SRI MEENAKSHI GOVT. ARTS COLLEGE FOR WOMEN (A), MADURAI - 625 002

Reaccredited with "A" by NAAC

B.Sc., PHYSICS SYLLABUS FOR THE ACADEMIC YEAR 2022 - 2023

DEAPRTMENT OF PHYSICS

CHOICE BASED CREDIT SYSTEM

SYLLABUS

FOR STUDENTS ADMITTED FROM JUNE 2022

SRI MEENAKSHI GOVT. ARTS COLLEGE FOR WOMEN (AUTONOMOUS), MADURAI-2

PROGRAMME : B.SC

SEMESTER–I

Part	Course Type	Code	Title of the Course	Hrs/ Week	Credits	Exam Hrs	Marks		
							Int	Ext	Total
I	LC	U221A1/ U221H1	Tamil/Hindi	6	3	3	25	75	100
II	ELC	U222A1	English	6	3	3	25	75	100
III	CC	U22CP1	Mechanics, Fluid dynamics and sound	3	3	3	25	75	100
III	CC	U22CP2	Heat and Thermodynamics	3	3	3	25	75	100
III	CC	U22CP3P	Major Practical – paper I	3	-	-	-	-	-
III	AC	U22AMP1	Allied Mathematics Paper –I	3	3	3	25	75	100
III	AC	U22AMP2	Allied Mathematics Paper –II	4	3	3	25	75	100
IV	AEC -I	U22AE1	Value Education	2	2	3	25	75	100
Total				**30**	**20**				**700**

SEMESTER–II

Part	Course Type	Code	Title of the Course	Hrs/ Week	Credits	Exam Hrs	Marks		
							Int	Ext	Total
I	LC	U221A2/ U221H2	Tamil/Hindi	6	3	3	25	75	100
II	ELC	U222A2	English	6	3	3	25	75	100
III	CC	U22CP4	Electricity and Electromagnetism	6	6	3	25	75	100
III	CC	U22CP3P	Major practical-paper I	3	3	3	40	60	100
III	AC	U22AMP3	Allied Mathematics Paper – III	7	4	3	25	75	100
IV	AEC - II	U22AE2	Environmental Studies	2	2	3	25	75	100
Total				**30**	**21**				**600**

Part	Course Type	Code	Title of the Course	Hrs/ Week	Credits	Exam Hrs	Marks		
							Int	Ext	Total
I	LC	U221A3/ U221H3	Tamil/Hindi	6	3	3	25	75	100
II	ELC	U222A3	English	6	3	3	25	75	100
III	CC	U22CP5	Physical and Laser optics	6	5	3	25	75	100
III	CC	U22CP6P	Major practical-paper II	3	-	-	-	-	-
III	AC	U22ACT1	Allied Chemistry – Paper –I	4	3	3	25	75	100
I	AC	U22ACP	Allied Chemistry Practical paper –I	3	-	-	-	-	-
IV	NMEC–I	U22NMP1	Weather forecasting	2	2	3	25	75	100
V			NCC/NSS/Extension Activity		1		100	-	100
				30	**17**				**600**

SEMESTER - III

SEMESTER–IV

Part	Course Type	Code	Title of the Course	Hrs/ Week	Credits	Exam Hrs	Marks		
							Int	Ext	Total
I	LC	U221A4/ U221H4	Tamil/Hindi	6	3	3	25	75	100
II	ELC	U222A4	English	6	3	3	25	75	100
III	CC	U22CP7	Mathematical methods	4	4	3	25	75	100
III	CC	U22CP6P	Major practical- paper II	3	3	3	40	60	100
III	AC	U22ACT2	Allied Chemistry – Paper –II	4	4	3	25	75	100
III	AC	U22ACP	Allied Chemistry Practical paper –I	3	3	3	40	60	100
IV	NMEC–II	**U22NMP2**	Solar energy and its applications	2	2	3	25	75	100
IV	SEC– I	U22SEP1	Astrophysics	2	2	3	25	75	100
Total				**30**	**24**				**800**

SEMESTER–V

Part	Course Type	Code	Title of the Course	Hrs/ Week	Credits	Exam Hrs	Marks		
							Int	Ext	Total
III	CC	U22CP8	Analog electronics	5	5	3	25	75	100
III	CC	U22CP9	Atomic physics	5	5	3	25	75	100
III	CC	U22CP10	Classical ,Statistical and Quantum Mechanics	5	5	3	25	75	100
III	CC	U22CP11P	Major practical-paper III	6	5	3	40	60	100
III	DSEC –I	U22DSP1A	Medical Physics	5	5	3	25	75	100
		U22DSP1B	Radiation safety						
III	GEC I	U22GEP1	Physics of the earth	2	2	3	25	75	100
IV	SEC– II	U22SEP2	Programming with C	2	2	3	25	75	100
Total				**30**	**29**				**700**

SEMESTER–VI

Part	Course Type	Code	Title of the Course	Hrs/ Week	Credits	Exam Hrs	Marks		
							Int	Ext	Total
III	CC	U22CP12	Digital electronics and communication	4	4	3	25	75	100
III	CC	U22CP13	Solid state physics	4	4	3	25	75	100
III	CC	U22CP14P	Major practical-paper IV	6	5	3	40	60	100
III	CC	U22CP15	Optoelectronics	4	4	3	25	75	100
III	DSEC-II	U22DSP2A/ U22DSP2B	Nuclear physics / Nano Physics	4	4	3	25	75	100
IV	DSEC–III	U22DSP3A/ U22DSP3B	Spectroscopy / Problems solving skills in Physics	4	4	3	25	75	100
IV	SEC-III	U22SEP3	Physics for competitive examinations	2	2	3	40	60	100
IV	AEC III	U22AE3	General Knowledge	2	2	3	25	75	100
Total				**30**	**29**				**800**

COURSES OFFERED BY DEPARTMENT OF PHYSICS TO MATHEMATICS

Part	Course Type	Code	Title of the Course	Hrs/ Week	Credits	Exam Hrs	Marks		
							Int	Ext	Total
III	AC-I	U22APMT1	General Physics - I (T)	4	3	3	25	75	100
III	AC-II	U22APMP	General Physics Practical	3+3	3	3	25	75	100
III	AC-III	U22APMT2	General Physics - II (T)	4	4	3	25	75	100

COURSES OFFERED BY DEPARTMENT OF PHYSICS TO CHEMISTRY

Part	Course Type	Code	Title of the Course	Hrs/ Week	Credits	Exam Hrs	Marks		
							Int	Ext	Total
III	AC-I	U22APCT1	Allied Physics - I (T)	4	3	3	25	75	100
III	AC-II	U22APCP	Allied Physics Practical	3+3	3	3	25	75	100
III	AC-III	U22APCT2	Allied Physics - II(T)	4	4	3	25	75	100

VALUE ADDED COURSES (FOR B.Sc PHYSICS)

Value added course	Code	Title of the Course	Hrs/ Week	Credits	Exam Hrs	Marks		
						Int	Ext	Total
1		Agricultural Physics	2	2	2	20	30	50

VALUE ADDED COURSES (COMMON FOR ALL MAJORS)

Value added course	Code	Title of the Course	Hrs/ Week	Credits	Exam Hrs	Marks		
						Int	Ext	Total
1	VAP1	Renewable Energy Sources	2	2	2	20	30	50

COURSE STRUCTURE ABSTRACT FOR B.Sc. PROGRAMME

Part	Course		Total No of Papers	Hours	Credit	Marks
I	Language Course (LC)		4	24	12	400
II	English Language Course (ELC)		4	24	12	400
III	Core Course (CC)		15	73	64	1500
III	Allied Course (AC)		6	28	20	600
III	Discipline Specific Elective Course (DSEC)		3	13	13	300
III	Generic Elective Course (GEC)		1	2	2	100
IV	Non Major Elective Course (NMEC)		2	4	4	200
IV	Skill Enhancement Course (SEC)		3	6	6	300
IV	Ability Enhancement Course (AEC)	Value Education	1	2	2	100
IV		Environmental Studies	1	2	2	100
IV		General Knowledge	1	2	2	100
V	NCC/NSS/Extension Activity		1	-	1	100
Total			**42**	**180**	**140**	**4200**
Value Added Course			**2**		**4**	**100**
Total			**44**		**144**	**4300**

QUESTION PAPER PATTERN

I YEAR UG

Section - A	Section-B	Section-C
(10 * 1 = 10) or (5 * 2 = 10)	**Answer ALL questions** **Either – Or pattern** **(5 * 5 = 25)**	**Answer ALL questions** **Either – Or pattern** **(5 * 8 = 40)**
I to V units equal distribution		

Programme : B.Sc Physics **Part III: Core**
Semester : I **Hours : 3 Hrs/W (45 Hrs P/S)**
Sub. Code : U22CP1 **Credits: 3**

TITLE OF THE PAPER: MECHANICS, FLUID DYNAMICS AND SOUND

Pedagogy	Hours	Lecture	Peer Teaching	GD/ Videos/Tutorial	ICT
	3	2	-	-	1

PREAMBLE: To impart knowledge to the students covering all areas of Mechanics, Properties of matter and Sound

COURSE OUTCOME At the end of the Semester, the Students will be able to	**Unit**	**Hrs P/S**
CO 1: Identify the concepts of dynamics of rigid bodies	I	9
CO 2: Discuss about types of collision and able to derive the expression for final velocities and loss of kinetic energy	II	9
CO 3: To collect primary idea of gravitation and rocket motion	III	9
CO 4: Impart the knowledge of properties of fluid, hydrostatics and kinematics of fluid flow	IV	9
CO 5: Analyze about Ultrasonic and its applications .	V	9

SYLLABUS

Unit – I : MECHANICS OF RIGID BODY

Rigid body – Translational and Rotational motion –Torque- angular momentum- Relation between torque and angular momentum - Expression for Torque, angular momentum, kinetic energy of a rotating rigid body – Compound pendulum theory – Determination of g by compound pendulum.

Unit – II : COLLISION

Impulse of a force-impulsive force – Collision – Elastic and inelastic collision - fundamental principles of impact- direct impact of two smooth spheres - loss of kinetic energy due to direct impact of two smooth spheres – oblique impact of two smooth spheres- loss of kinetic energy due to oblique impact of two smooth spheres -

Unit – III : GRAVITATION

Newton's Law of Gravitation - Kepler's laws of planetary motion - Determination of G –BOY's method experiment - Variation of g with latitude, altitude and depth– systems with varying mass : A Rocket – principle- acceleration of rocket at an instant- thrust on the rocket – velocity of the rocket at any instant

Unit - IV : FLUID DYNAMICS

Viscosity - stream lined and turbulent flow - Critical velocity – Significance of Reynold's number – poiseuille's formula for the flow of a liquid through a capillary tube – Equation of continuity – Energy of liquid- Bernoullie's theorem – Statement and proof –Applications of Bernoullie's theorem - Venturimeter - Pitot's tube.

Unit – V : SOUND

Transverse vibrations of stretched strings –velocity of transverse waves in a stretched string – frequency of transverse vibration of stretched string – laws of transverse vibration of stretched string - Melde's experiment – Ultrasonics- piezo electric effect-production of ultrasonic waves- piezo electric crystal method – detection of ultrasonic waves- properties of ultrasonic waves- applications of ultrasonic waves

TEXT BOOKS :

1. Properties of Matter - R. Murugeshan, S.Chand and company Pvt. Ltd, Revised Edition 2012.
   Unit I : Chapter 10 - 10.7 - 10.9
   Chapter 6 - 6.10

   Unit II : Chapter 8 - 8.1, 8.2, 8.4, 8.5-8.7

   Unit III : Chapter 6 - 6.1- 6.3, 6.7 - 6.9
   Chapter 19 - 19.3

   Unit IV : Chapter 2 - 2.1-2.3
   Chapter 4 - 4.1, 4.2, 4.4

   Unit V : Chapter 17 – 17.1

2. Mechanics, properties of matter and sound - R. Murugeshan, S.Chand and company Pvt. Ltd, (2004)

   Unit V : Chapter 6 – 6.1- 6.7

BOOKS FOR REFERENCES :

1. Elements of properties of matter – D.S. Mathur – S. Chand & Co., 2004.
2. Properties of matter – Brijlal and Subramanian S. Chand & Co., 2006.
3. N.Subrahmanyam and BrijLal, A Text Book of Sound,Vikas Publishing House - Second revised edition(1995)

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT I	Rigid body – Translational and Rotational motion –Torque- angular momentum- Relation between torque and angular momentum	3	Lecture & ICT
	Expression for Torque, angular momentum, kinetic energy of a rotating rigid body	3	Lecture & ICT
	Compound pendulum theory – Determination of g by compound pendulum	3	Lecture & ICT

UNIT II	Impulse of a force-impulsive force – Collision – Elastic and inelastic collision - fundamental principles of impact-.	3	Lecture & ICT
	direct impact of two smooth spheres - loss of kinetic energy due to direct impact of two smooth spheres oblique impact of two smooth spheres- loss of kinetic energy due to oblique impact of two smooth spheres	6	Lecture & ICT
UNIT III	Newton's Law of Gravitation - Kepler's laws of planetary motion - Determination of G –BOY's method experiment.	3	Lecture & ICT
	Variation of g with latitude, altitude and depth– systems with varying mass : A Rocket – principle	3	Lecture & ICT
	acceleration of rocket at an instant-thrust on the rocket – velocity of the rocket at any instant.	3	Lecture & ICT
UNIT IV	Viscosity - stream lined and turbulent flow - Critical velocity – Significance of Reynold's number – poiseuille's formula for the flow of a liquid through a capillary tube	4	Lecture & ICT
	Energy of liquid- Bernoullie's theorem – Statement and proof –Applications of Bernoullie's theorem - Venturimeter - Pitot's tube.	5	Lecture & ICT
UNIT V	Transverse vibrations of stretched strings –velocity of transverse waves in a stretched string – frequency of transverse vibration of stretched string – laws of transverse vibration of stretched string - Melde's experiment	6	Lecture & ICT
	Ultrasonics- piezo electric effect-production of ultrasonic waves- piezo electric crystal method – detection of ultrasonic waves- properties of ultrasonic waves- applications of ultrasonic waves-	3	Lecture & ICT

Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	4	2	3	4	4	3	3	2	4	3.3
CO2	4	4	2	2	4	4	3	3	2	4	3.2

CO3	4	4	3	3	3	4	3	3	3	3	3.3
CO4	4	3	2	3	4	4	4	2	3	3	3.2
CO5	4	4	3	3	4	4	3	3	2	4	3.4
Mean Overall Score											3.3

Result: The Score for this Course is 3.3 (High Relationship)

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
K1(Remembering / Recalling)	40%	40%
K2 (Understanding / comprehension)	30%	30%
K3 (Application and analysis)	30%	30%

Course Designer: Mrs. S V Meenakshi Department of Physics

Programme: B.Sc., PHYSICS | **Part III: Core II**
Semester : I | **Hours : 3 Hrs/W 45 Hrs /S**
Sub. Code : U22CP2 | **Credits : 3**

TITLE OF THE PAPER: HEAT AND THERMODYNAMICS

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	3	1	-	1	1

PREAMBLE: Understand the basics of Thermodynamics. Acquire knowledge in low temperature physics. Understand the transmission of heat and quantum theory of radiation.

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
CO1: Understand the behavior of real gases and derive Vander Waals equation of a state. Understand the concept of transport phenomenon.	I	9
CO2: State and explain the laws of thermodynamics. Apply the laws to explain carnot engine. Understand the concept of entropy and derive Maxwell's equations.	II	9
CO3: Understand the methods of liquefaction of air. Explain the properties of Helium I and II. Describe the process of Adiabatic demagnetization.	III	9
CO4: Understand the different methods of transmission of heat. State and explain Wien's displacement Law – Rayleigh Jean's Law - Solar constant. Explain Waterflow Pyrheliometer.	IV	9
CO5: Understand thermometry and calorimetry and explain C_p and C_v- Mayers relation-C_v by Jolys differential steam calorimeter method- C_p by Regnaults method.	V	9

SYLLABUS

UNIT – I : KINETIC THEORY OF GASES

Kinetic model, Postulates of Kinetic theory of gasea- Vander Waal's equation of state– Estimation of Critical constants – contants of Van der Waals equation -Molecular collisions-Mean free path-Expression for mean free path-Transport phenomenon-Expression for viscosity, thermal conductivity and Diffusion.

UNIT – II : THERMODYNAMICS

Zeroth, I, II and III Laws (statements alone) –Isothermal and adiabatic process- Carnot's ideal Heat Engine, Carnot's cycle-Concept of entropy – Change in entropy- change of entropy in reversible and irreversible processes – change of entropy when ice converted into steam –- Maxwell's equations- Clausius-Claypeyron latent heat equation.

UNIT – III : LOW TEMPERATURE PHYSICS

Joule Kelvin effect -Liquefaction of air - Linde's process – Liquefaction of Helium – Kammerling-Onne's method – Helium I and II –Lambda point- Adiabatic demagnetization-practical applications of low temperature.

UNIT - IV : TRANSMISSION OF HEAT

Conduction- Coefficient of thermal conductivity**,** Rectilinear flow of heat along a bar- Radiation – black body-Kirchoffs law-Stefan Boltzmann law- law - Distribution of energy spectrum of a black body -Wien's displacement Law – Rayleigh Jean's Law - Solar constant — Water flow Pyroheliometer.

UNIT – V : THERMOMETRY AND CALORIMETRY

Platinum resistance thermometer-calendar and Griffiths bridge-Specific heat capacity of solids-Regnaults method of mixtures(solid)- Specific heat capacity of liquids-Callendar and Barns method- Specific heat capacity of gases- C_p and C_v- Mayers relation-C_v by Jolys differential steam calorimeter method- C_p by Regnaults method.

TEXT BOOK :

1. Heat Thermodynamics and statistical Physics, Brijlal, Dr. N. Subrahmanian, P.S.Hemne, Revised Edition (2010) S.Chand & Co.,

Unit 1**. Ch 1,2 &3** (sec.1.3, 2.8, 2.10, 2.11, 3.1, 3.2, 3.5,3.7,3.8, 3.11, 3.16)
Unit 2.**Ch 4, 5 & 6** (sec.4.2, 4.7, 4.28, 5.15 (only statements),4.10.4, 4.10.7, 4.23, 4.24, 5.1, 5.2, 5.4, 5.6, 6.3, 6.11.)
Unit 3. **Ch7** (sec.7.5,7.8, 7.11, 7.12, 7.16).
Unit 4. **Ch15 & 8** (sec.15.1, 15.2, 8.1, 8.6,8.10, 8.12, 8.13,8.14,8.15,8.26,8.29).
Unit 5**. Ch13 & 14** (sec.13.15, 13.16, 14.2, 14.7, 14.10, 14.11,14.12).

REFERENCE :

1. Heat and Thermodynamics - Brijlal & Subramanian, Sixteenth edition
2. Heat and Thermodynamics - Singhal & Agarwal & Prakash, Eighth Revised Edition. Prakashan (Unit
3. Heat and Thermodynamics - D.S.Mathur,Sultan Chand & Sons, 5th edition, New Delhi,2014
4. Thermodynamics and Statistical Mechanics - S.LKakani .

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT I	Kinetic model, Postulates of Kinetic theory of gasea- Vander Waal's equation of state– Estimation of Critical constants – contants of Van der Waals equation	3	Lecture, GD, ICT and Teaching
	Molecular collisions-Mean free path-Expression for mean free path	3	Lecture, Video, ICT and Teaching
	Transport phenomenon-Expression for viscosity, thermal conductivity and Diffusion.	3	Lecture, GD, ICT and Teaching
UNIT II	Zeroth, I, II and III Laws (statements alone) –Isothermal and adiabatic process- Carnot's ideal Heat Engine, Carnot's cycle	3	Lecture, GD, ICT and Teaching
	Concept of entropy – Change in entropy- change of entropy in reversible and irreversible processes – change of entropy when ice converted into steam.	3	Lecture, Video, ICT and Teaching
	Maxwell's equations- Clausius-Claypeyron latent heat equation.	3	Lecture, GD, ICT and Teaching
UNIT III	Joule Kelvin effect -Liquefaction of air - Linde's process	3	Lecture, GD, ICT and Teaching
	Liquefaction of Helium – Kammerling-Onne's method – Helium I and II –Lambda point	3	Lecture, GD, ICT and Teaching
	Adiabatic demagnetization-practical applications of low temperature.	3	Lecture, GD, ICT and Teaching
	Conduction- Coefficient of thermal conductivity**,**	3	Lecture, GD, ICT

UNIT IV	Rectilinear flow of heat along a bar		and Teaching
	Radiation – black body-Kirchoffs law-Stefan Boltzmann law- law - Distribution of energy spectrum of a black body.	3	Lecture, GD, ICT and Teaching
	Wien's displacement Law – Rayleigh Jean's Law - Solar constant — Water flow Pyrheliometer . .	3	Lecture, GD, ICT and Teaching
UNIT V	Platinum resistance thermometer-calendar and Griffiths bridge	3	Lecture, GD, ICT and Teaching
	Specific heat capacity of solids-Regnaults method of mixtures(solid)- Specific heat capacity of liquids-Callendar and Barns method	3	Lecture, GD, ICT and Teaching
	Specific heat capacity of gases- C_p and C_v- Mayers relation-C_v by Jolys differential steam calorimeter method- C_p by Regnaults method.	3	Lecture, GD, ICT and Teaching

Course Outcomes (Cos)	Programme Outcomes (Pos)					Programme Specific Outcomes (PSOs)						Mean scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	
CO1	4	2	4	4	3	4	2	4	3	4	4	3.45
CO2	4	2	4	4	3	4	2	4	3	4	4	3.45
CO3	4	2	4	4	3	4	2	4	3	4	4	3.45
CO4	4	2	4	4	3	4	2	4	3	4	4	3.45
CO5	4	2	4	4	3	4	2	4	3	4	4	3.45
Mean Overall Score												3.45

Result: The Score for this Course is 3.45 (High Relationship)

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score of COs = $\frac{\text{Total of Value}}{\text{Total No. of Pos \& PSOs}}$

Mean Overall Score of COs = $\frac{\text{Total of Mean Score}}{\text{Total No. of COs}}$

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
K1(Remembering / Recalling)	40%	40%
K2 (Understanding / comprehension)	30%	30%
K3 (Application and analysis)	30%	30%

Course Designer: Dr. K. Lilly Mary Eucharista, Department of Physics.

Programme : B.Sc., Physics **Part III : Core Practical**
Semester : I **Hours : 3 P/W 60 Hrs/I&II SEM**
Sub. Code : U22CP3P **Credits : 3**

TITLE OF THE PAPER: MAJOR PRACTICAL PAPER -I

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	2	1	-	1	-

PREAMBLE: This course offers opportunity to handle the laboratory equipments and develop skills to determine elastic properties, thermal properties, surface tension which are relevant to the theory learnt in core courses.

COURSE OUTCOME

At the end of the Semester, the Students will be able to

CO 1 : be familiar with elasticity and various moduli of elasticity

CO 2 : calibrate the low range voltmeter

CO 3 : construct different types of waveforms

CO 4 : be familiar with spectroscopic techniques

CO 5 : experiment with semiconductor devices to understand their properties

LIST OF PRACTICALS

1. Thermal conductivity - Lee's method.
2. Joule's calorimeter – specific heat capacity of liquid.
3. Compound pendulum.
4. Torsional pendulum.
5. Young's modulus – uniform bending – microscope
6. Young's modulus – non uniform bending – telescope
7. Young's modulus - Cantilever depression.
8. Viscosity – Stoke's method.
9. Surface tension by capillary rise.
10. Potentiometer - calibration of low range voltmeter
11. Potentiometer - calibration of ammeter
12. Desauty's bridge
13. Spectrometer - Refractive index of prism
14. Newton's law of cooling

15. Young's modulus – uniform bending – telescope
16. Young's modulus – non uniform bending – microscope
17. L – Owen's bridge
18. Diode characteristics
19. Study of multimeter
20. Series Resonance

TEXT BOOKS

1. M.N.Srinivasan, S. Balasubramanian and R.Ranganathan, 2013 "A Text book of Practical Physics" (Sultan Chand & Sons)
2. Ouseph C.C., Rao U.J. and Vijayendran V., 2008, "Practical Physics and Electronics", S. Viswanathan (Printers and Publishers), Private Ltd., New Delhi.

REFERENCE BOOKS

1. Arora C.L., 2012, "B.Sc. Practical Physics", Twentieth Edition, S. Chand & Company Ltd., New Delhi.
2. Kakani S.L. and Shubhra K., 2015, "Applied Physics – Theory and Practicals", Viva Books Private Ltd., New Delhi.
3. Kakani S.L. and Shubhra K., 2011, "Engineering Practical Physics", CBS Private Ltd., New Delhi.
4. Manjeet S. and Anita D., 2011, "Applied Physics Theory and Experiments", Vayu Education of India, New Delhi.
5. Srivasta A. and Shukla R.K., 2006, "Practical Physics", New Age International Private Ltd., New Delhi.

Programme : B.Sc., Physics | **Part III : Core Course 3**
Semester : II | **Hours : 6 Hrs P/W 90 Hrs/P/S**
Sub. Code : U22CP4 | **Credits :6**

TITLE OF THE PAPER : ELECTRICITY AND ELECTROMAGNETISM

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDEOS/TUTORIAL	ICT
	6	4	-	1	1

Preamble:
The scope of this course is to impart the basic knowledge in the elemental concepts and enhance the intellectual, experimental, analytical and Mathematical skills of the students in Electricityand Magnetism which has the key role in the development of modern technological world.

COURSE OUTCOME On the successful completion of the course students will able to	Unit	Hrs P/S
CO1 : Understand fundamental laws of electricity and magnetism apply the knowledge of electricity and magnetism to technological advances	1	18
CO2 : Get a clear idea about chemical, thermal and magnetic effect of electric current and its uses which provide a pathway for the new scientific invention	2	18
CO3 Understand how Faraday's law relates to induced emf and to calculate the energy stored in an inductor	3	18
CO4 : Apply the knowledge of basic circuital laws and simplify the DC and AC networks using reduction techniques	4	18
CO5 : Apply Maxwell's equations to solve various physical problems and develop problem solving skills in electromagnetism	5	18

UNIT I : MAGNETIC EFFECT OF ELECTRIC CURRENT

Magnetic induction-Magnetic flux- Lorent'z force on a moving charge- Biot Savart law- Magnetic induction at a point due to a straight conductor carrying current –Ampere's circuital law (statement & proof) - Applications of Ampere's law (magnetic induction due to long straight current carrying wire)-Torque on a current loop in a uniform magnetic field (moving galvanometer basic concept) -Moving coil Ballistic galvanometer-theory (reduction factor) – current and voltage sensitivities of a moving coil galvanometer - Measurement of charge sensitiveness (Figure of merit)

UNIT II : THERMAL AND CHEMICAL EFFECT OF ELECTRIC CURRENT

Thermoelectricity- Seebeck effect-Measurement of thermo e.m.f using potentiometer- Peltier effect-Demonstration (S.G. Starling Method) -Thomson effect- Demonstration - thermodynamics of thermo couple - Faradays laws of electrolysis- electrical conductivity of an electrolyte-specific conductivity- Kohlrausch's bridge method of determining the specific conductivity of an electrolyte

UNIT III : ELECTROMAGNETIC INDUCTION

Faraday's laws of induction-selfinduction –self inductance of a long solenoid -determination of L by Anderson's method-self inductance of a toroidal coil of circular cross section- energy stored in magnetic field - mutual induction-mutual inductance between two co-axial solenoids-Measurement of mutual inductance by Carey Foster's method-co-efficient of coupling

UNIT IV : AC AND DC CIRCUITS

Introduction of AC and DC (definition, peak value, Mean value, RMS Value) -Growth of current in a circuit containing resistance and inductance - Decay of current in a circuit containing resistance and inductance - Growth and Decay of charge in a circuit containing resistance and capacitance - Alternating current Circuit Theory (AC circuit containing resistance only, inductance only and capacitance only) - LCR series resonance circuit (acceptor circuit, Q-factor and sharpness) - choke coil

UNIT V : MAXWELL'S EQUATION& ELECTROMAGNETIC WAVES

Introduction- -Displacement current-Maxwell's equations in a material media (No Derivation) - Plane electromagnetic waves in free space-Poynting vector- -Hertz experiment for production and detection of EM waves - Wave equations for Electric field and Magnetic field-The Ionosphere-Refraction of radio wave in ionosphere

TEXT BOOK

R. Murugeshan, Electricity and Magnetism, Tenth Revised Edition (2017) S Chand & Company Limited, NewDelhi

UNIT I : Chapter 10 – Section 10.1, 10.2, 10.3, 10.7, 10.8 (i), 10.10, 10.11, 10.12, 10.13

UNIT II : Chapter 8 & 9 – Section 8.1, 8.3, 8.4, 8.5, 8.6, 9.12, 9.2, 9.3

UNIT III : Chapter 11 & 13 - Section 11.1, 11.3, 11.4, 11.6, 11.12, 11.13, 11.15, 11.17, 11.18, 11.19

UNIT IV : Chapter 12 & 13 – Section 13.1, 12.1, 12.2, 12.3, 13.2, 13.3, 13.6

UNIT V : Chapter 15 – Section 15.1, 15.2, 15.7, 15.8, 15.10, 15.12, 15.23, 15.31

REFERENCE BOOKS

1. BrijLal& Subramanyam, Electricity andMagnetism,(2005)Ratan Prakashan Mandir Publishers,Agra
2. M.Narayanamurthy&N.Nagarathnam, Electricity & Magnetism,NPpub., Revised edition.
3. Electricity and Magnetism -D.N.Vasudeva (Twelfth revisededition)
4. Electricity and Magnetism - K.K.Tiwari (S.Chand&Co.)
5. Electricity and Magnetism -E.M.Pourcel,Berkley Physics Cource, Vol.2 (McGrraw-Hill)
6. Electricity andMagnetism -Tayal (Himalalaya PublishingCo.)
7. D.Halliday, R.Resnick and J.Walker, Fundamentals of Physics – Electicity and Magnetism (2011), Wiley India,Pvt Ltd
8. David J. Griffith, Introduction to Electrodynamics, (2012) PHI, NewDelhi

WEB REFERENCES

1. http://www.gutenberg.org/ebooks/34221
2. https://bookboon.com/en/university-physics-ii-notes-and-exercises-i-ebook

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT I: MAGNETIC EFFECT OF ELECTRIC CURRENT(18 Hrs)			
Magnetic induction-Magnetic flux-Lorent'z force on a moving charge		2	1 hours Lecture And1 hour Discussion
Biot Savart law- Magnetic induction at a point due to a straight conductor carrying current		3	2 hours Lecture and 1 hour Discussion and Quiz
Ampere's circuital law (statement & proof) - Applications of Ampere's law (magnetic induction due to long straight current carrying wire)-		4	2 hours Lecture 1 hour ICT and 1 hour Discussion
Torque on a current loop in a uniform magnetic field (moving galvanometer basic concept) - Moving coil Ballistic galvanometer-theory (reduction factor)		5	3 hours Lecture 1 hour ICT and1 hour Discussion
current and voltage sensitivities of a moving coil galvanometer -Measurement of charge sensitiveness (Figure of merit)		4	3 hours Lecture 1 hour ICT and Discussion
UNIT II : THERMAL AND CHEMICAL EFFECT OF ELECTRIC CURRENT (18 Hrs)			
Thermoelectricity- Seebeckeffect-Measurement of thermoe.m.f using potentiometer		5	4 hours lecture 1 hourICT& Discussion
Peltier effect-Demonstration (S.G. Starling Method) -Thomson effect- Demonstration - thermodynamics of thermo couple		5	4 hours lecture 1 hourICT& Discussion
Faradays laws of electrolysis-electrical conductivity of an electrolyte-specific conductivity		4	3 hours lecture 1 hour ICT&Discussion
Kohlrausch's bridge method of determining the specific conductivity of an electrolyte		4	3 hours lecture 1 hourICT& Discussion
UNIT III : ELECTROMAGNETIC INDUCTION (18 Hrs)			
Faraday's laws of induction-selfinduction –self inductance of a long solenoid		4	3 hours lecture 1 hour Discussion and Quiz
determination of L by Anderson's method-self inductance of a toroidal coil of circular cross section		4	3 hours lecture 1 hour Discussion and Quiz
energy stored in magnetic field - mutual induction-mutual inductance between two co-axial solenoids-		4	3 hours lecture 1 hour ICT&Discussion
Measurement of mutual inductance by Carey Foster's		3	2 hours lecture 1 hour ICT&Discussion
Kirchoff's laws, Wheatstone's network, Condition for balance		3	2 hours lecture 1 hour ICT&Discussion , Problem solving
UNITIV : AC AND DCCIRCUITS (18 Hrs)			

Introduction of AC and DC (definition, peak value, Mean value, RMS Value)	3	2 hours lecture 1 hour Discussion and ICT
Growth of current in a circuit containing resistance and inductance - Decay of current in a circuit containing resistance and inductance - Growth and Decay of charge in a circuit containing resistance and capacitance	5	4 hours lecture 1 hour Discussion and ICT
Alternating current Circuit Theory (AC circuit containing resistance only, inductance only and capacitance only)	6	4 hours lecture 1 hour Discussion and ICT 1 hour problem solving
LCR series resonance circuit (acceptor circuit, Q-factor and sharpness) - choke coil	4	2 hours lecture 1 hour Discussion and ICT 1 hour problem solving
UNIT V :MAXWELL'SEQUATION& ELECTROMAGNETICWAVES (18 Hrs)		
Introduction-Displacement current-Maxwell's equations in a material media	5	4 hours lecture 1 hour Discussion and ICT
Plane electromagnetic waves in free space-Poynting vector- -Hertz experiment for production and detection of EM waves	5	4 hours lecture 1 hour Discussion and ICT
Wave equations for Electric field and Magnetic field-The Ionosphere	4	3 hours lecture 1 hour Discussion and ICT
Refraction of radio wave in ionosphere	4	3 hours lecture 1 hour Discussion and ICT

Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	3	3	3	3	4	4	4	4	4	3.6
CO2	4	3	3	3	3	4	4	4	4	4	3.6
CO3	3	4	3	4	4	3	4	3	3	4	3.5
CO4	4	3	3	4	4	4	3	3	3	3	3.4
CO5	3	4	4	4	4	3	3	4	3	3	3.5
Mean Overall Score											3.52

Result: The Score for this Course is 3.52 (High Relationship)

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$

Mean Overall Score of COs = $\frac{\text{Total of Mean scores}}{\text{Total No. of COs}}$

ASSESSMENT RUBRICS

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
K1 (REMEMBERING/RECALLING)	40%	40%
K2 (UNDERSTANDING/COMPREHENSION)	30%	30%
K3 (APPLICATION and ANALYSIS)	30%	30%

Course Designer: Dr. P. INDRA DEVI & Dr. A. BEULAH MARY Assistant Professor, Department of Physics.

Programme : B.Sc., Physics **Part III : Core paper IV**
Semester : III **Hours : 6 HrsP/W 90Hrs/P/S**

Sub. Code : U22CP5 **Credits :5**

TITLE OF THE PAPER : PHYSICAL AND LASER OPTICS

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDEOS/TUTORIAL	ICT
	6	3	1	1	1

Preamble:
The scope of this course is to understand the concept of wave nature of light to describe different optical phenomenon like interference, diffraction, polarization. To expose the students to the application of lasers in various areas of life, science and industry of optics and laser

COURSE OUTCOME On the successful completion of the course students will able to	Unit	Hrs P/S
CO1 : describe and discuss about interference and its applications	1	18
CO2 : describe and discuss diffraction effects observed in a single slit and circular aperture and relate to optical resolution	2	18
CO3 know how to Produce and detect of plane, circularly and elliptically polarised light	3	18
CO4 : explain the basic principles of laser and types of laser	4	18
CO5 :understand the working principle, recording, reconstruction and types in holography and the advance applications of laser in various field like medicine and industry	5	18

UNIT I : INTERFERENCE

Introduction - Theory of Interference fringes – Wedge-shaped film - Determination of wavelength of sodium light by Newton's rings - Determination of refractive index of liquid byNewton's rings - Michelson interferometer - determination of wavelength of monochromatic light – Determination of difference between two doublets – Jamin's interferometer – Rayleigh's refractometer

UNIT II : DIFFRACTION

Introduction -Fresnel's explanation of rectilinear propagation of light-Diffraction of light waves – The Zone plate -Diffraction at a straight edge-Fraunhofer diffraction at a single slit-Fraunhofer diffraction at a Double slit-Plane transmission diffraction grating-Absent spectra with a diffraction grating- Dispersive power of a grating-Overlapping of spectral lines-Determination of wavelength of spectral lines using transmission grating (Normal incidence) -Resolving power of a plane diffraction grating

UNIT III : POLARISATION

Introduction- Polarisation of light - Double refraction - Nicol prism - Theory of plane polarized light, elliptically polarized light and circularly polarised light –Theory of production of elliptically and circularly polarised light –Quarter wave plate – Half wave plate - Production and detection of plane, circularly and elliptically polarised light – Babinet's compensator -–Dichroism

UNIT IV : LASER OPTICS

Induced absorption- Spontaneous emission – Stimulated emission –Principles of laser, Population inversion, pumping - Einstein's coefficients – Relation between Einstein's A and B coefficients- Ruby laser – He-Ne laser - CO_2 Laser- Semiconductor Laser

UNIT V :APPLICATIONS OF LASER

Laser Welding – hole drilling – laser cutting – Holography – principle, recording, viewing a hologram-Laser tracking- Lider- Lasers in medicine – Fibre optics – introduction-Fibre construction - Fibre optic communication system – Advantages of fibre optic communicationsystem-Fibre optic sensors.

TEXT BOOKS

Optics and spectroscopy – R.Murugesan, KiruthigaSivaprasath, 7 th revised edition, 2010, S.Chand& Company Limited

UNIT-I: CHAPTER –2.1, 2.2,2.7, 2.9, 2.10 - 2.14
UNIT-II : CHAPTER -3.1- 3.3, 3.7, 3.10- 3.15, 3.17, 3.24
UNIT-III : CHAPTER -4.1, 4.5, 4.8, 4.10, 4.11, 4.12 -4.14, 16.8,31.3
UNIT-IV: CHAPTER -5.13, 12.1,12.2,12.4, 5.14, 5.15, 5.16
UNIT-V : CHAPTER – 39.2, 9.1, 39.3, 39.4, 39.5, 8.1, 8.2, 8.5, 8.6, 8.10

REFERENCE BOOKS

1. Optics and Spectroscopy –Brijlal& Subramanian, 2006 edition, S.Chand&Co.
2. A Text book of Physics- R.Murugesan, 2006 edition, S.Chand&Co.
3. N. Avadhanulu , An introduction to LASERS, S. Chand &Company,2001.
4. WilliamT.Silfvast,Laserfundamentals,UniversityPress,Publishedin South Asia by Foundation books, New Delhi,1998
5. K.ThyagarajanandA.K.Ghatak,LASERTheoryandApplication,Mc Millan, India Ltd,1984.

WEB REFERENCES

1. Free Optics Books Download | Ebooks Online Textbooks Tutorials (freebookcentre.net)
2. Geometrical Optics and Physical Optics, by Herimanda A. Ramilison: FREE Book Download (free-ebooks.net)
3. Atomic and Laser Physics | Download book (freebookcentre.net)

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT I: INTERFERENCE (18 Hrs)			
Introduction - Theory of Interference fringes - Wedge-shaped film		**4**	**3 hour Lecture and1 hour Discussion and ICT**
Determination of wavelength of sodium light by Newton's rings - Determination of refractive index of liquid by Newton's rings		**5**	**4 hours Lecture and 1 hour Discussion and Quiz**
Michelson interferometer - determination of wavelength of monochromatic light		**5**	**4 hours Lecture 1 hour ICT& Discussion, Problem solving**
Determination of difference between two doublets – Jamin's interferometer – Rayleigh's refractometer		**4**	**3 hours Lecture 1 hour ICT**
UNIT II :DIFFRACTION (18 Hrs)			
Introduction -Fresnel's explanation of rectilinear propagation of light-		**3**	**2 hours lecture 1 hour Discussion**
Diffraction of light waves – The Zone plate - Diffraction at a straight edge-Fraunhofer diffraction at a single slit-Fraunhofer diffraction at a Double slit		**5**	**4 hour lecture 1 hour ICT&Discussion**
Plane transmission diffraction grating-Absent spectra with a diffraction grating- Dispersive power of a grating-Overlapping of spectral lines-		**5**	**4 hour lecture 1 hour ICT&Discussion**
Determination of wavelength of spectral lines using transmission grating (Normal incidence) -Resolving		**5**	**4 hour lecture 1 hour ICT&Discussion**

power of a plane diffraction grating		
UNIT III : POLARISATION (18 Hrs)		
Introduction- Polarisation of light - Double refraction - Nicol prism	**4**	**3 hours lecture** **1 hour Discussion**
Theory of plane polarized light, elliptically polarized light and circularly polarised light –Theory of production of elliptically and circularly polarised light	**5**	**4 hours lecture** **1 hour ICT &Discussion**
Quarter wave plate – Half wave plate - Production and detection of plane, circularly and elliptically polarised light	**5**	**4 hours lecture** **1 hour ICT&Discussion**
Babinet's compensator- Dichroism	**4**	**3 hours lecture 1 hour ICT and discussion**
UNITIV : LASER OPTICS (18 Hrs)		
Induced absorption- Spontaneous emission – Stimulated emission	**3**	**2 hours lecture and 1 hour discussion**
Principles of laser, Population inversion, pumping	**3**	**2 hours lecture and1 hour discussion**
Einstein's coefficients – Relation between Einstein's A and B coefficients	**4**	**3 hours lecture** **1 hour Discussion and Problem solving**
Ruby laser – He-Ne laser	**4**	**3 hours lecture** **1 hour ICT &Discussion**
CO_2 Laser- Semiconductor Laser	**4**	**3 hours lecture** **1 hour ICT&Discussion**
UNIT V: APPLICATIONS OF LASER (18 Hrs)		
Laser Welding – hole drilling – laser cutting –	**4**	**3 hours lecture** **1 hour Discussion**
Holography – principle, recording, viewing a hologram-	**5**	**4 hours lecture** **1 hour Discussion and ICT**
Laser tracking- Lider- Lasers in medicine – Fibre optics – introduction-	**4**	**3 hours lecture** **1 hour Discussion and ICT**
Fibre construction - Fibre optic communication system – Advantages of fibre optic communicationsystem-Fibre optic sensors	**5**	**4 hours lecture** **1 hour Discussion and ICT**

Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	3	4	3	3	4	3	4	4	3	3.5
CO2	4	3	3	4	3	4	3	4	3	3	3.4
CO3	4	4	3	3	4	3	4	4	3	4	3.6
CO4	4	3	3	4	4	4	3	3	4	4	3.6
CO5	3	4	4	3	4	3	3	4	4	4	3.6
Mean Overall Score											3.54

Result: The Score for this Course is 3.54 (High Relationship)

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$

Mean Overall Score of COs = $\frac{\text{Total of Mean scores}}{\text{Total No. of COs}}$

ASSESSMENT RUBRICS

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
K1 (REMEMBERING/RECALLING)	30%	30%
K2 (UNDERSTANDING/COMPREHENSION)	40%	40%
K3 (APPLICATION and ANALYSIS)	30%	30%

Course Designer: Dr. P.N.NIRMALA, Dr. A. BEULAH MARY & Dr.P. INDRA DEVI, Assistant Professor, Department of Physics.

Programme: B.Sc. **Part III: Elective Paper**
Semester : III **Hours : 2 Hrs/W 30 Hrs /S**

Sub. Code : U22NMP1 **Credits: 2**

TITLE OF THE PAPER: Weather Forecasting

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	2	1	1	-----	----

PREAMBLE: Understand the basics of Weather and Climate

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
UNIT 1 CO1: Understand the importance of atmosphere, composition and structure of atmosphere also know the characteristics	1	6 Hrs
UNIT 2 CO2: Know about the Wind systems and Clouds.	2	6 Hrs
UNIT 3 CO3: identify the Cyclones, Classification of Cyclones and thunderstorms	3	6 Hrs
UNIT 4 CO4: Know about the classification of climate and importance of global warming	4	6 Hrs
UNIT 5 CO5: Understand the importance of Weather Forecasting and Satellites observations.	5	6 Hrs

WEATHER FORECASTING

Course Objective:

The main objective of the course is not only to impart theoretical knowledge to the students and to enable them to develop an awareness and understanding regarding the causes and effects of different weather phenomenon and basic forecasting techniques

Unit 1: Introduction to atmosphere

Atmosphere - physical structure and composition - atmospheric pressure - its measurement - cyclones and anticyclones - its characteristics – Measuring air temperature – Sensor – Types.

Unit 2: Measuring the weather

Wind - force - speed - direction - measurement –atmospheric moisture/ humidity- clouds - rainfall- radiation- absorption- emission and scattering in atmosphere - radiation laws.

Unit 3: Weather systems

Air masses and fronts - classifications - jet streams - local thunderstorms - tropical cyclones – classification – tornadoes - hurricanes.

Unit 4: Climate and Climate Change

Climatic classification - causes of climate change – global warming - air pollution - aerosols- ozone depletion- acid rain - environmental issues related to climate.

Unit 5: Basics of weather forecasting:

Weather forecasting - historical background – need - types - weather forecasting methods - criteria of choosing weather station –Basics of choosing site and exposure - satellites observations - weather maps - uncertainty and predictability - probability forecasts.

Reference books:

1. Berry and Chorley – Atmosphere , Weather and Climate - Metheun
2. Howard J. Critch Field (1999) – General Climatology – Prentice Hall of India Delhi - 1999
3. Keith Smith – Principles of Applied Climatology - Mc Graw Hill Book Co, Newyork 1998
4. Glenn T. Trewartha & Lyle –H. Horn. An introduction to Climate – Mc. Grew Hill Book Co. New Delhi 1980

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT 1 ELECTROSTATICS			
Coulomb's law, Electric field, Electric potential		2	**2 hours Lecture and Discussion**
Potential at a point due to a point charge , Potential at a point due to a Uniformly charged conducting sphere		4	**3 hours Lecture and 1 hour Discussion and Quiz**
Capacitors, Capacitance of a spherical capacitor (outer sphere earthed & inner sphere earthed)		3	**2 hours Lecture 1 hour PPT and Discussion**
Capacitance of a Parallel plate capacitor, Capacitance of a Parallel plate capacitor partially filled with a dielectric slab		3	**2 hours Lecture 1 hour PPT and Discussion**
Energy stored in a charged capacitor, Loss of energy on sharing of charges between two capacitors.		2	**2 hours Lecture and Discussion**
UNIT II GAUSS'S LAW AND ITS APPLICATIONS			
Gauss's Law , Electric Field due to a Uniformly charged sphere , Electric Filed due to an infinite plane sheet of charge		**4**	**3 hours lecture 1 hour Discussion and Quiz**
Coulomb's theorem, Mechanical force experienced by unit area of a charged conductor, Charged soap bubble		**4**	**3 hours lecture 1 hour Discussion and Quiz**
Electrical images – Applications (i). Surface density of charge at a point on a conducting plane (ii). Force of attraction between the charge and the conducting plane.		**4**	**3 hours lecture 1 hour Discussion and Quiz**
UNIT III ELECTROSTATIC INSTRUMENTS			
Kelvin's the attracted Disc or Absolute Electrometer		**4**	**2 hours lecture 1 hour Discussion and Quiz**
Measurement of Potential difference between two given points , Determination of Relative permittivity of a material(in the form of a parallel slab)		**4**	**2 hours lecture 1 hour Discussion and Quiz**

The Quadrant electrometer, Measurement of ionization current.	**4**	**2 hours lecture** **1 hour Discussion and Quiz**
UNIT IV ELECTRICAL MEASUREMENTS		
Kirchoff's laws, Wheatstone's network, Condition for balance	**4**	**3 hours lecture** **1 hour Discussion and PPT**
Carey Foster's Bridge – Potentiometer, Calibration of Ammeter	**4**	**3 hours lecture** **1 hour Discussion and PPT**
Calibration of voltmeter (Low range & High Range), Comparison of capacitance of two capacitors.	**4**	**3 hours lecture** **1 hour Discussion and PPT**
UNIT V THERMO ELECTRICITY		
Seebeck Effect, Measurement of thermo EMF using potentiometer	**4**	**2 hours lecture** **1 hour Discussion and PPT**
Peltier Effect , Thomson Effect	**2**	**1 hours lecture** **1 hour Discussion and PPT**
Thermodynamics of thermocouple (Expressions for Peltier & Thomson Coefficients), Thermoelectric diagram and its uses.	**4**	**3 hours lecture** **1 hour Discussion and PPT**

Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	3	3	3	3	4	3	4	4	3	3.4
CO2	4	3	3	3	3	4	3	4	3	3	3.3
CO3	3	4	3	3	4	3	4	4	3	4	3.5
CO4	4	3	3	3	4	4	3	3	3	3	3.3
CO5	3	4	4	3	4	3	3	4	3	3	3.4
Mean Overall Score											3.38

Result: The Score for this Course is 3.38 (High Relationship)

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$

Mean Overall Score of COs = $\frac{\text{Total of Mean scores}}{\text{Total No. of COs}}$

Programme : B.Sc. **Part III: Practical**
Semester : III & IV **Hours :2 Hrs/W , 30Hrs /S**

Sub. Code : U22CP6P **Credits : 2**

TITLE OF THE PAPER: MAJOR PRACTICAL – PAPER – II

Pedagogy	Hours	Lecture	Peer Teaching	GD/ Vedos/Tutorial	P
	2		-		2

PREAMBLE : This course is able to develop practical knowledge by applying the experimental methods to correlate with the Physics theory. 2. To learn the usage of electrical and optical systems for various measurements. 3. Apply the analytical techniques and graphical analysis to the experimental data. 4. To develop intellectual communication skills and discuss the basic principles of scientific concepts in a group.

COURSE OUTCOME At the end of the Semester, the Students will be able to		
CO1: apply the procedures and techniques for the experiments.		
CO2: use the different measuring devices and meters to record the data with precision .		
CO3: show the basic working condition of the experiment.		
CO3: apply the mathematical concepts/equations to obtain quantitative results.		
CO4: understand the standard value of the results and the applications.		
CO5:communicate scientific information in oral, written and graphical formats.		
CO6: develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results		
CO7: identify the basic concepts needed to develop a program		

LIST OF PRACTICALS

1. LCR Parallel resonance
2. BH determination – field coil
3. AC frequency - Sonometer
4. MG – figure of merit
5. B.G – figure of merit
6. BG – comparison of capacitances
7. Air wedge – Thickness of thin wire
8. Dispersive power of prism – spectrometer
9. Grating – normal incidence – spectrometer
10. Grating – minimum deviation – spectrometer
11. Boltzmann's constant
12. a) Program for temperature conversion -from °C to ºF or ºF to °C
    b) To find the solution of a quadratic equation (else-if ladder).
13. a) To find the largest of given three numbers (nested if else)
    b) To find the sum of digits of a given number (while)
14. a) To find the factorial of a given number (for)
    b) To sort the given numbers in ascending or descending order (1D – array)
15. a) To find the multiplication table (Do-While)
    b) To arrange a list of names in an Alphabetical order (string)

16. To reverse the digits of the given number
17. To find the grade of the students
18. To generate a electric bill

Reference Books

1. C.L. Arora, Practical physics, S. Chand Publication
2. B.L. Worsnop and H. T. Flint , Advanced Practical Physics, Asia Publishing House
3. A Textbook of Practical Physics, M.N.Srinivasan, S.Balasubramanian, R.Ranganathan S.Chand&Sons Publications
4. Programming in ANSI C - E.Balagurusamy, 6th Edition - Tata McGrawHill Education Pvt. Ltd.

Course designer: R. Vijayalakshmi Department of physics

Programme : B.Sc **Part III: CC**
Semester : IV **Hours : 4 P/W 60Hrs P/S**

Sub. Code : U22CP7 **Credits : 4**

TITLE OF THE PAPER: Mathematical Methods

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	2	1	-	1	-

PREAMBLE: Understand various approximation methods to find solution to problems which do not have exact solutions.

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
CO1:define the errors and root of equations	I	12
CO2: solve the problems using Matrices	II	12
CO3: interpret the interpolation	III	12
CO4: explain about numerical differentiation and integration	IV	12
CO5: solve the problems using differential equations	V	12

UNITS	**TOPIC**	**LECTURE HOURS**	**MODE OF TEACHING**
UNIT I	Errors and their computations – Absolute error - relative error	4	Lecture & Tutorial
	percentage error - General error formula - Bisection method	4	Lecture & Tutorial
	Method of False position - Newton Raphson method	4	Lecture & Tutorial
UNIT II	Introduction- Gauss-Elimination method- Gauss Jordan elimination method	4	Lecture & Tutorial
	Crout's method for finding the inverse method	4	Lecture & Tutorial
	Iterative Methods - Gauss Seidal Iteration method.	4	Lecture & Tutorial
UNIT III	Linear Interpolation – Gregory-Newton forward Interpolation formula	4	Lecture & Tutorial
	Gregory-Newton backward Interpolation formula	4	Lecture & Tutorial
	Lagrange's Interpolation – Inverse interpolation	4	Lecture & Tutorial
UNIT IV	Numerical differentiation – Newton's forward difference formula to get the derivative	4	Lecture & Tutorial
	Newton's backward difference formula to compute the derivative-	4	Lecture & Tutorial

	Numerical Integration		
	trapezoidal rule - Simpson's 1/3 and 3/8 rules	4	Lecture & Tutorial
UNIT V	Introduction-Euler's method - Improved Euler's method –.	4	Lecture & Tutorial
	Modified Euler's method – Runge-kutta methods (II,III and IVorder)	4	Lecture & Tutorial
	predictor corrector methods	4	Lecture & Tutorial

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	4	3	4	3	3	4	3	3	5	3.5
CO2	5	3	4	3	4	3	3	4	3	4	3.6
CO3	3	3	3	4	3	3	5	4	3	3	3.4
CO4	3	3	4	3	3	3	4	4	3	4	3.4
CO5	4	3	3	4	4	3	3	4	4	3	3.5
Mean Overall score											3.48

Result: The Score for this Course is 3.48 (High Relationship)

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score of COs = $\frac{\text{Total of Value}}{\text{Total No. of Pos\& PSOs}}$

Mean Overall Score of COs = $\frac{\text{Total of Mean Score}}{\text{Total No. of COs}}$

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
K1 (REMEMBERING/RECALLING)	30%	30%
K2 (UNDERSTANDING/COMPREHENSION)	40%	40%
K3 (APPLICATION and ANALYSIS)	30%	30%

Course Designers: Dr. M. Mahalakshmi & Dr. G.Selvarani , Department of physics

Programme: B.Sc. **Part III: NME**

Semester : VI **Hours : 2 Hrs/W 30 Hrs /S**
Sub. Code : U22NMP2 **Credits: 2**

TITLE OF THE PAPER: SOLAR ENERGY AND ITS APPLICATIONS

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	2	1	1	-----	----

Preamble:
The scope of this course is to understand the importance of SOLAR ENERGY

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
CO1: Understand the importance of sun , composition ,layers .	1	6 Hrs
CO2: Know the difference of renewable energy sources and non-renewable energy sources	2	6 Hrs
CO3: know the working of solar heater and solar drier	3	6 Hrs
CO4: Know the working of solar cooker and solar pond.	4	6 Hrs
CO5: know the uses of solar energy	5	6 Hrs

SYLLABUS

UNIT : I SUN

Sun - composition of sun – basic parameters of sun – layers of sun – fusion in sun – black spots – solar flares – solar wind – solar radiations.

UNIT : II ENERGY

Non - renewable energy sources – non-renewable energy sources – solar energy – wind energy – Bio mass energy

UNIT : III SOLAR HEATER & DRIER

Solar water heaters – Types of water heaters – construction, working, efficiency, advantages and disadvantages of flat plate collector. Solar drier – types of driers – construction, working efficiency, advantages and disadvantages of integrated solar drier.

UNIT : IV SOLAR COOKER AND SOLAR PONDS

Solar cooker – types of cookers – construction, working, efficiency, advantages and disadvantages of dish type cooker –Solar ponds- types of ponds- construction, working, efficiency, advantages and disadvantages of non-convecting solar pond.

UNIT : V APPLICATIONS OF SOLAR ENERGY

Solar refrigerator - construction, working,efficiency, advantages and disadvantages of solar refrigerator – solar photovoltaic cell - construction, working, efficiency, advantages and disadvantages of solar photovoltaic cell – solar toys – solar caps – solar mobile chargers – solar torches – solar lanterns – solar garden lights – solar street lights – solar traffic signals – solar fountains – solar pumps.

Text Book:

Energy Physics by Dr. R.V.Jebha Rajasekhar., Eden publication, Nov 2009 Edition, Madurai.

Reference:

Non Conventional energy Sources – G.D.Rai, Fifth edition (April 2011) Khanna Publisher

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT 1 : SUN			
	Introduction to sun, composition	2	**1 hour Lecture** **1 hour Discussion**
	Layers, fusion and fission	2	**1 hours Lecture** **1 hour Discussion**
	Solar flares, solar wind and its radiation	2	**1 hour Lecture**
UNIT II : RENEWABLE AND NON-RENEWABLE ENERGY SOURCES			
	Introduction to Energy Sources	**2**	**1 hour lecture** **1 hour Discussion**
	Introduction to Renewable energy sources	**2**	**1 hour lecture** **1 hour Discussion**
	Introduction to non-renewable energy sources	**2**	**1 hour lecture** **1 hour Discussion**
UNIT III : SOLAR HEATER AND SOLAR DRIER			
	Construction, Working , advantages and disadvantages of solar heater	**3**	**2 hour lecture** **1 hour Discussion**
	Construction, Working , advantages and disadvantages of solar drier	**3**	**2 hour lecture** **1 hour Discussion**
UNIT IV : SOLAR COOKER AND SOLAR POND			
	Construction, Working , advantages and disadvantages of solar cooker	**3**	**2 hour lecture** **1 hour Discussion**
	Construction, Working , advantages and disadvantages of solar pond	**3**	**2 hour lecture** **1 hour Discussion**
UNIT V : APPLICATIONS OF SOLAR ENERGY			
	Construction, Working , advantages and disadvantages of solar refrigerator.	**2**	**1 hours lecture** **1 hour Discussion**
	Construction, Working , advantages and disadvantages of solar photovoltaic cells.	**2**	**1 hour lecture** **1 hour Discussion**
	Uses of Solar Energy	**2**	**2 hour lecture**

Course Outcomes	Programme Outcomes (POs)	Programme Specific Outcomes (PSOs)	Mean scores of

(Cos)	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Cos
CO1	3	3	3	3	4	3	3	4	4	3	3.3
CO2	3	3	3	3	4	4	3	4	3	4	3.4
CO3	3	4	4	3	3	3	4	4	3	4	3.5
CO4	4	3	4	3	3	3	3	3	4	3	3.3
CO5	4	4	3	3	3	3	3	4	3	3	3.3
Mean Overall Score											3.36

Result: The Score for this Course is 3.36 (High Relationship)

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$

Mean Overall Score of COs = $\frac{\text{Total of Mean scores}}{\text{Total No. of COs}}$

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
K1 (REMEMBERING/RECALLING)	40%	40%
K2 (UNDERSTANDING/COMPREHENSION)	30%	30%
K3 (APPLICATION and ANALYSIS)	30%	30%

Course Designers:
V. SATHYABAMA

Programme : B.Sc., Physics **Part III : Skill Based Paper- 3**
Semester : IV **Hours : 2 P/W 30 Hrs/SEM**

Sub. Code : U22SEP1 **Credits : 2**

TITLE OF THE PAPER : ASTROPHYSICS

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/Tutorial	ICT
	2	1	-	1	-

Preamble: The course is designed to provide students of physics their first pedagogical introduction to the Universe. The students are expected to understand the fundamentals, principles, physical concepts and recent developments in the Astrophysics area. To attain an advanced level of understanding of a topic of contemporary astrophysics and develop the power of appreciations, the achievements in Astrophysics and role in nature and society for the sustenance of prosperous earth atmosphere

COURSE OUTCOME On the successful completion of the course students will able to	Unit	30 Hrs P/ S
CO1: describe the features of objects in the Solar system giving details of similarities and differences between these objects. Understand the fundamental concepts of the celestial sphere comets, asteroids, meteors, galaxies and motion of planets.	1	6
CO2: understand the elements and types of telescopes and know the importance and features of Spectrograph	2	6
CO3 : study classification of stars and Hertzsprung - Russel diagram for population of stars, understand absolute, apparent luminosity and their measurement and black holes	3	6
CO4 : study the properties of Sun, Solar Atmosphereand Solar activity	4	6
CO5 : study structure and characteristics of the Earth, Understand the relations between the Moon and earth and Know the effects of sun, moon and earth	5	6

Unit I : EXPLORING THE SKY

Celestial sphere – Kepler's laws of planetary motion – Newton's Laws of Gravitation –Asteroids-Comets-Meteors–-Types of Galaxies:(Spiral –Elliptical – barred spiral galaxies, irregular galaxies, Lenticular galaxies etc.,– Milky Way Galaxy)

Unit II : OBSERVATIONAL ASTRONOMY

Elements of telescope –Radio telescope -The Hubble Space Telescope -James webb space telescope-Spectrograph

Unit III : THE STARS

Classification of Stars –Hertzprung-Russel Diagram-Magnitude of star - Luminosity of a Star –Stellar distance –Black holes

Unit IV: SOLAR PHYSICS

Sun – Physical properties – Solar Atmosphere:(Core – Nuclear Reactions –Photosphere – Chromosphere – Corona - Sunspots) -Solar Cycle–solar activity: (Solar Wind– solar prominences – solar flares)

Unit V: THE EARTH AND LUNAR PHYSICS

Structure of earth–Characteristics of earth –Magnetosphere–Auroras, space-weather effects - The cycles of the moon - The phases of the moon – Types of tide-Relation Between Moon Phases & Tides – Lunar eclipses – Solar eclipses.

Text Book

A. Mujiber Rahman, Concepts toAstrophysics,SciTechPublications, Chennai

UNIT I:1.2, 1.7, 1.8, 1.9, 1.10, 1.11, 5.2, 5.3
https://en.wikipedia.org/wiki/Galaxy
https://www.britannica.com/science/galaxy

UNIT II: 2.5, 2.8,2.9
https://en.wikipedia.org/wiki/Hubble_Space_Telescope
https://www.nasa.gov/mission_pages/hubble/main/index.html

UNIT III :4.1,4.2,4.3,4.7
https://en.wikipedia.org/wiki/Apparent_magnitude
https://www.space.com/30417-parallax.html

UNIT IV:3.1,3.2, 3.3,3,4, 3.5, 3.8, 3.10,3.11
https://en.wikipedia.org/wiki/Solar_cycle
http://solar system.nasa.gov

UNIT V: 3.9,3.12
https://en.wikipedia.org/wiki/Structure_of_Earth
https://www.school-for-champions.com/astronomy/earth.htm
https://en.wikipedia.org/wiki/Magnetosphere
https://en.wikipedia.org/wiki/Lunar_phase
https://moon.nasa.gov/moon-in-motion/moon-phases
https://www.ldisd.net/cms/lib5/TX01817232/Centricity/Domain/218/Moons%20Phases%20and%20Tides%20notes.pdf
https://www.britannica.com/story/what-causes-lunar-and-solar-eclipses

References

1. Carrol and Ostlie, 2007, Introduction to Modern Astrophysics, 2nd Pearson International.
2. Astrophysics-Stars and galaxies – K.D.Abhyankar, 1992 Tata McGraw Hill Publishing, New Delhi.
3. Universe – William J. Kaufmann- 4th Edition,1994.

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT 1: EXPLORING THE SKY (6 Hours)			
Celestial sphere, Kepler's laws of planetary motion, Newton's Laws of Gravitation		3	2 hours Lecture 1 hour ICT and Discussion
Asteroids-Comets-Meteors		1	1 hour Lecture
Types of Galaxies: (Spiral – Elliptical – barred spiral galaxies, irregular galaxies,Lenticular galaxies etc.,– Milky Way Galaxy)		2	1 hours lecture 1 hour ICT and Discussion
UNIT II : OBSERVATIONAL ASTRONOMY (6 Hours)			
Elements of telescope, Radio telescope, The Hubble Space Telescope		4	3 hours lecture 1 hour ICT and Discussion
James webb space telescope Spectrograph		2	1 hour lecture 1 hour ICT and Discussion
UNIT III : THE STARS (6 Hours)			
Classification of Stars, Hertzprung-Russel, Diagram Magnitude of star - Luminosity of a Star		4	3 hours lecture 1 hour ICT and Discussion
Stellar distance, Black holes		2	1 hour lecture 1 hour ICT and Discussion
UNIT IV : SOLAR PHYSICS (6 Hours)			
Sun – Physical properties		2	1 hour lecture 1 hour Discussion and ICT
Solar Atmosphere:(Core – Nuclear Reactions – Photosphere – Chromosphere – Corona - Sunspots)		2	1 hour lecture 1 hour Discussion and ICT
Solar Cycle, solar activity: (Solar Wind– solar prominences – solar flares)		2	1 hour lecture 1 hour Discussion and ICT
UNIT V : THE EARTH AND LUNAR PHYSICS (6 Hours)			
Structure of earth–Characteristics of earth – The phases of the moon		2	1 hour lecture 1 hour Discussion and ICT
Magnetosphere–Auroras, space-weather effects - The cycles of the moon		2	1 hour lecture 1 hour Discussion and ICT
Types of tide-Relation Between Moon Phases & Tides – Lunar eclipses – Solar eclipses		2	1 hour lecture 1 hour Discussion and ICT

Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	3	3	3	3	4	3	3	4	4	3.4
CO2	4	3	3	3	3	4	3	3	4	3	3.3
CO3	4	3	3	4	3	4	3	4	3	4	3.5
CO4	4	3	3	4	3	4	3	3	3	3	3.3
CO5	4	3	3	4	3	3	3	3	4	4	3.4
Mean Overall Score											3.38

Result: The Score for this Course is 3.38 (High Relationship)

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$

Mean Overall Score of COs = $\frac{\text{Total of Mean scores}}{\text{Total No. of COs}}$

ASSESSMENT RUBRICS

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
K1 (REMEMBERING/RECALLING)	30%	30%
K2 (UNDERSTANDING/COMPREHENSION)	40%	40%
K3 (APPLICATION and ANALYSIS)	30%	30%

Course Designer: Dr. A.BEULAH MARY , Dr. P. N. NIRMALA & Dr.P. INDRA DEVI, Assistant Professors

Programme : B.Sc | **Part III: Core**
Semester : V | **Hours : 5 P/W, 75 Hrs P/S**
Sub. Code : U22CP8 | **Credits: 5**

TITLE OF THE PAPER : ANALOG ELECTRONICS

Pedagogy	Hours	Lecture	Peer Teaching	GD/ Videos/Tutorial	ICT
	5	3	-	1	1

PREAMBLE: To provide the students depth knowledge about various network theorems, characteristics and applications of semiconductor diodes, working of Transistor, multivibrator, oscillator, Operational amplifier and FET and their applications

COURSE OUTCOME At the end of the Semester, the Students will be able to	**Unit**	**Hrs P/S**
CO 1:understand Kirchhoff's Laws and various network theorems and describe the function of various diodes and their applications	I	15
CO 2: distinguish between BJT and FET and able to explain the working of Transistor amplifiers	II	15
CO 3:describe the working of various types of amplifiers	III	15
CO 4: explain the working of different types of oscillators and multivibrators	IV	15
CO 5: explain the characteristics and application of operational amplifier	V	15

SYLLABUS

Unit I :NETWORK THEOREMS AND SEMICONDUCTOR DIODES:

Kirchhoff's Laws - Kirchhoff's current law- - Kirchhoff's voltage law Thevenin's Theorem Procedure for applying Thevenin's Theorem- Norton's Theorem- Procedure for applying Norton's Theorem-Superposition Theorem- Maximum power transfer theorem-Application of the Maximum power transfer theorem- V-I Characteristic of a PN junction Diode – forward characteristic – Reverse characteristic – Diode current equation – Zener Diode- Reverse characteristics of a Zener Diode – Zener Diode Application – Light Emitting Diode(LED) - Applications

Unit II: BIPOLAR JUCTIONTRANSISTORS AND FET :

Transistor Biasing- Operation of an NPN and PNP Transistors – BJT Circuit Configurations – characteristics of a Transistor in a Common base Configuration– Input and Output Characteristics – characteristics of a Transistor in a Common Emitter Configuration– Input and Output Characteristics - Transistor as an Amplifier – Common Emitter Transistor Amplifier - junction field effect transistor- Operation of JFET – Characteristics of JFET- Drain and Transfer Characteristics – JFET Parameters – Comparision between JFET and BJT

UNIT-III – TRANSISTOR AMPLIFIERS:

The h parameters of a linear circuit- Determination and meaning of h parameters- determination and meaning of a linear circuit- The h parameters notation for transistors- hybrid equivalent circuit for

common emitter transistor-RC Coupled amplifier-calculation of voltage gain for RC Coupled amplifier-classification of power amplifiers- class A amplifier- class B amplifier- characteristics of class C amplifier.

UNIT-IV: OSCILLATORS AND MULTIVIBRATORS:

Principle of feedback - Advantages and Disadvantages of negative feedback – Sinusoidal Oscillators –Comparison Between an Amplifier and an Oscillators - Classification of Oscillators - The Barkhausen Criterion - Hartley Oscillator- Colpitts Oscillators – Phase shift Oscillators – Multivibrators – types-Astable Multivibrators- Monostable Multivibrators .

UNIT- V: OPERATIONAL AMPLIFIER

Operational amplifier- Block diagram- Characteristics – slew rate – open loop operation – closed loop operation – virtual ground – inverting Operational amplifier – summing amplifier – subtracting amplifier –Op amp integrator - Op amp differentiator– Logarithmic amplifiers–Non inverting Operational amplifier– Voltage follower.

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TEXT BOOKS :

1. A Text Book of Applied Electronics- Dr.R.S.SEDHA- S.CHAND & Company Pvt . Ltd. Reprint 2015.
Unit – I: Chapter 5: 5.1-5.11, Chapter 12: 12.1-12.5, Chapter 13: 13.1-13.3,13.6,13.21,13.23
Unit –II: Chapter14: 14.7-14.9, Chapter15:15.2,15.3,15.5-15.8, Chapter24: 24.3,24.4, Chapter 16: 16.2-16.7,16.9,16.11,16.13
Unit –III:Chapter 25,26&27 (sec 25.1-25.3,25.6-25.8,26.4,26.5,27.6,27.7,27.12,27.26)
Unit–IV:Chapter 29,31&32: 29.1-29.3,31.1-31.3,31.9,31.14,31.15,31.26,32.6-32.8,32.11.
2.BASIC ELECTRONICS – G.JOSE ROBIN & A.UBALDRAJ, Indira Publication First Edition:May 2005.
Unit– V :Chapter 4: Page No: 227-255.

BOOKS FOR REFERENCE :

1. Basic Electronics Solid State - B.L. Theraja, IV Edition S. Chand & Co., 1989
2. Principles of Electronics - V.K. Mehta, S.Chand& Co., Ltd., Reprint, 1993.
3. Elements of Solid state electronics -A.Ambrose&VincentDevaraj,MeraPublication,IV Edition,1993
4. Hand Book of Electronics-Gupta S.L, Kumar V, -20th edition- Pragati Prakashan Publications.
5.Electronic Devices and Circuits-S.Salivahanan,secondedition,TataMcgraw Hill Publications,2011

WebResources:

1. https://amiestudycircle.com/free-samples%5Crecruitment%5Ctheory%5Ctheory-basic-circuits-network-theorems.pdf
2. https://www.brainkart.com/article/Configuration-of-Transistor-Circuit--CB,-CE,-CC-configuration-Input-and-Output-Characteristics_12528/
3. https://www.electrical4u.com/what-is-an-oscillator/
4. https://electronicscoach.com/multivibrator.html
5. https://www.electronicshub.org/power-amplifier/
6. https://en.wikipedia.org/wiki/Operational_amplifier

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT I	Kirchhoff's Laws - Kirchhoff's current law- - Kirchhoff's voltage law Thevenin's TheoremProcedure for applying Thevenin's Theorem	5	Lecture ,Groupdiscussion,ICT
	Norton's Theorem- Procedure for applying Norton's Theorem- Superposition Theorem- Maximum power transfer theorem-Application of the Maximum power transfer theorem	5	Lecture ,Group discussion, Assignment
	V-I Characterstic of a PN junction Diode – forward characteristic – Reverse characteristic – Diode current equation – Zener Diode- Reverse characteristics of a Zener Diode – Zener Diode Application – Light Emitting Diode(LED) - Applications .	5	Lecture ,Group discussion, ICT
UNIT II	Transistor Biasing- Operation of an NPN and PNP Transistors – BJT Circuit Configurations – characteristics of a Transistor in a Common base Configuration– Input and Output Characteristics —	5	Lecture ,Group discussion, Assignment
	characteristics of a Transistor in a Common Emitter Configuration– Input and Output Characteristics - Transistor as an Amplifier Common Emitter Transistor Amplifier -	5	Lecture ,Group discussion,ICT
	junction field effect transistor- Operation of JFET – Characterstics of JFET- Drain and Transfer Characteristics – JFET Parameters – Comparision between JFET and BJT	5	Lecture &ICT and Group Discussion
UNIT III	The h parameters of a linear circuit- Determination and meaning of h parameters- determination and meaning of a linear circuit- The h parameters notation for transistors- hybrid equivalent circuit for common emitter transistor	5	Lecture &Group Discussion
	RC Coupled amplifier-calculation of voltage gain for RC Coupled amplifier	4	Lecture ,ICT&Group Discussion

	classification of power amplifiers- class A amplifier- class B amplifier- characteristics of class C amplifier.	6	Lecture ,GroupDiscussion,Assignment
UNIT IV	Principle of feedback - Advantages and Disadvantages of negative feedback – Sinusoidal Oscillators – Comparison Between an Amplifier and an Oscillators	5	Lecture ,ICT&Group Discussion
	Classification of Oscillators - The Barkhausen Criterion - Hartley Oscillator- Colpitts Oscillators – Phase shift Oscillators.	6	Lecture ,ICT&Group Discussion
	Multivibrators–types-Astable Multivibrators-Monostable Multivibrators	4	Lecture ,ICT & Assignment
UNIT V	Operational amplifier- Block diagram- Characteristics – slew rate – open loop operation – closed loop operation – virtual ground – inverting Operational amplifier – summing amplifier	7	Lecture ,ICT&Group Discussion
	subtracting amplifier –Op amp integrator - Op amp differentiator– Logarithmic amplifiers–Non inverting Operational amplifier– Voltage follower.	8	Lecture ,ICT&Group Discussion

Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	4	4	3	4	4	4	3	4	4	3.7
CO2	4	4	3	4	4	4	4	3	4	4	3.6
CO3	4	4	4	3	4	4	3	4	4	4	3.8
CO4	4	3	4	3	4	4	3	4	4	4	3.7
CO5	4	4	3	4	4	4	4	3	4	4	3.8
Mean Overall Score											3.72

Result: The Score for this Course is 3.72 (High Relationship)

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score of COs = $\frac{\text{Total Values}}{\text{Total No. of Pos \& PSOs}}$

Mean Overall Score of COs = $\frac{\text{Total of Mean scores}}{\text{Total No. of COs}}$

ASSESSMENT RUBRICS

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
K1 (REMEMBERING/RECALLING)	30%	30%
K2 (UNDERSTANDING/COMPREHENSION)	30%	30%
K3 (APPLICATION and ANALYSIS)	40%	40%

Course Designer:
1.DR.N.NAGARANI
2.DR.G.KRISHNA BAMA

Programme : B.Sc., PHYSICS **Part III: MAJOR Core**
Semester : V **Hours : 5 P/W , 75 Hrs P/S**
Sub. Code : U22CP9 **Credits : 5**

TITLE OF THE PAPER: ATOMIC PHYSICS

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	5	2	--	2	1

PREAMBLE:
To provide an introductory account about the atomic structure and the impact of X-rays.
Acquire knowledge in spectral analysis.
Understand and apply the properties of X-rays in medical fields and the Photo Electric Devices with their performance.

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
CO1: Explain the Atom Model and the Quantum Number associated with the Vector Atom Model.	**I**	**15**
CO2:Explain the properties of positive rays and analyze the presence of positive rays by Thomson's parabola method. To able to solve the problem in Mass Spectrograph.	**II**	**15**
CO3: Summarize the free electron theory of metals, to classify the solids on the basis of band theory.	**III**	**15**
CO4:Explain the various types of Coupling scheme and to define the effect of Normal and Zeeman Effect.	**IV**	**15**
CO5:Study the production, properties, absorption and characteristics of X-rays sspectra and to solve problems using Moseley's law . Examine and understand the process of scattering of X-rays by light elements (Compton effect). Demonstrate and describe the photoelectric effect and to list the performance and applications of photoelectric devices. Formulate the Einstein's light quanta hypothesis.	**V**	**15**

SYLLABUS

Unit I: ATOMIC STRUCTURE:
Introduction-Rutherford 's Experiments on Scattering of Alpha Particles-Drawbacks-Theory of Alpha Particle Scattering (Relationship Between b and θ) - Bohr Atom model (only Basic Postulates and Explanation) –Bohr's Interpretation of the Hydrogen Spectrum- Spectral Series of Hydrogen Atom -Ritz Combination Principle and Correspondence Principle (only Statement) -The Vector Atom Model – Quantum Numbers Associated with the Vector Atom Model — the Pauli's Exclusion Principle - Some Examples of Electronic Configuration.

Unit II:POSITIVE RAYS:
Introduction –Discovery – Properties - Analysis – Thomson's Parabola Method - Bainbridge's Mass Spectrograph –Mass Defect and Packing Fraction.

Unit III: BAND THEORY OF SOLIDS:
Introduction- The Free Electron Theory of Metals – Expressions for Electrical Conductivity – Wiedman- Franz's Law (Statement) - Electron Microscope – Band Theory of Solids – Classification of Solids on the Basis of Band Theory - Millikan's Oil Drop Method.

Unit IV: FINE STRUCTURE OF SPECTRAL LINES:

Introduction - Coupling Schemes-L-S Coupling-j-j Coupling - Magnetic Dipole Moment due to Orbital Motion of the Electron- due to Spin of the Electron -Stern and Gerlach Experiment - Optical Spectra- Spectral terms- Spectral Notation- Selection Rules- Intensity Rules- Interval Rule- Fine Structure of Sodium D line –Normal Zeeman Effect, Larmor's Theorem, Anomalous Zeeman Effect, Paschen–Bach Effect and Stark Effect" (Statement and brief explanation).

Unit V: X-Rays and Photo Electric Effect:

Introduction- Production of X-rays – Properties- Absorption of X-rays - Bragg's law – Bragg's X-ray Spectrometer – The Powder Crystal Method –X-ray Spectra- Main Features of Continuous X- Ray Spectrum - Characteristic X-ray Spectrum - Moseley's Law (Statement)– Compton Scattering (No experimental verification).

Photo Electric Effect: Introduction- Einstein's Photo Electric Equation – Photo Electric Cells- Photo Emissive Cells-Photo Voltaic Cells-Photo Conductive Cells-Applications of Photoelectric Cells.

Text Book :

1. Modern Physics by R. Murugeshan, Kiruthiga Sivaprasath, S. Chand & Co., NewDelhi-55, 14th Revised Multicolor Edition **2008**.

Unit I:). **Chapter 6 :** (**Sec:** 6.1 - 6.4, 6.7, 6.12, 6.13, 6.15 & 6.17).

Unit II: **Chapter 5 :** (**Sec:** 5.1 - 5.3, 5.5 & 5.7).
Unit III: **Chapter 4 :** (**Sec:** 4.1 -4.3 &4.5 – 4.7).

Unit IV: **Chapter 6 :** (**Sec:** 6.14, 6.18 – 6.20, 6.22 – 6.24 & 6.26 - 6.28).
Unit V: **Chapter 7 & 8 :** (**Sec:** 7.1, 7.2, 7.4, 7.6 - 7.8 and 7.11 - 7.14) AND (8.5&8.6)

Reference Books:

1. Modern Physics by D.L.Sehgal, K.L.Chopra and N.K.Sehgal. Sultan Chand & Sons Publication, 7th Edition, NewDelhi**(1991).**

2. Atomic Physics by J.B. Rajam, S. Chand & Co., 20thEdition, New Delhi, **(2004).**

3. Atomic and Nuclear Physics by N. Subrahmanyam and BrijLal, S. Chand & Co. 5th Edition, NewDelhi **(2000).**

4. Concepts of Modern Physics by A. Beiser, Tata McGraw-Hill, New Delhi **(1997).**

5 . Fundamentals of Physics by D. Halliday, R.Resnick and J. Walker, Wiley, 6thEdition, New York **(2001).**

6 . Modern Physics byB L Theraja-S Chand & Company Ltd 15th edition **(1990)**

7. Atomic and Nuclear Physics -by Dr. W W Kulkarni, Himalayan Publishing House, 1st Edition **(2004).**

Web Reference:

a. **https**://opentextbc.ca
b. https://byjus.com
c. https://youtu.be/vEwjwUxWokQ

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT I	Introduction - Rutherford's Experiments on Scattering of Alpha Particles-Drawbacks - Theory of Alpha Particle Scattering (Relationship Between b and θ)	**4**	Motivation by asking questions – peer group discussion and by lecturing through ICT (power point presentation).
	Bohr Atom model (only Basic Postulates and Explanation) – Bohr's Interpretation of theHydrogen Spectrum-Spectral Series of Hydrogen Atom - Ritz Combination Principle and Correspondence Principle (onlyStatement)	**3**	Lecturing and by group discussion.
	The Vector Atom Model	**4**	Peer group discussion and by framing questions.
	Quantum Numbers Associated with the Vector Atom Model — the Pauli's Exclusion Principle - Some Examples of Electronic Configuration.	**4**	Lecturing with discussion and deriving the expression.
UNIT II	Introduction – Discovery – Properties	**5**	Lecture
	Analysis – Thomson's Parabola Method	**5**	Lecturing, deriving the expression for E/M.
	Bainbridge's Mass Spectrograph –Mass Defect and Packing Fraction.	**5**	Lecturing with ICT and solving the problem.
	Introduction- The Free Electron Theory of Metals – Expressions for Electrical **C**onductivity-	**5**	Lecturing with group discussion

	Wiedman- Franz's Law (Statement) - Electron Microscope		
UNIT III	Band Theory of Solids – Classification of Solids on the Basis of BandTheory	**5**	Seminar and given problem for solving.
	Millikan's Oil Drop Method.	**5**	Lecture
UNIT IV	Introduction - Coupling Schemes - L-S Coupling - j-j Coupling - Magnetic Dipole Moment due to Orbital Motion of the Electron- due to Spin of the Electron -Stern and Gerlach Experiment.	**5**	ICT
	Optical Spectra - Spectral terms - Spectral Notation- Selection Rules- Intensity Rules- Interval Rule- Fine Structure of Sodium D line	**5**	ICT
	Normal Zeeman Effect , Larmor's Theorem, Anomalous Zeeman Effect, Paschen – Bach Effect and StarkEffect (Statement and brief explanation).	**5**	Explaining
UNIT V	Introduction - Production of X-rays – Properties - Absorption of X-rays - Bragg's law – Bragg's X-ray Spectrometer – The Powder Crystal Method.	**5**	Seminar with ICT.
	X-ray Spectra - Main Features of Continuous X-Ray Spectrum - Characteristic X-ray Spectrum - Moseley's Law (Statement)– Compton Scattering (No experimental verification)	**5**	Seminar with ICT and solving the problem.
	Introduction -	**5**	Seminar with ICT.

	Einstein's Photo Electric Equation – Photo Electric Cells- Photo Emissive Cells- Photo Voltaic Cells- Photo Conductive Cells - Applications of Photoelectric Cells.		

Course Outcomes (COs)	**Programme Outcomes (POS)**					**Programme Specific Outcomes (PSOs)**					**Mean scores of Cos**
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	4	3	4	3	3	4	4	3	3	3.3
CO2	3	4	4	4	3	3	3	3	3	4	4.0
CO3	3	4	3	3	3	4	3	4	3	3	3.3
CO4	3	4	3	4	3	4	3	4	3	4	3.5
CO5	4	4	4	4	4	4	4	4	4	4	4.0
Mean Overall Score											3.62

Result: The Score for this Course is **3.62** (High Relationship)

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High
Mean Score of COs = Total of Value / Total No. of POS& PSOs			Mean Overall Score of COs = Total of Mean Score / Total No. of Cos		

BLOOM'S TAXANOMY	**INTERNAL**	**EXTERNAL**
K1: REMEMBERING/ RECALLING.	30%	30%
K2: UNDERSTANDING/ COMPREHENSION.	30%	30%
K3: APPLICATION AND ANALYSIS.	40%	40%

Course Designer : **Dr. Mrs. SANTHI. M** Department of physics

Programme : B.Sc. PHYSICS **Part III: CC**
Semester : V **Hours :5 P/W 75 HrP/S**
Sub. Code : U22CP10 **Credits : 5**

TITLE OF THE PAPER: CLASSICAL, STATISTICAL AND QUANTUM MECHANICS

Pedagogy	Hours	Lecture	Peer Teaching	GD/ Videos/Tutorial	ICT
	5	3	-	1	1

PREAMBLE: This course is essential to formulate and solve classical mechanics problems using Lagrangian and Hamiltonian methods. Evolution of wave mechanics and Schrodinger equation. To learn statistical interpretation of thermodynamics.

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
CO1: define the basic concepts in classical mechanics.	I	15
CO2: apply classical approach to some of the physical systems.	II	15
CO3: know the basics of wave mechanics.	III	15
CO4: understand thermodynamic probability andclassicalstatistics.	IV	15
CO5: explain quantum statistics and differentiate it from classical statistics.	V	15

SYLLABUS

UNIT I:MechanicsofaSystemofParticles

External and internal forces - centre of mass - Conservation of linear momentum – Conservation ofAngularmomentum – Conservation ofenergy-work-energytheorem – Conservativeforces – examples- Degreeoffreedom-GeneralizedCoordinates(transformationequations) - Constraints-Typesofconstraints-Examples.

UNIT II :Lagrangianand HamiltonianFormulations

Principle of virtual work - D'Alembert's principle -Lagrange's equation of motion for conservative and non-conservative systems –Simple applications- simple pendulum-Atwood's machine –compound pendulum –Hamiltonian function H- Hamilton's Canonical equation of motion –Applications-Harmonic oscillator-Planetary motion-Compound pendulum.

UNIT III : Wave Mechanics

Matter waves – Phase velocity – Group velocity – Relation between phase velocity andgroup velocity – Heisenberg's uncertainty principle - Applications of uncertainty principle (Non existence of electron in the nucleus, Ground state energy and the radius of the hydrogen atom) -Schrodinger's equation - Properties of the wave function– Simple applications– Free particle solution – The particle in a box.

UNIT IV : ClassicalStatistics

Micro and macro states-Thermo dynamical probability (Definition)-The mu-space and gamma space-fundamental postulates of statistical mechanics – Ensembles-different types-comparison of ensembles - Boltzmann's theorem of entropy and probability-Maxwell-Boltzmann statistics-Maxwell-Boltzmann energy distributive law in general form and energy distribution function for an ideal gas.

UNIT V: Quantum Statistics

Development of Quantum statistics- Bose- Einstein and Fermi-Dirac statistics- Bose-

Einstein distribution law- Derivation of Planck's radiation formula from Bose–Einstein statistics – Fermi-Dirac distribution law - Free electrons inmetal-Fermi gas- comparison of three statistics - Difference between classical and quantum statistics.

BOOKS FOR STUDY:

1. Classical Mechanics - J.C.Upadhyaya, HimalayaPublishing House,Mumbai, Reprint July 2005.
Unit I: Ch. 1,2 & 3 (1.7.1-1.7.3, 1.7.5, 1.7.8(a), 2.2, 2.3, 2.3.1-2.3.3)
Unit II: Ch.2 &3 (2.5-2.7, 2.8, Ex 2,3,5, 3.4, 3.5, 3.7 (1,2,4)

2. Heat&Thermodynamics, Brijlal&Subramaniam,S.Chand&CompanyLtd., Reprint1998.
Unit IV: Ch. 9,10 & 11(9.7, 9.8, 10.5,10.8, 10.10 (1-3),10.11,10.15, 11.3)
Unit V: Ch. 12 (12.2, 12.5, 12.7, 12.8, 12.9, 12.15, 12.16)

3. Modern Physics, R. Murugeshan, Kiruthiga Sivaprasath, 18th Edition, S.Chand & Co. Pvt. Ltd., 2016,
Unit III: Ch. 7 &8 (7.2,7.2.3,7.2.4,7.2.5,7.5,7.5.2 (Ex 2&3),8.1,8.11,8.2,8.3)

REFERENCE:

1. Classical Mechanics, Gupta,B.D., Satyaprakash, 1991, 9thed.,KadernathRamnathPubl., Meerut
2. Classical Mechanics, Gupta Kumar &Sharma,2005, PragatiPrakashanPubl., Meerut.

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT I	External and internal forces, centre of mass, Conservation of linear momentum, Conservation of angular momentum.	5	Lecture, G.D & ICT
	Conservation of energy,work-energy theorem, Conservative forces,examples, Degree of freedom.	5	Lecture,G.D& ICT
	Generalized coordinates (transformation equations), Constraints, Types of constraints, Examples.	5	Lecture & ICT
UNIT II	Principle of virtual work, D'Alembert's principle, Lagrange's equation of motion for conservative and non-conservative systems.	5	Lecture,G.D& ICT
	Simple applications, simple pendulum, Atwood's machine, compound pendulum, Hamiltonian function H.	5	Lecture,G.D& ICT
	Hamilton's Canonical equation of motion, Applications, Harmonic oscillator, Planetary motion, Compound pendulum.	5	Lecture,G.D& ICT
UNIT III	Matter waves, Phase velocity, Group velocity, Relation between phase velocity and group velocity, Properties of wave function.	5	Lecture, G.D & ICT
	Heisenberg's uncertainty principle - Applications of uncertainty principle (Non existence of electron in the nucleus, Ground state energy and the radius of the hydrogen atom).	5	Lecture,G.D& ICT

	Schrodinger's equation, Simple applications– Free particle solution – The particle in a box.	5	Lecture,G.D& ICT
UNIT IV	Micro and macro states, Thermo dynamical probability (Definition), The mu-space and gamma space.	5	Lecture, G.D & ICT
	Fundamental postulates of statistical mechanics, ensembles, different types, comparison of ensembles, Boltzmann's theorem of entropy and probability.	5	Lecture,G.D& ICT
	Maxwell-Boltzmann energy distributive law in general form and energy distribution function for an ideal gas.	5	Lecture, G.D & ICT
UNIT V	Development of Quantum statistics, Bose- Einstein and Fermi Dirac statistics, Bose-Einstein distribution law.	5	Lecture, G.D & ICT
	Derivation of Planck's radiation formula from Bose–Einstein statistics, Fermi-Dirac distribution law.	5	Lecture, G.D & ICT
	Free electrons in metal from Fermi gas, comparison of three statistics, Difference between classical and quantum statistics.	5	Lecture, G.D & ICT

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	4	3	4	3	3	4	3	3	5	3.5
CO2	5	3	4	3	4	3	3	4	3	4	3.6
CO3	3	3	3	4	3	3	5	4	3	3	3.4
CO4	3	3	4	3	3	3	4	4	3	4	3.4
CO5	4	3	3	4	4	3	3	4	4	3	3.5
Mean Overall score											3.48

Result: The Score for this Course is 3.48 (High Relationship)

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score of COs = $\frac{\text{Total of Value}}{\text{Total No. of Pos\& PSOs}}$

Mean Overall Score of COs = $\frac{\text{Total of Mean Score}}{\text{Total No. of COs}}$

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
K1(Remembering / Recalling)	30%	30%
K2 Understanding / comprehension	30%	30%
K3 Application and analysis	40%	40%

Course Designer:R. Vijayalakshmi, Department of Physics

Programme : B.Sc. PHYSICS **Part III: DSEC I**
Semester : V **Hours : 5P/W 75Hrs P/S**
Sub. Code : U22DSP1A **Credits :5**

TITLE OF THE PAPER: MEDICAL PHYSICS

Pedagogy	Hours	Lecture	Peer Teaching	GD/Videos/Tutorial	ICT
	5	3	-	1	1

PREAMBLE: To know the parts of biomedical instruments.To understand the use of them in the recording system and physiological assist devices.

COURSE OUTCOME At the end of the Semester, the students will be able to	Unit	Hrs P/S
CO1 : list the electrode material and types of electrodes	I	15
CO2 : mention active and passive transducers	II	15
CO3 : explain the characteristics of the recording system	III	15
CO4 : discuss about the diagnostic instruments	IV	15
CO5: understand the working of medical equipments	V	15

SYLLABUS

UNIT I: **BIOPOTENTIAL AND ELECTRODES**

Transport of ions through cell membranes - Resting and action potentials – Design of medical instruments - Component of biomedical instrument systems – Electrodes - Half cell potential - Electrode paste - Electrode material -Types of electrodes - Micro electrodes (metal micro electrodes) - Depth and needle electrodes - Surface electrodes.

UNIT II:TRANSDUCERS

Active transducers–magnetic induction type – piezo electrictype –photovoltaic type - thermoelectric type - Passive transducer- resistive type–loading effect and sensitivity of a bridge –inductive transducer- linear variable differential transducer(LVDT).

UNIT III: BIO POTENTIAL RECORDERS

Electro Cardio Grapy (ECG) – origin of cardiac action potential – lead Configurations-recording setup – practical considerations – Analysis of recorded signals - Electro Encephalography (EEG) – brain waves - recording set up – Electromyography (EMG) - recording set up – determination of condition velocities in motor nerves- Electroretinography(ERG).

UNIT IV: DIAGNOSTIC INSTRUMENTS

Blood flow meters - (Electromagnetic blood flow meter, ultrasonic blood flow meter, Recording fetal heart movements and blood circulation using Doppler ultrasonic method) - Gas analysers: (infra red gas analysers, para magnetic oxygen analyser only).

UNIT V: MEDICAL EQUIPMENTS

X-ray machine – radiography and fluoroscopy – angiography – applications of X-ray examination – radiation safety instrumentation –nuclear imaging techniques – computer tomography (CT) – applications of computer tomography –magnetic resonance imaging – MRI instrumentation – Positron Emission Tomography (PET).

BOOK:

1. Bio Medical Instrumentation, Dr. M.Arumugam , Edition II ,McGraw Hill, 1994.
Unit – I : **Ch. 1&2** (Sec. 1.4., 1.5., 2.2.-2.4., 2.4.1. -2.4.7).
Unit – II: **Ch. 2** (Sec. 2.5.,2.5.1 - 2.5.8., 2.5.14., 2.5.15).
Unit – III: **Ch. 4** (Sec. 4.3.,4.3.1.-4.3.5.,4.4.,4.4.2.,4.4.4.,4.4.5.,4.5.,4.5.1.,4.5.2.,4.6.,4.7).
Unit – IV : **Ch. 6** (Sec. 6.10.,6.10.1.,6.10.2.((i),(ii),b),6.13.,6.13.1.,6.13.2).
Unit – V :**Ch. 7, 9 & 10** (Sec.7.9., 7.10., 7.12., 7.13., 9.2., 10.6., 10.7., 10.10.8., 10.11.)
REFERENCE:
Handbook of Biomedical Instrumentation – R.S.Khandpur – Second Edition,McGraw Hill.

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT I	Transport of ions through cell membranes, Resting and action potentials, Design of medical instruments.	5	Lecture , Video & ICT
	Component of biomedical instrument systems, Electrodes , Half cell potential, Electrode paste, Electrode material.	5	Lecture , Video & ICT
	Types of electrodes, Micro electrodes (metal micro electrodes), Depth and needle electrodes , Surface electrodes.	5	Lecture , Video & ICT
UNIT II	Active transducers, magnetic induction type, piezoelectric type, photovoltaic type.	5	Lecture , Video & ICT
	thermoelectric type, Passive transducer, resistive type, loading effect and sensitivity of a bridge.	5	Lecture , Video & ICT
	inductive transducer, linear variable differential transducer(LVDT).	5	Lecture , Video & ICT
UNIT III	Electro Cardio Grapy (ECG), origin of cardiac action potential, lead Configurations, recording setup, practical considerations.	5	Lecture , Video & ICT
	Analysis of recorded signals - Electro Encephalography (EEG) , brain waves, recording set up.	5	Lecture , Video & ICT
	Electromyography (EMG), recording set up, determination of condition velocities in motor nerves, Electroretinography (ERG) - Accuracy of recorders.	5	Lecture , Video & ICT
UNIT IV	Blood flow meters -Electromagnetic blood flow meter	5	Lecture , Video & ICT
	ultrasonic blood flow meter, Recording fetal heart movements and blood circulation using Doppler ultrasonic method	5	Lecture , Video & ICT
	Gas analysers: (infra red gas analysers, para magnetic oxygen analyser only)	5	Lecture , Video & ICT
UNIT V	X-ray machine – radiography and fluoroscopy – angiography – applications of X-ray examination – radiation safety instrumentation	5	Lecture , Video & ICT
	nuclear imaging techniques – computer tomography (CT) – applications of computer tomography	5	Lecture , Video & ICT

	magnetic resonance imaging – MRI instrumentation – Positron Emission Tomography (PET)	5	Lecture , Video & ICT

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	3	3	4	4	4	3	3	3	4	3.4
CO2	3	4	3	4	3	4	3	3	3	4	3.4
CO3	3	3	4	4	4	4	3	3	3	4	3.5
CO4	3	3	3	4	3	4	3	3	3	4	3.3
CO5	3	3	3	4	3	4	3	3	3	4	3.3
Mean Overall Score											3.38

Result: The Score for this Course is 3.38 (High Relationship)

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High
Mean Score of COs = Total of Value / Total No. of POs& PSOs			Mean Overall Score of COs = Total of Mean Score / Total No. of COs		

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
K1 (Remembering / Recalling)	30%	30%
K2 (Understanding / comprehension)	30%	30%
K3 (Application and analysis)	40%	40%

Course Designer: G.Selvarani, Department of Physics

Programme : B.Sc. PHYSICS **Part III: DSEC I**
Semester : V **Hours : 5P/W 75Hrs P/S**
Sub. Code : U22DSP1B **Credits :5**

TITLE OF THE PAPER:RADIATION SAFETY

Pedagogy	Hours	Lecture	Peer Teaching	GD/Videos/Tutorial	ICT
	5	3	-	1	1

PREAMBLE: To understand the basics of atomic and nuclear physics. To study the types of radiators, monitoring devices and radiation safety management. To understand the use of them in medicines and food industries.

COURSE OUTCOME At the end of the Semester, the students will be able to	Unit	Hrs P/S
CO1 : understand the basics of atomic and nuclear physics	1	15
CO2 : list the types of radiation and its interaction with matter	2	15
CO3 : discuss different radiators and monitoring devices	3	15
CO4 : specify the radiation safety management	4	15
CO5:study the use of radiators in medicines and industries	5	15

SYLLABUS

UNIT I: BASICS OF ATOMIC AND NUCLEAR PHYSICS

Basic concept of atomic structure- X rays characteristic and production- concept of bremsstrahlung and auger electron-The composition of nucleus and its properties- mass number- isotopes of element- spin, binding energy- stable and unstable isotopes- law of radioactive decay- Mean life and half life- basic concept of alpha, beta and gamma decay- concept of cross section and kinematics of nuclear reactions- types of nuclear reaction- Fusion- fission.

UNIT II: INTERACTION OF RADIATION WITH MATTER

Types of Radiation: Alpha, Beta, Gamma and Neutron and their sources- sealed and unsealed sources-Interaction of Photons -Photo-electric effect- Compton Scattering- Pair Production- Linear and Mass -Attenuation Coefficients- Interaction of Charged Particles: Heavy charged particles- Beth-Bloch Formula- Scaling laws- Mass Stopping Power- Range- Straggling- Channeling and Cherenkov radiation-Beta Particles- Collision and Radiation loss(Bremsstrahlung)- Interaction of Neutrons- Collision-slowing down and Moderation.

UNIT III: RADIATION DETECTION AND MONITORING DEVICES

Radiation Quantities and Units:Basic idea of different units of activity- KERMA- exposure-absorbed dose-equivalent dose- effective dose- collective equivalent dose- Annual Limit of Intake (ALI) and derived Air Conentration (DAC)- Radiation detection: Basic concept and working principle of gas detectors (Ionization Chambers, Proportional Counter,Multi-Wire Proportional Counters (MWPC) and Gieger Muller Counter)- Scintillation Detectors (Inorganic and Organic Scintillators)- Solid States Detectors and NeutronDetectors-Thermo luminescent Dosimetry.

UNIT IV: RADIATION SAFETY MANAGEMENT

Biological effects of ionizing radiation- Operational limits and basics of radiation hazards-evaluation and control- radiation protection standards- International Commission on Radiological Protection (ICRP) principles- justification-optimization- limitation- introduction of safety and risk management of radiation- Nuclear waste and disposal management- Brief idea about Accelerator driven Sub-critical system (ADS) for waste management.

UNIT V: APPLICATION OF NUCLEAR TECHNIQUES

Application in medical science (e.g., MRI, PET, Projection Imaging Gamma Camera, radiation therapy)- Archaeology- Art, Crime detection, Mining and oil- Industrial Uses: Tracing- Gauging-

Material Modification-Sterilization- Food preservation.

BOOKS FOR STUDY:

1. Nuclear and Particle Physics - W.E. Burcham and M. Jobes – Longman,1995.

2. An Introduction to Radiation Protection - A.Martin and S.A.Harbisor, John Willey & Sons, Inc. New York, 1981.

3. Fundamental Physics of Radiology - W.J.Meredith and J.B.Massey, John Wright and Sons, UK, 1989.

REFERENCE:

1. Thermoluninescense Dosimetry - Mcknlay, A.F., Bristol, Adam Hilger
2. Radiation detection and measurements - G.F.Knoll.
3. Medical Radiation Physics Year Book - W.R. Hendee,Medical Publishers Inc. London, 1981
4.Handbook of Biomedical Instrumentation – R.S.Khandpur – Second Edition,McGraw Hill.

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT I	Basic concept of atomic structure- X rays characteristic and production- concept of Bremsstrahlung and auger electron	5	Lecture , Video & ICT
	The composition of nucleus and its properties- mass number- isotopes of element- spin, binding energy- stable and unstable isotopes- law of radioactive decay	5	Lecture , Video & ICT
	Mean life and half life- basic concept of alpha, beta and gamma decay- concept of cross section and kinematics of nuclear reactions- types of nuclear reaction- Fusion- fission.	5	Lecture , Video & ICT
UNIT II	Types of Radiation: Alpha, Beta, Gamma and Neutron and their sources- sealed and unsealed sources-Interaction of Photons -Photo-electric effect	5	Lecture , Video & ICT
	Compton Scattering- Pair Production- Linear and Mass -Attenuation Coefficients- Interaction of Charged Particles: Heavy charged particles- Beth-Bloch Formula- Scaling laws- Mass Stopping Power- Range- Straggling	5	Lecture , Video & ICT
	Channeling and Cherenkov radiation- Beta Particles- Collision and Radiation loss(Bremsstrahlung)- Interaction of Neutrons- Collision- slowing down and Moderation.	5	Lecture , Video & ICT
UNIT III	Radiation Quantities and Units:Basic idea of different units of activity- KERMA- exposure- absorbed dose-equivalent dose- effective dose- collective equivalent dose	5	Lecture , Video & ICT
	Annual Limit of Intake (ALI) and derived Air Conentration (DAC)- Radiation detection: Basic concept and working principle of gas detectors (Ionization Chambers, Proportional Counter	5	Lecture , Video & ICT

	Multi-Wire Proportional Counters (MWPC) and Gieger Muller Counter)- Scintillation Detectors (Inorganic and Organic Scintillators)- Solid States Detectors and NeutronDetectors-Thermo luminescent Dosimetry.	5	Lecture , Video & ICT
UNIT IV	Biological effects of ionizing radiation- Operational limits and basics of radiation hazards- evaluation and control- radiation protection standards	5	Lecture , Video & ICT
	International Commission on Radiological Protection (ICRP) principles- justification- optimization- limitation- introduction of safety and risk management of radiation	5	Lecture , Video & ICT
	Nuclear waste and disposal management- Brief idea about Accelerator driven Sub-critical system (ADS) for waste management.	5	Lecture , Video & ICT
UNIT V	Application in medical science (e.g., MRI, PET, Projection Imaging Gamma Camera, radiation therapy)	5	Lecture , Video & ICT
	Archaeology- Art, Crime detection, Mining and oil	5	Lecture , Video & ICT
	Industrial Uses: Tracing- Gauging- Material Modification-Sterilization- Food preservation.	5	Lecture , Video & ICT

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	3	3	4	4	4	3	3	3	4	3.4
CO2	3	4	3	4	3	4	3	3	3	4	3.4
CO3	3	3	4	4	4	4	3	3	3	4	3.5
CO4	3	3	3	4	3	4	3	3	3	4	3.3
CO5	3	3	3	4	3	4	3	3	3	4	3.3
Mean Overall Score											3.38

Result: The Score for this Course is 3.38 (High Relationship)

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High
Mean Score of COs = Total of Value / Total No. of POs& PSOs			Mean Overall Score of COs = Total of Mean Score / Total No. of COs		

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
K1 (Remembering / Recalling)	30%	30%
K2 (Understanding / comprehension)	30%	30%
K3 (Application and analysis)	40%	40%

Course Designer: R.Vijayalakshmi & G.Selvarani, Department of Physics

Programme : B.Sc., PHYSICS **Part III: GEN.SKILL PAPER**

Semester : V **Hours : 2 Hrs P/W 30Hrs P/S**
Sub. Code : U22GEP1 **Credits : 2**

TITLE OF THE PAPER : PHYSICS OF THE EARTH

Pedagogy per unit	Hours	Lecture	Peer Discussion/Teaching	GD/VIDOES/TUTORIAL	ICT
	2	1	1/2	1/2	1

PREAMBLE: To understand the physical structure and behavior of the earth as well as geomagnetic properties of rocks in the Earth's crust.

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COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
CO1: To describe the Important physical parameters and properties of the planet earth	I	6 hrs
CO2: Impart the knowledge of understanding Gravitational attraction, Gravitational Theory	II	6 hrs
CO3 Analyse the Thermal history of the Earth.	III	6 hrs
C04 To understand the Elastic constants and Elastic process in the earth.	IV	6 hrs
CO5 To understand the Theory of earth's magnetic field.	V	6 hrs

SYLLABUS

UNIT – I: SOLAR SYSTEM

The earth and the solar system – Important physical parameters and properties of the planet earth; Stress and Strain, Wave and motion, Seismic waves. Travel time Tables and Velocity – Depth curves – Variation of Density within the Earth.

UNIT – II: GRAVITATION

Rotation of the Earth - Gravitational attraction, Gravitational Theory, Measurements of Gravity, Gravity meters - Principles and method of measuring gravity - Gravity anomalies-Local and regional variations.

UNIT – III: THERMAL HISTORY OF EARTH

Thermal history of the Earth. Temperature in the Primitive Earth and the Earth's surface and interior. Thermal conductivity. Generation of heat in the Earth. Heat flow measurements,

UNIT – IV ELASTIC PROPERTIES

Elastic constants and Elastic process in the earth. Earth's free rotation. Latitude variation. Tides of the Solid earth. Numerical values of Love's numbers. Rigidity of the Earth. Bulk modules in the earth. Poisson's ratio in the Earth, Young's modulus and Lame's constant.

UNIT – V: GEOMAGNETISM AND PALAEOMAGNETISM

Geomagnetism and palaeomagnetism-Earth's magnetic field. Origin-Theory of earth's magnetic field. Magneto hydrodymics of the Earth. Magnetic reversals. Polar wandering. Tectonic movements and its relation to palaeomagnetism - Measurement of magnetic properties of rocks.

BOOKS FOR REFERENCE

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
Unit I	**The earth and the solar system – Important physical parameters and properties of the planet earth; Stress and Strain,.**	**3 hrs**	Motivation by asking questions – peer group discussion and by demonstrating through ICT.
	Wave and motion, Seismic waves. Travel time Tables and Velocity – Depth curves – Variation of Density within the Earth	**3 hrs**	Lecture & Tutorial
Unit II	**Rotation of the Earth - Gravitational attraction, Gravitational Theory, Measurements of Gravity, Gravity meters –**	**3 hrs**	Motivation by asking questions – peer group discussion and by demonstrating through ICT.
	Rotation of the Earth - Gravitational attraction, Gravitational Theory, Measurements of Gravity, Gravity meters - Principles and method of measuring gravity - Gravity anomalies- Local and regional	**3 hrs**	Lecture & Tutorial

	variations		
Unit III	**Thermal history of the Earth. Temperature in the Primitive Earth and the Earth's surface and interior.,**	**3 hrs**	Motivation by asking questions – peer group discussion and by demonstrating through ICT.
	. Thermal onductivity. Generation of heat in the Earth. Heat flow measurements,	**3 hrs**	Lecture & Tutorial
Unit IV	**Elastic constants and Elastic process in the earth. Earth's free rotation. Latitude variation. Tides of the Solid earth. Numerical values of Love's numbers. Rigidity of the Earth. Bulk modules in the earth. Poisson's ratio in the Earth, Young's modulus and Lame's constant.**	**6 hrs**	Motivation by asking questions – peer group discussion and by demonstrating through ICT.
Unit V	**Geomagnetism and palaeomagnetism-Earth's magnetic field. Origin-Theory of earth's magnetic field. Magneto hydrodymics of the Earth. Magnetic reversals. Polar wandering. Tectonic movements and its relation to palaeomagnetism - Measurement of magnetic properties of rocks.**	**6 hrs**	Motivation by asking questions – peer group discussion and by demonstrating through ICT.

Course Outcomes (COs)	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean scores of Cos**
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	4	3	3	3	3	4	4	3	3	3.3
CO2	3	3	4	4	3	3	3	3	3	4	3.3
CO3	3	4	3	3	3	4	3	4	3	3	3.3

CO4	3	3	3	4	3	4	3	4	3	3	3.3
CO5	4	3	4	4	4	3	4	4	4	3	4.0
Mean Overall Score											3.5

Result: The Score for this Course is **3.5** (High Relationship)

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score of COs = Total of Value / Total No. of POs & PSOs

Mean Overall Score of COs = Total of Mean Score / Total No. of COs

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
K1:REMEMBERING/RECALLING.	20%	20%
K2:UNDERSTANDING / COMPREHENSION.	20%	20%
K3:APPLICATION AND ANALYSIS.	30%	30%
K4:SYNTHESIS AND EVALUATION.	30%	30%

Course Designer :**Dr. Mrs. SAROJA** Department of PHYSICS

Programme : B.Sc. **Part IV: SKILL BASED**
Semester : V **Hours : 2 P/W 30 Hrs P/S**
Sub. Code : U22SEP2 **Credits : 2**

TITLE OF THE PAPER: PROGRAMMING WITH C

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	2	1	1	-	-

PREAMBLE: To understand thebasics and concepts involved in programming language. To emphasize logical thinking and to develop programming skill.

COURSE OUTCOME At the end of the semester, the students will be able to	Unit	Hrs P/S
CO1: define the basics of programming language	I	6
CO2: understand the concept of input and output operations	II	6
CO3: describe decision making and branching	III	6
CO4: discuss the use decision making and looping	IV	6
CO5: describe arrays and strings	V	6

SYLLABUS

Unit I : CONSTANTS, VARIABLES, DATA TYPES AND OPERATORS

Basic structure of C Program - Character Set – C tokens-Keywords and identifiers, Constants, Variables, Data types - Declaration of Variables - Assigning values to variables -Defining Symbolic Constants - Arithmetic Operators - Relational, Logical, Assignment, Increment and Decrement, and Conditional operators - Arithmetic Expressions - Precedence of Arithmetic operators

Unit II: MANAGING INPUT AND OUTPUT OPERATIONS

Managing input and output Operations- Reading a character-Writing a character- Formatted input-formatted output.

Unit III : DECISION MAKING AND BRANCHING

Decision making with IF statement- Simple IF, IF-ELSEstatements - ELSE - IF Ladder - Switch statement.

Unit IV : DECISION MAKING AND LOOPING

Introduction - WHILE, DO and FOR Statements - Jumps in Loops.

Unit V : ARRAYS AND STRINGS

Arrays - One dimension & Two dimensions - Declaration and initialization of one and two dimensional arrays -Declaring and initializing string variables - String handling functions.

LIST OF PROGRAMS

1 Program for temperature conversion - From °C to °F or °Fto °C or to use any scientific formula – Simple type.

2 To reverse the digits of the given number.

3 To find the solution of a quadratic equation (Else-if ladder).

4 To find the largest of given three numbers (Nested if else)

5 To find the grade of the students (Switch statement)

6 To find the sum of digits of a given number (While)

7 To find the multiplication table (Do - While)

8 To find the factorial of a given number (For)

9 To sort the given numbers in ascending or descending order (1D – Array)

10 To find addition and subtraction of matrices (2D – Array)

TEXT BOOK:

1. Programming in ANSI C - E.Balagurusamy, 6th Edition - Tata Mc GrawHill Education Pvt. Ltd.

Unit – I : **Ch. 1**(Sec.1.8. Ch. 2 – 2.2. – 2.6., 2.10.,2.11.)
Unit – II :**Ch. 3**(Sec. 3.1. – 3.7., 3.10. , 3.12. , Ch. 4 – 4.2. – 4.5.)
Unit – III :**Ch.5**(Sec. 5.1.- 5.4. , 5.6. – 5.9.)
Unit – IV :**Ch.6**(Sec. 6.1. – 6.5.)
Unit – V :**Ch.7& 8**(Sec. 7.1. – 7.6., 8.3., 8.4.,8.8.)

REFERENCE BOOKS :

1.Programming Language C with Practicals - AnanthiSheshasaayee& G.Sheshasaayee, Edition - 2001 (2nd Print)
2.Programming in C – KamthaneAshok.N, 2nd Edition – 2013, Pearson Education
3.Programming in C - P. RadhaGanesan& S.Ramasamy – Edition - 2004, Scitech Publications

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT I	Basic structure of C Program - Character Set – C tokens-Keywords and identifiers, Constants, Variables, Data types - Declaration of Variables - Assigning values to variables -Defining Symbolic Constants	2	Lecture , peer teaching
	Declaration of Variables - Assigning values to variables -Defining Symbolic Constants 1 Program for temperature conversion - From °C to °F or °Fto °C or to use any scientific formula – Simple type. 2 To reverse the digits of the given number.	2	Lecture , peer teaching
	Arithmetic Operators - Relational, Logical, Assignment, Increment and Decrement, and	2	Lecture , peer teaching

	Conditional operators - Arithmetic Expressions - Precedence of Arithmetic operators		
UNIT II	Managing input and output Operations	2	Lecture , peer teaching
	Reading a character-Writing a character	2	Lecture , peer teaching
	Formatted input- formatted output	2	Lecture , peer teaching
UNIT III	Decision making with IF statement- Simple IF	2	Lecture , peer teaching
	IF-ELSEstatements	2	Lecture , peer teaching
	ELSE - IF Ladder - Switch statement 1 To find the solution of a quadratic equation (Else-if ladder). 2 To find the largest of given three numbers (Nested if else)	2	Lecture , peer teaching
UNIT IV	Introduction – WHILE statement 1 To find the grade of the students (Switch statement) 2 To find the sum of digits of a given number (While)	2	Lecture , peer teaching
	DO and FOR Statements 1 To find the multiplication table (Do - While) 2 To find the factorial of a given number (For)	2	Lecture , peer teaching
	Jumps in Loops	2	Lecture , peer teaching
UNIT V	Arrays - One dimension & Two dimensions	2	Lecture , peer teaching
	Declaration and initialization of one and two dimensional arrays. 1 To sort the given numbers in ascending or descending order (1D – Array) 2 To find addition and subtraction of matrices (2D – Array)	2	Lecture , peer teaching
	Declaring and initializing string variables - String handling functions.	2	Lecture , peer teaching

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean scores of Cos
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	
CO1	3	3	3	3	4	4	3	3	3	4	3.3
CO2	3	4	3	3	3	4	3	3	3	4	3.3
CO3	3	3	4	3	4	4	3	3	3	4	3.4
CO4	3	3	3	3	3	4	3	3	3	4	3.2
CO5	3	3	3	3	3	4	3	3	3	4	3.2
Mean Overall Score											3.28

Result: The Score for this Course is 3.28 (High Relationship)

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High
Mean Score of COs = Total of Value / Total No. of POs & PSOs			Mean Overall Score of COs = Total of Mean Score / Total No. of COs		

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
K1 – Remembering/Recalling	30%	30%
K2 – Understanding /Comprehension	30%	30%
K3 – Application and Analysis	40%	40%

Course Designer: Dr.M.Mahalakshmi & Dr.G.Selvarani Department of Physics

Programme : B. Sc., PHYSICS **Part III: Core paper**
Semester : V **Hours : 6 P/W 90 Hrs P/S**
Sub. Code : U22CP11P **Credits : 3**
TITLE OF THE PAPER: PHYSICS PRACTICAL - III

Pedagogy	Hours	Demonstration and practical sessions	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	3+3	3+3	-	-	-

PREAMBLE: The purpose of the course is to make the students to apply the physics concepts studied in mechanics, electricity, electromagnetism and optics.

COURSE OUTCOME

At the end of the Semester, the Students will be able to

CO1 : Understand the theoretical concepts by doing experiments
CO2 : Familiarize with microscope, spectrometer and ballistic galvanometer
CO3 : Understand the application side of the experiment
CO4 : Study the spectral and optical properties of the given materials.
CO5 : Improve the practical skills and knowledge.

S.NO	EXPERIMENT
1.	CALIBRATION OF LOW RANGE AMMETER USING B.G.
2.	DETERMINE THE ABSOLUTE VALUE OF **C** USING B.G. .
3.	DETERMINE THE SELF INDUCTANCE OF THE COIL BY MAXWELL'S BRIDGE.
4.	DETERMINE THE SELF INDUCTANCE OF THE COIL BY ANDERSON'S BRIDGE.
5.	DETERMINE THE YOUNG'S MODULUS OF THE MATERIAL BY SUBJECTING IT TO NON-UNIFORM BENDING BY KOINEG'S METHOD.
6.	DETERMINE THE RADIUS OF CURVATURE OF THE CONVEX LENS BY NEWTON'S RING METHOD.
7.	DETERMINE THE REFRACTIVE INDEX OF WATER BY NEWTON'S RING METHOD.
8.	DETERMINE THE REFRACTIVE INDEX OF GLASS BY NEWTON'S RING METHOD
10.	DETERMINE THE CAUCHY'S CONSTANT BY SPECTROMETER.
11.	i-d curve BY SPECTROMETER.
12	I-I' CURVE BY SPECTROMETER.
13	DETERMINE THE RESOLVING POWER OF THE PRISM BY SPECTROMETER.

Programme : B.Sc **Part III: Core**

Semester : VI **Hours : 4 P/W 60 Hrs P/S**

Sub. Code : U22CP12 **Credits : 4**

TITLE OF THE PAPER: DIGITAL ELECTRONICS AND COMMUNICATION

Pedagogy	Hours	Lecture	Peer Teaching	GD/ Vedos/Tutorial	ICT
	4	2	-	1	1

PREAMBLE to understand the fundamental knowledge of digital principles namely the number systems, basic and universal logic circuits, working of multivibrators and flipflops and application of operational amplifier

COURSE OUTCOME At the end of the Semester, the students will be able to	**Unit**	**Hrs P/S**
CO 1: define the different types of number systems and enhance their skills in conversion of number systems	I	12
CO 2: explain the basic and universal logic gates and relates the truth tables	II	12
CO 3: simplify the logic expressions using Boolean laws and Kmap	III	12
CO 4understand the working of multivibrators and flipflops	IV	12
CO 5: describe the principle and types of modulation	V	12

SYLLABUS

UNIT- I: NUMBER SYSTEM

Number systems-Binary-Decimal conversion-binary addition- 1's and 2's complement – (subtraction only) double complement -binary multiplication-octal numbers-Decimal to octal-Hexa decimal numbers-Binary coded decimals

UNIT- II: LOGIC GATES AND BOOLEAN ALGEBRA

Digital circuits-Logic gate-Binary concept-Positive logic and negative logic system-Basic logic gates-AND, OR, NOT gates -Characteristics of logic gate-NOR, NAND, Exclusive OR gate - Boolean algebra-De-Morgan's laws -universal building block.

UNIT- III: KARNAUGH MAP AND BINARY ADDERS

Two variable map-Three variable map-Four Variable map-Minterm-Maxterm-Truth table from Karnaugh map- Don't care conditions- Product -of-sums simplifications - Half adder-Full adder-Encoder-Decimal-to-BCD Encoder-Decoders-BCD-to-decimal decoder.

UNIT- IV: TIMER AND FLIP FLOP

555 Timer-Monostable Multivibrator-Astablemultivibrator-Frequency divider-Logic gate flip flop-R-S flip flop-Clocked R-S Flip flop-J-K flip flop-J-K master slave flip flop-D-flip flop-T-Flip flop.

UNIT-V- MODULATION AND DEMODULATION

Modulation – Types – Amplitude Modulation – Modulated power output – Frequency Modulation – Expression for frequency modulated voltage – FM Receiver – Transmission of Radio waves – AM Receiver – Characteristic of a receiver – Demodulation – FM Transmitter- PAM- PCM PFM -PTM - PPM - PWM.

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1. ANALOG ELECTRONICS AND DIGITAL ELECTRONICS – G.JOSE ROBIN &A.UBALDRAJ, Indira Publication First Edition: May 2003.
UNIT: I Chapter 10 : (10.01-10.19)
UNIT: II Chapter 11A & 11B ; 11.01-11.1711.28-11.39,\
UNIT: III Chapter 7C &8 : Page No : 389-408 421-425 438-442
UNIT: IV Chapter 9 : Page No: 454-478

2. ANALOG ELECTRONICS AND DIGITAL ELECTRONICS – G.JOSE ROBIN & A.UBALDRAJ, Indira Publication First Edition: May 2008.
UNIT-V : Chapter 5 : Page No : 249-262, 264-275, 279-280
3.Electronic Communications- Dennis Roddy, John Coolen - Fourth Edition - PEARSON
UNIT 5: Chapter 11

REFERENCE BOOKS:
1. Elements of Solid state electronics - A. Ambrose & Vincent Devaraj, Mera Publication, IV Edition,1993
2. Digital Principles and Applications- Albert Paul Malvino&Donald P. Leach Tata Mc Graw Hill Publishing Ltd., sevenh Edition ,2011
3. Digital Electronics -G.K.KHARATE, OXFORD University press 2017

4. Digital Fundamentals - V VIJAYENDRAN,S.Viswanathan Pvt.Ltd.,2012

5. Hand Book of Electronics- -Gupta S.L, Kumar V, 20th edition- Pragati Prakashan Publications.

WebResourses:
1. https://www.cuemath.com/numbers/number-systems/
2. https://www.researchgate.net/publication/343361651_Chapter_Two_Logic_Gates
3. https://www.electronicsforu.com/technology-trends/learn-electronics/flip-flop-rs-jk-t-d
4. https://www.toppr.com/guides/physics/communication-systems/modulation-and-demodulation/
5. https://www.javatpoint.com/simplification-of-boolean-expressions-using-karnaugh-map
6. https://www.electronicsforu.com/technology-trends/learn-electronics/555-timer-working-specifications

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT I	Number systems-Binary-Decimal conversion-binary addition-	4	Lecture ,Group discussion ICT
	1's and 2's complement – (subtraction only) double complement -binary multiplication-	4	Lecture ICT and,Assignment
	octal numbers-Decimal to octal-Hexadecimal numbers-Binary coded decimals	4	Lecture , Group discussion and Assignment
UNIT II	Digital circuits-Logic gate-Binary	4	Lecture and ICT Assignment

	concept-Positive logic and negative logic system-Basic logic gates-AND, OR, NOT gates -		
	Characteristics of logic gate-NOR, NAND, Exclusive OR gate -	4	Lecture , Group discussion and ICT
	Boolean algebra-De-Morgan's laws - universal building block.	4	Lecture ,ICTand Assignment
UNIT III	Two variable map-Three variable map-Four Variable map-Minterm-Maxterm-Truth table from Karnaugh map- Don't care conditions- Product -of-sums simplifications -	4	Lecture ,ICTand Assignment
	Minterm-Maxterm-Truth table from Karnaugh map- Don't care conditions- Product -of-sums simplifications -	4	Lecture , ICT and Assignment
	Half adder-Full adder- Encoder-Decimal-to-BCD Encoder-Decoders-BCD-to-decimal decoder.	4	Lecture ICTand Seminar
UNIT IV	555 Timer-Monostable Multivibrator-Astablemultivibrator-Frequency divider-	6	Lecture & ICT
	Logic gate flip flop-R-S flip flop-Clocked R-S Flip flop-J-K flip flop-J-K master slave flip flop-D-flip flop-T-Flip flop.	6	Lecture & ICT
UNIT V	Modulation – Types – Amplitude Modulation – Modulated power output – Frequency Modulation – Expression for frequency modulated voltage – FM Receiver – Transmission of Radio waves	6	Lecture & ICT
	AM Receiver – Characteristic of a receiver – Demodulation – FM Transmitter- PAM- PCM PFM -PTM - PPM - PWM. .	6	Lecture , ICT& Group Discussion

Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	4	3	4	4	4	3	4	4	4	3.9
CO2	4	3	4	3	4	4	3	4	4	4	3.7
CO3	4	4	4	4	3	4	3	4	4	4	3.8
CO4	4	3	4	3	4	4	4	3	3	4	3.6
CO5	4	4	3	3	4	4	3	4	4	4	3.7
Mean Overall Score											3.74

Result: The Score for this Course is 3.74 (High Relationship)

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score of COs = $\frac{\text{Total Values}}{\text{Total No. of Pos \& PSOs}}$

Mean Overall Score of COs = $\frac{\text{Total of Mean scores}}{\text{Total No. of COs}}$

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
K1 (REMEMBERING/RECALLING)	30%	30%
K2 (UNDERSTANDING/COMPREHENSION)	30%	30%
K3 (APPLICATION and ANALYSIS)	40%	40%

Course Designers:
1.DR.N.NAGARANI
2.DR.G.KRISHNA BAMA

Programme : B.Sc **Part III: Core**
Semester : VI **Hours : 4 P/W 60 Hrs P/S**
Sub. Code : U22CP13 **Credits : 4**

TITLE OF THE PAPER: SOLID STATE PHYSICS

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	4	2	1		1

PREAMBLE:

- To promote an understanding of the basics of crystallography
- To develop an understanding of the unique properties and characteristics of conductivity, superconductivity, magnetic and dielectric based materials.
- To acquaint the student with their types and applications.

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
CO 1: Conceptually explain the classification schemes that are used to categorize engineering materials and describe how and why defects in materials greatly affect engineering properties and limit their use in service	1	12
CO 2: understand concisely and effectively resistivity and conductivity using basic relations, gain important conceptual and operational understanding of different types of conduction materials	2	12
CO3 : Complete understanding about magnetic materials and superconductors, their basic theories, types and applications.	3	12
CO4 : Acquaint complete knowledge of dielectric materials, with their types and applications.	4	12
CO5 : Acquire knowledge of biomaterials,ceramics and nano materials, with their preparation and applications.	5	12

SYLLABUS

UNIT I: ELEMENTARY CRYSTALLOGRAPHY

Different types of chemical bonds (Ionic, Covalent, Metallic, Dispersion, dipole and Hydrogen bond) – Crystal structure (sc, bcc, fcc, hcp-upto packing factor) – Crystal imperfections – Point defects – Line defects – Surface defects – Volume defects

UNIT II: CONDUCTING MATERIALS

Introduction – Atomic interpretation of ohm's law – Relaxation time & electrical conductivity –Electrical and thermal conductivity – Different types of conduction materials: Low resistivity conducting materials (properties, examples) – High resistivity conducting materials (properties examples)

UNIT-III : MAGNETIC MATERIALS &SUPER CONDUCTING MATERIALS

Hysteresis – Explanation of Hysteresis cure on the basis of domain theory- Hard and soft materials – Applications of Soft magnetic materials - Applications of hard magnetic materials (different types of hard magnetic materials)

Introduction – Explanation of the occurrence of Super conductivity (BCS theory) – general properties of super conductors – Types of super conductors (Type I & Type II) Applications of superconductor.

UNIT-IV : DIELECTRIC MATERIALS

Dielectrics – Fundamental definitions in dielectrics – Various polarization mechanisms in dielectrics – Internal field (Clausius – Mosotti relation)- Dielectric breakdown.

UNIT – V : MODERN MATRIALS

Biomaterials- metals and alloys- polymers- ceramics-applications-nanometerials- synthesis – applications.

TEXT BOOKS:

UNIT I: 2.3,3.6,3.9,3.9.1,3.9.3,3.9.4, Material Science : Dr. M. Arumugam, 3rd revised edition,Reprint 2010. Anuradha Publications.

UNIT II: 5.1,5.2,5.3.2,5.13, Material Science : Dr. M. Arumugam, 3rd revised edition,Reprint 2010. Anuradha Publications.

UNIT III: 7.8,7.9,8.1,8.2,8.3,8.5,8.7, Material Science : Dr. M. Arumugam, 3rd revised edition,Reprint 2010. Anuradha Publications.

UNIT IV: 6.1,6.2,6.3,6.6,6.7,6.9 Material Science : Dr. M. Arumugam, 3rd revised edition,Reprint 2010. Anuradha Publications.

UNIT V: 11.6,11.6(i, ii, iii), 11.13.3
Material Science : Dr. M. Arumugam, 3rd revised edition,Reprint 2010. Anuradha Publications.
6.7.1,6.3,6.3.1,
Material Science : P.K. Palanisamy, 1st Print,2004,Scitech Publications.

REFERENCES:

1.Solid State Physics- S.O.Pillai,
2. Material Science : V. Rajendran, A. marikani II print, 2004. Tata McGraw Hill Publishing com. Ltd., New Delhi

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT I			
Different types of chemical bonds -Ionic bond-Covalent bond -Metallic, Dispersion, dipole and Hydrogen bond		4	**3 hours Lecture and 1 Discussion**
Crystal structure - sc, bcc, fcc,hcp (upto packing factor)		4	**3 hours Lecture and 1Discussion**
Crystal imperfections – Point defects-Line defects Surface defects-Volume defects		4	**3 hours Lecture and 1Discussion**
UNIT II			
Introduction to conducting materials		2	**2 hours Lecture**
Atomic interpretation of ohm's law-Relaxation time & electrical conductivity		3	**2 hours Lecture and 1 Discussion**
Electrical and thermal conductivity		3	**2 hours Lecture and 1 Discussion**
Different types of conduction materials: Low resistivity conducting materials (properties, examples) – High resistivity conducting materials (properties examples)		4	**3 hours Lecture and 1Discussion**
UNIT III			
Hysteresis Explanation of Hysteresis cure on the basis of domain theory-Hard and soft materials		3	**2 hours Lecture and 1Discussion**
Applications of Soft and hard magnetic materials		2	**2 hours Lecture and Discussion**
Introduction to super conducting materials		1	**1 hour Lecture**

Explanation of the occurrence of Super conductivity	2	**2 hours Lecture and Discussion**
BCS theory- general properties of super conductors	2	**2 hours Lecture**
Types of super conductors (Type I & Type II) - Applications of superconductor.	2	**2 hours Lecture and Discussion**
UNIT IV		
Introduction to dielectric materials	2	**2 hours Lecture**
Fundamental definitions in dielectrics	2	**2 hours Lecture and Discussion**
Various polarization mechanisms in dielectrics	3	**2 hours Lecture and 1 Discussion**
Internal field (Clausius – Mosotti relation)	3	**2 hours Lecture and 1 Discussion**
Dielectric breakdown	2	**2 hours Lecture**
UNIT V		
Biomaterials- metals and alloys- polymers	4	**3 hours Lecture and 1Discussion**
ceramics-applications	4	**3 hours Lecture and 1 Discussion**
Nanometerials- synthesis – applications	4	**3 hours Lecture and 1 Discussion**

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	4	3	4	3	3	4	3	3	5	3.5
CO2	5	3	4	3	4	3	3	4	3	4	3.6
CO3	3	3	3	4	3	3	5	4	3	3	3.4
CO4	3	3	4	3	3	3	4	4	3	4	3.4
CO5	4	3	3	4	4	3	3	4	4	3	3.5
Mean Overall score											3.48

Result: The Score for this Course is 3.48 (High Relationship)

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score of COs = $\frac{\text{Total of Value}}{\text{Total No. of Pos\& PSOs}}$

Mean Overall Score of COs = $\frac{\text{Total of Mean Score}}{\text{Total No. of COs}}$

ASSESSMENT RUBRICS

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
KNOWLEDGE	30%	30%
UNDERSTANDING	30%	30%
APPLY	40%	40%

Course Designer: Dr. A.BEULAH MARY, & Dr. P. N,NIRMALA, Assistant Professor

Programme : B.Sc., Physics **Part III : Core**
Semester : VI **Hours : 4 HrsP/W 60Hrs/P/S**
Sub. Code : U22CP15 **Credits :4**

TITLE OF THE PAPER : OPTO ELECTRONICS

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDEOS/TUTORIAL	ICT
	4	2	-	1	1

Preamble:
The scope of this course is to provides an insight into the physical principles of operation of lasers and their applications in various areas of science and industry. It also provides fundamentals of nonlinear optics and interaction of light

COURSE OUTCOME On the successful completion of the course students will able to	Unit	Hrs P/S
CO1 : Understand the basic knowledge of LED and LCD and instrumentation involved	1	12
CO2 :acquire complete about the operation and construction of lasers	2	12
CO3 : Familiarize with various optoelectronics such as Photo transistors, photo diodesand its real time applications	3	12
CO4 : understand basic principle of optical fibre	4	12
CO5 : learn and practice the techniques used by an optical phenomenon so that these can be applied to actual field studies	5	12

UNIT I : LIGHT SOURCES

Introduction – Light emitting diode (LED) -Structure of LED– LEDmaterials – LCDCharacteristics and action of LCD – Principle, Construction, Working – Advantages& Disadvantages

UNIT II : LASER

Laser operation - characteristics of laser - types of lasers-Semiconductor laser diode- spatial Emission pattern of laser- current Vs output power characteristics of a laser -laser chirp

UNIT III :PHOTO DETECTOR

Photo detector- Introduction– Characteristics of Photo detectors– PN junction Photo detector– PIN Photo diode- Avalanche Photo diode- Phototransistor-BIT-error rate

UNIT IV :OPTICAL FIBRE

Introduction – Principle of optical fibre – Propagation of light waves in an optical fibre-– Acceptance angle and acceptance cone of a fibre – Numerical aperture.

UNIT V :CLASSIFICATION OPTICAL FIBRE

Fibres – classifications-Steped indexfibre, Graded fibre multimode fibre – Plastic fibres – Advantages : fibre optic switches, bypass switches, other optical switches, optical Logic gates

TEXT BOOKS

1. Optical Fibres and Fibre Optic Communication Systems – Subir Kumar Sarkar Revised IV Edition 2010.
   Unit 1 - 9.1,9.2,9.2.2, 9.2.3

2. Modern Physics- R Murugeshan, Kiruthiga Sivaprasath18e edition 2021.
   Unit 1 - 34.5

3. Optical Fibres and Fibre Optic Communication Systems – Subir Kumar Sarkar Revised IV Edition 2010.
   Unit 2 - 9.3.1, 9.3.2, 9.3.3, 9.3.4, 9.3.6, 9.3.10

4. Optical Fibres and Fibre Optic Communication Systems – SubirKumar Sarkar Revised IV Edition 2010.
   Unit 3 - 10.1,10.2,10.6,10.7,10.8,10.9, 10.10
   Unit 4 - 2.2,2.4,2.5
   Unit 5 - 3.1,3.2,3.5, 3.6, 14.2, 14.3, 14.4, 14.5

REFERENCE BOOKS

1. Opto Electronics – Wilson & Hawker, Prentice Hall of India2004.
2. Optoelectronics - A.Ubald Raj, G,Jose Robin, First Edition: June 2010
3. Semiconductor physics and Optoelectronics – P. K. Palanisamy, SCITECH Publication, Chennai2002.
4. Optical fibres and Fibre Optic Communication – Sabir Kumar Sarkar IV Revised Edition2003.

WEB REFERENCES

1. Physics of Light and Optics | Download book (freebookcentre.net)
2. Free Books on Modern Physics: Laser books : 1- Fundamentals of Light Sources and Lasers (onlinephysicsbooks.blogspot.com)

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT I: LIGHT SOURCES (12Hrs)			
Introduction – Light emitting diode (LED) -Structure of LED– LEDmaterials		6	5 hour Lecture and1 hour Discussion and ICT
LCDCharacteristics and action of LCD – Principle, Construction, Working – Advantages& Disadvantages		6	5 hours Lecture and 1 hour Discussion and Quiz
UNIT II : LASER(12Hrs)			
Laser operation - characteristics of laser - types of lasers		4	2 hours lecture& 2 hours ICT & Discussion
Semiconductor laser diode- spatial Emission pattern of laser		4	3 hour lecture 1 hour ICT&Discussion
current Vs output power characteristics of a laser -laser chirp		4	3 hour lecture 1 hour ICT&Discussion
UNIT III :PHOTO DETECTOR (12Hrs)			
Photo detector- Introduction– Characteristics of Photo detectors		4	3 hours lecture 1 hour Discussion
PN junction Photo detector– PIN Photo diode		4	3 hours lecture 1 hour ICT&Discussion
Avalanche Photo diode-Phototransistor-BIT-error rate		4	3 hours lecture 1 hour ICT&Discussion
UNITIV :OPTICAL FIBRE (12Hrs)			
Introduction – Principle of optical fibre – Propagation of light waves in an optical fibre		6	5 hours lecture and 1 hour ICT &discussion
Acceptance angle and acceptance cone of a fibre – Numerical aperture		6	5 hours lecture and 1 hour ICT & discussion
UNIT V :CLASSIFICATION OPTICAL FIBRE (12Hrs)			
Fibres – classifications-Steped indexfibre, Graded fibre multimode fibre		6	5 hours lecture and 1 hour ICT& discussion
Plastic fibres – Advantages : fibre optic switches, bypass switches, other optical switches, optical Logic gates		6	5 hours lecture and 1 hour ICT& discussion

Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	4	3	4	3	4	4	3	4	3	3.6
CO2	4	3	4	3	3	4	3	4	3	3	3.4
CO3	4	4	3	4	4	4	4	4	3	4	3.8
CO4	4	3	3	3	3	4	3	3	3	3	3.2
CO5	3	4	4	3	4	3	4	4	4	3	3.6
Mean Overall Score											3.52

Result: The Score for this Course is 3.52 (High Relationship)

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$

Mean Overall Score of COs = $\frac{\text{Total of Mean scores}}{\text{Total No. of COs}}$

ASSESSMENT RUBRICS

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
REMEMBERING/RECALLING	30%	30%
UNDERSTANDING/COMPREHENSION	30%	30%
APPLICATION and ANALYSIS	40%	40%

Course DesignerDr. A. BEULAH MARY&Dr.P.N. NIRMALA Assistant Professor, Department of Physics.

Programme :B.Sc PHYSICS **PART III :DSEC- II Elective**
Semester : VI **Hours : 4 P/W, 60 Hrs P/S**
Sub code : U22DSP2A **Credits : 4**

TITLE OF THE PAPER : NUCLEAR PHYSICS

Pedagogy	Hours	Lecture	Peer teaching	TUTORIAL	ICT
	4	1	1	1	1

PREAMBLE :
The purpose of this course is to give an introductory details about the properties and stability of nucleus. It gives brief information about nuclear models ,radio activity, nuclear reactions, nuclear detectors, particle accelerators , cosmic rays and elementary particles.

COURSE OUTCOME At the end of the Semester, the students will be able to	UNIT	Hrs P/S
UNIT 1 CO1- PROPERTIES AND STRUCTURE OF NUCLEI Know the properties of nucleus, understand binding energy, nuclear composition , nuclear forces , analyse liquid drop model	1	12
UNIT 2 CO2 - RADIOACTIVITY Know properties of alpha, beta , gamma rays, understand alpha , beta decay , properties of neutrino, uses of radio isotopes, determine age of earth and matter.	2	12
UNIT 3 CO3 – NUCLEAR REACTIONS Know kinematics of nuclear reaction, differentiate nuclear fusion and nuclear fission, understand working of various reactors , calculate Q value of nuclear reaction	3	12
UNIT 4 CO4– NUCLEAR DETECTORS AND PARTICLE ACCELERATORS Know neutron sources , properties , nuclear detectors , particle accelerators, understand the working principle of detectors and accelerators.	4	12
UNIT 5 CO5- COSMIC RAYS AND ELEMENTARY PARTICLES Know about cosmic rays , origin of cosmic rays, understand altitude, latitude , longitudinal effect of cosmic rays , differentiate elementary particles	5	12

SEMESTER- VI
DISCIPLINE SPECIFIC ELECTIVE COURSE (DSEC) - II
NUCLEAR PHYSICS
4Hrs/week

Code : EP63 **Credit : 4**

UNIT I: Properties and structure of Nuclei

General properties of nucleus- binding energy – BE/A curve – theories of nuclear composition -Nuclear forces –characteristics –Meson theory of nuclear forces – Yukava Potential – liquid drop model.

UNIT II: Radio Activity Fundamental laws of radio activity –

Properties of alpha, beta and gamma rays –range of alpha particle – Geiger and Nuttal method of experimental measurement of range of alpha particle - neutrino theory of beta decay – K - electron capture - nuclear isomers- Mossabauer effect - Radio carbon dating

UNIT III: Nuclear Reactions

Artificial transmutation - Kinematics of nuclear reaction (Q value equation for nuclear reaction) - types of nuclear reaction -Nuclear fission – atom bomb –nuclear reactors – uses - Nuclear fusion – hydrogen bomb-fusion reactor –plasma confinement : Magnetic confinement.

UNIT IV: Nuclear Detectors and Particle Accelerators

Detectors: Geiger – Muller Counter - Wilson cloud chamber – bubble chamber - Particle accelerators: cyclotron - synchrocyclotron- betatron

UNIT V: Cosmic Rays and Elementary Particles

Cosmic rays: latitude effect - azimuth effect- altitude effect – primarycosmic rays - secondary cosmic rays -Van Allen belt- origin of cosmic rays - Elementary particles : Introduction– elementary particles -particles and antiparticles .

Books for Study:

1. Modern physics by R. Murugeshan, Kiruthigasivaprasath, S.Chand& Co., New Delhi, Eighteenth Edn., 2018 .

Unit – I : page no. (324-328, 330 – 333 , 340-341)
Unit – II : page no. (388, 389,393, 401, 403, 407, 408 , 416)
Unit – III : page no. (443 , 449 – 451 , 455 , 458 - 460)
Unit – IV : page no. (358-364, 377-384)
Unit – V : page no. (464-466, 468-469, 471-473,)

2. Atomic and Nuclear Physics by N. Subrahmanyam and Brijlal, S Chand &Co.,NewDelhi (1996).
3. Nuclear Physics by Tayal D.C., Himalaya Publishing House, Mumbai(2006).
4. Nuclear Physics by R.C.Sharma, K.Nath& Co., Meerut (2000)
5. Nuclear Physics by Irving Kaplan, Narosa Publishing house, New Delhi.

Books for Reference :

1. Nuclear Physics by R.R.Roy and B.P.Nigam, New Age International (P) Ltd., NewDelhi(1997).
2. Fundamentals of Elementary Particle Physics by Longo, McGraw-Hill.

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT - I	General properties of nucleus	2	L,P
	Binding energy, BE/A curve	2	L,T
	Theories of nuclear composition	2	L,I
	Nuclear forces	2	P,T
	Meson theory of nuclear forces ,Yukava potential	2	I,P
	Liquid drop model	2	I, T
UNIT-II	Properties of alpha , beta and gamma rays	2	P, I
	Range of alpha particles, Geiger-Nuttal experiment	2	L, T
	Neutrino theory of beta decay	2	I, P
	K – electron capture , nuclear isomers	2	I, T
	Mossabauer effect	2	L,T
	Radio carbon dating	2	L,P
UNIT-III	Artificial transmutation	2	P,T
	Kinematics of nuclear reaction	2	L,P
	Types of nuclear reaction	2	I, T
	Nuclear fission, atom bomb, nuclear reactor	2	L,T
	Nuclear fusion, hydrogen bomb, fusion reactor	2	I,P
	Plasma confinement – magnetic confinement	2	L,I
UNIT-IV	Geiger – Muller counter	2	L , T
	Wilson cloud chamber	2	I , P
	Bubble chamber	2	I , T
	Cyclotron	2	L , P
	Synchrocyclotron	2	I , P
	Betatron	2	L, T
UNIT-V	Cosmic rays, latitude effect	2	L,T
	Azimuthal effect , altitude effect	2	P,I
	Primary cosmic rays, secondary cosmic rays	2	P ,T
	Vanallen belt, origin of cosmic rays	2	L,P
	Elementary particles	2	L ,I
	Particles and anti particles	2	I ,T

Course outcomes	Programme outcomes					Programme specific outcomes					Mean scores
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO5	
CO1	5	4	3	3	3	5	4	4	3	3	3.7
CO2	5	4	4	3	4	5	4	3	3	3	3.8
CO3	4	4	4	4	4	4	4	3	3	3	3.7
CO4	4	4	3	3	3	4	4	4	3	3	3.5
CO5	4	4	4	3	3	4	4	4	4	3	3.7
Mean overall score											3.68

Result : The Score for this course is 3.68 - High

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
KNOWLEDGE	50%	50%
UNDERSTANDING	30%	30%
APPLY	20%	20%

Course Designer :Dr.J.S.P.CHITRA , Department of PHYSICS

Programme :B.Sc PHYSICS **PART III :DSEC- II Elective**
Semester : VI **Hours : 4 P/W, 60 Hrs P/S**
Sub code : U22DSP2B **Credits : 4**

TITLE OF THE PAPER : NANO PHYSICS

Pedagogy	**Hours**	**Lecture**	**Peer teaching**	**TUTORIAL**	**ICT**
	4	**1**	**1**	**1**	**1**

PREAMBLE :

- To create the basic knowledge in nano materials.
- To understand the scientific perspective of nanomaterials.
- To identify the techniques suitable for nanomaterial synthesis.
- To know the significance of nanomaterials

COURSE OUTCOME At the end of the Semester, the students will be able to	**UNIT**	**Hrs P/S**
CO1 Know the history of nano technology, understand synthesis of oxide nano particles, develop skills in synthesis of nano particles	1	12
CO2 Know super lattice, understand preparation of quantum nano structure,differentiate quantum well laser, quantum cascade laser, quantum wire, quantum dot, analyse application of quantum dots.	2	12
CO3 Know discovery of nano tubes, classify types of carbon nano tubes,synthesize carbon nano tubes	3	12
CO4 Know nano crystalline soft material, understand theoretical back ground of permanent magnetic material, discuss quantum cellular automata	4	12
CO5 Know about chemistry and environment, understand applications of nano technology, analyse medical applications of nano technology	5	12

SYLLABUS

UNIT I: Nanomaterials

History of Nanotechnology- Nanostructures- synthesis of oxide nano particlesSynthesis of semiconductor nano particles- Synthesis of metallic nano particles

UNIT II: Quantum Hetero structure

Super lattice- preparation of Quantum nanostructure- Quantum well laserQuantum cascade laser-Quantum wire- Quantum dot- Application of Quantum dots.

UNIT III: Carbon Nanotubes

Discovery of Nanotubes- Carbon Allotropes- Types of carbon NanotubesGraphene sheet to a single walled nanotube- Electronic structure of Carbon Nanotubes- Synthesis of Carbon Nanotube.

UNIT IV : Nanocrystalline soft material

Nanocrystalline soft material- Permanent magnet material- Theoretical background- Super paramagnetism- Coulomb blockade-Quantum cellular Automata.

UNIT V: Application of Nanotechnology

Chemistry and Environment – Energy applications of nanotechnologyInformation and Communication- Heavy industry-Consumer goodsNanomedicine - Medical application of Nanotechnology

Text Book:

1. Text book of Nanoscience and Nanotechnology – B. S. Moorthy, P. Sankar, Baldev Raj, B. B. Rath and James Murdy University Press – IIM
2. Nanophysics, Sr. Geradin Jayam, Holy Cross College, Nagercoil (2010)

Reference:

1. ‘Nanoscience and Nanotechnology: Fundamentals to Frontiers’
2. M.S. Ramachandra Rao, Shubra Singh, Wiley India pvt. Ltd., New Delhi. (2013).
3. ‘Nano the Essentials’ - T. Pradeep, Tata Mc.Graw Hill company Ltd (2007)
4. ‘The Chemistry of Nano materials : Synthesis, Properties and Applications’, Volume 1 C. N. R. Rao, A. Mu¨ller, A. K. Cheetham, , Germany (2004).

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT - I	History of nano technology	2	L,P
	Nano structure	2	L,T
	Synthesis of oxide nano particles	2	L,I
	Synthesis of semiconductor nano particles	3	P,T,I
	Synthesis of metallic nano particles	3	I,P,T
UNIT-II	Super lattice	2	P, I
	Preparation of quantum nano structure	2	L, T
	Quantum well laser	2	I, P
	Quantum cascade laser	2	I, T
	Quantum wire, quantum dots	2	L,T
	Applications of quantum dots	2	L,P
UNIT-III	Discovery of nano tubes	2	P,T
	Carbon allotropes	2	L,P
	Types of carbon nano tubes	2	I, T
	Grapheme sheet to single walled nano tube	2	L,T
	Electronic structure of carbon nano tubes	2	I,P
	Synthesis of carbon nano tubes	2	L,I
UNIT-IV	Nano crystalline soft material	2	L , T
	Permanent magnetic material	2	I , P
	Theoretical back ground	2	I , T
	Super paramagnetism	2	L , P
	Coulomb blockade	2	I , P
	Quantum cellular Automata	2	L, T
UNIT-V	Chemistry and environment	2	L,T
	Energy applications of nano technology	2	P,I
	Information and communication	2	P ,T
	Heavy industry- consumer goods	2	L,P
	Nano medicine	2	L ,I
	Medical applications of nano technology	2	I ,T

Course outcomes	Programme outcomes					Programme specific outcomes					Mean scores
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO5	
CO1	5	4	3	3	3	5	4	4	3	3	3.7
CO2	5	4	4	3	3	5	4	3	3	3	3.7
CO3	4	4	4	4	4	4	4	3	3	3	3.7
CO4	4	4	3	3	3	4	4	4	3	3	3.5
CO5	4	4	4	3	3	4	4	4	3	3	3.6
Mean overall score											3.64

Result : The Score for this course is 3.64 - High

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
KNOWLEDGE	50%	50%
UNDERSTANDING	30%	30%
APPLY	20%	20%

Course Designer : Dr.J.S.P.CHITRA , Department of PHYSICS

Programme : B.Sc Physics **Part III: DSEC -III Elective**
Semester : VI **Hours : 4 hrs/W (60 Hrs P/S)**
Sub. Code : U22DSP3A **Credits: 4**

TITLE OF THE PAPER: SPECTROSCOPY

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	4	3	--	---	1

PREAMBLE: Acquire knowledge and understanding of the basics of spectroscopy and apply it in their higher studies (Post graduate).

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
CO1: understand Microwave Spectroscopy in detail with the knowledge of classification of molecules	I	12
CO2: analyze the theory of Infra red spectroscopy with the vibrating diatomic molecule as harmonic and an anharmonic oscillator.	II	12
CO3: understand and analyze Raman Spectroscopy in detail with the knowledge of classical and quantum effects.	III	12
CO4: understand the electronic spectroscopy Vibrational coarse structure: Progressions – Frank-Condon principle	IV	12
CO5: explain the construction and working of IR spectrophotometer (Single beam and double beam).	V	12

SYLLABUS

Objective:
To understand molecular spectroscopy and the instrument techniques

Unit I: Microwave Spectroscopy
Rotation of molecules – Classification of molecules – Rotation spectra of diatomic molecules – Intensities of Spectral lines – Effect of Isotopic Substitution, Techniques and Instrumentation.

Unit II: Infrared Spectroscopy
I.R. Spectroscopy – Vibrating diatomic molecules – Simple Harmonic Oscillator - anharmonic oscillator – Diatomic vibrating rotator – IR Spectrum of HCl - Interaction of rotations and vibrations – Vibration of Polyatomic molecules

Unit III: Raman Spectroscopy
Raman effect: Discovery – Quantum theory of Raman effect – Classical theory of Raman Effect –Pure rotational Raman Spectra- Linear molecules – Raman Spectrum of symmetric top molecules - Vibrational Raman spectra – Rule of mutual exclusion, Polarization of light and the Raman Effect - Structure determination from IR and Raman spectroscopy.

Unit IV: Electronic spectroscopy

Vibrational coarse structure: Progressions – Frank-Condon principle – Dissociation energy and Dissociation products – Rotational Fine Structure of Electronic Vibration Transitions - Fortrat diagram – Predissociation

Unit V: Instrumentation

Instrumentation and Techniques in Infrared spectroscopy – Sources – monochromators – Sample cells – Detectors – Single beam Infra red spectrometer – Double beam Infra red spectrometer

Book For Study :

1. Molecular structure and spectroscopy - G. Aruldhas, PHI Learning Pvt. Ltd, India.

Unit 1. Chapter 6 (6.1, 6.11, 6.2 – 6.6, 6.8, 6.14)

Unit 2. Chapter 7 (7.4, 7.5, 7.11, 7.11.1)

Unit 3. Chapter 8 (8.1 -8.5, 8.10, 8.12)

Unit 4. Chapter 9 (9.2, 9.4, 9.6, 9.7, 9.8, 9.9, 9.10)

Unit 5. Chapter 7 (7.16)

Book For Reference:

1. Hand book of Analytical Instruments -R.S. Khandpur, Tata MC Grow Hill Ltd
2. Fundamentals of Molecular Spectroscopy - Colin N Banwell Elaine- M Mccash Fifth Edition

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
Unit I	Rotation of molecules – Classification of molecules –	4	Lecture, ICT
	Rotation spectra of diatomic molecules – Intensities of Spectral lines – Effect of Isotopic Substitution,	5	GD, Lecture
	Techniques and Instrumentation – Chemical analysis by Microwave spectroscopy.	3	Teaching (chalk and talk), Videos
Unit II	I.R. Spectroscopy – Vibrating diatomic molecules – Simple Harmonic Oscillator -	5	Lecture
	anharmonic oscillator – Diatomic vibrating rotator – IR Spectrum of HCl -	4	Teaching (chalk and talk), video
	Interaction of rotations and vibrations – Vibration of Polyatomic molecules	3	GD, ICT
Unit III	Raman effect: Discovery – Quantum theory of Raman effect – Classical theory of Raman Effect	4	Lecture
	Pure rotational Raman Spectra- Linear molecules – Raman Spectrum of symmetric top molecules -	3	GD
	Vibrational Raman spectra – Rule of mutual exclusion, Polarization of light and the Raman	3	Teaching (chalk and talk), GD

	Effect -		
	Structure determination from IR and Raman spectroscopy.	2	Lecture, ICT
Unit IV	Vibrational coarse structure: Progressions – Frank-Condon principle	4	ICT, GD
	Dissociation energy and Dissociation products – Rotational Fine Structure of Electronic Vibration	5	Teaching (chalk and talk), Lecture
	Transitions - Fortrat diagram – Pre dissociation	3	Lecture, Video
Unit V	Instrumentation and Techniques in Infrared spectroscopy	3	Lecture, ICT
	Sources – monochromators – Sample cells – Detectors – Single beam Infra red spectrometer –	6	Lecture, Teaching (chalk and talk)
	Double beam Infra red spectrometer	3	GD, Videos

Course outcomes	**Programme outcomes**					**Programme specific outcomes**					**Mean scores**
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**	**PSO5**	
CO1	5	4	3	3	3	4	4	4	3	3	3.6
CO2	5	4	4	3	4	4	4	3	3	3	3.7
CO3	4	4	4	4	4	4	4	3	3	3	3.7
CO4	4	4	3	3	3	4	4	4	3	3	3.5
CO5	4	4	4	3	3	4	4	4	4	3	3.7
Mean overall score											3.64

Result: The Score for this Course is 3.64 (High Relationship)

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score of COs = $\frac{\text{Total of Value}}{\text{Total No. of Pos \& PSOs}}$

Mean Overall Score of COs = $\frac{\text{Total of Mean Score}}{\text{Total No. of COs}}$

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
K1(Remembering / Recalling)	40%	40%
K2 (Understanding / comprehension)	30%	30%
K3 (Application and analysis)	30%	30%

Course Designer: S V Meenakshi **Department of Physics.**

Programme : B.Sc Physics | **Part III: DSEC -III Elective**
Semester : VI | **Hours : 4 hrs/W (60 Hrs P/S)**
Sub. Code : U22DSP3B | **Credits: 4**

TITLE OF THE PAPER: PROBLEMS SOLVING SKILLS IN PHYSICS

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	4	--	2	1	1

PREAMBLE: Acquire knowledge and understanding of the basics skills of solving problems and apply it in attending competitive exams.

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
CO1: understand and develop the skill in solving problems in Mechanics and also to recollect the corresponding theories.	I	12
CO2: analyze and solve the problems in Thermal Physics.	II	12
CO3: solve the problems in Electricity and Magnetism and also will discuss the corresponding theories.	III	12
CO4: understand and solve problems in Quantum Mechanics	IV	12
CO5: explain the general concepts in Physics and mathematics by solving problems.	V	12

SYLLABUS

Objective:
To understand the method to solve the problems quickly and correctly.

Unit 1: Problems in Mechanics
Newton laws of motion for various systems (1, 2 and 3 dimension), Conservation laws and collisions, Rotational mechanics, central force, Harmonic oscillator, special relativity

Unit II: Problems in Thermal Physics
Kinetic theory- MB distribution-Laws of thermodynamics–Ideal Gas law-Various Thermodynamic process- Entropy calculation for various process-Heat engine-TS and PV diagram-Free energies various relations

Unit III: Problems in Electricity & Magnetism
Electrostatics- calculation of Electrostatic quantities for various configurations- Conductors,Magneto statics- Calculation of Magnetic quantities for various configuration, Electromagnetic induction, Poynting vector, Electromagneticwaves.

Unit IV: Problems in Quantum mechanics
Origin of Quantum mechanics- Fundamental Principles of Quantum mechanics- potential wells and harmonic oscillator- Hydrogen atom.

Unit V: Problems in General Physics & Mathematics

Plotting the graphs for various elementary and composite functions-Elasticity-Viscosity and surface tension- fluids-Buoyancy-pressure-Bernoulli's theorem-applications-waves and oscillations, Errors and propagation of errors.

Text book for reference:

1. Mechanics(in SI units) by Charles Kittel, Walter D knight etc. (Berkeley Physics course-volume 1), Tata McGraw Hill publication ,second edition.
2. Thermal physics by S.C.Garg,RM Bansal &CK Ghosh. (Tata McGraw Hill Publications), 1st edition.
3. Electricity & magnetism(in SI units) by E.M.Purcell, Tata Mcgraw hill Publication, 2nd Edition.
4. Quantum mechanics by N.Zettili, Wiley Publishers, second edition.
5. Introduction to quantum mechanics by David. J.Griffith, Pearson Publications, second edition.

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
Unit I	Newton laws of motion for various systems (1, 2 and 3 dimension), Conservation laws and collisions, Rotational mechanics, central force, Harmonic oscillator, special relativity	12	Peer teaching, GD, ICT
Unit II	Kinetic theory- MB distribution-Laws of thermodynamics–Ideal Gas law-Various Thermodynamic process- Entropy calculation for various process-Heat engine-TS and PV diagram-Free energies various relations	12	Peer teaching, GD, ICT
Unit III	Electrostatics- calculation of Electrostatic quantities for various configurations-Conductors,Magneto statics- Calculation of Magnetic quantities for various configuration, Electromagnetic induction, Poynting vector, Electromagneticwaves.	12	Peer teaching, GD, ICT
Unit IV	Origin of Quantum mechanics- Fundamental Principles of Quantum mechanics- potential wells and harmonic oscillator- Hydrogen atom.	12	Peer teaching, GD, ICT
Unit V	Plotting the graphs for various elementary and composite functions-Elasticity-Viscosity and surface tension- fluids-Buoyancy-pressure-Bernoulli's theorem-applications-waves and oscillations, Errors and propagation of errors.	12	Peer teaching, GD, ICT

Course outcomes	**Programme outcomes**					**Programme specific outcomes**					**Mean scores**
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**	**PSO5**	
CO1	5	4	3	3	3	4	4	4	3	3	3.6
CO2	5	4	4	3	4	4	4	3	3	3	3.7
CO3	4	4	4	4	4	4	4	3	3	3	3.7
CO4	4	4	3	3	3	4	4	4	3	3	3.5
CO5	4	4	4	3	3	4	4	4	4	3	3.7
Mean overall score											3.64

Result: The Score for this Course is 3.64 (High Relationship)

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score of COs = $\frac{\text{Total of Value}}{\text{Total No. of Pos \& PSOs}}$

Mean Overall Score of COs = $\frac{\text{Total of Mean Score}}{\text{Total No. of COs}}$

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
K1(Remembering / Recalling)	40%	40%
K2 (Understanding / comprehension)	20%	20%
K3 (Application and analysis)	40%	40%

Course Designer: S V Meenakshi **Department of Physics.**

Programme : B.Sc Physics **Part III: Skill –SEC- III**
Semester : VI **Hours : 2 hrs/W (30 Hrs P/S)**
Sub. Code : U22SEP3 **Credits: 2**

TITLE OF THE PAPER: PHYSICS FOR COMPETITIVE EXAMS

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	2	1	--	1	----

PREAMBLE: Learn the skill of time management in solving problems and answering multiple choice questions

COURSE OUTCOME At the end of the Semester, the Students will be able to	Unit	Hrs P/S
CO1: develop the method of attending multiple choice questions in mechanics, properties of matter	I	6
CO2: enhance the skill in solving problems and answering multiple choice questions in physics	II	6
CO3: understand and analyze the tricks in attending more questions (multiple choice) in a short interval of time.	III	6
CO4: apply the knowledge of physics in solving problems.	IV	6
CO5: develop the confidence of attending competitive exams.	V	6

SYLLABUS

Objective:
To apply the knowledge of physics in answering multiple choice questions and solving problems in physics.

Unit – I : Mechanics and properties of matter

Laws of motion – friction – work, power, energy – conservation of energy and momentum – elas and inelastic collisions – projectile motion – circular motion – centripetal and centrifugal forces – mechan of rigid bodies – moment of inertia – conservation of angular momentum – gravitation – planets and satelli - cosmic rays & the universe- elasticity.

Hydrostatics – principles of buoyancy and pressure in fluid – surface tension – flow of liquids viscosity.

Unit – II : **Heat and sound**

Thermal expansion – calorimetry and change of state – thermodynamics – isothermal, adiabat isobaric, isochoric processes – laws of thermodynamics – reversible and irreversible processes – entropy

transmission of heat – conduction, convection and radiation – black body radiations – J-K effect – liquefacti of gases.

Simple harmonic motion – damped and forced oscillations – progressive waves – beats- stationa waves in a string – Doppler effect – acoustics – ultrasonic waves.

Unit – III : Electricity and electromagnetism.

Electric field and potential – capacitors and dielectrics – electric current and circuits – thermo electric – magnetic effect of current.

Magnetic materials – hysteresis – energy loss – electromagnetic induction – self and mutual inductanc – AC circuits – series and parallel resonances – transformer.

Unit IV : **Optics and Electronics**

Reflection, refraction and dispersion – aberration and optical instruments – interference of light interference in thin films- Fresnel and Fraunhofer diffraction – resolving power – polarization – doul refraction – optical activity – principle of fibre optic communication – NA – step index and graded index fib – characteristics of laser.

Intrinsic and extrinsic semiconductors – junction diodes – pnp and npn transistors – FE JFET,MOSFET- rectifiers – amplifiers – oscillators – modulation and demodulation – OP – AMPS – Boole identities – De Morgan's laws – logic gates.

Unit – V : Modern Physics

Electron – band theory of solids – structure of atom – X-rays – photoelectric effect – wave mechan – nuclear structure – nuclear radiations – particle accelerators – radioactivity – nuclear fission and fusion nuclear reactors.

Different crystal systems – bonding in crystals - crystal imperfections – classification of sup conductors - applications.

Relativity – reference systems – Galilean invariance and conservation laws – Michelson – Morl experiment – postulates of special theory of relativity – Lorentz transformation – length contraction – ti dilation – variation of mass with velocity – mass – energy equivalence.

Book For Study :

Material: Prepared by the Department of Physics

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
Unit I	Rotation of molecules – Classification of molecu – Laws of motion – friction – work, power, ener – conservation of energy and momentum – elas and inelastic collisions – projectile motion – circu motion – centripetal and centrifugal forces mechanics of rigid bodies – moment of inertia conservation of angular momentum – gravitation planets and satellites - cosmic rays & the univers elasticity. Hydrostatics – principles of buoyancy a pressure in fluid – surface tension – flow of liquid viscosity.	6	Lecture & GD
Unit II	Thermal expansion – calorimetry and change of st – thermodynamics – isothermal, adiabatic, isobar isochoric processes – laws of thermodynamics reversible and irreversible processes – entropy	6	Lecture & GD

	transmission of heat – conduction, convection a radiation – black body radiations – J-K effect liquefaction of gases. Simple harmonic motion – damped a forced oscillations – progressive waves – bea stationary waves in a string – Doppler effect acoustics – ultrasonic waves.		
Unit III	Electric field and potential – capacitors a dielectrics – electric current and circuits – therr electricity – magnetic effect of current. Magnetic materials – hysteresis – energy lo – electromagnetic induction – self and mutu inductances – AC circuits – series and paral resonances – transformer.	6	Lecture & GD
Unit IV	Reflection, refraction and dispersion – aberrati and optical instruments – interference of light interference in thin films- Fresnel and Fraunho diffraction – resolving power – polarization – doul refraction – optical activity – principle of fibre op communication – NA – step index and graded ind fibres – characteristics of laser. Intrinsic and extrinsic semiconductors junction diodes – pnp and npn transistors – FE JFET,MOSFET- rectifiers – amplifiers – oscillato – modulation and demodulation – OP – AMPS Boolean identities – De Morgan's laws – logic gat	6	Lecture, GD
Unit V	Electron – band theory of solids – structure of ato – X-rays – photoelectric effect – wave mechanics nuclear structure – nuclear radiations – partic accelerators – radioactivity – nuclear fission a fusion – nuclear reactors. Different crystal systems – bonding crystals - crystal imperfections – classification super conductors - applications. Relativity – reference systems – Galilean invariance and conservation laws – Michelson – Morley experiment – postulates of special theory of relativity – Lorentz transformation – length contraction – time dilation – variation of mass with velocity – mass – energy equivalence	6	Lecture, Teaching (chalk and talk)

Course Outcomes (Cos)	Programme Outcomes (Pos) and Programme Specific Outcomes (PSOs)										Mean scores of COs
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	Mean CO
CO1	3	2	3	4	4	3	2	4	3	3	3.09
CO2	4	2	3	4	4	4	2	4	3	4	3.39
CO3	4	2	3	4	4	4	2	4	3	4	3.39
CO4	4	2	3	4	4	4	2	4	3	4	3.39
CO5	3	4	3	4	4	3	4	2	2	4	3.29
Mean Overall Score of COs											3.31

Result: The Score for this Course is 3.36 (High Relationship)

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
K1(Remembering / Recalling)	40%	40%
K2 (Understanding / comprehension)	20%	20%
K3 (Application and analysis)	40%	40%

Course Designer: Mrs. S V Meenakshi **Department of Physics**

Programme : B. Sc., **Part III: Core paper**
Semester : VI **Hours : 6 P/W 90 Hrs P/S**
Sub. Code : U22CP14P **Credits : 5**

TITLE OF THE PAPER: PHYSICS PRACTICAL - IV

Pedagogy	Hours	Lab Experimentation	Peer Teaching	GD/VIDOES/TUTORIAL	ICT
	3+3	3+3	-	-	-

PREAMBLE: The purpose of the *course* is to make the students to construct electronic circuits using Diodes, transistors and ICs and study their behavior. To make the students to know the applications of electronic components like diodes, transistors and IC's .

COURSE OUTCOME

At the end of the Semester, the Students will be able to

CO1: Construct electronic circuits using logic gates & ICs
CO2: Study the characteristics Transister and FET.
CO3: Construct dual power supply.
CO4: Understand the theoretical concepts by doing experiments
CO5: Understand applications of ICs by doing experiments

S.NO	EXPERIMENT
1.	LOGIC GATES USING DISCRETE COMPONENT.
2.	STUDY OF TRANSISTOR CHARACTERITICS – CE MODE
3.	DESIGN AND STUDY OF HALF AND FULL WAVE RECTIFIER.
4.	STUDY OF FET CHARACTERITICS – CS MODE.
5.	STUDY OF HARTLEY OSCILLATOR USING TRANSISTORS.
6.	STUDY OF COLPITT's OSCILLATOR USING TRANSISTORS.
7.	STUDY OF ASTABLE MULTIVIBRATOR USING TRANSISTORS.
8.	VERIFICATION OF IC's.
10.	NAND AS A UNIVERSAL BUILDING BLOCK.
11.	NOR AS A UNIVERSAL BUILDING BLOCK..
12	DESIGN AND STUDY OF DUAL POWER SUPPLY.

Course Designer : **Dr. Mrs. SANTHI.** Department of PHYSICS

Programme : B.Sc., Chemistry | **Part III : Allied Paper 1**
Semester : I | **Hours : 4 HrsP/W 60 Hrs/P/S**
Sub. Code : U22APCT1 | **Credits : 3**

TITLE OF THE PAPER : ALLIED PHYSICS - I (T)

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDEOS/TUTORIAL	ICT
	4	2	-	1	1

Preamble:
The scope of this course is to understand the concept of strength of materials, viscous properties o liquids, heat transformation from one place to another, converting heat to do mechanical work and basic properties of light such as interference and diffraction and polarisation.

COURSE OUTCOME On the successful completion of the course students will able to	Unit	Hrs P/S
CO1 : understand the various modulus involved in the materials and apply the knowledge to practical applications	1	12
CO2 : explain the concept behind flow of liquids due to viscous forces	2	12
CO3 understand how heat is transmitted due to process of conduction, convection and radiation and atmospheric pollution	3	12
CO4 : understand various thermodynamic laws and the concept of entropy	4	12
CO5 : know the concepts of interference, diffraction and polarisation and its uses in practical applications	5	12

UNIT I : PROPERTIES OF MATTER

Introduction- Elasticity-Different moduli of elasticity – Bending of beams – Expression for the bending moment –Uniform bending of a beam- Measurement of young'smodulus by bending of a beam–non-uniformbending (pin & microscope) - uniform (optical lever & telescope) and- Torsion of a body -Expression for torque per unit twist – work done in twisting a wire – Torsional oscillations of a body (only)

UNIT II : VISCOSITY

Introduction-Viscous force – Co-efficient of viscosity –Streamline flow-Turbulent flow– Reynold's number-Poiseuille's method for determining co-efficient of viscosity of a liquid and comparison of Viscosities- Poiseuille's method for determining co-efficient of viscosity of a liquid (variable pressure head) – Equation of continuity--Bernoulli's theorem – Statement and proof – Applications-Venturimeter

UNIT III : HEAT (CONDUCTION, CONVECTION AND RADIATION)

Conduction (definition) - Thermal conductivity- coefficientofthermalconductivity – Determination of thermal conductivity by Lee's disc method - Convection (definition) -convection in the atmosphere-Green House Effect-Atmospheric Pollution-Radiation (definition) - Stefan's Law(statement) -determination of Stefan's constant by filament heating method

UNITIV : THERMODYNAMICS

Zeroth Law of thermodynamics(statement only) – First, second and third law of thermodynamics (statement only) – Heat engine- Carnot'sengine and Carnot's cycle – Efficiency of a Carnot's engine – Entropy – Change of entropy in a Carnot's cycle

UNIT V :OPTICS

Interference (Definition)– conditions for maxima and minima –Stoke's law- Air wedge– Experiment to measure the diameter of thin film –Diffraction (Definition) – Fresnel diffraction - Fraunhofer diffraction –Plane transmission diffraction grating- determination of wavelength of light using transmission grating- Polarization (Definition) - Double Refraction-Uniaxial crystal

TEXT BOOKS

1. **Properties of Matter - R.Murugesan-S.Chand& company Pvt.Limited Revised edition 2012**

   UNIT 1 : Chapter 1 - 1.1, 1.2, 1.14, 1.15, 1.20, 1.21, 1.9, 1.12, 1.13

   UNIT II : Chapter 2 & 4 - 2.1, 2.2, 2.5, 2.7, 4.1, 4.4, 4.4 (ii)

2. **Thermal Physics - R.Murugesan – For Madurai Kamaraj University B.Sc., Ancillary Physics II Semester (2011)**

   UNIT III : Chapter III, IV & V – 3.1, 3.2, 4.1, 4.2, 4.5, 4.6, 5.1, 5.2, 5.3

   UNIT IV : Chapter VII – 7.1, 7.2,7.5,7.6

3. **Allied Physics I & II - R.Murugesan -S.Chand & company Pvt.Limited Revised and enlarged edition 2010**

   UNIT IV : 3.15, 3.16,3.17,3.18

   UNIT V : Chapter VI : 6.2, 6.5, 6.8, 6.10, 6.11, 6.12, 6.14

REFERENCE BOOKS

1. Properties of matter – Brijlal and Subramanyam – Eurasia Publishing co., New Delhi, III Edition1983
2. Element of properties of matter – D.S.Mathur – S.Chand & Company Ltd,New Delhi, 10th Edition1976
3. Heat and Thermodynamics–Brijlal& Subramanyam, S.Chand & Co, 16th Edition2005
4. Heat and Thermodynamics– D.S. Mathur, SultanChand & Sons, 5th Edition2014.
5. Optics and Spectroscopy –R.Murugeshan, S.Chand and co., New Delhi, 6th Edition2008.
6. A text book of Optics – Subramanyam and Brijlal, S. Chand and co.. New Delhi, 22nd Edition2004.
7. Optics – Sathyaprakash, Ratan Prakashan Mandhir, New Delhi, VIIth Edition1990.

WEB REFERENCES

1. Properties Of Matter.Pdf - eBook and Manual Free download (thebookee.net)
2. Thermal and Statistical Physics | Download book (freebookcentre.net)

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT I: PROPERTIES OF MATTER (12 Hrs)			
Elasticity-Introduction- Different moduli of elasticity – Bending of beams		**2**	**1 hour Lecture and1 hour Discussion and ICT**
Expression for the bending moment –Uniform bending of a beam		**2**	**1 hours Lecture and 1 hour Discussion and Quiz**
Measurement of young'smodulus by bending of a beam–non-uniformbending (pin & microscope) - uniform (optical lever & telescope)		**3**	**2 hours Lecture 1 hour ICT& Discussion, Problem solving**
Torsion of a body -Expression for torque per unit twist – work done in twisting a wire		**3**	**2 hours Lecture 1 hour ICT**
Torsional oscillations of a body		**2**	**1 hour Lecture 1 hour ICT& Discussion**
UNIT II : VISCOSITY (12 Hrs)			
Introduction-Viscous force – Co-efficient of viscosity –Streamline flow-Turbulent flow– Reynold's number		**2**	**2 hours lecture& Discussion**
Poiseuille's **method for determining** co-efficient of viscosity of a liquid and comparison of Viscosities		**3**	**2 hour lecture 1 hour ICT&Discussion**
Poiseuille's **method for determining** co-efficient of viscosity of a liquid **(variable pressure head)**		**2**	**1 hour lecture 1 hour ICT&Discussion**
Equation of continuity- -Bernoulli's theorem – Statement and proof		**3**	**2 hours lecture& 1 hour Discussion**
Applications-Venturimeter		**2**	**1hours lecture 1 hourICT& Discussion**
UNIT III : HEAT (CONDUCTION, CONVECTION AND RADIATION) (12 Hrs)			
Conduction (definition) - Thermal conductivity-coefficientofthermalconductivity – Determination of thermal conductivity by Lee's disc method		**4**	**2 hours lecture 1 hour ICT 1 hour Discussion and Quiz**
Convection (definition) -convection in the atmosphere-Green House Effect-Atmospheric Pollution		**3**	**2 hours lecture 1 hour ICT&Discussion**
Radiation (definition) - Stefan's Law-determination of Stefan's constant by filament heating method		**5**	**3 hours lecture 1 hour ICT & 1 hourDiscussion**
UNITIV : THERMODYNAMICS (12Hrs)			
Zeroth Law of thermodynamics – First, second and third law of thermodynamics		**3**	**2 hours lecture 1 hour Discussion and ICT**
Heat engine- Carnot'sengine and Carnot's cycle – Efficiency of a Carnot's engine		**5**	**4 hours lecture 1 hour Discussion and ICT**
Entropy – Change of entropy in a Carnot's cycle		**4**	**3 hours lecture 1 hour Discussion and Problem solving**
UNIT V : OPTICS (12 Hrs)			
Interference (Definition)– conditions for maxima and minima –Stoke's law		**3**	**2 hours lecture 1 hour Discussion**
Air wedge–Experiment to measure the diameter of thin film - thickness of a thin wire		**3**	**2 hours lecture 1 hour Discussion and ICT**

Diffraction (Definition) – Fresnel diffraction - Fraunhofer diffraction - Theory of transmission grating- determination of wavelength of light using transmission grating	**3**	**2 hours lecture** **1 hour Discussion and ICT**
Polarization (Definition) -Double Refraction-Uniaxial crystal	**3**	**2 hours lecture** **1 hour Discussion and ICT**

Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	4	3	4	3	4	3	4	3	3	3.4
CO2	4	3	3	4	3	4	3	4	3	3	3.4
CO3	4	3	3	4	3	4	4	3	3	4	3.5
CO4	4	3	3	3	4	4	3	3	3	3	3.3
CO5	4	3	4	3	4	4	3	4	3	3	3.5
Mean Overall Score											3.42

Result: The Score for this Course is 3.42 (High Relationship)

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$

Mean Overall Score of COs = $\frac{\text{Total of Mean scores}}{\text{Total No. of COs}}$

ASSESSMENT RUBRICS

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
K1 (REMEMBERING/RECALLING)	40%	40%
K2 (UNDERSTANDING/COMPREHENSION)	30%	30%
K3 (APPLICATION and ANALYSIS)	30%	30%

Course Designer: Dr. P. INDRA DEVI, Dr. A. BEULAH MARY & Dr.P.N.NIRMALAAssistant Professor, Department of Physics.

Semester : III **Hours : 4 HrsP/W 60 Hrs/P/S**
Sub. Code : U22APMT1 **Credits : 3**

TITLE OF THE PAPER : GENERAL PHYSICS – I (T)

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDEOS/TUTORIAL	ICT
	4	2	-	1	1

Preamble:
The scope of this course is to understand the concept of strength of materials, viscous properties o liquids, heat transformation from one place to another, converting heat to do mechanical work and basic properties of light such as interference and diffraction and polarisation.

COURSE OUTCOME On the successful completion of the course students will able to	Unit	Hrs P/S
CO1 : understand the various modulus involved in the materials and apply the knowledge to practical applications	1	12
CO2 : explain the concept behind flow of liquids due to viscous forces	2	12
CO3 understand how heat is transmitted due to process of conduction, convection and radiation and atmospheric pollution	3	12
CO4 : understand various thermodynamic laws and the concept of entropy	4	12
CO5 : know the concepts of interference, diffraction and polarisation and its uses in practical applications	5	12

UNIT I : PROPERTIES OF MATTER

Introduction- Elasticity-Different moduli of elasticity – Bending of beams – Expression for the bending moment –Uniform bending of a beam- Measurement of young'smodulus by bending of a beam–non-uniformbending (pin & microscope) - uniform (optical lever & telescope) - Torsion of a body -Expression for torque per unit twist – work done in twisting a wire – Torsional oscillations of a body– Rigidity modulus of a wire (only)

UNIT II : VISCOSITY

Introduction-Viscous force – Co-efficient of viscosity –Streamline flow-Turbulent flow– Reynold's number- Poiseuille's method for determining co-efficient of viscosity of a liquid and comparison of Viscosities- Poiseuille's method for determining co-efficient of viscosity of a liquid (variable pressure head) – Equation of continuity- -Bernoulli's theorem – Statement and proof – Applications-Venturimeter -Pitot tube

UNIT III : HEAT (CONDUCTION, CONVECTION AND RADIATION)

Conduction (definition) - Thermal conductivity- coefficientofthermalconductivity – Determination of thermal conductivity by Lee's disc method - Convection (definition) -convection in the atmosphere-Green House Effect-Atmospheric Pollution-Radiation (definition) - Stefan's Law(statement)-determination of Stefan's constant by filament heating method- Solar constant-Temperature of the Sun

UNITIV : THERMODYNAMICS

Zeroth Law of thermodynamics (statement only) – First, second and third law of thermodynamics (statement only) – Heat engine- Carnot'sengine and Carnot's cycle – Efficiency of a Carnot's engine – Entropy – Change of entropy in a Carnot's cycle- change of entropy in conversion of ice into stream

UNIT V :OPTICS

Interference (Definition)– conditions for maxima and minima –Stoke's law- Air wedge– Experiment to measure the diameter of thin film –Diffraction (Definition) – Fresnel diffraction - Fraunhofer diffraction –Plane transmission diffraction grating- determination of wavelength of light using transmission grating- Polarization (Definition) -Double Refraction-Uniaxial crystal-Nicol Prism

TEXT BOOKS

1. **Propertiesof Matter-R.Murugesan-S.Chand& company Pvt.Limited Revised edition 2012**

   UNIT 1 : Chapter 1 - 1.1, 1.2, 1.14, 1.15, 1.20, 1.21, 1.9, 1.12, 1.13

   UNIT II : Chapter 2 & 4 - 2.1, 2.2, 2.5, 2.7, 4.1, 4.4, 4.4 (ii,iii)

2. **Thermal Physics -R.Murugesan – For Madurai Kmaraj University B.Sc., Ancillary Physics II Semester (2011)**

   UNIT III : Chapter III, IV & V – 3.1, 3.2, 4.1, 4.2, 4.5, 4.6, 5.1, 5.2, 5.3, 5.4,5.6
   UNIT IV : Chapter VII – 7.1, 7.2, 7.5, 7.6, 7.7

3. **Allied Physics I & II - R.Murugesan -S.Chand & company Pvt.Limited Revised and enlarged edition 2010**

   UNIT IV : 3.15, 3.16,3.17,3.18

   UNIT V : Chapter VI : 6.2, 6.5, 6.8, 6.10, 6.11, 6.12, 6.14, 6.16

REFERENCE BOOKS

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7. Optics – Sathyaprakash, Ratan Prakashan Mandhir, New Delhi, VIIth Edition1990.

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2. Thermal and Statistical Physics | Download book (freebookcentre.net)

UNITS	TOPIC	LECTURE HOURS	MODE OF TEACHING
UNIT I: PROPERTIES OF MATTER (12 Hrs)			
Elasticity-Introduction- Different moduli of elasticity – Bending of beams		**2**	**1 hour Lecture and1 hour Discussion and ICT**
Expression for the bending moment –Uniform bending of a beam		**2**	**1 hours Lecture and 1 hour Discussion and Quiz**
Measurement of young'smodulus by bending of a beam–non-uniformbending (pin & microscope) - uniform (optical lever & telescope)		**3**	**2 hours Lecture 1 hour ICT& Discussion, Problem solving**
Torsion of a body -Expression for torque per unit twist – work done in twisting a wire		**3**	**2 hours Lecture 1 hour ICT**
Torsional oscillations of a body, Rigidity modulus of a wire (only)		**2**	**1 hour Lecture 1 hour ICT& Discussion**
UNIT II : VISCOSITY (12 Hrs)			
Introduction-Viscous force – Co-efficient of viscosity –Streamline flow-Turbulent flow– Reynold's number		**2**	**2 hours lecture& Discussion**
Poiseuille's **method for determining** co-efficient of viscosity of a liquid and comparison of Viscosities		**3**	**2 hour lecture 1 hour ICT&Discussion**
Poiseuille's **method for determining** co-efficient of viscosity of a liquid **(variable pressure head)**		**2**	**1 hour lecture 1 hour ICT&Discussion**
Equation of continuity- -Bernoulli's theorem – Statement and proof		**3**	**2 hours lecture& 1 hour Discussion**
Applications-Venturimeter,Pitot tube		**2**	**1hours lecture 1 hourICT& Discussion**
UNIT III : HEAT (CONDUCTION, CONVECTION AND RADIATION) (12 Hrs)			
Conduction (definition) - Thermal conductivity-coefficientofthermalconductivity – Determination of thermal conductivity by Lee's disc method		**4**	**2 hours lecture 1 hour ICT 1 hour Discussion and Quiz**
Convection (definition) -convection in the atmosphere-Green House Effect-Atmospheric Pollution		**3**	**2 hours lecture 1 hour ICT&Discussion**
Radiation (definition) - Stefan's Law-determination of Stefan's constant by filament heating method, Solar constant- Temperature of the Sun		**5**	**3 hours lecture 1 hour ICT & 1 hourDiscussion**
UNITIV : THERMODYNAMICS (12Hrs)			
Zeroth Law of thermodynamics – First, second and third law of thermodynamics		**3**	**2 hours lecture 1 hour Discussion and ICT**
Heat engine- Carnot'sengine and Carnot's cycle – Efficiency of a Carnot's engine		**5**	**4 hours lecture 1 hour Discussion and ICT**
Entropy – Change of entropy in a Carnot's cycle, change of entropy in conversion of ice into stream		**4**	**3 hours lecture 1 hour Discussion and Problem solving**
UNIT V : OPTICS (12 Hrs)			
Interference (Definition)– conditions for maxima and minima –Stoke's law		**3**	**2 hours lecture 1 hour Discussion**

Air wedge–Experiment to measure the diameter of thin film - thickness of a thin wire	**3**	**2 hours lecture** **1 hour Discussion and ICT**
Diffraction (Definition) – Fresnel diffraction - Fraunhofer diffraction - Theory of transmission grating- determination of wavelength of light using transmission grating	**3**	**2 hours lecture** **1 hour Discussion and ICT**
Polarization (Definition) -Double Refraction-Uniaxial crystal, Nicol Prism	**3**	**2 hours lecture** **1 hour Discussion and ICT**

Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	4	3	4	3	4	3	4	3	3	3.4
CO2	4	3	3	4	3	4	3	4	3	3	3.4
CO3	4	3	3	4	3	4	4	3	3	4	3.5
CO4	4	3	3	3	4	4	3	3	3	3	3.3
CO5	4	3	4	3	4	4	3	4	3	3	3.5
Mean Overall Score											3.42

Result: The Score for this Course is 3.42 (High Relationship)

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$

Mean Overall Score of COs = $\frac{\text{Total of Mean scores}}{\text{Total No. of COs}}$

ASSESSMENT RUBRICS

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
K1 (REMEMBERING/RECALLING)	30%	30%
K2 (UNDERSTANDING/COMPREHENSION)	40%	40%
K3 (APPLICATION and ANALYSIS)	30%	30%

Course Designer: Dr. P. INDRA DEVI, Dr. A. BEULAH MARY & Dr.P.N.NIRMALAAssistant Professor, Department of Physics.

Programme : B.Sc., Chemistry **Part III : Allied Paper II**

Semester : II **Hours : 04 HrsP/W 60 Hrs/P/S**
Sub. Code : U22APCT2 **Credits :3**

TITLE OF THE PAPER : ALLIED PHYSICS – II (T)

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDEOS/TUTORIAL	ICT
	4	3	-	1	-

Preamble:
The scope of this course is to understand the concepts of resistances, capacitance, amount of current that can pass through a conductor using ohms law and its applications, effect of magnetic field due to current and concept of resonant frequency in tuning circuits, construction of a rectifier, amplifiers and oscillator, basic digital electronics principles through logic gates and the laws governing them

COURSE OUTCOME On the successful completion of the course students will able to	Unit	Hrs P/S
CO1 : understand the uses of resistance and capacitance and able to determine the unknown values like current, voltage in the circuit	1	12
CO2 : know how electrons are ejected from the surface of a metal when light is incident on it and its technological applications	2	12
CO3 understand the basic concepts of electromagnetic induction and acquire complete knowledge about Alternating current	3	12
CO4 :explain the methods of biasing transistors & design of simple amplifier circuits and to develop the ability to analyze and design analog electronic circuits using discrete components..	4	12
CO5 :apply knowledge of number systems, codes and Boolean algebra to the analysis and design of digital logic circuits.	5	12

UNIT I : CURRENT ELECTRICITY

Ohm's law (Definition) –Kirchoff's laws – Application of Kirchoff's laws to Wheatstone's network – condition for balance - Carey-Foster's bridge – Measurement of specific resistance – – Potentiometer – calibration ofVoltmeter (low range)-Calibration of ammeter

UNIT II : PHOTO ELECTRICITY

Photo electricity -Laws of photoelectric emission (laws only) – Einstein's photo electric equation – Photoelectric cells – Photo emissive cells – Photoconductive and Photovoltaic cells – Applications of photoelectric cells-Solar cell (Principle, Construction, working)

UNIT III : ELECTROMAGNETISM

Electromagnetic Induction – Faraday's laws – Lenz law – Self Induction– Mutual Induction– Coefficient ofCoupling-A.C. Circuits – Mean value, RMS value, Peak value (Alternating Current alone)– LCR in series circuit – impedance – resonant frequency – sharpness of resonance.

UNIT IV : ANALOG ELECTRONICS

Formation of PN junction diode – Forward and reverse biasing of a junction diode- V-I Characteristics-Bridge rectifier (construction and working) – Transistor– working of an n-p-n transistor - Characteristics of a Transistor (CE mode) –Common Emitter Transistor Amplifier

UNIT V : DIGITAL ELECTRONICS

Number systems – Decimal – Binary – conversion of one number system to another number system (Decimal & Binary)-Binary addition and subtraction –Laws and theorems of Boolean algebra- De-Morgan;s Theorems - Basic Logic Gates – OR, AND, NOT – The NOR gate – NOR Gate is an universal gate

.

TEXT BOOKS

1. **Electricity and Magnetism - Narayanamurti, Nagarathinam, Lakshminarayan- The National Publishing Co., 3rd revised edition 1994**

   UNIT I – Chapter VII -7.3
2. **Electricity and Magnetism R.Murugesan -S.Chand & company Pvt.Limited 10th edition 2017**

   UNIT I – Chapter -VI – 6.6, 6.7, 6.8
3. **Modern Physics R.Murugesan, Kiruthiga Sivaprasath -S.Chand & company Pvt.Limited 18e edition 2019**

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   UNIT III – Chapter – XI& XIII – 11.1,11.3,11.15,11.19,13.1,13.3
5. **Electricity and electronics – R. Murugesan, For Madurai Kamaraj university B.Sc., Ancillary Physics III Semester (2007)**

   UNIT IV – Chapter –IV - 4.1,4.2,4.3, 4.7, 4.9, 4.10, 4.12, 4.14

   UNIT V– Chapter – V–5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8, 5.9,5.10,5.11,5.12, 5.13, 5.14, 5.15,

REFRENCE BOOKS

1. ElectricityandMagnetism–R.Murugesan,S.chand&co,2001.
2. ModernPhysics–R.Murugesan,S.chand&co,1998.
3. Basic Electronics – B.L. Theraja, S. chand & co,2003.

WEB REFRENCES

1. Free Basic Electronics Books Download | Ebooks Online Textbooks (freebookcentre.net)
2. 20+ Electricity Books for Free! [PDF] | InfoBooks.org

UNITS	TOPIC	LECTURE	MODE OF TEACHING

		HOURS	
UNIT I : CURRENT ELECTRICITY(1 2 Hrs)			
Ohm's law (Definition) – Kirchoff's laws		3	2 hours Lecture And1 hour Discussion
Application of Kirchoff's laws to Wheatstone's network – condition for balance		3	2 hours Lecture and 1 hour Discussion and problem solving
Carey-Foster's bridge –measurement of specific resistance		3	2 hours Lecture 1 hour ICT and Discussion
Potentiometer – calibration ofVoltmeter (low range)-Calibration of ammeter		3	2 hours Lecture 1 hour ICT and Discussion
UNIT II : PHOTO ELECTRICITY (12 Hrs)			
Photo electricity -Laws of photoelectric emission		4	3 hours lecture 1 hourICT& Discussion
Einstein's photo electric equation – Photoelectric cells – Photo emissive cells		4	3 hours lecture 1 hourICT& Discussion
Photoconductive and Photovoltaic cells – Applications of photoelectric cells-Solar cell (Principle, Construction, working)		4	3 hours lecture 1 hourICT&Discussion
UNIT III : ELECTROMAGNETISM (12 Hrs)			
Electromagnetic Induction – Faraday's laws – Lenz law		2	1 hour lecture 1 hour Discussion and Quiz
Self Induct**ion**– Mutual Induct**ion**– Coefficient ofCoupling		3	2 hours lecture 1 hour ICT&Discussion
A.C. Circuits – Mean value, RMS value, Peak value (Alternating Current alone)		3	2 hours lecture 1 hour ICT&Discussion
LCR in series circuit – impedance – resonant frequency – sharpness of resonance.		4	2 hours lecture 1 hour ICT&Discussion 1 hour Problem solving
UNIT IV : ANALOG ELECTRONICS (12 Hrs)			
Formation of PN junction diode – Forward and reverse biasing of a junction diode		2	1 hour lecture 1 hour Discussion and ICT
V-I Characteristics-Bridge rectifier		3	2 hours lecture 1 hour Discussion and ICT
Transistor– working of an n-p-n transistor - Characteristics of a Transistor (CE mode)		3	2 hours lecture 1 hour Discussion and problem solving
Common Emitter Transistor Amplifier		4	3 hours lecture 1 hour Discussion and problem solving
UNIT V : DIGITAL ELECTRONICS (12Hrs)			
Number systems – Decimal – Binary		2	1hours lecture 1 hour Discussion
conversion of one number system to another number system (Decimal & Binary)Binary addition and subtraction		4	3 hours lecture 1 hour Discussion and ICT
Laws and theorems of Boolean algebra- De-			2 hours lecture

Morgan;s Theorems	3	1 hour Discussion
Basic Logic Gates – OR, AND, NOT – – The NOR gate – NOR Gate is an universal gate	3	2 hours lecture 1 hour Discussion and problem solving

Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	3	3	3	4	4	3	3	4	3	3.4
CO2	4	3	4	3	3	4	3	3	3	3	3.3
CO3	4	3	3	4	3	4	3	4	3	4	3.5
CO4	4	4	3	4	3	4	3	3	4	4	3.6
CO5	3	4	4	3	3	4	3	4	4	3	3.5
Mean Overall Score											3.46

Result: The Score for this Course is 3.46 (High Relationship)

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$

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Course Designer: Dr. P. INDRA DEVI, Dr. A. BEULAH MARY & Dr. P.N.NIRMALA, Assistant Professor, Department of Physics.

Programme : B.Sc., Maths **Part III : Allied Paper II**
Semester : IV **Hours : 04 HrsP/W 60 Hrs/P/S**

Sub. Code : U22APMT2 **Credits :3**

TITLE OF THE PAPER : GENERAL PHYSICS – II (T)

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDEOS/TUTORIAL	ICT
	4	3	-	1	-

Preamble:

The scope of this course is to understand the concepts of resistances, capacitance, amount of current that can pass through a conductor using ohms law and its applications, effect of magnetic field due to current and concept of resonant frequency in tuning circuits, construction of a rectifier, amplifiers and oscillator, basic digital electronics principles through logic gates and the laws governing them

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CO1 : understand the uses of resistance and capacitance and able to determine the unknown values like current, voltage in the circuit	1	12
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CO3 understand the basic concepts of electromagnetic induction and acquire complete knowledge about Alternating current	3	12
CO4 :**e**xplain the methods of biasing transistors & design of simple amplifier circuits and to develop the ability to analyze and design analog electronic circuits using discrete components..	4	12
CO5 :apply knowledge of number systems, codes and Boolean algebra to the analysis and design of digital logic circuits.	5	12

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   UNIT V– Chapter – V –5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8, 5.9,5.10,5.11,5.12, 5.13, 5.14, 5.15, 5.16, 5.17

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Morgan;s Theorems	3	1 hour Discussion
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Course Outcomes (Cos)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean scores of Cos
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CO2	4	3	4	3	3	4	3	3	3	3	3.3
CO3	4	3	3	4	3	4	3	4	3	4	3.5
CO4	4	4	3	4	3	4	3	3	4	4	3.6
CO5	3	4	4	3	3	4	3	4	4	3	3.5
Mean Overall Score											3.46

Result: The Score for this Course is 3.46 (High Relationship)

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
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Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
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Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$

Mean Overall Score of COs = $\frac{\text{Total of Mean scores}}{\text{Total No. of COs}}$

ASSESSMENT RUBRICS

BLOOM'S TAXANOMY	INTERNAL	EXTERNAL
K1 (REMEMBERING/RECALLING)	30%	30%
K2 (UNDERSTANDING/COMPREHENSION)	40%	40%
K3 (APPLICATION and ANALYSIS)	30%	30%

Course Designer: Dr. P. INDRA DEVI, Dr. A. BEULAH MARY & Dr. P.N.NIRMALA, Assistant Professor, Department of Physics.

Programme : B.Sc., Chemistry **Part III : Allied Physics Lab**
Semester : II **Hours : 03 HrsP/W 45Hrs/P/S**
Sub. Code : U22APCP **Credits :3**

TITLE OF THE PAPER : ALLIED PHYSICS PRACTICAL

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDEOS/TUTORIAL	ICT
	3	2	-	1	-

Preamble:
The course provides hands on training in Physics experiments relevant to the theory learnt in allied courses and to develop basic lab skills.

COURSE OUTCOME

On the successful completion of the course students will able to

CO1 : use vernier caliper and screw gauge for various measurements

CO 2 : apply the concepts of Physics relevant to the theory learnt in allied core courses in a practical situation

CO 3 evaluate various physical properties of materials through experiments

CO 4 : analyze the basic electrical circuit and to find the unknown value of current and inductance

CO 5 :construct logic circuits using universal NAND or NOR gates.

Any Twelve Only (For Two Semesters)

1. Young's Modulus – Uniform Bending (Optic lever) .
2. Young's Modulus – Non-Uniform Bending (Pin & Microscope).
3. Torsion Pendulum – Rigidity Modulus
4. Coefficient of Viscosity by Poiseullie's method.
5. Comparison of coefficient of viscosity of two liquids
6. Thickness of a thin wire by Air-Wedge.
7. Spectrometer - Grating – Normal incidence method.
8. Potentiometer – Calibration of voltmeter.
9. LCR – Series Resonance Circuit.
10. LCR – Parallel Resonance Circuit.
11. Junction and Zener diode – V-I Characteristics.
12. Logic gates – OR, AND, NOT (Using discrete components).
13. Verification of Ohm's law
14. NOR as an universal gate

For Ancillary Physics Examination Marks Allotment

PPA Practical Examination :

External examination is at the end of II semester (Chemistry) IV semester (Maths) .

Exam Duration - 3 Hrs
Internal Marks - 40
External Marks - 60
Total Marks - 100

Internal Marks:

Record - 10 Marks
Viva voce - 10 Marks
Model Exam - 20 Marks
Total - 40 Marks

ExternalMarks:

External Exam - 60 Marks

TEXT BOOKS

3. Ouseph, C. C., Rao, U. J. and Vijayendran, V., 2010, "Practical Physics and Electronics", First Edition, S. Viswanathan Printers and Publishers Pvt. Ltd., Chennai.
4. Subrahmanyam, S. V., Malakondaiah, K. and Narasimhamurthy, Y., 2011, "Experiments in Electronics", Second Edition, McMillan Publishers India Limited, New Delhi.

REFERENCE BOOKS

6. Arora, C. L., 2012, "B.Sc. Practical Physics", Twentieth Edition, S. Chand & Company Limited, New Delhi.
7. Kakani, S. L. and Shubhra, K., 2015, "Applied Physics – Theory and Practicals", Second Edition, Viva Books Pvt. Ltd., New Delhi.
8. Kakani, S. L. and Shubhra, K., 2011, "Engineering Practical Physics", First Edition, CBS Publishers Pvt. Ltd., New Delhi.
9. Manjeet, S. and Anita, D., 2011, "Applied Physics - Theory and Experiments", Third Edition, Vayu Education of India, New Delhi.
10. Srivasta, A. and Shukla, R. K., 2018, "Practical Physics", Second Edition, New Age International Pvt. Ltd., New Delhi.

WEB REFERENCES

1. Practical - Applied Physics-I | Aminotes
2. General Physics Laboratory Experiments: Video Lectures | CosmoLearning Physics

Course Designer: Dr. P. INDRA DEVI, Dr. A. BEULAH MARY& Dr. P.N.NIRMALA, Assistant Professor

Programme : B.Sc., Maths **Part III : Allied Physics Lab**
Semester : IV **Hours : 03 HrsP/W 45Hrs/P/S**
Sub. Code : U22APMP **Credits :3**

TITLE OF THE PAPER : GENERAL PHYSICS PRACTICAL

Pedagogy	Hours	Lecture	Peer Teaching	GD/VIDEOS/TUTORIAL	ICT
	3	2	-	1	-

Preamble:
The course provides hands on training in Physics experiments relevant to the theory learnt in allied courses and to develop basic lab skills.

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On the successful completion of the course students will able to

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3. Torsion Pendulum – Rigidity Modulus
4. Coefficient of Viscosity by Poiseullie's method.
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12. Logic gates – OR, AND, NOT (Using discrete components).
13. Verification of Ohm's law
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For Ancillary Physics Examination Marks Allotment

PPA Practical Examination :

External examination is at the end of II semester (Chemistry) IV semester (Maths) .

Exam Duration - 3 Hrs
Internal Marks - 40
External Marks - 60
Total Marks - 100

Internal Marks:

Record - 10 Marks
Viva voce - 10 Marks
Model Exam - 20 Marks
Total - 40 Marks

ExternalMarks:

External Exam - 60 Marks

TEXT BOOKS

5. Ouseph, C. C., Rao, U. J. and Vijayendran, V., 2010, "Practical Physics and Electronics", First Edition, S. Viswanathan Printers and Publishers Pvt. Ltd., Chennai.
6. Subrahmanyam, S. V., Malakondaiah, K. and Narasimhamurthy, Y., 2011, "Experiments in Electronics", Second Edition, McMillan Publishers India Limited, New Delhi.

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11. Arora, C. L., 2012, "B.Sc. Practical Physics", Twentieth Edition, S. Chand & Company Limited, New Delhi.
12. Kakani, S. L. and Shubhra, K., 2015, "Applied Physics – Theory and Practicals", Second Edition, Viva Books Pvt. Ltd., New Delhi.
13. Kakani, S. L. and Shubhra, K., 2011, "Engineering Practical Physics", First Edition, CBS Publishers Pvt. Ltd., New Delhi.
14. Manjeet, S. and Anita, D., 2011, "Applied Physics - Theory and Experiments", Third Edition, Vayu Education of India, New Delhi.
15. Srivasta, A. and Shukla, R. K., 2018, "Practical Physics", Second Edition, New Age International Pvt. Ltd., New Delhi.

WEB REFERENCES

1. Practical - Applied Physics-I | Aminotes
2. General Physics Laboratory Experiments: Video Lectures | CosmoLearning Physics

Course Designer: Dr. P. INDRA DEVI, Dr. A. BEULAH MARY& Dr. P.N.NIRMALA, Assistant Professor

VALUE ADDED COURSES FOR OTHER MAJOR

Programme: B.sc./B.A./B.com./BBA.
Semester : III **Hours : 2 Hrs/W , 30Hrs/S**
Sub. Code : VAP1 **Credits : 2**

TITLE : RENEWABLE ENERGY SOURCES

COURSE OBJECTIVES

After completion of the course, the students will be able to

CO1 : understand the need of renewable energy sources
CO2 : acquire the knowledge of different types of renewable energy sources
CO3 : understand the concept of renewable energy sources and their applications
CO4 : develop biogas plant at the minimal scale

Unit I: Introduction

Difference between renewable energy sources and non-renewable energy sources-need of renewable energy sources

Unit II: Solar Energy

Introduction-solar constant-application of solar energy

Unit III: Tidal Energy

Introduction-basic principles of tidal power-advantages and limitations of tidal power

Unit IV: Wind Energy

Introduction-wind energy conversion-wind energy collector

Unit V: Bio-mass energy

Introduction-biomass conversion-advantages of anerobic digestion

Text Book:
Non conventional energy sources - G.D. Rai – IV Edition,

IX Print, 2001,Khanna publishers,
Delhi

Value Added course for B.Sc Physics

Programme : B.Sc **Hours : 2Hrs / W , 30 Hrs/S**

Semester : IV **Credit : 2**

Sub . Code :

Title : Agricultural Physics

Scope:. To impart basic knowledge about physics related to agriculture and plant growth.

Unit I: Basic concepts of Physics

Importance of physics related to agriculture- physical laws – Brownian movement – Tyndoll effect-– Adhesion and Cohesion properties – hydrostatic pressure- Surface tension relevant to agriculture

Unit II: Soil physics

Physical properties of soils - Soil moisture movement – physical classification of soil moisture - thermal properties of soils- heat capacity – heat conductivity –specific heat - factors affecting soil temperature - measurement of soil temperature- management of extreme soil temperatures.

Unit III: Nanophysics in agriculture

Nano particles definition – physical properties of nanoparticles – natural nanoparticles - working principles of Transmission Electron microscope –Scanning Electron Microscope - their applicationsrelated to agriculture– application of nanotechnology in modern agricultural practices

Unit IV: Soil Water Movement

Water flow in saturated and unsaturated soils– capillary movement of water in soil andplant –tortuosity of water insoils –Poiseuille's law, Darcy's law; hydraulic conductivity, permeability and fluidity, measurement of hydraulic conductivity in saturated and unsaturated soils.

Unit V: Physical constraints in agriculture and instrumentation

Soil constraints – impermeability of soil – compaction methods – causes and effects of soil compaction – types of soil compaction - Soil physics as a factor in soil management – measure of soil moisture - Tensiometer- measure of hydrostatic pressure of ground water-Peizometer-measure of soil strength penetrometer

TEXT BOOK :

Chinnamuthu, C.R., B.Chandrasekaran and C.Ramasamy, 2007. Nanotechnology Applications in Agriculture. TNAU Offset & Printing Press, Directorate of Open and Distance Learning, TNAU, Coimbatore.

REFERENCE BOOK:

1. William Lambe, T and Robert V. Whitman 1979. Soil Mechanics. Willey Eastern Ltd, New Delhi

HelmutKohnke,1979.SoilPhysics.TataMcGraw-HillP