### CHOICE BASED CREDIT SYSTEM – STRUCTURE

### FOR THOSE WHO HAVE JOINED FROM THE ACADEMIC YEAR 2017-18 ONWARDS

Dent	0	Subject	Codo	TTere	6 <sup>th</sup>	0	Adl.	Exam	Ma	rks
Part	Course	Subject	Code	пrs.	Hr.	Cr.	Cr.	(Hrs)	Int.	Ext.
		SEMES	STER - I	1			1			
Ι	Lang. – I	Tamil – I	170103101	6		3		3	25	75
II	Lang. – II	English – I	171003101	6		3		3	25	75
	Core	Properties of matter and Thermal Physics	172103101	4		4		3	25	75
III	Core	Electricity	172103102	4		4		3	25	75
	Core Lab	Practical –I	-	2				-	-	-
	Al. Maths	Allied Mathematics Paper-I	172003121	6		5		3	25	75
IV	SBE - I	Material science	174403121	2		2		2	25	75
V	Extension activities	NSS / NCC / PED	_		3			-	_	-
	Additional	Communicative English–I	-		2			-	-	-
	Courses	Computer Literacy	_		1			_	_	_
		SEMES	TER - II							
Ι	Lang. – I	Tamil – II	170103201	6		3		3	25	75
II	Lang. – II	English – II	171003201	6		3		3	25	75
	Core	Optics and Spectroscopy	172103201	4		4		3	25	75
TTT	Core	Electromagnetism	172103202	3		3		3	25	75
111	Core Lab	Practical– I	172103203	2		2		3	40	60
	Al. Maths	Allied Mathematics Paper-II	172003221	6		5		3	25	75
137	SBE - II	Renewable Energy sources	174403221	2		2		2	25	75
IV	EVS	Environmental Studies	174103201	1		1		2	_	100
V	Extension activities	NSS / NCC / PED	-		3			-	_	-
	Additional	Communicative English–I	178003201		2		1	3	25	75
	Courses	Computer Literacy	-		1			_	_	_
	SLC	Law and Society	178003202				3	3	_	100
		SEMES	fer - III	1			1			
Ι	Lang. – I	Tamil – III	170103301	6		3		3	25	75
II	Lang. – II	English – III	171003301	6		3		3	25	75
	Core	Classical Mechanics	172103301	2		2		3	25	75
	Core Lab	Practical– II	-	2		_		-	-	_
III	Al. Maths	Allied Mathematics Paper- III	172003321	6		5		3	25	75
	Al. Che	Inorganic, Organic and Physical Chemistry – I	172203321	4		4		3	25	75
	Al. Che	Volumetric Analysis Lab	-	2		_		-	-	-
IV	NME - I	Basic Physics – I	174603321	2		2		2	25	75
V	Extension activities	NSS / NCC / PED	-		3			-	_	-
	Additional	Communicative English–II	-		2			_	_	_
	Courses	Computer Literacy	_		1			_	_	_

### **B.Sc PHYSICS**

	SLC	Human Rights	178003301				3	3	_	100
--	-----	--------------	-----------	--	--	--	---	---	---	-----

Part	Course	Subject	Code	Hrs	6 <sup>th</sup>	Cr.	Adl.	Exam	Ма	rks
1 arc	course			1113.	Hr.	01.	Cr.	(Hrs)	Int.	Ext.
T	т. т.	SEMES	<b>TER - IV</b>	6	1				05	76
	Lang. – I	Tamil – IV	170103401	6		3		3	25	75
	Lang. – II	English – IV	171003401	6		3		3	25	75
	Core	Statistical Physics	172103401	2		2		3	25	75
	Core Lab	Practical-II	172103402	2		2		3	40	60 75
III	AI.Maths	Allied Mathematics Paper – IV	172003421	0		5		3	25	75
	Al.Che	Chemistry – II	172203421	4		4		3	25	75
	Al.Che	Volumetric Analysis Lab	172203423	2		3		3	40	60
IV	NME - II	Basics of Photography	174603421	2		2		2	25	75
v	Extension activities	NSS / NCC* / PED*	-		3	1		3	25 *40	75 *60
	Additional	Communicative English–II	178003401		2		1	3	25	75
	Courses	Computer Literacy	-		1			-	_	_
	SLC	C Programming	178003421				4	3	_	100
	1	SEMES	TER - V	1	T	T	1	1	T	ī
	Core	Basic Electronics	172103501	5		5		3	25	75
	Core	Atomic Physics	172103502	5		5		3	25	75
	Core	Solid state Physics	172103503	5		5		3	25	75
Ш	Core Lab	Physics Lab – III	_	3				-	-	_
	Core Lab	Physics Lab – IV	_	3				-	Max     Int.     25     25     25     40     25     40     25     40     25     40     25     40     25     40     25     40     25     40     25     40     25     40     25     40     25     40     25     40     25     40     25     40     25     40     25     40     25     40     25     40     25     40     25     40     25 <	-
	Al.Che.	Inorganic and Physical Chemistry	142203521	4		4		3	25	75
	Al.Che.Lab	Organic Analysis Lab	-	2				-	25       40       25       25       40       25       40       25       40       25       40       25       40       25       40       25       40       25       40       25       40       25       40       25       40       25       40	_
13.7	SBE – III	Medical Physics	174403521	2		2		2	25	75
IV	WS	Women Studies	174603501	1		1		2	-	100
		Communicative English –III	_		2			-	-	_
	Additional	Computer Literacy	-		1			-	_	_
	Courses	Skill Development – Career Guidance	-		3			-	_	_
	SLC	Communication Systems	178003521				4	3	_	100
		SEMES	TER - VI	1	1	1		1	1	1
	Core	Digital Electronics	172103601	5		5		3	25	75
	Core	Nuclear Physics and Quantum mechanics	172103602	5		5		3	25	75
TIT	Core	Project *Report;@Viva	172103603	6		5		-	40 [24:16]	60 [36:24]
111	Core Lab	Physics Lab – III	172103604	3		3		3	40	60
	Core Lab	Physics Lab – IV	172103605	3		3		3	40	60
	Al. Che.	Organic and Physical Chemistry	172203621	4		4		3	25	75
	Al.Che.Lab	Organic Analysis Lab	172203622	2		3		3	40	60
IV	VBE	Value Based Education	174303601	2		2		2	_	100
		Communicative English–III	178003601		2		1	3	25	75
	Additional	Computer Literacy	178003602		1		1	3	_	100
	Courses	Skill Development – Career Guidance	178003603		3		2	3	_	100
		TOTAL		180	36	140	20			

	ALLIED – PF	IYSICS FOR M	IATHEM	ATICS				
Sem	Title of the Paper	SUB CODE	Hrs.	Cr.	Exam	Mar	ks	
					(Hrs)	Mai       Int.       25       40       25       40       25       40       25       40       25       40       25       40       Mai       Int.       25       40       25       40       25       40       25       40       25       40       Mai       Int.       25       40       Mai       Int.       25       40	Ext.	
I	Mechanics, Properties of Matter and Sound	172103121	4	4	3	25	75	
II	Thermal Physics	172103221	4	4	3	25	75	
II	Allied Physics Practical – I	172103222	2	2	3	40	60	
III	Electricity and Electronics	172103321	4	4	3	25	75	
IV	Optics and Modern Physics	172103421	4	4	3	25	75	
IV	Allied Physics Practical – II	172103423	2	2	3	40	60	
	ALLIED – PHYSICS FOR CHEMISTRY							
Sem	Title of the Paper	SUB CODE	Hrs.	Cr.	Exam Mar		ks	
					(Hrs)	Int.	Ext.	
III	Mechanics, Properties of Matter and Sound	172103322	4	4	3	25	75	
IV	Thermal Physics	172103422	4	4	3	25	75	
IV	Allied Physics Practical – I	172103426	2	2	3	40	60	
v	Electricity and Electronics	172103521	4	4	3	25	75	
VI	Optics and Modern Physics	172103621	4	4	3	25	75	
VI	Allied Physics Practical – II	172103622	2	2	3	40	60	
	ALLIED – PHYS	SICS FOR COM	IPUTER	SCIEN	CE			
Sem	Title of the Paper	SUB CODE	Hre	Cr	Exam	Mar	·ks	
Join		002 0022	1110.	0	(Hrs)	Int.	Ext.	
	Digital Principles and	172103122						
I	Applications		4	3	3	25	75	
II	Digital Electronics Practicals	172103223	3	2	3	40	60	
	ALLIED – PHYSICS	FOR INFORM	ATION T	ECHN	OLOGY			
Sem	Title of the Paper	SUB CODE	Hrs.	Cr.	Exam	Mar Allot	ks ted	
					(Hrs)	Int.	Ext.	
II	Digital Principles and	172103224	4	4	3	25	75	
	Applications				Ŭ	Mar       Int.       25       40       25       40       25       40       25       40       25       40       25       40       Mar       Int.       25       40       25       40       25       40       25       40       25       40       Mar       Int.       25       40       Sate       40		
II	Digital Electronics	172103225	2	2	3	40	60	

### **B.Sc Physics: Those Who Have Joined in The Academic** Year 2017–18 Onwards Under CBCS System

#### Core Subject PROPERTIES OF MATTER AND THERMAL PHYSICS SEMESTER I Code: 172103101 4 Hrs / Week

**Objective:** 

 ${\ensuremath{\it extsf{z}}}$  To explain the physical origins which govern the properties of matter and to make the students understand the physics of heat UNIT – I: [15 Hrs]

Elasticity:

Torsion - Torsion of a Cylinder - Expression for torque per unit twist - Determination of Rigidity Modulus by Static Torsion Method [searle's apparatus - scale and telescope] - Work done in twisting a wire - Torsional Oscillations of a Body - Rigidity Modulus by Torsion Pendulum [dynamic torsion method] - Bending of Beams - Expression for Bending Moment - Measurement of Young's Modulus - Uniform and non-uniform bending.

UNIT – II:

Gravitation:

Newton's Law of Gravitation - Kepler's Laws of Planetary Motion - Deduction of Newton's Law of Gravitation from Kepler's Laws -Determination of G by Boy's Experiment - Variation of 'g' with Latitude or Rotation of the Earth, Attitude and Depth - Compound Pendulum -Theory and Experiment to Determine 'g' at a given place.

UNIT – III:

Thermodynamics:

Zeroth Law of Thermodynamics - First Law of Thermodynamics - Adiabatic and Isothermal Process - Work done during an Isothermal Process and Adiabatic Process - Slopes of Adiabatics and Isothermals - Reversible and Irreversible Process - Heat Engines - Definition of Efficiency - Carnot's Ideal Heat Engine - Carnot's engine and Refrigerator - Second Law of Thermodynamics - Concept of Entropy -Change in Entropy – Change in Entropy in Adiabatic Process.

Third Law of Thermodynamics: Nernst's Heat Theorem - Zero Point Energy.

UNIT – IV:

Conduction and Convection:

Conduction - Coefficient of Thermal Conductivity - Lee's Disc Method for Bad Conductors - Cylindrical Flow of Heat - Thermal Conductivity of Rubber - Thermal Conductivity of Glass - Wiedemann - Franz Law - Convection - Applications of Convection.

UNIT – V:

Radiation: Black Body - Black Body Radiation and its Temperature Dependence - Emissive Power and Absorptive Power - Stefan -

[15 Hrs]

**Credits 4** 

# [10 Hrs]

## [10 Hrs]

[10 Hrs]

4

Boltzmann Law – Distribution of Energy in Black Body Spectrum – Wein's Displacement Law – Rayleigh – Jeans Law Ultraviolet Catastrophe – Planck's Radiation Law – Disappearing Filament Optical Pyrometer.

TEXT BOOKS:

- 01. Murugeshan, R. Properties of Matter, S. Chand and Company Ltd., New Delhi, 2010.
  - UNIT I: 1.9, 1.11–1.15, 1.19–1.21
  - UNIT II: 6.1–6.3, 6.7–6.10
- 02. Brijlal, Subrahmanyam, N. and Hemne, P.S. Heat, Thermodynamics and Statistical Physics, S.Chand and Company Ltd., New Delhi, 2010.
  - UNIT III: 4.2, 4.7, 4.10.4, 4.10.7, 4.12, 4.13, 4.14,
    - 4.20-4.23, 4.26, 4.28, 5.1-5.3, 5.15-5.16
  - UNIT IV: 15.1, 15.11, 15.14–15.16, 15.19, 15.22–15.23
  - UNIT V: 8.6, 8.8-8.9, 8.12-8.17, 8.24

**REFERENCES**:

- 01. Brijlal and Subramanyam, Properties of Matter, 6<sup>th</sup> Edition, Eurasia Publishing House Pvt. Ltd., New Delhi, 1991.
- 02. Mark W, Zemansky, Richard H., and Dittman, Heat and Thermodynamics, 6<sup>th</sup> Edition, McGraw–Hill International edition.
- 03. Mathur D.S., Elements of Properties of Matter, S.Chand and Co., 2000.
- 04. Mathur D.S., Heat and Thermodynamics, Sultan Chand and Sons, New Delhi

Core Subject

ELECTRICITY SEMESTER I

Code: 172103102

4 Hrs / Week Credits 4

**Objectives:** 

To familiarize the fundamentals of electricity and laws which govern the electric fields to the students

UNIT – I:

[12 Hrs]

Electrostatics:

Basic Concepts – Coulomb's Law – Electric Field – Electric Field due to a Point Charge – Flux of the Electric Field – Gauss's Law – Differential form of Gauss Law – Applications of Gauss's Law – Electric Field due to a Uniformly Charged Sphere – Electric Field due to an insulated Uniformly Charged Conducting Sphere–Electric Field due to an Infinite Line of Charge – Electric Field due to a Uniform Infinite Cylindrical Charge – Potential Difference – Electric Potential as Line Integral of Electric Field – Potential at a Point due to a Point Charge – Electric Potential Energy.

UNIT – II:

Capacitors:

Introduction – Capacitance of a Spherical Capacitor – Capacitance of a Cylindrical Capacitor – Capacitance of a Parallel Plate

Capacitor - Capacitance of a Parallel Plate Capacitor partly filled with a Dielectric Slab - Capacitors in Series and Parallel - Energy Stored in a Charged Capacitor - Loss of Energy on sharing of charges between two capacitors.

UNIT – III:

Applications of Kirchhoff's Laws:

Kirchhoff's Laws - Applications of Kirchhoff's Laws to Wheat Stone's Network - Sensitivity of Whetstone's Bridge - Carey Foster Bridge - Determination of the Temperature Coefficient of Resistance -Potentiometer - Calibration of Ammeter - Calibration of Voltmeter (low range and high range)

UNIT – IV:

Thermo Electricity:

Seebeck Effect - Laws of Thermo emf - Measurement of Thermo emf using Potentiometer - Peltier Effect (no demonstration) - Thomson Effect - Thomson Coefficient (no demonstration) - Thermo emf of Thermocouple.

UNIT – V:

Magnetic Effect of Electric Current:

Introduction - Biot - Savart Law - Magnetic Induction at a Point on the Axis of a Circular Coil Carrying Current – Torque on a Current Loop in a Uniform Magnetic Field – Moving Coil Ballistic Galvanometer - Correction for Damping in Ballistic Galvanometer - Uses of BG -Absolute Capacitance of a Capacitor.

**TEXT BOOK:** 

01. Murugeshan R., Electricity and Magnetism, S.Chand and Company Ltd., 2004.

UNIT – I	:	1.1-1.5, 2.1-2.8, 3.1-3.3, 3.4
UNIT – II	:	4.1-4.9, 4.11
UNIT – III	:	6.6, 7.1-7.2
UNIT – IV	:	8.1-8.6
UNIT – V	:	10.1-10.2, 10.4, 10.10-10.11, 10.14

**REFERENCES:** 

- 01. Brijlal Subramanian, Electricity and and Magnetism, 20th Revised Edition, S.Chand and Co., New Delhi,
- 02. Shegal Chopra Shegal, Electricity and Magnetism, 5<sup>th</sup> Edition, Sultan Chand and Sons, New Delhi, 1996.

[12 Hrs]

Part-IV Skill Based Elective MATERIAL SCIENCE SEMESTER I

**Objectives:** 

✓ To study the structural, electrical and magnetic properties of different types of materials UNIT – I:

Conducting materials:

Atomic interpretation of Ohm's law - Relaxation time, Collision time and mean free path - Thermal conductivity - Expression for thermal conductivity due to conduction electrons - Electrical conductivity – different types of conducting materials.

UNIT – II:

Dielectric materials:

Fundamental definitions in dielectrics - Different types of electric polarization - Frequency and temperature effects on polarization - Dielectric loss - dielectric breakdown - properties and different types of insulating materials - classification of insulting materials.

UNIT – III:

Semiconductor materials:

Properties of semiconductors – chemical bonds in semiconductors - types of semiconductors - the P-N junction theory light emitting diode (LED) - Applications - uses - Liquid crystal displays (LCD)

UNIT – IV:

Crystals:

Fundamental definitions in crystallography – Lattice parameters of an unit cell - crystal directions - crystal planes and Miller indices seven crystal system – crystal growth.

UNIT – V:

Non linear Materials:

Introduction - Basic Principles - Classification of Non-linear Materials

- Non-linear Properties - Polarization - Frequency doubling or tripling

- optical mixing - applications

**TEXT BOOK:** 

01. Dr.V.Chinnathambi and U.Sankar, Material Science, First edition 2002, Nanolite publications. (Units I to IV) Unit - I - Chapter 1, Unit - II - Chapter 2, Unit - III - Chapter 4, Unit – IV – Chapter 5 (Relevent topics)

02. V. Rajendran, Materials Science, 2011, Tata McGraw Hill Publishers, New Delhi (Unit V) Unit V – Chapter 25, Sections 25.1, 25.2, 25.3, 25.4 (25.4.1, 25.4.2,25.4.3), 25.6

### [6 Hrs]

### [6 Hrs]

[6 Hrs]

# [6 Hrs]

# [6 Hrs]

Code: 174403121 2 Hrs/Week **Credits 2** 

### **REFERENCE:**

- 01.Dr.M.Arumugam, MaterialScience. Anuratha Publications, Kumbakonam, Chennai.
- 02.V.Raghavan, Materials science and Engineering fifth Edition 2012, PHI Publications.

Core Subject	<b>OPTICS AND SPECTROSCOPY</b>	Code: 172103201
	SEMESTER II	
		4 Hrs / Week
		Credits 4

### **Objectives:**

S To understand the basic concepts in Optics and Spectroscopy UNIT – I: [9 Hrs]

Geometrical optics:

Lens System: Convex lens - principal focus and focal planes refraction through a thin lens - equivalent focal length of two Thin lenses separated by a distance.

Aberration in lenses: Introduction - spherical aberration in lenses - Method of minimizing spherical aberration - condition for minimum spherical aberration of two thin lenses separated by a distance - chromatic aberration in a lens - condition for achromation of two thin lenses placed in contact - condition for achromatism of two thin lenses separated by a finite distance. UNIT – II:

Interference: Introduction - Young's Experiment - theory of Interference fringes - colours of Thin films - interference of reflected light - transmitted system - Production of colours in thin films wedge shaped film - newton's ring- Determination of wave length of sodium light by Newton's ring - Michelson interferometer - uses of interferometer - Determination of wavelength of monochromatic light -Determination of difference in wave length between two neighbouring lines.

UNIT – III:

Introduction - Fresnel's explanation of Rectilinear propagation of light - the zone plate - Multiple foci in a zone plate - comparison of a zone plate with a convex lens - Diffraction at circular Aperture -Diffraction at a straight edge - Fraunhofer diffraction at a single slit -Fraunhofer diffraction at a double slit - Resolving power of optical instruments: Resolving power of a Telescope - Relation beween Magnifying power and Resolving power of a Telescope - Resolving power of a microscope - Resolving power of a Prism.

## [9 Hrs]

[9 Hrs]

[12 Hrs]

UNIT – IV:

Polarisation of light: Introduction - Polarisation by Reflection piles at plates - laws of malus - Double refraction - Huygen's theory of double refraction in uniaxial crystals - Nicol prism - plane, Circularly and Elliptically polarized light - Quarter wave plate - Half wave plate production and detection of plane, circularly and elliptically polarized light - Optical activity: Introduction - Biot's law of rotatory polarization - specific rotation - Laurent's half shade polarimeter - Determination of specific rotation at sugar solution - optical rotation by Magnetic and Electric fields.

UNIT – V:

# [9 Hrs]

Spectroscopy: Introduction - types of spectra - Infrared spectroscopy - Ultraviolet spectroscopy - Rayleigh's Scattering -Raman effect - discovery - Experimental study of Raman effect quantum theory of Raman effect - Applications - Electron Spin Resonance Spectroscopy – ESR Spectrometer – Applications.

### **TEXT BOOKS:**

- 01. Murugeshan R., Kiruthiga Sivaprasath, Optics and Spectroscopy, Eighth Revised edition, S.Chand and Company, New Delhi. UNIT – I: Chapter 1 - 1.1 to 1.6, 1.15 to 1.18, 1.20 to 1.22, 1.25 to 1.28. - 2.1, 2.2, 2.5 to 2.9, 2.11 UNIT – II: Chapter 2 UNIT – III: Chapter 3: - 3.1 to 3.7, 3.10 – 3.11, 3.19 to 3.23 UNIT – IV: Chapter 4: - 4.1 to 4.8, 4.10 to 4.16, 4.19 to 4.22 UNIT – V: Chapter 5: - 5.1 to 5.8, 5.12. **REFERENCES**:
- 01. Dr.N.Shanmugam Brijlal, Dr.M.N.Avadhanulu, Atext book of optics, S.Chand and Company limited, New Delhi revised edition 2010.

ELECTROMAGNETISM Code: 172103202 **Core Subject** SEMESTER II 3 Hrs / Week **Credits 3 Objectives:** 

 $\varkappa$  To study the fundamentals of electromagnetism and the behavior of current in circuits

UNIT – I:

**Electromagnetic Induction:** 

Faraday's Laws of Electromagnetic Induction - Faraday's Laws of Electromagnetic Induction in Vector Form - Self Induction - Self Inductance of a Long Solenoid – Determination of Self Inductance by Rayleigh's Method – Mutual Induction – Mutual Inductance between Two Coaxial Solenoids - Experimental Determination of Mutual Inductance - Coefficient of Coupling - Eddy Currents - Rotating

### [9 Hrs]

Magnetic Field (principle of an a.c. induction motor) – Single Phase Induction Motor.

UNIT – II:

Transient Currents:

Growth of Current in a Circuit Containing a Resistance and an Inductance – Decay of Current in a Circuit Containing L and R – Charge and Discharge of a Capacitor through a Resistor – Measurement of High Resistance by Leakage – Growth of Charge in a Circuit with Inductance, Capacitance and Resistance – Discharge of a Capacitor through an Inductor and Resistor in Series (decay of charge in a LCR circuit) – Importance in Wireless Telegraphy.

UNIT – III:

Alternating Current:

E.M.F. Induced in a Coil Rotating in a Magnetic Field – Peak Value, Mean Value, Effective Value and Form Factor of A.C. – A.C. Circuit Containing a Resistance, Inductance and a Capacitance in Series – Q Factor – Vector Diagram – Parallel Resonance Circuit – Comparison between Series and Parallel Resonance Circuits – Power in a Circuit Containing Resistance, Inductance and Capacitance – Wattless Current – Choke Coil.

A.C. Bridges:

Introduction – Maxwell's Bridge – Owen's Bridge – Desauty's Bridge – Wien's Bridge.

UNIT – IV:

Magnetic Properties of Materials:

Magnetic Induction – Magnetisation – Relation between the Three Magnetic Vectors B, H and M – Magnetic Susceptibility – Magnetic Permeability – Properties of Diamagnetic Materials, Paramagnetic Materials and Ferromagnetic Materials – Anti ferromagnetism and Ferrimagnetism – Electron Theory of Para, Dia and Ferromagnetism – Langevin's Theory of Diamagnetism Only – Experiment to draw M – H curve (horizontal method) – Energy Loss due to Hysterisis – Importance of Hysteresis Curves – Determination of Susceptibility (Curie balance method).

UNIT – V:

Maxwell's Equations and Electromagnetic Waves:

Introduction – Displacement Current – Maxwell's Equation in Material Media – Plane Electromagnetic Waves in Free Space (velocity of light) – Poynting Vector – Hertz Experiment for Production and Detection of Electromagnetic Wave.

# [12 Hrs]

# [16 Hrs]

## [9 Hrs]

### [11 Hrs]

### TEXT BOOK:

- 01. Murugeshan R., Electricity and Magnetism, S.Chand and Co. Ltd., 2004.
  - UNIT I: 11.1–11.5, 11.7–11.10, 11.16, 21.10–21.11
  - UNIT II: Chapter 12

UNIT – III: 13.1–13.6, 19.1–19.5

UNIT – IV: 15.1–15.11, 15.14, 15.16–15.18

UNIT – V: Chapter 16

REFERENCES:

- 01. Duggal B.D., and Chhabra C.L., Fundamentals of Electricity and Magnetism, Vishal Publications,
- 02. Shegal Chopra Shegal, Electricity and Magnetism, 5<sup>th</sup> Edition, Sultan Chand and Sons, New Delhi, 1996.

### Core Lab

# PRACTICAL – ICode: 172103203LIST OF EXPERIMENTS2 Hrs / WeekSEMESTER I & IICredits 2

### **Objectives:**

- To demonstrate an understanding of the fundamentals of properties of matter and to experiment using spectrometers
  - 01. Estimation of Errors Screw Gauge and Vernier Calipers
  - 02. Young's modulus by uniform bending scale and telescope method
  - 03. Young's modulus by non-uniform bending pin and microscope method
  - 04. Calibration of low range voltmeter potentiometer
  - 05. Calibration of low range Ammeter potentiometer
  - 06. Calibration of high range voltmeter potentiometer
  - 07. Resistance and resistivity Carey Foster's bridge
  - 08. Determination of unknown Resistance B.G.
  - 09. Young modules by uniform bending Pin and microscope method
  - 10. Young modules by non-uniform bending scale and telescope method
  - 11. Determination of 'g' by compound pendulum
  - 12. Rigidity modulus by Torsional pendulum
  - 13. Melde's Apparatus Frequency of tuning fork (Transverse and Longitudinal modes of vibration)
  - 14. Thermal conductivity of a bad conductor Lee's disc method

Part-IV	RENEWABLE ENERGY S	OURCES
Skill Based Elective	SEMESTER II	Code: 174403221
		2 Hrs/Week
Objectives:		Credits 2

To know about the renewable energy sources and to know the working of solar based energy systems

UNIT – I:

Energy resources and their utilisation:

Conservation and forms of Energy – Energy reserves of India – renewable energy sources – energy efficiency and conservation – New technologies – distributed energy systems and dispersed generation.

[6 Hrs]

UNIT – II:

Solar thermal Energy collectors:

Introduction – flat plate collector – Effect of design parameters on performance – laws of thermal radiation – Radiation heat transfer between real bodies – Radiation optics – solar concentrating collectors – Types of concentrating collectors.

UNIT – III:

Solar thermal Energy conversion systems:

Solar water heating – solar distillations – solar ponds – solar pumping systems – solar air heaters – solar crop drying – solar kilns – solar cookers – solar green houses.

UNIT – IV:

Solar photovoltaic system

Photovoltaic effect – efficiency of solarcells – Limits to cell efficiency – solar photovoltaic system – Application of PV Systems – solar power plant using a satellite – Plastic solar cells with nano technology.

UNIT – V:

Wind Energy:

Introduction – classifications of wind turbines – Types of rotors – Aerodynamic operations of wind turbines – wind energy extraction – extraction of wind turbine power – mean wind speed and energy estimation.

TEXT BOOK:

01. D.P.Kothari, K.C. Singal, Rakesh Ranjan Renewable energy sources and Engineering technologies, IInd Edition 2013, PHI Publications.

Unit – I - Chapter 1 – 1.2, 1.5, 1.8, 1.12, 1.13, 1.14

Unit – II - Chapter 4 – 4.1 to 4.6, 4.10, 4.11

Unit -III - Chapter 5 - 5.2, 5.3, 5.10 to 5.14, 5.19

Unit - IV - Chapter 6 - 6.7 to 6.9, 6.11, 6.13, 6.18, 6.19

Unit -V - Chapter 7 - 7.1, 7.3, 7.4, 7.6, 7.7, 7.10

**REFERENCE:** 

- 01. Tasneem Abbasi and Abbasi S.A., Renewable energy sources, First edition 2013, PHI publications.
- 02. G.D.Rai, Non Conventional Energy sources, 4<sup>th</sup> Edison 2006, Khanna Publishers,

[6 Hrs]

[6 Hrs]

[6 Hrs]

#### Allied Phy **MECHANICS, PROPERTIES OF MATTER AND SOUND** [For Mathematics Major Students] SEMESTER I Code: 172103121

4 Hrs / Week **Credits 4** 

**Objectives:** 

Z To understand the fundamental concepts about mechanics, sound and properties of matter [12 Hrs]

UNIT – I:

Force, Work, Power and Energy:

Forces in Nature - Central Forces - Gravitational and Electromagnetic - Conservative and Non-Conservative Forces -Examples - Nuclear Force - Friction - Angle of Friction - Motion of Bodies along an Inclined Plane - Workdone by a force - Workdone by a Varying Force - Expression for Kinetic Energy - Expression for Potential Energy - Power.

UNIT – II:

**Rotational Motion:** 

Angular Velocity - Normal Acceleration (no derivation) -Centrifugal and Centripetal Forces - Torque and Angular Acceleration - Work and Power in Rotational Motion - Angular Momentum - K.E. of Rotation - Moment of Inertia - Laws of Parallel and Perpendicular Axes Theorems - Moment of Inertia of Circular Ring, Circular Disc - Solid Sphere, Hollow Sphere and Cylinder.

UNIT – III:

Gravitation:

Kepler's Laws of Planetary Motion - Law of Gravitation - Boy's Method for G - Compound Pendulum Expression for Period -Experiment to find 'g' - Variation of g with Latitude, Attitude and Depth – Artificial Satellites.

UNIT – IV:

Elasticity and Viscosity:

Elastic Moduli - Poisson's Ratio - Beams - Expression for Bending Moment - Determination of Young's Modulus by uniform and non-uniform Bending- I Section Girders - Torsion - Expression for Couple per unit twist - Work done in Twisting - Torsional Pendulum -Derivation of Poiseuille's Formula (analytical method) - Bernouli's Theorem – Proof – Applications – Venturimeter – Pilot Tube.

UNIT – V: Sound:

Simple Harmonic Vibrations - Progressive Waves - Properties -Composition of Two SHM and Beats - Stationary Waves - Properties -

# [12 Hrs]

[12 Hrs]

### [12 Hrs]

[12 Hrs]

13

Melde's Experiments for the Frequency of Electrically Maintained Tuning Fork – Transverse and Longitudinal Modes – Tape Recording – Acoustic of Buildings – Ultrasonics – Properties and Applications.

TEXT BOOKS:

- 01. Murugesan R., Ancillary Physics I, Vivekananda Press, Madurai.
- 02. Brijlal N., and Subramanyam, A Text Book of Sound, S.Chand and Co., New Delhi,
- REFERENCES:
- 01. Brijlal N. and Subramanyam, Properties of Matter, S.Chand and Co., New Delhi,
- 02. Mathur D.S., Mechanics, S.Chand and Co., New Delhi.

#### Allied Phy DIGITAL PRINCIPLES AND APPLICATIONS [For Computer Science Major Students] SEMESTER I Code: 172103122

To impart knowledge on digital principles in electronics, circuit design and analysis

UNIT –I:

**Objectives:** 

Digital logic and Combinational logic circuits:

The Basic Gates – Boolean Algebra – NOR Gates – NAND Gates – Boolean Laws and Theorem – Sum of Product Method – K–Map–Pairs, Quads and Octets – K-map Simplification – Don't Care Condition – Product of Sum Method.

UNIT –II:

Number Systems and Codes:

Binary Number System - Binary to Decimal Conversion – Decimal to Binary Conversion – Octal Numbers – Hexadecimal Numbers – ASCII Code – Excess – 3 Code – Gray Code.

UNIT – III:

Data Processing and Arithmetic Circuits:

Multiplexer – De Multiplexer – 1 of 16 Decoder – BCD to Decimal Decoder – 7 Segment Decoder – Encoder – Exclusive OR Gate – Parity Generators and Checkers – Binary Addition – Binary Substraction – 2's Complement Representation – Arithmetic Building Blocks – Half Adder – Full Adder – The Adder / Subtractor – Binary Multiplication and Division.

UNIT – IV:

Flip Flops:

R –S Flip Flop – Gated flip flops – Edge – Triggered RS flip flops – Edge Triggered D Flip Flops – Edge Triggered J. K. Flip Flops – J.K. Master Slave Flip Flops.

### [12 Hrs]

[12 Hrs]

4 Hrs/Week Credits 3

[12 Hrs]

UNIT – V:

**Registers and Timing Circuits** 

Types of Registers – Serail In – Serial out – serial in parallel out – Parallel in serial out – Parallel in parallel out Schmitt trigger, Astable and monostable multivibrator using 555 timer.

### TEXT BOOK:

01. Albert Paul Malvino and Donald P. Leach., Digital Principles and Applications, 5<sup>th</sup> Edition, McGraw-Hill Publication, New Delhi, 2007.

UNIT – I	:	Chapter 2 – 2.2 to 2.5
		Chapter 3 – 3.1 to 3.7
UNIT – II	:	Chapter 5 – 5.1 to 5.8
UNIT – III	:	Chapter 4 – 4.1 to 4.8,
		Chapter 6 – 6.1 to 6.9.
UNIT – IV	:	Chapter 8 – 8.1 to 8.7,
UNIT – V	:	Chapter 9 – 9.1, 9.5.
		Chapter 7 – 7.3 to 7.5

### **REFERENCE**:

01. Puri V.K., Digital Electronics Circuits and Systems, 1<sup>st</sup> Edition, Tata McGraw–Hill Publishing Company Ltd., New Delhi, 1997.

Allied Phy	THERMAL PHYSICS	Code: 172103221
•	[For Mathematics Major Students]	
	SEMESTER II	
		4 Hrs / Week

Hrs / Week Credits 4

**Objectives:** 

To understand the laws govern thermodynamics and to understand the physics involved in the thermal processes

UNIT – I:

### [12 Hrs]

[12 Hrs]

Thermal Expansion:

Expansion of Crystals – Determination of  $\alpha$  by Airwedge Method – Expansion of Anisotropic Solids – Solids of Low Expansivity and their Uses – Anomalous Expansion of Water – Thermostats.

Isothermal and Adiabatic Changes:

Derivation of Equation for Both –  $C_v$  and  $C_p$  of a Gas – Relation between them – Experimental Determination of  $C_V$  by Joly's Method – Determination of Cp by Regnault's Method.

UNIT – II:

Conduction:

Lee's Disc Method for Conductivity of a Bad Conductor – Analogy between Heat Flow and Electric Current – Wiedemann Franz Law.

Convection:

Convection in Atmosphere – Lapse Rate – Stability of Atmosphere – Green House Effect – Atmospheric Pollution. Radiation:

Stefan's Law - Determination of Stefan's Constant by Filament Heating Method - Solar Constant Measurement - Water Flow Pyrheliometer Temperature of the Sun - Solar Spectrum - Energy Distribution in Black Body Spectrum - Planck's Law (no derivation) -Derivation of Wien's Law and Rayleigh Jean's Law from Planck's Law. UNIT – III: [12 Hrs]

Kinetic Theory of Gases:

Mean Free Path - Transport Phenomena - Diffusion - Viscosity and Thermal Conductivity – Maxwell's Law of Distribution of Molecular Speed (no derivation) – Experimental Verification – Degrees of Freedom - Boltzmann's Law of Equipartition of Energy - Calculation for Monoatomic and Diatomic Gases.

UNIT – IV:

Thermodynamics:

Derivation of Efficiency - Carnot's Theorem (statement only) -Second Law of Thermodynamics - Entropy - Changes of Entropy in Carnot's Cycle - Change of Entropy in Conversion.

UNIT – V:

Low Temperature Physics:

Joule kelvin Effect - Simple Theory of Porous Plug Experiment -Liquefaction of Oxygen - Cascade Process - Liquefaction of Air -Linde's Process - Liquefaction of Helium - K.Onnes Method - Adiabatic Curie's Demagnetization \_ Law – Giauque's Method Superconductivity.

**TEXT BOOK:** 

01. Murugeshan R., Thermal Physics, Ancillary Physics - II. **REFERENCE:** 

02. Brijlal and Subramanyam N., Heat and Thermodynamics, S.Chand and Co., New Delhi, 2007.

#### PRACTICAL - I Code: 172103222/172103426 Allied Phy. [For Mathematics & Chemistry Major Students] 2 Hrs/Week SEMESTER I & II/III & IV 2 Credits

### **Objectives:**

✓ To demonstrate the knowledge gained about properties of matter in measuring quantities related to electricity and gravitation.

### LIST OF EXPERIMENTS:

- 01. Young's modulus uniform bending pin and microscope method.
- 02. Young's modulus uniform bending optic lever method.

[12 Hrs]

- 03. Young's modulus non-uniform bending pin and microscope method.
- 04. Young's modulus non-uniform bending optic lever method.
- 05. Determination of coefficient of viscosity using Stoke's method.
- 06. Torsional pendulum determination of rigidity modulus of the given wire and moment of incrtia of the disc.
- 07. Compound pendulum determination of acceleration due to gravity and radius of gyration.
- 08. Thermal conductivity of bad conductor using Lee's disc method.
- 09. Sonometer verification of laws transverse vibration stretched strings.
- 10. Calibration of voltmeter using potentiometer.
- 11. Calibration of ammeter using potentiometer.
- 12. Comparison of EMF's using ballistic galvanometer.
- 13. Comparison of capacitances of capacitors using ballistic galvanometer.
- 14. Carey Foster bridge determination of resistance and resistivity of a given coil.

### Allied Phy. DIGITAL ELECTRONICS PRACTICALS [For Computer Science Major Students] SEMESTER I & II Code:172103223 3 Hrs/Week Credits 3

### **Objective:**

To demonstrate the skills acquired in digital electronic circuits in constructing basic logical circuits

### LIST OF EXPERIMENTS:

- 01. Logic Gates using Discrete Components.
- 02. Universality of NAND Gate using IC 7400.
- 03. Universality of NOR Gate using IC 7402.
- 04. R-S Flip Flop using NAND Gate.
- 05. R-S Flip Flop using NOR Gate.
- 06. Astable Multivibrator using IC 555.
- 07. Schmitt trigger using IC 555.
- 08. XOR Gate using NOR Gate, XOR Gate using NAND Gate.
- 09. Half Adder and Full Adder.
- 10. Binary to Gray code converter.

- 11. 1 to 4 Decoder.
- 12. J.K. Flip Flop using IC 7473.
- 13. Verification of Demorgan's Theorem.
- 14. Monostable Multivirator

Allied Phy. DIGITAL PRINCIPLES AND APPLICATIONS [For Information Technology Major Students] SEMESTER II Code: 172103224 4 Hrs/Week Credits 4

### **Objectives:**

 $\varkappa$  To let the students know the fundamentals of digital electronics and to understand the construction of circuits UNIT – I: [12 Hrs] Logical Circuits and Number Systems: Logic Gates - NOT, OR, AND - Boolean Algebra - NAND, NOR Gates - DeMorgan's theorem - Number Systems - Binary - Decimal -Octal - Hexadecimal - ASCII Code - Excess 3 Code - Gray Code. UNIT - II: [12 Hrs] Circuit Analysis and Design: Boolean Law and Theorems - Sum of Product Method - Kmap -Truth Tables - Pairs, Quads, Octets - Kmap Simplification - Don't Condition - Product of Sums Method - Product of Sums Care Simplification.

UNIT – III:

Data Processing Circuits:

Multiplexers – Demultiplexers – 1 of 16 Decoder – BCD – to Decimal Decoders – Seven–Segment Decoders – Encoders – Exclusive OR Gates – Parity Generators – Checkers.

UNIT – IV:

Arithmetic Circuits:

Binary Addition – Binary Subtraction – 2's and 1's Complement Representation – Arithmetic Building Blocks - The Adder – Subtracter – Half adder – Full adder – Bianary Multiplication and Division.

UNIT – V:

Flip Flops and Timers:

RS Flip Flop – Clocked RS Flip Flop – D Flip Flop – Edge triggered D Flip Flop – JK Flip Flop – JK Master Slave Flip Flop – Schmitt Trigger – IC555 timer – Astable and Monostable multivibrator

### TEXT BOOK:

01. Albert Paul Malvino Donald P. Leech, Digital Principles and Applications, 4<sup>th</sup> Edition, Tata McGraw-Hill, New Delhi, 1999.

UNIT – I : Chapter 1.2 to 1.7, 4.2 to 4.8

UNIT – II : Chapter 2.1-2.8, UNIT – III : Chapter 3.1 to 3.8,

UNIT – IV : Chapter 5.1 to 5.9, UNIT – V : Chapter 8.1-8.8 9.3, 9.4

# [12 Hrs]

[12 Hrs]

### **REFERENCE**:

01. Morrismano M., Digital Logic and Computer Design, Prentice Hall of India, New Delhi, 1999.

### Allied Phy. Lab DIGITAL ELECTRONICS LAB Code: 172103225 [For Information Technology Major Students] SEMESTER II

2 Hrs/Week Credits 2

### **Objectives:**

### ∠ Implementation of digital principles in the construction of circuits

- 01. Implementation of all Logic gates using discrete components
- 02. Implementation of all logic functions using NAND gate
- 03. Implementation of all logic functions using NOR gate
- 04. XOR gate using NAND gate only
- 05. XOR gate using NOR gate only
- 06. Half adder
- 07. Full adder
- 08. RS flip flop using NOR gate
- 09. JK flip flop
- 10. Verification of DeMorgan's Theorems.

# B.Sc PHYSICS: Those who have joined in the Academic year 2017–18 onwards under CBCS System

### **EVALUATION PATTERN**

Internal :	25 Marks	<b>External</b> :	75 Marks
INTERNAL:			
Test – 20	(average of the better	r two of the three test	ts conducted)
Assignme	nt – 5		
Question Paper	<u>Pattern:</u>		
IN'	<b>TERNAL</b>	EXTERNA	L
Part – A :	6 × 1 = 6	Part – A :10 $\times$ 1	= 10
(Multiple	Choice)	(Multiple Choice)	
Part – B :	$2 \times 7 = 14$	Part – B : $5 \times 7$	= 35
(Either /C	)r)	(Either /Or)	
Part – C :	2/3×10= 20	Part – C : 3/5×10	) = 30
	*40		75
* Internal test n	nark 40 will be conve	rted to 20.	

### SBE & NME

### INTERNAL

### **EXTERNAL**

Part – A : $3 \times 1 = 3$	Part – A :15 × 1	=	15
(Multiple Choice)	(Multiple Choice)		
Part – B : $1 \times 7 = 7$ (Either /Or)	Part – B : 3/5 × 10	=	30
Part – C : $1/2 \times 10 = 10$	Part – C : $2/4 \times 15$	=	30
20			75

The **Assignment** Component of any one of the subjects (except Non-Major Electives and other Department Papers) in the III and IV Semesters in UG COURSES (as decided by the Head of the Department on Rotation Basis) should be in the form of REPORT (as per the guidelines) on the **HANDS ON EXPERIENCE GAINED** by the students from their:

- Part-time job (or)
- Self-Employment (or)
- Making of Hand made Products (or)
- Survey on Marketing of goods and services (or)
- > Maintenance and Servicing of Equipments (or)
- How things Work (or)
- Working Principles of Toys/gadgets.... Models (or)
- Making of working Models using some Concepts

Students should maintain a work diary which should be monitored by the **course teacher** guided by a **Monitoring Committee** of the concerned department.