iNIxYznMdMs			
Electric Iron	https://youtu.be/boXKyfKf_Xc			
Electric kettle	https://youtu.be/uxNktCVCeVM			

# MAPPING OF CO's WITH PO's and PSO's

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	2	1	2	1	1	1	1	1	2	1	1
CO2	3	3	1	2	1	2	1	1	1	2	2	1	2	1
CO3	3	2	1	1	1	2	1	1	1	1	1	2	2	1
CO4	3	2	1	1	1	2	1	1	1	2	2	2	2	1
CO5	3	2	1	1	1	2	1	1	1	2	1	2	2	1

(Correlation : 3 – High, 2 – Medium, 1 – Low )

# ASSESSMENT TOOLS

S. No.	Assessment Methods	Frequency of Assessment
1	End Semester Examination	Once in a semester
2	CIA I	Once in a semester
3	CIA II	Once in a semester
4	Model	Once in a semester
5	Assignment (Unit I & II)	Twice in a semester
6	Seminar (Unit III & IV)	Twice in a semester
7	Problem Solving (Unit V)	Once in a semester

Course Designed by: Mrs. X. Mary Josephine	Verified by HOD: Dr. R. Amutha
Checked by CDC: Dr. G. Chitra	Approved by: Principal

Dr. G. Uma	Dr. S. Ramanathan	Dr. V. Sathya	Mr. S.P.Senthil	Ms. H. Glory
Devi	Assistant Professor	Narayana Moorthy	Subramaniam	Renita (Alumna)
Associate Professor	Sri Ramakrishna Mission	Assistant	Partner	Research Scholar
Govt Arts	Vidhyalaya	Professor	Mighty Electronics	CIT College
College.	Periyanaickenpalayam	PSG College of	Equipments	Coimbatore
Coimbatore	Coimbatore	Arts and Science	Corporation	
		Coimbatore	Coimbatore	

#### **SEMESTER: VI**

# COURSE CODE: 23UPS6C10

#### **TITLE OF THE COURSE: CORE 10: NUCLEAR PHYSICS**

#### (Employability)

#### **OBJECTIVES**

- To acquire knowledge and apply it to study the structure of nucleus
- To know the formation of nucleus and their binding energy
- To motivate the students to analyze the energy released by the nucleus during the fission and fusion process.

#### **COURSE OUTCOMES**

#### At the completion of the course the student will be able to:

CO1	Explain the models of nuclear structure using binding energy concept	K2
CO2	Explain the different type of particle accelerator.	K2
CO3	Distinguish between natural and artificial radio activity from the laws of radioactivity.	K3
CO4	Differentiate primary and secondary cosmic rays using cosmic rays cascade theory of shower.	K3
CO5	Classification of elementary particles .	K2

# **Syllabus**

# Credits: 5

# **UNIT I: Introduction to the Nucleus (K2)**

General properties of Nucleus (size, mass, density, charge, spin, angular momentum, magnetic dipole moment) – binding energy – BE/A and stability of nucleus – packing fraction – nuclear stability – nuclear forces – definition – properties – meson theory – model of nuclear structure – the liquid drop model – semi-empirical mass formula – the shell model – evidence for shell model.

# (Self study: The Shell model)

#### **UNIT II: Detector and Particle Accelerators (K2)**

Interaction between the energetic particles and matter – heavy charged particles electrons – gamma ray-ionization chamber – solid state detector – G-M counter – Wilson cloud chamber – scintillation counter – nuclear emission – linear accelerator – cyclotron – betatron.

# (21 hours)

**Instructional Hours: 105** 

# (21 hours)

# (Beyond the Curriculum: Proportional counter, The Synchrocyclotron, scintillation counters, electron synchrotron)

# **UNIT III: Radioactivity (K3)**

Natural Radioactivity – alpha, beta and gamma rays – properties – determination of e/m of alpha particle – determination of charge of alpha particle – determination of e/m of beta particle – determination of wavelength of gamma rays (Dumond Spectrometer) – origin of gamma rays – laws of radioactivity – Soddy-Fajan's displacement law – law of radioactive disintegration – half life period – mean life period (definition, expression) – units of radioactivity – artificial radioactivity – preparation of radio elements – application of radio isotopes.

#### **UNIT IV: Nuclear Fission and Fusion Reactions (K3)**

Nuclear fission – energy released in fission – Bohr and Wheelers theory of nuclear fission – chain reaction – multiplication factor – critical size – natural uranium and chain reactions – atom bomb – nuclear reactor – nuclear fusion – source of stellar energy – carbon nitrogen cycle – proton-proton cycle – hydrogen bomb – controlled thermo nuclear reactions.

#### (Self study: Atom Bomb)

#### **UNIT V: Cosmic rays and Elementary particles (K2)**

Cosmic rays – origin of cosmic rays – latitude effect – azimuth effect – altitude effect – seasonal and Diurnal changes – primary and secondary cosmic rays – cascade theory of shower – pair production and annihilation – Van Allen belts – elementary particles – introduction – particles and antiparticles – antimatter – the fundamental interactions – the quark model.

#### **TEXT BOOK:**

Murugesan R and Kiruthiga Sivaprakash . (2002). Modern Physics. (2<sup>nd</sup> edition), S. Chand & Co, New Delhi.

#### **REFERENCE BOOKS:**

- 1. Tayal D C. (1973).Nuclear Physics. (5<sup>th</sup> edition), Himalaya Publishing House Pvt Ltd.
- 2. Arthur Beiser.(2009).Concept of Modern Physics.(6th edition), Tata MC Graw Hill.
- 3. Richtmyer F K. et.al. (1976).Introduction to Modern Physics.(6<sup>th</sup> edition), MC Graw Hill.
- Pandya M.C. and Yadav, R P S. Elements of nuclear physics.(7<sup>th</sup> edition), Ketarnath Ramnath Publication.

# (21 hours)

#### (21hours)

(21hours)

# **BLENDED LEARNING**

UNIT IV: Nuclear Fission and Fusion Reactions					
Торіс	Links				
nuclear fission, energy released in fission	https://youtu.be/vPJidbP_oLM				
natural uranium and chain reaction	https://youtu.be/0tMs9EkktIY				
nuclear reactor	https://youtu.be/bukjtmM2djU				
nuclear fusion	https://youtu.be/6vPQYYm2fO8				
Thermonuclear fusion reactor	https://youtu.be/nY9MQH9yHvU				

# MAPPING OF CO'S WITH PO's and PSO's

	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	<b>PO9</b>	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	2	1	1	3	1	2	1	3	2
CO2	2	2	2	1	3	2	2	1	2	1	2	3	3	2
CO3	3	3	3	2	1	2	1	1	3	2	1	2	3	1
CO4	3	3	2	3	3	1	3	1	3	3	1	3	3	2
CO5	2	2	2	2	2	2	3	1	2	2	2	3	3	2

(Correlation: 3 – High, 2 – Medium, 1 – Low)

# ASSESSMENT TOOL

S. No.	Assessment Methods	Frequency of Assessment
1	End Semester Examination	Once in a semester
2	CIA I	Once in a semester
3	CIA II	Once in a semester
4	Model	Once in a semester
5	Assignment (Unit I & II)	Twice in a semester
6	Seminar (Unit III & IV)	Twice in a semester
7	Quiz (Unit V)	Once in a semester

Course Designed by: Ms. R. Leethiyal	Verified by HOD: Dr. R. Amutha
Checked by CDC: Dr. G. Chitra	Approved by: Principal

Dr. G. Uma Devi Associate Professor Govt. Arts College, Coimbatore	Dr. S. Ramanathan Assistant Professor Sri Ramakrishna Mission Vidhyalaya Periyanaickenpalayam Coimbatore	Dr. V. Sathya Narayana Moorthy Assistant Professor PSG College of Arts and Science Coimbatore	Mr. S.P.Senthil Subramaniam Partner Mighty Electronics Equipments Corporation Coimbatore	Ms. H. Glory Renita (Alumna) Research Scholar CIT College Coimbatore

## **SEMESTER: VI**

# COURSE CODE: 23UPS6E01

# TITLE OF THE COURSE: ELECTIVE – COMPUTER PROGRAMMING IN 'C'

#### (*Employability*)

# **Objectives:**

- To learn the arithmetical operations.
- To learn about arrays.

# **COURSE OUTCOMES**

#### At the completion of the course the student will be able to

CO1	Explain constraints and operators	K2
CO2	Explain the evaluation of arithmetic expression using precedence of arithmetic operators	K2
CO3	Apply decision making to simple program using conditional statements	К3
CO4	Apply string function using arrays	К3
CO5	Understand accessing a variable through its pointers	K2

#### Credits: 4

# **Instructional hours: 60**

#### **UNIT I: CONSTANTS AND OPERATORS (K2)**

Character set -C tokens -keywords and identifiers -constants - variables - data types (primary data types) <math>- declaration of variables.

Relational operators – logical operators – assignment operators – increment and decrement operators – conditional operators.

(Self Study :primary data types)

# **UNIT II: INPUT OUTPUT OPERATION (K2)**

Arithmetic expression – evaluation of expressions – precedence of arithmetic operators – operator precedence and associativity – mathematical functions – reading a character – writing a character – formatted input – formatted output .

# (Self Study: Precedence of arithmetic operators)

# (12 hours)

(12 hours)

# **UNIT III: DECISION MAKING (K3)**

Simple 'if' statement and 'if else' statement – nesting 'if else' statement – the 'switch' statement – the 'goto' statement – the 'while' statement - the 'do' statement – the 'for' statement.

# UNIT IV: ARRAYS (K3)

One dimensional arrays – two dimensional arrays – declaring and initializing string variables – reading string from terminal – writing strings to screen – string handling functions .

# UNIT V: STRUCTURE (K2)

Structure definition – giving values to members – structure initialization – understanding pointers – accessing the address of the variable – declaring and initializing pointers – accessing a variable through its pointers.

# **TEXT BOOK:**

1. Balaguruswamy E. (2007). Programming in ANSI C. (4<sup>th</sup> edition), Mc Graw Hill, New Delhi.

# **REFERENCE BOOKS:**

- 1. Yashavant Kanetkar. (2011). Let us C. (11th edition), BPB publication, New Delhi.
- 2. Mullish H& Cooper, H L.(1990). The spirit of C. (1<sup>th</sup> edition), Jaico Publishing House, New Delhi.
- 3. Ravichandran D.(1996). Programming in C. (1<sup>st</sup> edition), New Age international, New Delhi.
- 4. Rajaraman, V. (1994). Computer program in C. (1<sup>st</sup> edition), Printice Hall of India, New Delhi.

# **BLENDED LEARNING**

UNIT V: STRUCTURE	
Торіс	Links
structure definition, Structure initialization	https://youtu.be/0Nh5hdqQHYU
understanding pointers, accessing a variable throug pointer	https://youtu.be/hvDw7WA4Z10

# (12 hours)

# (12 hours)

(12 hours)

# Mapping of CO's with POs/ PEOs

	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	2	2	2	2	2	3	2	2	2	1	2	3	2	1
CO2	2	3	3	3	1	2	2	2	1	2	2	3	2	2
CO3	2	3	3	3	1	2	1	2	1	1	1	2	3	2
CO4	2	2	2	2	1	1	1	2	1	2	1	2	3	2
CO5	2	1	1	1	2	1	1	2	1	2	2	2	1	1

(Correlation: 3 – High, 2 – Medium, 1 – Low)

# ASSESSMENT TOOLS

S. No.	Assessment Methods	Frequency of Assessment
1	End Semester Examination	Once in a semester
2	CIA I	Once in a semester
3	CIA II	Once in a semester
4	Model	Once in a semester
5	Assignment (Unit I & II)	Twice in a semester
6	Quiz (Unit III & IV)	Twice in a semester
7	Quiz (Unit V)	Once in a semester

Course Designed by: Mrs. W. Maria Therease	Verified by HOD: Dr. R. Amutha
Ramya	
Checked by CDC: Dr. G. Chitra	Approved by:
	Principal

Dr. G. Uma	Dr. S. Ramanathan	Dr. V. Sathya	Mr. S.P.Senthil	Ms. H. Glory
Devi	Assistant Professor	Narayana Moorthy	Subramaniam	Renita (Alumna)
Associate	Sri Ramakrishna Mission	Assistant	Partner	Research Scholar
Professor Cout Arts	Vidhyalaya	Professor	Mighty Electronics	CIT College
College	Periyanaickenpalayam	PSG College of	Equipments	Coimbatore
Coimbatore	Coimbatore	Arts and Science	Corporation	
		Coimbatore	Coimbatore	

# SEMESTER VI

# COURSE CODE: 23UPS6E02

# TITLE OF THE COURSE: ELECTIVE - INSTRUMENTATION

# (*Employability*)

# **OBJECTIVES**

- To understand the basic principles of measurement devices- their performance under various external conditions and sources of error in measurement.
- To enable students to select appropriate standards of measurement and methods of calibration.
- To select an appropriate transducer for basic temperature- pressure and flow measurement.

# **COURSE OUTCOMES**

#### At the end of the course the student will be able to:

CO1	Use the concepts of measurement.	K1
CO2	Understand a typical instrument design.	K2
CO3	Apply statistical error analysis for measurement	K3
CO4	Choose a transducer/sensor for typical measurement of temperature- pressure and flow.	K4
CO5	Evaluate the performance and reliability of measurement devices available in market.	K5

#### Credits: 4

# **Instructional Hours: 60**

(12 hours)

# **Unit:I Basic Concept of Measurement (K1)**

Introduction – System configuration – Problem Analysis – Basic Characteristics of measuring devices – Calibration. **Transducers:** Capacitive transducers – Piezoelectric transducers – Photoelectric effect – Photoconductive transducers – Ionization transducers – Hall Effect transducers – Digital displacement transducers.

# (Self study: Piezoelectric transducers)

# Unit:II Performance Characteristics of an Instrumentation system (K2) (12 hours)

Introduction – Generalized measurement – Zero order system – first and second order system – Dead time element – Specification and testing of dynamic response.

# **Unit:III Pressure Measurement (K3)**

Mechanical Pressure measurement devices – Bourdon tube Pressure gauge – The Bridgeman Gauge – Dead weight tester – Low Pressure measurement – The McLeod gauge – Pirani thermal Conducting gauge – The Knudsen gauge.

# **Unit:IV Flow Measurement (K4)**

Positive displacement methods – Flow Obstruction methods – Flow measurement by drag effects – Hot wire and Hot film anemometers – Magnetic flow meters

# **Unit:V Measurement of Temperature (K5)**

Temperature scales – The ideal gas thermometer – temperature measurements by mechanical effects temperature measurements –ThermistorsThermoelectric effects.

# (Self study: The ideal gas thermometer)

# **Text Books:**

- C.S. Rangan, G. R. Sarma and V. S. Mani. (1983). Instrumentation Devices and Systems. (2<sup>nd</sup> Edition), Tata McGRaw Hill- New Delhi.
- 2. J. P. Holman. (2007). Experimental Methods for Engineers. (7<sup>th</sup> Edition), McGRaw Hill, New Delhi. **Reference Books:**
- 1. H. S. Kalsi. (2012). Electronic Instrumentation. (3<sup>rd</sup> edition), Tata McGraw Hill- New Delhi.
- E.O. Doebalin. (2007). Measurement System Applications and Design. (5<sup>th</sup> edition), McGraw Hill International.
- 3. D. V. S. Murthy. (2010). Transducers and Instrumentation. (2<sup>nd</sup> edition), Prentice Hall of India.

# (12 hours)

# (12 hours)

# (12 hours)

# **BLENDED LEARNING**

<b>UNIT V: STRUCTURE</b>	
Торіс	Links
Static and dynamic measurement	https://youtu.be/DFdTRPUwKI
Pressure measurement	https://youtu.be/sHmjE21Fp9w
Temperature measurement	https://youtu.be/As5kzxkyT24
Electrical measurement	https://youtu.be/3eYmFjHnQjY?si=ZHhkYFTg9PdX7gc7
Introduction to instrumentation measurement	http://ocw.ump.edu.my/course/view.php?id=272

# MAPPING OF CO'S WITH POs/PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	2	2	2	2	3	3	3	3	3	3	2
CO2	2	3	2	3	2	3	3	3	1	1	1	3	2	1
CO3	2	2	3	2	2	3	2	1	3	1	3	3	3	3
CO4	3	2	2	3	2	3	2	2	2	2	3	3	2	3
CO5	3	3	2	3	3	1	2	3	1	3	2	2	1	2

(Correlation: L Low; M Medium; H – High)

# ASSESSMENT TOOLS

S. No.	Assessment Methods	Frequency of Assessment
1	End Semester Examination	Once in a semester
2	CIA I	Once in a semester
3	CIA II	Once in a semester
4	Model	Once in a semester
5	Assignment (Unit I & II)	Twice in a semester
6	Quiz (Unit III & IV)	Twice in a semester
7	Quiz (Unit V)	Once in a semester

Course Designed by: Dr. R. Amutha	Verified by HOD: Dr. R. Amutha
Checked by CDC: Dr. G. Chitra	Approved by: Principal

Dr. G. Uma Devi Associate Professor Govt. Arts College, Coimbatore	Dr. S. Ramanathan Assistant Professor Sri Ramakrishna Mission Vidhyalaya Periyanaickenpalayam Coimbatore	Dr. V. Sathya Narayana Moorthy Assistant Professor PSG College of Arts and Science Coimbatore	Mr. S.P.Senthil Subramaniam Partner Mighty Electronics Equipments Corporation Coimbatore	Ms. H. Glory Renita (Alumna) Research Scholar CIT College Coimbatore

#### **SEMESTER: VI**

# COURSE CODE: 23UPS6CP3

# TITLE OF THE COURSE: CORE PRACTICAL III: GENERAL

#### (Skill Development)

(Examination at the end of sixth Semester) Any twelve experiments only

#### **OBJECTIVES**

- develop the experimental skills in Mechanics and Properties of Matter
- gain knowledge about the experiments based on Electricity and Magnetism and diodes
- motivate the students to apply the experimental techniques in Optics

CO1	To examine Mechanics, Properties of Matter, Electricity, Magnetism,	K A
	Sound, Heat, Diode and Optics through experiments.	<b>N</b> 4
CO2	To calculate the values obtained from the experiment and show the	K3
	results through record representation	KJ

# Credits: 4

# **Instructional hours: 45**

- 1. Spectrometer i- i' curve.
- 2. Spectrometer narrow angle prism.
- 3. Spectrometer Solar spectrum wavelength of Fraunhoffer lines.
- 4. Spectrometer Hartmann's interpolation formula prism scale and telescope.
- 5. Young's modulus Koenig's method scale and telescope Uniform bending.
- 6. Young's modulus Koenig's method scale and telescope Non-Uniform bending.
- 7. Kater's Pendulum Determination of acceleration due to gravity.
- 8. Newton's Rings Refractive index of the lens.
- 9. Potentiometer EMF of thermocouple.
- 10. Potentiometer Calibration of high range voltmeter.
- 11. Coefficient of viscosity of water- logarithmic decrement- Mayer's disc.
- 12. Carey Foster's bridge resistance and specific resistance.

- 13. Cantilever Static method.
- 14. Cantilever Dynamic method.
- 15. BG Figure of merit.
- 16. Polarization Determination of specific rotatory power of liquid.
- 17. Comparison of emf of two cells BG.
- 18. Series resonance circuit.
- 19. Parallel resonance circuit.

# **TEXT BOOKS:**

- 1. Dr. R. Sathyamoorthy, Dr. P. Padmavathy, Dr. S. Somasundaram. (2015). Practical Physics. (Revised edition), Apsara Publications, Tiruchirapalli-17.
- M.N. Srinivasan, S. Balasubramaniam, R.Ranganathan. (2015). A text Book of Practical Physics. Sulthan Chand & sons, New Delhi.

# **REFERENCE BOOK:**

 Dr. S. L. Guptha, Dr. V. Kumar. (2013). Practical Physics. (Twenty Eighth Edition), Pragathi Prakashan, Meerut.

# **BLENDED LEARNING**

Торіс	Links
Spectrometer – i-i' curve	https://www.youtube.com/watch?v=ewRYz9dgoaQ
Young's modulus Koenig's method	https://www.youtube.com/watch?v=V_z0AgbyfeM
Kater's Pendulum	https://www.youtube.com/watch?v=CEoARVci-9k
Ballistic Galvanometer	https://www.youtube.com/watch?v=WNXMTowRPCk
Newtons ring	https://youtu.be/Bk_X8G95iZo

# MAPPING OF CO'S WITH PO's and PSO's

	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	3	2	3	1	2	3	3	3	3	3	3
CO2	3	3	2	3	2	3	1	2	3	3	3	3	3	3

( Correlation : 3 – High, 2 – Medium, 1 – Low )

# **ASSESSMENT TOOLS**

S. No.	Assessment Methods	Frequency of Assessment
1	End Semester Examination	Once in a year
2	Test 1	Once in a year
3	Test II	Once in a year
4	Observation Note	Once in a year
5	Record Note	Once in a year

Course Designed by: Dr. R. Amutha	Verified by HOD: Dr. R. Amutha
Checked by CDC: Dr. G. Chitra	Approved by: Principal
	- i meipui

Dr. G. Uma Devi	Dr. S. Ramanathan	Dr. V. Sathya Narayana Moorthy	Mr. S.P.Senthil	Ms. H. Glory Renita (Alumna)
Associate	Sri Ramakrishna Mission	Assistant	Partner	Research Scholar
Professor Govt Arts	Vidhyalaya	Professor	Mighty Electronics	CIT College
College	Periyanaickenpalayam	PSG College of	Equipments	Coimbatore
Coimbatore	Coimbatore	Arts and Science	Corporation	
		Coimbatore	Coimbatore	

# **SEMESTER: VI**

# COURSE CODE: 23UPS6CP4

# TITLE OF THE COURSE: CORE PRACTICAL IV: ELECTRONICS (Skill Development)

(Examination at the end of sixth Semester) Any twelve experiments only

# **OBJECTIVES**

- develop the experimental skills in Electronics and Digital Electronics
- analyse the characteristics of various electronic devices like transistor, UJT, LDR, and Solar cell
- Design different types of power supply, amplifier, Oscillators and OP AMP

CO1	To examine Transistors, Solar Cell, LDR, Logic Gates, Oscillators,	K4
	and Power supply related experiments	
CO2	To calculate the values obtained from the experiment and show the	K3
	results through record representation	NJ

# Syllabus

# Credits: 4

# **Instructional hours: 45**

- 1. R.C. Coupled Amplifier Transistor single stage
- 2. Transistor characteristics CE, CB mode.
- 3. Hartley oscillator Transistor.
- 4. Colpitt's oscillator Transistor.
- 5. Study of Solar Cell
- 6. Emitter Follower
- 7. IC Regulated Power Supply-7805-5 Volts
- 8. IC Regulated dual DC power supply 7805 7905-5 V.
- 9. Transistor regulated power supply
- 10. Study of LDR

- 11. Verification of truth table of gates IC.
- 12. NAND as universal gate
- 13. NORas universal gate
- 14. Demorgan's theorems
- 15. Half adder, Full adder
- 16. Half subtractor, Full subtractor
- 17. Gray to Binary, Binary to Gray code convertor
- 18. Adder- operational amplifier
- 19. subtractor- operational amplifier
- 20. RS flip flop- unclocked and clocked.
- 21. Decade counter.
- 22. UJT characteristics.
- 23. Integrator and differentiator OP AMP.
- 24. Hartley oscillator OP AMP.
- 25. Colpitt's oscillator OP AMP.
- 26. Phase shift oscillator OP AMP.
- 27. Digital to analog converter ladder method.
- 28. Digital to analog converter weighted resistor method.

# **TEXT BOOKS**

- Dr. R. Sathyamoorthy, Dr. P. Padmavathy, Dr. S. Somasundaram. (2015). Practical Physics. (Revised edition), Apsara Publications, Tiruchirapalli-17.
- M.N. Srinivasan, S. Balasubramaniam, R.Ranganathan. (2015). A text Book of Practical Physics. Sulthan Chand & sons, New Delhi.

#### **REFERENCE BOOK**

 Dr. S. L. Guptha, Dr. V. Kumar. (2013). Practical Physics. (Twenty Eighth Edition), Pragathi Prakashan, Meerut.

# **BLENDED LEARNING**

Торіс	Links
IC – Regulated Power Supply-7805-5 Volts	https://youtu.be/x2wqwqUhMdE
IC-Regulated dual DC power supply -	https://youtu.be/h3tW0oYnJus
7805 -7905-5 V	
NAND as universal gate	https://youtu.be/HcH0khFGwS8
NOR as universal gate	https://youtu.be/HcH0khFGwS8
Demorgan's theorems	https://youtu.be/RrynEQ7sG5A

# MAPPING OF CO'S WITH PO's and PSO's

	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	3	3	2	3	2	3	1	2	3	3	3	3	3	3
CO2	3	3	2	3	2	3	1	2	3	3	3	3	3	3

(Correlation: 3 – High, 2 – Medium, 1 – Low)

# ASSESSMENT TOOLS

S. No.	Assessment Methods	Frequency of Assessment
1	End Semester Examination	Once in a year
2	Test 1	Once in a year
3	Test II	Once in a year
4	Observation Note	Once in a year
5	Record Note	Once in a year

Course Designed by: Mrs. X. Mary Josephine	Verified by HOD: Dr. R. Amutha
Checked by CDC: Dr. G. Chitra	Approved by:

Principal

Dr. G. Uma	Dr. S. Ramanathan	Dr. V. Sathya	Mr. S.P.Senthil	Ms. H. Glory
Devi	Assistant Professor	Narayana Moorthy	Subramaniam	Renita (Alumna)
Associate	Sri Ramakrishna Mission	Assistant	Partner	Research Scholar
Professor Court Arts	Vidhyalaya	Professor	Mighty Electronics	CIT College
College	Periyanaickenpalayam	PSG College of	Equipments	Coimbatore
Coimbatore	Coimbatore	Arts and Science	Corporation	
		Coimbatore	Coimbatore	

# **SEMESTER: VI**

#### **COURSE CODE: 23UPS6SB4**

# TITLE OF THE COURSE: SKILL BASED IV: OPTICAL FIBRES AND FIBRE OPTIC COMMUNICATION SYSTEMS

(Skill Development)

#### **OBJECTIVES**

- To learn the different types of fabrication methods.
- To learn about the losses.
- To gain knowledge about the application of fibre optics.

#### **COURSE OUTCOMES**

#### At the completion of the course the student will be able to:

CO1	Explain the fibre classification	K2
CO2	Describe fibre fabrication techniques	K2
CO3	Explain fibre losses in optical fibre	K2
CO4	Calculate the modulation bandwith and sperical emission of LED	K4
CO5	Apply the knowledge to make varied link and networking	К3

# **Syllabus**

# Credits: 2

# UNIT I: FIBRE CLASSIFICATION (K2)

 $\label{eq:propagation} Propagation of light waves in an optical fibre - acceptance angle and acceptance cone of a fibre - Numerical Aperture (N.A) - N.A of a graded Index Fibre - mode of propogation fibres - classification - stepped index fibre - stepped index monomode fibre - graded index multimode fibre - comparison of step and graded index fibres.$ 

(Self Study : Propagation of light wave in an optical fibre) UNIT II: FIBRE FABRICATION AND CABLES (K2) (1

# **Instructional hours: 60**

# (12 hours)

(12 hours)

Classification of fibre fabrication techniques – external chemical vapour deposition – characteristics – internal chemical vapour deposition (1<sup>st</sup>method only) – characteristics – phasil system – fibre cable construction – losses incurred during installation of cable – testing of cables – cable selection criteria.

#### UNIT III: FIBRE LOSSES AND DISPERSION IN OPTICS (K2) (12 hours)

Attenuation in optic fibre – Rayleigh scattering losses – absorption losses – bending losses – radiation induced losses – inherent defect losses – core and cladding losses. Dispersion in an optical fibre – inter-modal dispersion – material or chromatic dispersion – dispersion power penalty – total dispersion delay.

#### **UNIT IV: LIGHT SOURCES FOR OPTICAL FIBRES (K4)**

LED – The process involved in LED's – structures of LED – fibre – LED coupling – modulation bandwidth and spectral emission of LED's.

### (Self Study :LED and Structure of LED)

#### **UNIT V: APPLICATIONS (K3)**

Introduction – video link – **establish voice link using optical fibre** - satellite link – computer link – nuclear reaction link – community antenna television – switched star CATV – networking.

# **TEXT BOOK:**

Subir Kumar Sarkar. (2014). Optical Fibres and Fibre Optic Communication Systems. (4<sup>th</sup> edition), S.chand & company Pvt. Ltd. New Delhi.

#### **REFERENCE BOOKS:**

- Selvarajan A, Subrat Kar and Srinivas T. (2002). Optical fiber communication principles and systems. (1<sup>st</sup> edition), Tata Mc Graw- Hill Publishing company limited, New Delhi.
- Sheno M.R, Sunil K. Khijwania, Ajoy Ghatak. (2009). Fiber optic through experiments. (2<sup>nd</sup> edition), Viva books private limited, New Delhi.
- Gerd Keiser. (2000). Optical fiber communications. (3<sup>rd</sup> edition), Mc Graw-Hill higher education, New Delhi.
- 4. Anuradha De. (2005). Optical fibre and laser principles and applications. (2<sup>nd</sup> edition), New age international Private limited publishers, New Delhi.

(12 hours)

(12 hours)

# **BLENDED LEARNING**

UNIT IV: LIGHT SOURCES FOR OPTICAL FIBRES				
Торіс	Links			
Introduction to LED	https://youtu.be/FJknBjBJrOM			
process involved in LED	https://youtu.be/Yk57t0VDTg8			
structures of LED	https://youtu.be/WxiOQvq2P-k			
Modulation band width of LEDs	https://youtu.be/VGGnv-gdoj8			
Spectral emission of LEDs	https://youtu.be/zyGtTqoRYJg			

# MAPPING OF CO'S WITH PO's and PSO's

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	2	2	2	1	2	2	2	2	2	2
CO2	3	2	2	2	3	2	3	1	3	1	2	2	2	2
CO3	3	3	3	3	2	2	2	1	2	2	3	2	2	2
CO4	3	2	2	3	3	2	2	1	3	2	3	3	2	3
CO5	3	2	3	3	3	2	2	1	3	2	2	3	3	3

(Correlation : 3 – High, 2 – Medium, 1 – Low)

# ASSESSMENT TOOLS

S. No.	Assessment Methods	Frequency of Assessment
1	End Semester Examination	Once in a semester
2	CIA I	Once in a semester
3	CIA II	Once in a semester
4	Model	Once in a semester
5	Assignment (Unit I & II)	Twice in a semester
6	Seminar (Unit III & IV)	Twice in a semester
7	Quiz (Unit V)	Once in a semester

Course Designed by: Mrs. X. Mary Josephine	Verified by HOD: Dr. R. Amutha
Checked by CDC: Dr. G. Chitra	Approved by:
	Principal

Dr. G. Uma Devi Associate Professor Govt. Arts College, Coimbatore	Dr. S. Ramanathan Assistant Professor Sri Ramakrishna Mission Vidhyalaya Periyanaickenpalayam Coimbatore	Dr. V. Sathya Narayana Moorthy Assistant Professor PSG College of Arts and Science Coimbatore	Mr. S.P.Senthil Subramaniam Partner Mighty Electronics Equipments Corporation Coimbatore	Ms. H. Glory Renita (Alumna) Research Scholar CIT College Coimbatore

# **SEMESTER: VI**

#### COURSE CODE: 23IDSBPS1

# TITLE OF THE COURSE: SKILL BASED II: HOME APPLIANCES - WORKING

#### **OBJECTIVES**

- To acquire knowledge about fire safety
- To learn the operation of mixer grinder, grinder, fan

#### At the end of the course the student will be able to:

CO1	Explain Fire prevention and safety	K2
CO2	Discuss tools used by electrician in day-to-day life	K2
CO3	Distinguish room and table heaters	K2
CO4	Describe about mixer grinder, electric kettle, table fan and ceiling fan	K2
CO5	Explain earth tester, multimeter and resistance	K2

#### **Syllabus**

# **Instructional Hours: 45**

# **UNIT I:** Fire prevention and protection

Fire prevention and protection – causes of industrial fire – types and uses of fire fighting equipment – Fire Extinguishers– safety in use of electricity – Shock treatment – Advantages and disadvantages – Safety precautions

# (Self study: types and uses of fire fighting equipment)

# **UNIT II: Resistors and Cells**

**Total Credit: 2** 

Measurement of resistance – resistors – types of carbon resistors – resistance value - comparison of cells – cells in series – cells in parallel – to measure the internal resistance of a battery – use of hydrometer – method of use – to charge a battery by battery charger and to test a charged battery.

#### **UNIT III: Heaters and Washing machine**

#### 9 hours

9 hours

#### 9 hours

Heater – table heater – room heater – parts of a table heater – defects and remedies – room heater – parts of a room heater – defects and remedies – hot plate construction – to demonstrate practically - washing machine – parts – connection.

#### **UNIT IV: Domestic Appliances**

Mixer grinder – parts – circuit diagram – to demonstrate practically – electric iron – parts – defect in irons and their remedy – to open and study the iron – electric kettle – table fan and ceiling fan – defects in fans – to demonstrate practically.

# **UNT V: Testing of Components**

Earthing and testing – plate earthing – pipe earthing – use of earth tester – multimeter – to measure resistance with multimeter – methods of measuring DC voltage – resistance colour code – resistance in series and parallel – testing of electronic components with multimeter – electrolytic condenser – inductors or coils – value.

(Self study: multimeter)

# **TEXT BOOK:**

Hans L R and Anwani M L (2016). Basic shop practicals in electrical engineering. Dhanpat Rai & Co. (p) Ltd., New Delhi.

# **REFERENCE BOOKS:**

- 1. Lon H Ferguson and Christopher A Janicak. (2005). Fundamentals of fire protection for the safety professional. Government Institutes, an imprint of The Scarecrow Press. USA.
- 2. Khandpur R S. (2007). Troubleshooting Electronic Equipment. Mc Graw Hill, New York, Chicago.
- Eric Kleinert. (2013). Troubleshooting and Repairing Major Appliances. (3<sup>rd</sup> Edition), Mc Graw Hill, New York, Chicago.

# **BLENDED LEARNING**

UNIT IV: Domestic Appliances					
Торіс	Links				
mixer grinder	https://youtu.be/iNIxYznMdMs				
Electric Iron	https://youtu.be/boXKyfKf_Xc				
Electric kettle	https://youtu.be/uxNktCVCeVM				

#### 9 hours

#### 9 hours

# MAPPING OF CO'S WITH PO's and PSO's

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	3	2	2	2	2	2	2	2	2	2	1
CO2	2	2	2	1	2	2	2	2	2	2	2	2	2	2
CO3	2	2	2	2	2	1	2	2	2	2	2	2	1	2
CO4	2	2	2	2	2	2	2	2	2	2	2	2	2	2
CO5	2	3	2	2	2	1	2	2	2	2	2	2	1	2

(Correlation: 3 – High, 2 – Medium, 1 – Low)

# ASSESSMENT TOOLS

S. No.	Assessment Methods	Frequency of Assessment
1	End Semester Examination	Once in a semester
2	CIA I	Once in a semester
3	CIA II	Once in a semester
4	Model	Once in a semester
5	Assignment (Unit I & II)	Twice in a semester
6	Seminar (Unit III & IV)	Twice in a semester
7	Quiz (Unit V)	Once in a semester

Course Designed by: Ms. R. Leethiyal	Verified by HOD: Dr. R. Amutha
Checked by CDC: Dr. G. Chitra	Approved by: Principal
	Principal

Dr. G. Uma	Dr. S. Ramanathan	Dr. V. Sathya	Mr. S.P.Senthil	Ms. H. Glory
Devi	Assistant Professor	Narayana Moorthy	Subramaniam	Renita (Alumna)
Associate	Sri Ramakrishna Mission	Assistant	Partner	Research Scholar
Professor Cout Arts	Vidhyalaya	Professor	Mighty Electronics	CIT College
College	Periyanaickenpalayam	PSG College of	Equipments	Coimbatore
Coimbatore	Coimbatore	Arts and Science	Corporation	
		Coimbatore	Coimbatore	

# **SEMESTER: IV**

# COURSE CODE: 21UCCNSA1

# **CERTIFICATE COURSE: NANO SCIENCE AND ITS APPLICATIONS**

# **Objectives:**

- To acquire knowledge about nanotechnology.
- To learn the top-down and bottom-up approach of preparing nanomaterials.
- To understand the fundamental concepts and techniques used in material .characterization techniques.

# At the end of the course the student will be able to:

CO1	Distinguish the properties of bulk and nano materials	K2
CO2	Explain the methods of synthesis of nano materials	K2
CO3	Explain the characterization techniques of nanomaterials	K2
<b>CO4</b>	Discuss the fabrication, properties and applications of carbon nanotubes	K2
CO5	Explain the sensors and memories	K2

# **Syllabus**

# **Instructional Hours: 30**

# **Unit I: Introduction to Nano materials**

Definition of nano material - origin of nano technology – difference in properties between bulk and nano materials – Dimension based classification of nano materials – 0D, 1D, 2D, 3D.

# Unit II: Synthesis of nano materials

Top down process – Lithographic process – ball milling method – Bottom up process – vapour phase deposition – physical vapour deposition method – chemical vapour deposition method –sol gel method.

# Unit III: Characterization of nano material

Scanning electron microscopy – transmission electron microscopy – Atomic force microscopy – X- ray diffraction method – powder method – Determination of lattice constant.

# **Unit IV: Carbon nanotubes**

# 6 hours

# 6 hours

6 hours

# 6 hours

Fabrication of carbon nanotubes - laser evaporation method – carbon arc method – chemical vapour deposition method – structure of carbon nanotubes – electrical properties of carbon nanotubes – mechanical properties of carbon nanotubes – applications of carbon nanotubes.

#### **Unit V: Nanoelectronics**

#### 6 hours

Sensors – classification of sensors – factors influencing the function of sensors – working – potential of nanomaterial based sensors – memories – classification - mechanism – advancements in random access memories - batteries.

#### **Text Books:**

- Murugesan R. and Sivaprasath. (2016). Modern Physics. (18<sup>th</sup> edition), . Chand and Company Ltd, New Delhi.
- G. Mohan Kumar. (2016). Nanotechnology Nanomaterials and Nanodevices. Narosa Publishing House Pvt Ltd, New Delhi.

# **Reference Book:**

 K K chattopadhyay A N Banerjee. (2014) Introduction to Nanoscience and Nanotechnology. PHI learning, New Delhi.

#### ASSESSMENT TOOLS

S. No.	Assessment Methods	Frequency of Assessment
1	End Semester Examination	Once in a year

Question Pattern for End Semester Examination (50 Marks)

Section A  $-5 \times 1 = 5$ Section B  $-5 \times 3 = 15$ Section C  $-5 \times 6 = 30$ 

Dr. G. Uma	Dr. S. Ramanathan	Dr. V. Sathya	Mr. S.P.Senthil	Ms. H. Glory
Devi	Assistant Professor	Narayana Moorthy	Subramaniam	Renita (Alumna)
Associate	Sri Ramakrishna Mission	Assistant	Partner	Research Scholar
Professor Cout Arts	Vidhyalaya	Professor	Mighty Electronics	CIT College
College	Periyanaickenpalayam	PSG College of	Equipments	Coimbatore
Coimbatore	Coimbatore	Arts and Science	Corporation	
		Coimbatore	Coimbatore	