PSGR Krishnammal College for Women

DEPARTMENT OF PHYSICS (SF)

CHOICE BASED CREDIT SYSTEM &

OUTCOME BASED EDUCATION

SYLLABUS

BACHELOR OF PHYSICS (SF)

2020– 2021 BATCH

PROGRAMME OUTCOME - UG

PO1 : To enhance the student's academic abilities, personal qualities and transferable skills which will give them an opportunity to develop as responsible citizens.

PO2 : To define the basic laws involved in Physics

PO3 : To understand the concepts and significance of the various physical phenomena.

PO4 : To carry out experiments to understand the laws and concepts of Physics.

PO5 : To apply the theories learnt and the skills acquired to solve real time problems.

PO6 : To acquire a wide range of problem solving skills, both analytical and computational and to apply them.

PROGRAMME SPECIFIC OUTCOME

At the end of the programme the student will

PSO1 : Gain a wide spectrum of skills which will enable them to solve both theoretical and experimental problems.

PSO2 : Secure jobs in banks, in the field of Education, and in industries which require Scientific and Engineering knowledge.

PSO3 : Understand the importance of renewable energy and its applications.

PSO4 : Acquire the skill to gauge the physical properties of materials.

PSO5 : Be able to make effective use of information technology

PSGR Krishnammal College for Women

DEPARTMENT OF PHYSICS (SF)

CHOICE BASED CREDIT SYSTEM & OUTCOME BASED EDUCATION SYLLABUS & SCHEME OF EXAMINATION BACHELOR OF PHYSICS – 2020-2021 BATCH

Programme & Branch B.Sc Physics												
Scheme of Examination **(Applicable to students admitted during the academic year *2020- 2021*onwards)**												
Semester	**Part**	**Subject Code**	**Title of the Paper**	**Instruction hrs/ week**	**Instruction hrs/ sem**	**Tutorial hrs**	**Duration of Examination**	**Examination marks**			
								CA	**ESE**	**Total**	**Credits**
I	I	TAM2001/ HIN2001/ FRE2001	Language T/H/F Paper I	6	86	4	3	40	60	100	3
	II	ENG2001/ ENG20F1	English Paper I/ Functional English	6	86	4	3	40	60	100	3
	III		**Group A – Core**								
		PS20C01	Core Physics Paper I: Mechanics, Properties of Matter and Sound	6	86	4	3	40	60	100	5
		PS16CP1	Core Physics Practical I	3			-	-	-	-	-
			Group B – Allied - Paper I								
		CE20A03/	Allied Chemistry Paper –I /	4	56	4	3	40	60	100	4
		TH20A01/	Mathematical Statistics- I with R /								
		CE20AP2	Allied Chemistry Practicals	3			-	-	-	-	-
	IV		**Non Tamil Students**								
		NME19B1/	Basic Tamil I/	2	27	3	3	50	50	100	2
		NME19A1/	Advanced Tamil I/	2	27	3	3	50	50	100	
			Students with Tamil as Language								
		NME12WS/	Women Studies/	2	27	3		100		100	
		NME12AS	Ambedkar Studies					100		100	

		NME12GS/	Gandhian Studies/					100		100	
		NME18ES	Introduction to Entrepreneurship	2	27	3		100		100	
II	**I**	TAM2002/ HIN2002/ FRE2002	Language T/H/F Paper II	6	86	4	3	40	60	100	3
	II	ENG2002/ ENG20F2	Part II–English Paper II / Functional English	6	86	4	3	40	60	100	3
	III		**Group A – Core**								
		PS20C02	Core Physics Paper II Heat and Thermodynamics	5	71	4	3	40	60	100	4
		PS16CP1	Core Physics Practicals – I	3			3	40	60	100	4
			Group B – Allied - Paper I								
		CE20A04	Allied Chemistry Paper –II	5	71	4	3	40	60	100	4
		TH20A05	Mathematical Statistics –II with R								
		CE20AP2	Allied Chemistry Practicals	3			3	20	30	50	2
	IV		**Group C**								
		NME19B2/	Basic Tamil II /	2				50	50	100	Grade
		NME19A2/	Advanced Tamil II/	2				50	50	100	Grade
		REG16EE	Effective English Communication (EEC)	2				50	50	100	2
			Open Course (Self Study online courses)	-	-	-	-	-	-	-	-
	VI	NM12GAW	General Awareness	Self Study				-	-	Grade	-
III	**I**	TAM1603/ HIN1603/ FRE1603	Language T/H/F Paper III	6	86	4	3	40	60	100	3
	II	ENG2003 / ENG20F3	Language Through Literature - Level III/ Language Through Literature - Functional Level III	5	71	4	3	40	60	100	3
	III		**Group A – Core**								
		PS20C03	Core Physics Paper III Electricity and Magnetism	4	56	4	3	40	60	100	4
		PS20CP2	Core Physics Practical – II	3			-	-	-	-	-
			Group B – Allied - Paper I								
		TH16A12	Allied Mathematics for Physics - I	7	101	4	3	40	60	100	5
		PL16A01	Allied Botany Paper- I	4							4

		AS16A01	Allied Zoology Paper I	4	101	4	3	40	60	100	4
			Skill Based Subject								
		PS19SB01	Skill Based Elective - Theory Programming in C	1							
		PS19SBP1	Skill Based Elective Practicals Programming in C	2							
	IV	NM14VHR	Value Education and Human Rights	2	27	3	3	25	75	100	2
	VI		Job Oriented Course PCB Fabrication Techniques	After 12.50 PM			3	-	-	Grade	-
IV	**I**	TAM1604/ HIN1604/ FRE1604	Language T/H/F Paper IV	5	71	4	3	40	60	100	3
	II	ENG2004 / ENG20F3	Language Through Literature - Level III/ Language Through Literature - Functional Level III	6	86	4	3	40	60	100	3
	III		**Group A – Core**								
		PS20C04	Core Physics Paper IV Fundamentals of Digital Electronics	4	56	4	3	40	60	100	4
		PS20CP2	Core Physics Practicals – II	3			3	40	60	100	4
			Group B – Allied - Paper II								
		TH16A13	Allied Mathematics for Physics - II	7	101	4	3	40	60	100	5
		PL16A02	Allied Botany Paper- II	4		4	3	40	60	100	4
		AS16A02	Allied Zoology Paper II								
		PL16AP1	Allied Botany Practicals	3			3	20	30	50	2
		AS16AP1	Allied Zoology Practicals								
			Skill Based Subject								
		PS19SB01	Skill Based Elective - Theory Programming in C	2			2	25	75	100	3
		PS19SBP1	Skill Based Elective Practicals Programming in C	1			2	40	60	100	2
	IV	NM10EVS	Environmental Studies	2	27	3	3	25	75	100	2
	VI	INSTI	Internship (4 Weeks)	-			-	-	100	100	2
	V	COCOACT	NSS/NCC/YRC/ SPORTS&GAMES	-			-	-	100	100	1

BLOOM'S TAXONOMY BASED QUESTION PAPER PATTERN

CORE & ALLIED PAPERS

Continuous Internal Assessment: 20 Marks

Bloom's Category	SECTION	MARKS	WORD LIMIT	TOTAL
Remember (K1) & Understand (K2)	A – 5 X 2 Marks	10	One or two sentences	50
Remember(K1) & Understand (K2)	B – 4 X 5 Marks	20	250	
Apply(K3) & Analyse (K4)	C - 2/3 X 10 Marks	20	500	

End Semester Examination: 20 Marks

Bloom's Category	SECTION	MARKS	WORD LIMIT	TOTAL
Remember (K1) & Understand (K2)	A-11/13 X 2 Marks	22	One or two sentences	100
Remember(K1) & Understand (K2)	B – 5/7 X 6 Marks	30	250	
Apply(K3) & Analyse (K4)	C - 4/6 X 12 Marks	48	500	

SKILL BASED SUBJECT

Continuous Internal Assessment: 20 Marks

SECTION	MARKS	TOTAL
A – 4 / 6 X 4 Marks	16	25
B – 1 / 2 X 9 Marks	9	

End Semester Examination: 20 Marks

SECTION	MARKS	TOTAL
A- 4 / 6 X 5 Marks	20	50
B – 2 / 3 X 15 Marks	30	

ADVANCED LEARNERS COURSE (ALC)

Continuous Internal Assessment: 20 Marks

SECTION	MARKS	TOTAL
A – 4 / 6 X 4 Marks	16	25
B – 1 / 2 X 9 Marks	9	

End Semester Examination: 20 Marks

SECTION	MARKS	TOTAL
A-5/8X5=25 Marks	25	75
B – 5/8X10=50 Marks	50	

VALUE EDUCATION AND HUMAN RIGHTS / WOMEN STUDIES / AMBEDKAR STUDIES / GANDHIAN STUDIES / ENTREPRENEURSHIP / ENVIRONMENTAL STUDIES

Continuous Internal Assessment: 50 Marks

SECTION	MARKS	TOTAL
A – 4 / 6 X 5 Marks	20	50
B – 2 /3 X 15 Marks	30	

Value Education and Human Rights & Environmental Studies two internal tests will be conducted for 50 marks each and the total marks secured will be equated to a maximum of 75 marks and 25 marks is allotted for project / group discussion / presentation of a report.

INFORMATION SECURITY

Continuous Internal Assessment: 50 Marks

SECTION	MARKS	TOTAL
A – 5 / 8 X 2 Marks	10	40
B – 6 / 8 X 5 Marks	30	

FIELD TRAINING

The students have the option to select any organization – Government / private like industry, R & D organizations, scientific companies, etc., in consultation with the staff co-ordinator & HoD. The students are to undergo training for a period of two weeks at the end of semester IV during vacation. The students must maintain a work diary and prepare report of the training undergone and submit the same to the HoD. On a stipulated date, there will be a viva-voce with internal examiners at the beginning of the semester V

MODE OF EVALUATION	MARKS	TOTAL
Attendance	10	100
Work Diary	15	
Report	50	
Viva-voce	25	

PROJECT

To make the students to understand the importance of experimental analysis, scientific approach in solving problems related to the environment and society and to educate and train the students to write scientific papers

Group Project & viva voce

Each group will be comprising of 5 members and will be allotted to a staff coordinator. A specific problem will be assigned to the students or they will be asked to choose a problem/ area of interest. The topic/ area of work will be finalized at the end of IV semester, allowing scope for the students to gather relevant literature during the vacation. The research work can be carried at the college or any other organization approved by the staff coordinator and the HOD. Viva-voce/ presentation will be conducted by a panel of internal examiners including the HOD and the staff coordinator guiding the project. A PowerPoint / OHP presentation by the group before the audience will be evaluated on the basis of student's response to questions.

Area of work

Electronics, Optics, Mechanics, Heat, Crystallography, Nano Technology,Applications of Physics in IoT, Space science, Batteries.

Methodology

Each project should contain the following details:

- Brief introduction on the topic
- Review of literature
- Materials and Methods
- Experimental Results and Discussion – evidences in the form of figures, tables and photographs can be enclosed
- Summary
- Bibliography

The above content should not exceed 50 pages.

Evaluation

Internal Evaluation: 20 Marks

Review	Mode of Evaluation	Marks	Total
I	Selection of the field of study, topic & literature collection	5	20
II	Research design & data collection	10	
III	Analysis & conclusion Preparation of rough draft	5	

External Assessment: 80 Marks

Mode of Evaluation	Marks	Total
Project Report		
Relevance of the topic to the academic / society	10	60
Objectives	10	
Experimental design	20	
Expression of results and discussion	20	
Viva voce		
Presentation	10	20
Discussion	10	

WEIGHTAGE ASSIGNED TO VARIOUS COMPONENTS OF CONTINUOUS INTERNAL ASSESSMENT

THEORY:

	CIA I	CIA II	Model Examination	Assignment/ Class Notes	Seminar	Quiz	Class Participation	Library Usage	Attendance	Max Marks
Core/Allied	5	5	6	4	5	4	5	3	3	40
SBS	5	5	15	-	-	-	-	-	-	25
ALC	-	10	15	-	-	-	-	-	-	25
Information Security	40	40	-	10	-	10	-	-	-	100

PRACTICAL:

	Model Exam	Lab Performance	Regularity in Record Submission	Attendance	Maximum Marks
Core / Allied / SBS	12	20	5	3	40

RUBRICS

ASSIGNMENT/ SEMINAR

Maximum - 20 Marks (converted to 4 marks)

Criteria	4 Marks	3 Marks	2 Marks	1 Mark
Focus Purpose	Clear	Shows awareness	Shows little awareness	No awareness
Main idea	Clearly presents a main idea.	Main idea supported throughout	Vague sense	No main idea
Organisation: Overall	Well planned	Good overall organization	There is a sense of organization	No sense of organization

Content	Exceptionally well presented	Well presented	Content is sound	Not good
Style: Details and Examples	Large amounts of specific examples and detailed description	Some use of examples and detailed descriptions	Little use of specific examples and details	No use of examples

CLASS PARTICIPATION

Maximum - 20 Marks (converted to 5 marks)

Criteria	5 Marks	4 Marks	3 Marks	2 Marks	1 Mark
Level of Engagement in Class	Student proactively contributes to class by offering ideas and asks questions more than once per class.	Student proactively contributes to class by offering ideas and asks questions once per class	Student contributes to class and asks questions occasionally	Student rarely contributes to class by offering ideas and asking no questions	Student never contributes to class by offering ideas
Listening Skills	Student listens when others talk, both in groups and in class. Student incorporates or builds off of the ideas of others.	Student listens when others talk, both in groups and in class.	Student listens when others talk in groups and in class occasionally	Student does not listen when others talk, both in groups and in class.	Student does not listen when others talk, both in groups and in class. Student often interrupts when others speak.
Behavior	Student almost never displays disruptive behavior during class	Student rarely displays disruptive behavior during class	Student occasionally displays disruptive behavior during class	Student often displays disruptive behavior during class	Student almost always displays disruptive behavior during class
Preparation	Student is almost always prepared for class with required class materials	Student is usually prepared for class with required class materials	Student is occasionally prepared for class with required class materials	Student is rarely prepared for class with required class materials	Student is almost never prepared for class.

MAPPING OF POs WITH Cos

COURSE	PROGRAMME OUTCOMES					
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**
COURSE – PS20C01						
CO1	M	S	S	S	M	L
CO2	M	S	S	S	M	S
CO3	S	M	S	M	S	S
CO4	S	M	M	S	S	S
CO5	S	M	M	S	S	S
COURSE – PS20C02						
CO1	S	S	M	M	M	S
CO2	S	S	S	S	S	M
CO3	S	S	S	S	M	S
CO4	S	S	S	S	S	S
CO5	S	S	S	S	M	S
COURSE - PS16CP1						
CO1	S	S	L	L	L	L
CO2	S	S	S	S	M	M
CO3	S	S	S	S	M	M
CO4	S	S	S	S	M	M
CO5	S	S	S	S	M	M
COURSE – PS20C03						
CO1	S	S	S	M	M	S
CO2	S	S	S	S	S	M
CO3	S	S	S	S	M	S
CO4	S	S	S	S	M	M
CO5	S	S	S	S	M	M
COURSE – PS20C04						
CO1	S	S	M	M	S	S
CO2	S	S	S	**S**	**S**	S
CO3	S	S	**S**	**S**	**S**	M

CO4	S	S	S	M	S	M
CO5	S	S	S	M	S	S
COURSE – PS20CP2						
CO1	S	S	L	L	L	L
CO2	S	S	S	S	M	M
CO3	S	S	S	S	M	M
CO4	S	S	S	S	M	M
CO5	S	S	S	S	M	M
COURSE – PS19SB01						
CO1	S	M	M	M	S	S
CO2	S	S	S	M	M	S
CO3	S	M	S	S	S	M
CO4	S	S	S	S	S	M
CO5	S	M	S	M	S	S
COURSE – PS19SBP1						
CO1	S	M	M	M	S	S
CO2	S	M	M	M	S	S
CO3	S	M	M	S	S	S
CO4	S	M	M	M	S	S
CO5	S	M	M	M	S	S

PS20C01	MECHANICS , PROPERTIES OF MATTER AND SOUND	Category	L	T	P	Credit
			86	4	-	5

Preamble

To give the students fundamental ideas on conservation laws, rotational and vibrational motion of rigid bodies, elasticity, viscosity, surface tension and basics of sound and ultrasonics.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Understand and define the laws involved in mechanics	K1
CO2.	Gain deeper understanding of mechanics and its fundamental concepts.	K2
CO3.	Rigid body dynamics will help the students to understand the behaviour of various bodies due to kinematic and dynamic forces acting on the body.	K3
CO4.	Describe the key evidence for the breakdown of the classical description of the properties of matter	K3
CO5.	Recall the principles and basic equations and apply them to unseen problems	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6
CO1.	M	S	S	S	M	L
CO2.	M	S	S	S	M	S
CO3.	S	M	S	M	S	S
CO4.	S	M	M	S	S	S
CO5.	S	M	M	S	S	S

S- Strong; M-Medium; L-Low

Syllabus

Unit I **17 Hrs**

Impact of elastic bodies and Friction

Conservation Laws - Collision- Impulse of a force – Fundamental principle of impact-Oblique impact of a smooth sphere on a fixed smooth plane – Direct impact of two smooth spheres- loss

of K.E due to direct impact of two smooth spheres- oblique impact of two smooth spheres and loss of K.E due to oblique impact – friction – Laws of friction – angle of friction –cone of friction – Experimental method for determining co-efficient of friction between two surfaces- Equilibrium of a body on a rough inclined plane acted upon by an External force.

Unit II **17 Hrs**

Rigid Body Dynamics

Rigid body – rotational and vibrational motion – Torque – angular momentum-Angular impulse- moment of inertia – radius of gyration- dimensions and units of moment of inertia-Analogous parameters in translational and Rotational motion

Simple Harmonic Motion

Composition of two simple harmonic motions in a straight line- Composition of two simple harmonic motions of equal time periods at right angles-Lissajous Figures – Experimental methods –Uses of Lissajous Figures

Unit III **17 hrs**

Elasticity

Elasticity - Three types of elastic moduli and relation between them – Poisson's ratio – Bending of beams – Expression for bending moment – Depression of the loaded end of a Cantilever – uniform – non uniform bending – theory – experiment - pin and microscope method – work done in uniform bending – Koenig's method – non-uniform bending - theory - expression for couple per unit twist - determination of rigidity modulus - Static torsion method with scale and telescope - Rigidity modulus by torsion pendulum with mass.

Unit IV **18 hrs**

Viscosity and Surface tension

Viscosity – Poiseuille's formula for the flow of a liquid through a capillary tube- corrections- Poiseuille's method to determine the coefficient of viscosity of liquid- Ostwald's viscometer- variation of viscosity with temperature and pressure – Searle's viscometer (rotating cylinder method).

Surface tension- work done in increasing the area of the surface- work done in blowing a bubble- experimental determination of surface tension – Jaegar's method- Quincke's method- variation of surface tension with temperature - drop weight method- experimental determination of interfacial tension between water and kerosene.

Unit V **17 hrs**

Sound

Velocity of transverse waves along stretched string – Laws of transverse vibration of strings- Melde's experiment- Siren – Determinations of frequency of a tuning fork by revolving drum method and phonic stroboscopic method - Means of Lissajous method - **Acoustics**- Reverberation- Sabine's reverberation formula- Determination of absorption coefficient. **Ultrasonics**- properties- production- Galton whistle – Magnetostriction oscillator – Piezo-electric oscillator- detection and application.

Text Book

S.No	Authors	Title of the Book	Publishers	Year of Publication	Edition
1	Murugeshan.R	Mechanics and Mathematical Methods	S.Chand & Co Ltd, New Delhi	2006	Reprint
2	Mathur D.S	Mechanics	S. Chand & Co Ltd, New Delh	2012	2nd Edition
3	R.Murugesan	Properties of Matter	S.Chand and Company Pvt Ltd	2013	11th edition
4	Saighal.R.L	Textbook of Sound	S.Chand & Co Ltd	1998	2nd Edition

Reference Books

S.No	Authors	Title of the Book	Publishers	Year of Publication	Edition
1	Bhargava & Sharma	A Text Book of Mechanics	Ratan Prakshan Mandir	1990	7th Edition
2	Brijlal Subramanyam	Properties of Matter	S.Chand and Company Pvt Ltd	1995	3rd Edition
3	Murugesan. R	Properties of matter, Sound and thermal physics	S. Chand & Co Ltd	2011	1st Edition

Pedagogy

Chalk and Talk lectures, Group Discussion, Seminar, Interaction, power point presentation.

Course Designers

1. Dr. S.Shanmuga Sundari
2. Dr. J.P.Deeba Sree

PS20C02	HEAT AND THERMODYNAMICS	Category	L	T	P	Credit
			71	5	-	5

Preamble

The aim of this course is to acquire knowledge in heat transfer, entropy, production of low temperature and liquefaction of gases, thermal radiation and statistical thermodynamics

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Listing the basic ideas on heat.	K1
CO2.	Understand the central concepts and basic formalisms of specific heat, entropy, quantum theory of radiation;	K2
CO3.	Use of tools needed to formulate problems in the thermodynamics of gases.	K2
CO4.	Solving problems based on heat transfer, entropy and thermal radiation	K3
CO5.	Finding applications of the physical quantities.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	M	M	M	S
CO2	S	S	S	S	S	M
CO3	S	S	S	S	M	S
CO4	S	S	S	S	S	S
CO5	S	S	S	S	M	S

S- Strong; M-Medium; L-Low

Syllabus

Unit I **14 Hrs**

Kinetic theory of gases

Maxwell's Law of Distribution of Velocities, Mean Free Path - Brownian motion – Langevin's theory of Brownian motion – Einstein's theory of Brownian motion–van der Waal's equation of state – critical constants –experimental determination of critical constants.

Quantum Theory of Specific Heat

Specific heat of solids - Dulong and Petits law and the deduction – failure of Dulong and Petit's law – Einstein's theory and its limitation – Debye theory of specific heat of solids – specific heat of gases – Variation of specific heat of diatomic gases with temperature.

Unit II **14 Hrs**

Production of Low Temperature and Liquefaction of Gases

Methods of production of low temperatures – Joule Thomson effect – Porous plug experiment – its theory and result – Joule Thomson effect for perfect and real gases –Liquefaction of Hydrogen & Helium – Helium I and Helium II -Lamda point - super fluidity – adiabatic demagnetization

Unit III **14 Hrs**

Thermal Radiation

Quantum theory of radiation- Planck's hypothesis – average energy of Planck's oscillator – Planck's radiation law and its experimental verification -Derivation of Planck's law– Derivation of Wein's law and Rayleigh-Jean's from Planck's law – Stefan's and Wein's displacement laws from Planck's law.

Unit IV **14 Hrs**

Entropy

Entropy - Concept of entropy - temperature – entropy diagram – physical significance of entropy - Entropy of a perfect gas. Thermo dynamic potentials- internal energy (U)- Helmtzholtz function (F)- Gibb's function (G) and enthalpy (H) – significance of thermodynamic potentials - Maxwell's thermodynamics relation – the (T-dS) equation – Clapeyron's latent heat equation using Maxwell's thermodynamics relation.

Unit V **15 Hrs**

Statistical Thermodynamics

Probability- Macrostate and microstate – thermodynamic probability – Ensembles – Kinds of Ensembles – Maxwell's Boltzmann distribution law- Maxwell's Boltzmann distribution in terms of temperature – Maxwell quantum statistics – phase space – Bose Einstein distribution law – Fermi - Dirac distribution law – Comparison of three statistics.

Text Books

S.No	Authors	Title of the Book	Publishers	Year of Publication	Edition
1	Brijlal N Subrahmanyam P.S.Hemne	Heat Thermodynamics and Statistical Physics and applications	S. Chand	2012	3rd edition
2	R.Murugeshan Er. Kiruthiga Sivaprasath	Thermal Physics	S.Chand	2012	3rd edition

Reference Books

S. No	Authors	Title of the Book	Publishers	Year of Publication	Edition
1	A.B Gupta H.P. Roy	Thermal Physics	Arunabha Sen	2005	1st edition
2	Agrawal Prakash	Thermal Physics	Pragati Prakashan	2015	27th edition
3	Agrawal Prakash	Thermodynamics and Statistical Physics	Pragati Prakashan	2015	27th edition

Pedagogy

Chalk and talk, PPT, Seminar, Group discussion, Interaction

Course Designers

1. Dr. G. Praveena
2. Mrs. P. Maheswari

PS16CP1	CORE PRACTICALS I

Category	L	T	P	Credit
	-	-	82	4

Preamble

This course introduces students to the methods of experimental physics. Emphasis will be given on laboratory techniques such as accuracy of measurements and data analysis. The concepts that are learnt in the lecture sessions will be translated to the laboratory sessions thus providing a hands-on learning experience such as in measuring the basic concepts in properties of matter, Sound, Heat, Optics, Electricity and Magnetism.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Apply knowledge of mathematics and physics fundamentals and an instrumentation to arrive solution for various problems.	K1
CO2.	Understand the usage of basic laws and theories to determine various properties of the materials given.	K2
CO3.	Understand the application side of the experiments	K2
CO4.	Use standard methods to calibrate the given low range voltmeter and ammeter and to measure resistance of the given coil and various physical quantities.	K3
CO5.	Use of basic laws to study the spectral properties and optical properties of the given prism.	K3

Mapping with Programme Outcomes

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**
CO1.	S	S	L	L	L	L
CO2.	S	S	S	S	M	M
CO3.	S	S	S	S	M	M
CO4.	S	S	S	S	M	M
CO5.	S	S	S	S	M	M

S- Strong; M-Medium; L-Low

Syllabus

List of Experiments

1. Young's Modulus- Non Uniform bending- Optic lever
2. Young's Modulus- Uniform bending – pin and microscope.
3. Rigidity modulus- Static torsion
4. Rigidity modulus and moment of inertia – Torsion pendulum.
5. A.C. Frequency- Sonometer.
6. Acceleration due to gravity – Compound pendulum
7. Co-efficient of thermal conductivity- Lee's disc method
8. Refractive index of a solid prism- Spectrometer
9. Refractive index of a liquid prism- Spectrometer
10. Wavelength of a spectral lines – grating – minimum deviation method using Spectrometer
11. Calibration of a low range voltmeter- Potentiometer
12. Calibration of a low range ammeter- Potentiometer
13. Resistance by Potentiometer
14. Moment of a magnet - deflection magnetometer –Tan C method.
15. Moment of a magnet – Circular coil- deflection magnetometer
16. Temperature co-efficient of resistance of a Thermistor
17. Determination of Spring Constant of different metals.
18. Determination of frequency of tuning fork using Melde's apparatus
19. Experimental determination of Planck's constant.

Pedagogy:

Demonstration and practical sessions

Course Designers:

1. Dr. G. Praveena
2. Dr. P. Meena

PS20C03	ELECTRICITY AND MAGNETISM

Category	L	T	P	Credit
	56	4	-	4

Preamble

The aim of this course is i) to acquire in-depth knowledge in electrostatics and magnetostatics so that students would apply theories of static and moving charges and extend its applications to instruments involving electric and magnetic fields and ii) to give idea on the fundamentals of electromagnetic conduction and electromagnetic waves.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Develop the basic knowledge of scalar and vector fields	K1
CO2.	Understand the Gauss's law in electrostatics and the concepts of electric potential	K2
CO3.	Apply theorems to construct and solve electrical circuits.	K3
CO4.	Ability to analyze the generation of magnetic fields by electrical currents through Biot Savart's law and Ampere's circuital law	K4
CO5.	Build up strong problem solving skills by effectively formulate a circuit problem into a mathematical problem using circuit laws and theorems	K5

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6
CO1.	S	S	S	M	M	S
CO2.	S	S	S	S	S	M
CO3.	S	S	S	S	M	S
CO4.	S	S	S	S	M	M
CO5.	S	S	S	S	M	M

S- Strong; M-Medium; L-Low

Syllabus

Unit I **12 Hrs**

Vector Analysis:

Scalar and Vector fields, gradient of a scalar field, divergence of a vector field, Curl of a vector field and their physical significance, Vector Integration, Line, surface and volume integrals of Vector fields, Gauss divergence theorem and Stoke's theorem of vectors (Statement and proof only)

Electrostatic Field:

Electric field, Continuous charge distribution*, Divergence and curl of electrostatic fields; Field lines, flux and Gauss' law statement and its proof, applications of Gauss's law – uniformly charged spherical shell and conducting sphere, infinite line of charge, uniform infinite cylindrical charge and infinite plane sheet of charge, Coulomb's Law.

Unit II **11 Hrs**

Electric potential:

Introduction to potential, Comments on potential*, Poisson's and Laplace's equations, Potential of a localized charge distribution, electrostatic boundary value problems – Uniqueness theorem

Electrical Images:

Solution of field problems in case of a point charge near a grounded conducting infinite plane. Boundary value problems: in uniform external field for (1) insulated Conducting Sphere. (2) conducting spherical shell and (3) dielectric sphere.

Unit III **11 Hrs**

DC currents:

Growth and decay of charge in series RC circuit, Growth and decay of current in series LR circuit, Growth and Decay of charge in series LCR circuit - Damped, under-damped and over-damped conditions

AC Circuits:

Series resonance circuit- Parallel LCR Circuit – Complex form of LCR circuits- j operator method - Characteristics of LCR Circuit: (1) Resonance, (2) Quality Factor, (3) Band Width and (4) Sharpness of Resonance - power consumed by the above circuits.

Unit IV **11 Hrs**

Magnetic Field:

Magnetic force between current elements and definition of Magnetic Field **B**. Biot-Savart's Law and its simple applications: long straight wire and circular loop. Current Loop as a Magnetic Dipole and its Dipole Moment (Analogy with Electric Dipole). Ampere's Circuital Law and its application to (1) Solenoid and (2) Toroid. Properties of **B**: curl and divergence. Differential form of Ampere's circuital law- Magnetic scalar and Vector Potential -Importance.

Unit V **11 Hrs**

Electromagnetic waves:

Equation of continuity – Displacement current – Significance of displacement current – Derivation of Maxwell's equations – Maxwell's equations in integral form - Differential form* –

Plane electromagnetic waves – Transverse nature of electromagnetic waves - Maxwell's equations in free space-Electromagnetic waves in free space- Poynting theorem (Statement and Proof)

Text Books:

S. No	Authors	Title of the Book	Publishers	Year of Publication	Edition
1	R. Murugesan	Electricity and Magnetism	S. Chand & Co Pvt Ltd	2013	5th Edition
2	Dr. K. K. Tewari	Electricity and Magnetism	S. Chand & Co Pvt Ltd	2011	Revised Edition
3	Brijlal and N. Subrahmanyam	Electricity and Magnetism	S. Chand & Co Pvt Ltd	1990	18th Edition

Reference Books:

S. No	Authors	Title of the Book	Publishers	Year of Publication	Edition
1	David J Griffith	Electrodynamics	Prentice Hall	1999	3rd Edition
2	Edward M. Purcell	Electricity and Magnetism, Berkeley Physics Course – Volume 2	Tata Mc-Graw Hill Education	2011	First Reprint
3	D C Tayal	Electricity and Magnetism	Himalaya Publishing House	1988	2nd edition
4	Sehgal, Chopra, Sehgal	Electricity and Magnetism	S.Chand and sons	2010	2nd edition
5	A S Mahajan, A A Rangwala	Electricity and Magnetism	S.Chand and sons	2007	6th edition

Pedagogy

Chalk and talk, PPT, Seminar, Group discussion, Interaction

Course Designer:

1. Dr.N.Priyadharsini

PS20C04	FUNDAMENTALS OF DIGITAL ELECTRONICS

Category	L	T	P	Credit
	56	4	-	4

Preamble

The aim of this course is to make students acquire knowledge about Boolean algebra, logic circuits, designing counters and the basic concepts of memory and programmable logic device.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Understand the concepts and techniques in digital electronics	K1
CO2.	Understand various number systems and their importance in digital designing	K1
CO3.	Acquire knowledge about the internal circuitry and logic behind any digital system	K2
CO4.	Analyze and construct various digital circuits	K3
CO5.	Design combination and sequential circuits	K3

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	M	M	S	S
CO2	S	S	S	**S**	**S**	S
CO3	S	S	**S**	**S**	**S**	M
CO4	S	S	S	M	S	M
CO5	S	S	S	M	S	S

S- Strong; M-Medium; L-Low

Syllabus

Unit I

Number Systems, Logic gates and Boolean algebra **12 Hrs**

Number Systems-Binary-octal-Hexadecimal and its conversions-Binary Codes- BCD codes-8421 code-Excess 3 code-Grey code[1]-Logic gates – AND, OR, NOT, NAND, NOR gates[2] – Boolean algebra- operators – logic expressions De-Morgan's theorem – laws and rules of

Boolean algebra – truth table – reducing Boolean expressions – Karnaugh maps – simplification of digital circuits.

Unit II

Arithmetic circuits and Flip flops **11 Hrs**

Half adder- full adder – Parallel binary adder, half subtractor – full subtractor – Four bit binary addition and subtraction - Parallel binary Subtractor, parity generator – encoder – decoder[3].

Flip flop –NAND Latch- RS Flip Flop- Edge triggered RS Flip Flop, D and T Flip Flop - JK Flip Flop, Master Slave Flip Flop.

Unit – III

Registers and Counters **11 Hrs**

Registers – Shift registers-Shift left and Shift right registers – Ring Counter – Johnson's Counter - Asynchronous / Ripple counters – modulus counter- Mod 3, 4, 5, 6, 7, 8 and 9 counters - Decade counter[4] - Synchronous Counters.

Unit – IV **11 Hrs**

A/D & D/A Converters

Digital to Analog (D/A) converter- Binary weighted resistor method – R / 2R Ladder Network - Analog to Digital (A/D) Converter – counter type - Dual slope integrator – successive approximation A/D Converter[5].

Unit – V **11 Hrs**

Semiconductor memory

Read only memory – Random access memory – PROM – EPROM-SRAMs –DRAMs[6]. Digital IC Characteristics –Resistor Transistor Logic (RTL) – Transistor Transistor Logic (TTL) – Schottky TTL – Emitter Coupled Logic (ECL).

Text Books:

S.No	Authors	Title of the Book	Publishers	Year of Publication	Edition
1	Malvino & Leach	Digital principles and applications	Tata Mc Graw Hill	1995	5th Edition
2	M. Morris Mano	Digital Logic & Computer Designs	Prentice Hall Of India.	2014	4th Edition
3	Vijayendran V	Introduction to Integrated electronics	S.Viswanathan (Printers & Publishers, Chennai)	2005	1st Edition

Reference Books:

S.No	Authors	Title of the Book	Publishers	Year of Publication	Edition
1	Chatterji B.N	Digital Computer technology	Khanna Publishers, Delhi	1986	2nd Edition
2	Puri V K	Digital Electronics circuits and systems	Tata McGraw Hill Publishing Company Limited New Delhi	1997	1st Edition
3	S Salivahanan S Arivazhagan	Digital Circuits and Design	Vikas Publishing House Private Limited	2007	3rd Edition

1. Video lecture from NPTEL : https://www.youtube.com/watch?v=A-gWV5liKxM
   https://www.youtu.be/IeWcvAsz88o
   https://www.youtu.be/AzyG_wL3qMY
2. https://www.youtu.be/gI-qXk7XojA
   https://www.youtu.be/aWp8ILQgudI
   https://www.youtu.be/IDf2vEcyDfs
   https://www.youtu.be/95kv5BF2Z9E
3. https://www.youtu.be/qXv08d8caYc
   https://www.youtu.be/ugDLiNUxMi4
   https://www.youtu.be/olFGxLD9N5o
   https://www.youtu.be/feBvhLFQEDk
4. **E-module**
   https://www.youtu.be/fKVZpupyP_o
   https://www.youtu.be/ZWGOO-WlOhg
   https://www.youtu.be/fU6sMNam2yM
5. https://www.youtu.be/BD3k9bO3hJ0
   https://www.youtu.be/lgoC0FJLi0k
   https://www.youtu.be/2CflTZXE9_Q
   https://www.youtu.be/PoVWXEidaXY
6. https://www.youtu.be/-NzYf8_Tjjw&list=PLVxaDiNqtkpeo9IkdcFKDsxQDp4r1LgwS
   https://www.youtu.be/p3q5zWCw8J4
   https://www.youtu.be/PVad0c2cljo
   https://www.youtu.be/r787m_IaR1I

Pedagogy

Chalk and talk, PPT, Seminar, Group discussion, Interaction

Course Designer:

1. Mrs.D.Niveditha

PS20CP2	CORE PRACTICALS II

Category	L	T	P	Credit
	-	-	82	4

Preamble

This course introduces students to the methods of experimental physics. Emphasis will be given on laboratory techniques such as accuracy of measurements and data analysis. The concepts that are learnt in the lecture sessions will be translated to the laboratory sessions thus providing a hands-on learning experience such as in measuring the basic concepts in properties of matter, heat, optics, electricity and electronics.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Understand the usage of basic laws and theories to determine various properties of the materials given.	K1,K2
CO2.	Understand the application side of the experiments.	K2
CO3.	Apply knowledge of mathematics and physics fundamentals and an instrumentation to arrive solution for various problems.	K3
CO4.	Use standard methods to calibrate the given high range voltmeter and ammeter and to measure the elasticity and thickness of the given material.	K3
CO5.	Use of basic laws to study the spectral properties and optical properties of the given prism and grating.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6
CO1.	S	S	L	L	L	L
CO2.	S	S	S	S	M	M
CO3.	S	S	S	S	M	M
CO4.	S	S	S	S	M	M
CO5.	S	S	S	S	M	M

S- Strong; M-Medium; L-Low

Syllabus

List of Experiments

Answer any 16

1. Young's Modulus – Uniform Bending – Koenig's Method
2. i-d curve- μ of the prism- Spectrometer
3. Dispersive Power of Grating – Spectrometer- Wave length of Mercury Spectral Lines by minimum deviation method
4. Refractive index (μ) of the material of the prism lens – Newton's rings method
5. Calibration of High Range Voltmeter – Potentiometer
6. Wave length of Mercury Spectral Lines – Grating - Normal Incidence – Spectrometer
7. Young's Modulus –Non-Uniform Bending – Koenig's Method
8. Thickness of a thin wire – Air Wedge method
9. EMF of thermocouple – Potentiometer
10. High resistance by i) Charging
    ii) Leakage using Ballistic Galvanometer
11. Comparison of Mutual Inductance's – Ballistic Galvanometer
12. Measurement of dielectric constant - Parallel Plate Capacitor Method
13. Series Resonant Circuit
14. Parallel Resonant Circuit
15. i) Verification of Truth Tables of IC Gates: OR, AND, NOT, XOR, NOR, and NAND
    ii) Verification of Demorgan's theorem using Logic Gates
16. Verification of Truth Table of Half and Full Adders
17. Verification of NAND as a Universal Block
18. Verification of NOR as a Universal Block
19. Verification of Truth Tables of Half and Full Subtractor

PS19SB01	PROGRAMMING IN C	Category	L	T	P	Credit
			45	2/1 O/E	-	2

Preamble

The main objective of this course is to i) train the students to the basic concepts of programming language ii) to provide exposure to problem solving through programming iii) also create foundation for students to learn other complex programming languages like C++, Java, etc.,

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the fundamentals of C programming	K1
CO2	Understand the concepts of operators and arrays	K2
CO3	Understand the role of structure and pointers in the program.	K2
CO4	Develop a greater understanding of the issues involved in programming language design and implementation	K3
CO5	Write C program for simple applications of real life using structures	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6
CO1.	S	M	M	M	S	S
CO2.	S	S	S	M	M	S
CO3.	S	M	S	S	S	M
CO4.	S	S	S	S	S	M
CO5.	S	M	S	M	S	S

S- Strong; M-Medium; L-Low

Syllabus

Unit I **11Hrs**

Introduction to C

Overview of C - C character set - C tokens - Key words and identifiers-constants- variables - date types and sizes- declaration of variables –Assigning valued to the variables –Defining symbolic constants.

Unit II **11 Hrs**

Operators and Expressions

Arithmetic operators - relational and logical operators-assignment operators - increment and decrement operator-Conditional operator-Bit wise and Special operator - Arithmetic expression-Evaluation of expression – Precedence of arithmetic operations-Type conversion in expressions- Operator precedence and some computational problems.

Unit III

Statements and Loops **11 Hrs**

IF Statement – IF ELSE Statement- Nesting IF ELSE Statements- Switch Statements- the?: Operator- GOTO Statements-While Statements – DO statements – For Statements- Jumps in loops

Unit IV **11 Hrs**

Arrays and Structures

One Dimensional array- Two dimensional Array- Initializing two-dimensional Array- Multidimensional arrays- Dynamic Arrays. Structure definition – Giving values to members- Structure initialization – Comparison of structure variables- Arrays of Structures – Arrays within Structure – Structure with in Structures- Structures and Functions

Unit V **12Hrs**

Pointers in C

Understanding Pointers-Accessing the address of a variable- Declaring and Initializing Pointers- Accessing a variable through its pointer- Chain of pointers -Pointer expressions – Pointer increments and Scale factor-Pointers and Arrays-Pointers and Character Strings- Pointers to Functions- Pointers and Structures.

Book for Study

S. No	Authors	Title of the Book	Publishers	Year of Publication
1	E. Balagurusamy	Programming In ANSI C	Tata Mc Graw Hill, 6th Edition.	2012

Reference Books

S. No	Authors	Title of the Book	Publishers	Year of Publication
1	Byran gottfried	Programming with C	Tata McGraw Hill, 3rd Edition.	2013
2	V.Rajaraman	Computer Programming in C	Prentice Hall of India Pvt Ltd, 1st Edition.	2004
3	Smarajit Ghosh	Programming in C	Prentice Hall of India Pvt Ltd, 1st Edition.	2004
4	Yeswanth Kanethkar	Let us C	BPB Publications, 13th Edition.	2014
5	Martin J Gentile	An Easy Guide to Programming in C	Create Space Independent Publishing Platform, 2nd Edition	2012

Pedagogy

Chalk and talk, PPT, Discussion, Assignment, Quiz, Seminar.

Course Designer

1. Dr. S. Shanmuga Sundari

PS19SBP1	PROGRAMMING IN C	Category	L	T	P	Credit
			45	1/2 O/E	-	2

Preamble

The main objective of this course is to i) train the students to the basic concepts of programming language ii) to provide exposure to problem solving through programming iii) create foundation for students to learn other complex programming languages like C++, Java, etc.,

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Develops the ability to analyze a problem, develop an algorithm to solve it	K1
CO2	Ability to define and manage data structures based on problem subject domain.	K2
CO3	Understanding a defensive programming concept. Ability to handle possible errors during program execution	K2
CO4	Develops the use of the C programming language to implement various algorithms, and develops the basic concepts and terminology of programming in general.	K3
CO5	Introduces the more advanced features of the C language	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	M	M	M	S	S
CO2	S	M	M	M	S	S
CO3	S	M	M	S	S	S
CO4	S	M	M	M	S	S
CO5	S	M	M	M	S	S

S- Strong; M-Medium; L-Low

Syllabus

PROGRAMMING IN C

Any 16

1. Write a program to perform transpose of a given matrix
2. Write a program to perform Matrix Addition
3. Write a program to perform Matrix Multiplication
4. Write a program that uses functions to compare two strings input by the user .The program should state whether the first string is less than, equal or greater than the second string
5. Write a C program to use of XOR operations on two numbers.
6. Write a C program to count spaces in a given string.
7. Write a C program to validate user input.
8. Write a C program to solve the Quadratic Equation.
9. Write a C program to generate prime numbers within a range.
10. Write a C program to find sum of the digits and reverse the digits.
11. Write a C program to generate the Fibonacci series.
12. Write C program to find the Factorial of a given number using function.
13. Write a C program to read the text and count the number of vowels, consonants, and digits in it.
14. Write a C program to convert the case of given string from upper case to lower case and vice versa
15. Write a C program to find whether the given string is Palindrome or not.
16. Write a program to find the sum, average, standard deviation for the given N numbers.
17. Write a C program to Count the number of positives, negatives and zeroes.
18. Write a C program to Sort set of numbers in ascending and descending order.
19. Write a C program to swap values of two variables without use of third variable.
20. Write C program to print table of a given number using goto statement.

Pedagogy

Practical sessions

Course Designer

1. Dr. S. Shanmuga Sundari