E.M.G. YADAVA WOMEN'S COLLEGE, MADURAI - 625 014.

(An Autonomous Institution – Affiliated to Madurai Kamaraj University) Re-accredited (3rd Cycle) with Grade A⁺ & CGPA 3.51 by NAAC

DEPARTMENT OF PHYSICS



TANSCHE - CBCS With OBE

BACHELOR OF SCIENCE PROGRAMME CODE - P

COURSE STRUCTURE

(w.e.f. 2023 - 2024 Batch onwards)

E.M.G. YADAVA WOMEN'S COLLEGE, MADURAI -14.

(An Autonomous Institution – Affiliated to Madurai Kamaraj University) (Re –accredited (3rd cycle) with Grade A⁺ and CGPA 3.51 by NAAC) TANSCHE - CBCS with OBE

DEPARTMENT OF PHYSICS – UG

(w.e.f. 2023-2024 Batch onwards)

Vision

To enhance the knowledge of Physics in teaching and research through holistic education

Mission

- ✓ Imparting quality education both in theoretical as well as experimental physics
- ✓ Providing students with rigorous and comprehensive courses that allow them to perform at a high level
- ✓ Striving for excellence in performance based teaching and research

Programme Educational Objectives(PEOs): B.Sc Physics

SL.No.	Programme Educational Objective
PEO1	Pursue higher education in relevant subjects, such as teaching and management, and start a career as an educator, researcher, or technical specialist.
PEO2	Endow the graduates to take part in extracurricular and co-curricular activities to develop the leadership skills.
PEO3	A successful career in academics, the public sector, business, corporations, or as an entrepreneur or self-employed person.
PEO4	Graduates explore physical systems using theoretical models and the scientific work's findings in a way that reflects moral responsibility, social care, and environmental awareness.
PEO5	Graduates will be well-versed in their fields and possess the technical aptitude to recognize, evaluate, and solve scientific problems for the society.
PEO6	Develop the experimental and data analysis skills by using various experiments in physics.

Programme Outcomes for Science Graduates:

On completion of B.Sc., Programmes students will be able to

SL.No.	Programme Outcomes
PO1	Develop necessary foundation in fundamentals, aptitude, applications of sciences and other
	related subjects. Able to clear competitive examinations appear and possess basic skill on the
	related subjects. Secure jobs in employment in Government / Private / Industry and
	entrepreneurship.
PO2	Receive basic experimental skills in the observation and study of nature, biological
	techniques, scientific research and demonstrate proficiency in critical analysis or creativity
	and provide scientific solutions to the problems of the society.
PO3	Enhance the digital knowledge of statistics and to understand its application in interpreting
	the obtained data
PO4	Obtain knowledge with emerging trends in their disciplinary and inter-disciplinary areas.
	Usage of modern tools and software can also be put to use.
PO5	Leadlifelong learning & contribute sustainability to environment, equip students enough to
	takeup higher studies upto research in various disciplines to become professionals.
PO6	Imbibe democratic, ethical, moral, social & spiritual values in the minds of the learners to
	become responsible citizens and build a healthy nation.

Programme Specific Outcomes (PSOs):

		РО
PSOs	After completion of B.Sc Physics the students will be able to	Addressed
PSO1	Placement: To prepare the students who will demonstrate respectful	PO1
	engagement with others' ideas, behaviors, beliefs and apply diverse frames of	
	reference to decisions and actions.	
PSO 2	Entrepreneur: To create effective entrepreneurs by enhancing their critical	PO2
	thinking, problem solving, decision making and leadership skill that will	
	facilitate startups and high potential organizations.	
PSO3	Research and Development: Design and implement HR systems and practices	PO3 &
	grounded in research that comply with employment laws, leading the	DOA
	organization towards growth and development.	PO4
PSO4	Contribution to Business World: To produce employable, ethical and	PO5 & PO6
	innovative professionals to sustain in the dynamic business world.	
PSO 5	Contribution to the Society: To contribute to the development of the society	PO2 & PO6
	by collaborating with stakeholders for mutual benefit.	

Qualification for Admission

Candidates should have passed the Higher Secondary Examination with Physics and Mathematics, conducted by the Board of Higher Education, Government of Tamilnadu, CBSE & ICSE or any other examination approved by Madurai Kamaraj University as equivalent.

Duration of the Course

The students shall undergo this prescribed course of study for the period of three academic years under Choice Based Credit System(CBCS) semester pattern with Outcome Based Education (OBE).

Medium of Instruction: English

System: Choice Based Credit System with Outcome Based Education Model

Nature of the Course

Courses are classified according to the following nature

- 1. Knowledge and skill oriented
- 2. Employability oriented
- 3. Entrepreneurship oriented

Outcome Based Education (OBE)& Assessment

Students understanding must be built on and assessed for wide range of learning activities, which includes different approaches and are classified along several basis, such as

1. Based on purpose:

- Continuous Assessment (internal tests, Assignment, seminar, quiz, Documentation, Case lets, ICT based Assignment, Mini projects administered during the learning process)
- External Assessment (Evaluation of students' learning at the end of instructional unit)
- Based on Domain Knowledge:(for UG Upto K4 levels) Assessment through K1, K2, K3& K4

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TANSCHE – CBCS with OBE

(w.e.f. 2023-2024 batch onwards)

(PART I / PART II / PART III)

Internal (Formative)	: 25 marks
External (Summative)	: 75 marks
Total	:100 marks

Components	Marks
Test (Average of two tests)	10
(Conducted for 100 marks and converted into 10 marks)	
Assignment	5
Seminar	5
Quiz/ Documentation/ Case lets/ ICT based Assignment/ Mini Projects	5
Total	25

Formative Test (CIA-Continuous Internal Assessment) : 25 Marks

- ✓ **Centralized system** of Internal Assessment Tests
- ✓ There will be **Two Internal Assessment** Tests
- ✓ Duration of Internal assessment test will be 2 hours for Test I & II
- Students shall write retest with the approval of HOD on genuine grounds if they are absent.

Question Paper Pattern for Continuous Internal Assessment – Test I and II

Section	Marks
A- Multiple Choice Question (7x1mark)	7
B- Short Answer (4x2marks)	8
C- Either Or Type (3/6x5marks)	15
D- Open Choice Type (2/3x 10marks)	20
Total	50

Conducted for 100 marks and converted into 10 marks.

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Section	Marks
A-Multiple choice Questions without Choice (10x1 mark)	10
B-Short Answer without choice (5x2marks)	10
C-Either Or type (5/10x5marks)	25
D-Open Choice type (3/5x10 marks)	30
Total	75

In respect of Summative Examinations passing minimum is **36% for UG**.

Latest amendments and revision as per UGC and TANSCHE norms is taken into consideration in curriculum preparation.

BLUE PRINT FOR INTERNAL ASSESSMENT - I

Articulation Mapping – K Levels with Course Learning Outcomes (CLOs)

SI. No CLOs		CLOs K- Level	Section A		Section B		Section C	Section D	
			MCQ (No Cho)s bice)	Short Ans (No Cho	swers bice)	(Either or	(Open choice)	Total
			No. of Ouestions	K- Level	No. of Ouestions	K- Level	Type)		
1	CLO 1	Upto K3	3	(K1/ K2)	3	(K1/ K2)	2 (K2) / 2 (K3) /	2 (K3)	
2	CLO 2	Upto K3	2	(K1/ K2)			2 (K4) (Each set of	& 1 (K4)	
3	CLO 3	Upto K4	2	(K1/ K2)	1	(K1/ K2)	must be in same level)		
No. of Questions to be asked		7		4		6	3	20	
No. of Questions to be answered		7		4		3	2	16	
Marks for each question		1		2		5	10	-	
Total sectio	Marks for e	ach	7		8		15	20	50

			Section A		Secti	on B	Section C	Section D	
Sl. No CLOs		K- Level	MCQs (No Choice)		Short A (No C	Answers (hoice)	(Either or Type)	(Open choice)	Total
			No. of Questions	K- Level	No. of Questions	K- Level			
1	CLO 3	Upto K4	2	(K1/ K2)	1	(K1/ K2)	2 (K2) / 2 (K3) /		
2	CLO 4	Upto K3	2	(K1/ K2)	3	(K1/ K2)	2 (K4) (Each set of questions	2 (K3) & 1 (K4)	
3	CLO 5	Upto K4	3	(K1/ K2)			must be in same level)		
No. of Questions to be asked		7		4		6	3	20	
No. of Questions to be answered		7		4		3	2	16	
Marks for each question		1		2		5	10	-	
Total section	l Marks f on	or each	7		8		15	20	50

BLUE PRINT FOR INTERNAL ASSESSMENT – II

Articulation Mapping – K Levels with Course Learning Outcomes (CLOs)

Distribution of Marks with K-Levels CIA I and CIA II

CIA	K Levels	Section -A MCQ (No choice)	Section -B Short Answer (No choice)	Section -C (Either or Type)	Section –D (Open choice)	Total Marks	% of Marks
	K1	4	4	-	-	8	10
I	K2	3	4	10	-	17	23
a II	K3	-	-	10	20	30	40
	K4	-		10	10	20	27
	Marks	7	8	30	30	75	100

Articulation Mapping - K Levels with Course Learning Outcomes (CLOs) for External Assessment

SI. No	CLOs	K- Level	Section A MCQs (No choice)		Section B Short Answers (No choice)		Section C (Either/or Type)	Section D (open	lotal
			No. of	K-	No. of	K-		choice)	L ·
			Questions	Level	Questions	Level			
1	CLO 1	Upto K3	2	K1/K2	1	K1/K2	2 (K3& K3)	1(K2)	
2	CLO 2	Upto K3	2	K1/K2	1	K1/K2	2(K2& K2)	1(K3)	
3	CLO 3	Upto K4	2	K1/K2	1	K1/K2	2 (K4&K4)	1(K4)	
4	CLO 4	Upto K 3	2	K1/K2	1	K1/K2	2 (K3& K3)	1(K3)	
5	CLO 5	Upto K 4	2	K1/K2	1	K1/K2	2 (K4& K4)	1(K4)	
No. o	f Questions	s to be	10		5		10	5	30
asked									
No. of Questions to be		10		5		5	3	23	
answered									
Marks for each question		1		2		5	10		
Total Marks for each		10		10		25	30	75	
sectio	n								

Distribution of Section-wise Marks with K Levels for External Assessment

K Levels	Section A (MCQ'S) (No choice)	Section B (Short Answer) (No choice)	Section C (Either or Type)	Section D (Open Choice)	Total Marks	% of Marks
K1	9	6	-		15	13
K2	1	4	10	10	25	21
K3	-	-	20	20	40	33
K4	-	-	20	20	40	33
Total Marks	10	10	50	50	120	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems, Justifying the statement and deriving inferences

K4- Examining, analyzing, presentation and make inferences with evidences

EVALUATION (THEORY)

(PART IV - SEC / DSEC)

Internal (Formative)	: 25 marks
External (Summative)	: 75 marks
Total	: 100 marks

Formative Test (CIA-Continuous Internal Assessment) : 25 Marks

Components	Marks
Test (Average of two tests)	20
(Conducted for 60 marks and converted into 20 marks)	
Assignment / Seminar/ Quiz/ Documentation (from Unit 5)	5
Total	25

- \checkmark There will be two Internal Assessment Test
- ✓ Duration of Internal assessment test will be 1 hour for Test
 Students shall write retest with the approval of HOD on genuine grounds if they are absent.

Question Paper Pattern for Continuous Internal Assessment Test I & II

	Section	Marks
A-	Multiple Choice Question (4x1mark)	4
B-	Short Answer (3x2marks)	6
C-	Either Or type (2/4 x5marks)	10
D-	Open choice type (1/2 x10marks)	10
Tot	al	30

Conducted for 60 marks and converted into 20 marks

Question Paper Pattern for External Examination

Section	Marks
A- Multiple Choice Question (10x1mark)	10
B- Short Answer (5x2marks)	10
C-Either Or type (5/5 x5marks)	25
E- Open choice type (3/5 x10marks)	30
Total	75

BLUE PRINT FOR INTERNAL ASSESSMENT –I Articulation Mapping - K Levels with Course Learning Outcomes (CLOs)

SI. No CLOs Level			Section	A	Section B		Section C	Section D	
		- Level	MCQs (No Choice)		Short Answers (No Choice)		(Either or	(Open choice)	Total
		Y	No. of Questions	K- Level	No. of Questions	K- Level	Type)		
1	CLO 1	Upto K3	2				1 (K2) / 1 (K3) (Each set of	1 (K2) &	
2	CLO 2	Upto K3	Upto 2 K1 K3		3	K1	questions must be in same level)	1 (K3)	
No be	. of Ques asked	stions to	4		3		4	2	13
No. of Questions to be answered		4		3		2	1	10	
Marks for each question		1		2		5	10	-	
To sec	tal Marks tion	s for each	4		6		10	10	30

BLUE PRINT FOR INTERNAL ASSESSMENT –II Articulation Mapping - K Levels with Course Learning Outcomes (CLOs)

			Section	A	Section	Section B		Section D					
SI. No CLOs		(- Level	MCQ (No Cho	MCQs (No Choice)		MCQs Short Answers (No Choice) (No Choice)		Short Answers (No Choice)		Short Answers (No Choice)		(Open choice)	Total
			No. of Questions	K- Level	No. of Questions	K- Level	Type)						
1	CLO 3	Upto K3	2				1 (K2) / 1 (K3) (Each set of	1 (K2) &					
2	CLO 4	Upto 2 K1 3 K3		3	K1	questions must be in same level)	1 (K3)						
No be	. of Ques asked	tions to	4		3		4	2	13				
No. of Questions to be answered		4		3		2	1	10					
Marks for each question		1		2		5	10	-					
Tot sec	tal Marks tion	s for each	4		6		10	10	30				

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CIA	K Levels	Section A MCQ	Section B (Short Answers)	Section C (Either Or Type)	Section D (Open Choice)	Total Marks	% of Marks
	K1	4	6	-	-	10	20
I	K2	-	-	10	10	20	40
а П	K3 10		10	10	20	40	
	Marks	4	6	20	20	50	100

Distribution	of Marks	with K	Levels –	CIA I	& II
Distribution	UI MIAINS	WILLI IN			u II

Articulation Mapping - K Levels with Course Learning Outcomes (CLOs) for External Assessment

			Section	h A	Section	n B			
I. No	CLOs	K- Level	MCQs		Short Answers		Section C (Either or	Section D (Open	[otal
S		20101	No. of Questions	K- Level	No. of Questions	K- Level	Type)	Choice)	Ľ
1	CLO 1	Upto K3	2		1		6(K2) &		
2	CLO 2	Upto K3	2	K1	1	K1	4(K3) (Each set	2(K2)	
3	CLO 3	Upto K3	2		1		of questions	& 3(K3)	
4	CLO 4	Upto K 3	2		1		must be in same		
5	CLO 5	Upto K 3	2		1		level)		
No. aske	of Questic d	ons to be	10		5		10	5	30
No. ansv	of Questic vered	ons to be	10		5		5	3	23
Mar ques	ks for eacl	h	1		2		5	10	
Tota sect	al Marks fo ion	or each	10		10		25	30	75

Distribution of Section-wise Marks with K Levels for External Assessment

K Levels	Section A (MCQ's)	Section B (Short Answer)	Section C (Either or Type)	Section D (Open Choice)	Total Marks	% of Marks
K1	10	10	-		20	16
К2	-	-	30	20	50	42
К3	-	-	20	30	50	42
Total Marks	10	10	50	50	120	100

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DEPARTMENT OF PHYSICS – UG

TANSCHE – CBCS WITH OBE

COURSE STRUCTURE

(w.e.f. 2023 – 2024 Batch onwards)

Semester	Part	Course Code	Course Title	Teaching HRS (Per Week)	uration Of xam (Hrs)		Mark Allotte	s ed	Credits
	T	2201117.4.1	T	6			SE	Total	2
	1	230011A1	1 ami1	6	3	25	15	100	3
	II	23OU2EN1	General English -I	6	3	25	75	100	3
	III	23OUPH11	Core Course1:	5	3	25	75	100	5
			Properties of Matter and Acoustics						
Ι		23OUPH1P	Core Course-2:	3	3	40	60	100	3
			Practical – I: Properties of Matter						
		23OUPHGEMA1	GEC 1: Mathematics – I	6	3	25	75	100	5
	IV	230UPHSECN1	SEC 1 (NME): Physics for	2	3	25	75	100	2
			Everyday life						
		23OUPHFC1	FC: Introductory physics	2	3	25	75	100	2
	Ι	230U1TA2	Tamil	6	3	25	75	100	3
	II	230U2EN2	General English-II	6	3	25	75	100	3
	III	23OUPH21	Core Course3:	5	3	25	75	100	5
			Heat, Thermodynamics and						
			Statistical Physics						
		23OUPH2P	Core Course4:	3	3	40	60	100	3
Π			Practical – II: Heat, oscillations,						
			waves & Sound						
		23OUPHGEMA2	GEC 2: Mathematics – II	6	3	25	75	100	5
	IV	230UPHSECN2	SEC 2 (NME): Astrophysics	2	3	25	75	100	2
		23OUPHSEC3	DSEC: Electricity	2	3	25	75	100	2
		<u> </u>]	TOTAL						46

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DEPARTMENT OF PHYSICS –UG TANSCHE – CBCS WITH OBE COURSE STRUCTURE ALLIED PHYSICS FOR MATHS (w of 2023 – 2024 Patch onwords)

(w.e.f. 2023 – 2024 Batch onwards)

Semester	Part	Course Code	Course Title	Teaching Hrs (Per Week)	uration Of Xam (Hrs)	l A	Marks Allotted		Credits
					DH	CIA	SE	Total	
	23OUMAGEPH1		Allied 1: Allied Physics – I	4	3	25	75	100	3
I		23OUMAGEPH1P	Allied Practical 1: Allied Physics	2	3	40	60	100	2
	III		Practical-I						
		230UMAGEPH2	Allied 2: Allied Physics – II	4	3	25	75	100	3
II		23OUMAGEPH2P	Allied Practical 2: Allied Physics	2	3	40	60	100	2
			Practical-II						

	Department of Physics				Cla	ass: I B.S	Se	
Sem	m Category Course Code Course Title		Credits	Contact CIA		SE	Total	
					Hours / Week			
Ι	Core	23OUPH11	Properties of Matter and Acoustics	5	5	25	75	100
	Course 1							

Nature of the Course							
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship oriented					
\checkmark							

Course Objectives:

- 1. To Understand the concepts of Elasticity of the materials.
- 2. To Acquire the basic Knowledge of Bending of beams.
- 3. To Understand the concepts of Fluid dynamics.
- 4. To Study the basic properties of Waves and Oscillations.
- 5. To Acquire the knowledge about the Acoustics and Ultrasonic.

Course Content:

Unit I: ELASTICITY: Hooke's law – stress-strain diagram – elastic constants –Poisson's ratio – relation between elastic constants and Poisson's ratio – work done in twisting a wire - twisting couple on a cylinder – rigidity modulus by static torsion–torsional pendulum (with and without masses)

Unit II: BENDING OF BEAMS: cantilever– expression for Bending moment – expression for depression at the loaded end of the cantilever– oscillations of a cantilever – expression for time period –experiment to find Young's modulus – non-uniform bending– experiment to determine Young's modulus by Koenig's method – uniform bending – expression for elevation – experiment to determine Young's modulus using microscope.

Unit III: FLUID DYNAMICS: *Surface tension*: definition – molecular forces– excess pressure inside a curved liquid surface – application to spherical and cylindrical drops and bubbles – determination of surface tension by Jaegar's method–variation of surface tension with temperature. *Viscosity*: definition – streamline and turbulent flow – rate of flow of liquid in a capillary tube – Poiseuille's formula –corrections – terminal velocity and Stoke's formula–variation of viscosity with temperature

Unit IV: WAVES AND OSCILLATIONS: Simple Harmonic Motion (SHM) – differential equation of SHM – graphical representation of SHM – composition of two SHM in a straight line and at right angles – Lissajous's figures- free, damped, forced vibrations - resonance and

sharpness of resonance-Laws of transverse vibration of strings – *sonometer* : determination of AC frequency using sonometer –determination of frequency using Melde's string apparatus.

Unit V: ACOUSTICS OF BUILDINGS AND ULTRASONICS

Intensity of sound – decibel – loudness of sound–reverberation–Sabine's reverberation formula – acoustic intensity – factors affecting the acoustics of buildings. **Ultrasonic waves**: production of ultrasonic waves – Piezoelectric crystal method – magnetostriction effect – application of ultrasonicwaves

Books for Study:

- 1. D.S.Mathur, 2010, Elements of Properties of Matter, S.Chand & Co.
- 2. BrijLal & N. Subrahmanyam, 2003, Properties of Matter, S. Chand & Co
- 3. D.R.Khanna & R.S.Bedi, 1969, Textbook of Sound, AtmaRam & sons
- 4. BrijLal and N.Subrahmanyam, 1995, A Text Book of Sound, Second revised edition, Vikas Publishing House.
- 5. R.Murugesan, 2012, Properties of Matter, S.Chand& Co.

Books for Reference:

- 1. C.J. Smith, 1960, General Properties of Matter, Orient LongmanPublishers
- H.R. Gulati, 1977, Fundamental of General Properties of Matter, Fifth edition, R. Chand & Co.
- 3. A.P French, 1973, Vibration and Waves, MIT IntroductoryPhysics, Arnold-Heinmann India.

Web resources/ E-Books:

- 1. https://www.biolinscientific.com/blog/what-are-surfactants-and- how-do-they-work
- 2. http://hyperphysics.phy-astr.gsu.edu/hbase/permot2.html
- 3. <u>https://www.youtube.com/watch?v=gT8Nth9NWPM</u>
- 4. <u>https://www.youtube.com/watch?v=m4u-SuaSu1s&t=3s</u>
- 5. https://www.biolinscientific.com/blog/what-are-surfactants-and- how-do-they-work
- 6. https://learningtechnologyofficial.com/category/fluid-mechanics-lab/
- 7. http://www.sound-physics.com/
- 8. http://nptel.ac.in/courses/112104026/

Pedagogy:

Chalk and Talk, PPT, group discussion, quiz, on the spot test.

Rationale for nature of Course

Knowledge and Skill: Study of the properties of matter leads to information which is of practical value to the physicist. It gives us information about the internal forces which act between the constituent parts of the substance. Students who undergo this course are successfully bound to get a better insight and understanding of the subject.

Activities to be given:

- 1. Enhancing the quality of students to understand the properties of matter.
- 2. Train the students to understand the theory by conducting the experiments.

Course Learning Outcomes (CLOs):

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

		Knowledge
CLO	Course Learning Outcomes	According to Bloom's
		Taxonomy(upto K level)
CLO1	Relate elastic behavior in terms of three modulii of elasticity and working of	K1 to K3
	torsion pendulum.	
CLO2	Able to appreciate concept of bending of beams and analyze the expression,	K1 to K3
	quantify and understand nature of materials.	
CLO3	Explain the surface tension and viscosity of fluid and support the interesting	K1 to K4
	phenomena associated with liquid surface, soapfilms provide an analogue	
	solution to many engineering problems.	
CLO4	Analyze simple harmonic motions mathematically and applythem. Understand	K1 to K3
	the concept of resonance and use it to evaluate the frequency of vibration. Set	
	up experiment to evaluate frequency of ac mains	
CLO5	Understand the concept of acoustics, importance of constructing buildings with	K1 to K4
	good acoustics. Able to apply their now ledge of ultrasonics in real life,	
	especially in medical field and assimilate different methods of production of	
	ultrasonic waves	

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	3	2	3	3	3
CLO2	3	3	2	3	3	3
CLO3	3	3	3	3	3	3
CLO4	3	3	2	3	3	3
CLO5	3	3	3	3	3	3
1-Basic Level 2- Intermediate Level 3- Advanced Level						

LESSON PLAN : TOTAL HOURS(60HRS)

UNIT	DESCRIPTION	HRS	MODE
	Unit :I ELASTICITY: Hooke's law – stress-strain diagram – elastic constants	12	Chalk and Talk,
	-Poisson's ratio - relation between elastic constants and Poisson's ratio - work		PPT, group
Ι	done in twisting a wire - twisting couple on a cylinder - rigidity modulus by		discussion
	static torsion-torsional pendulum (with and without masses)		
	Unit :II BENDING OF BEAMS: cantilever- expression for Bending moment		
	- expression for depression at the loaded end of the cantilever- oscillations of a	12	Chalk and Talk,
	cantilever - expression for time period -experiment to find Young's modulus -		PPT, group
II	non-uniform bending- experiment to determine Young's modulus by Koenig's		discussion
	method – uniform bending – expression for elevation – experiment to determine		
	Young's modulus using microscope.		
	Unit:III FLUID DYNAMICS: Surface tension: definition – molecular forces–		
	excess pressure inside a curved liquid surface - application to spherical and	12	Chalk and Talk,
III	cylindrical drops and bubbles - determination of surface tension by Jaegar's		PPT, group
	method-variation of surface tension with temperature. Viscosity: definition -		discussion
	streamline and turbulent flow - rate of flow of liquid in a capillary tube -		
	Poiseuille's formula -corrections - terminal velocity and Stoke's formula-		
	variation of viscosity with temperature		
IV	Unit : IV WAVES AND OSCILLATIONS: Simple Harmonic Motion (SHM)	12	Chalk and Talk,
	- differential equation of SHM - graphical representation of SHM - composition		PPT, group
	of two SHM in a straight line and at right angles - Lissajous's figures- free,		discussion.
	damped, forced vibrations - resonance and		
	sharpness of resonance-Laws of transverse vibration of strings – <i>sonometer</i> :		
	determination of AC frequency using sonometer -determination of frequency		
	using Melde's string apparatus.		
	Unit :V ACOUSTICS OF BUILDINGS AND ULTRASONICS	12	Chalk and Talk,
	Intensity of sound – decibel – loudness of sound-reverberation-Sabine's		PPT, group
V	reverberation formula – acoustic intensity – factors affecting the acoustics		discussion,
	of buildings. Ultrasonic waves: production of ultrasonic waves -		
	Piezoelectric crystal method - magnetostriction effect - application of		
	ultrasonicwaves.		

Course Designer: Ms. E.Chris Monica Mrs. M.Hemalatha

Department of Physics							Cla	ss: I B.So	2
Sem	Category Course Course Title C		Cre	edits	Contact	CIA	SE	Total	
		Code				Hours/			
						Week			
Ι	Core Course-2	23OUPH1P	Practical-I		3	3	40	60	100
			Properties of Matter						

List of experiments: (Any Eight)

- 1. Determination of rigidity modulus without mass using Torsional pendulum.
- 2. Determination of rigidity modulus with masses using Torsional pendulum.
- 3. Determination of moment of inertia of an irregular body.
- 4. Verification of parallel axes theorem on moment of inertia.
- 5. Verification of perpendicular axes theorem on moment of inertia.
- 6. Determination of moment of inertia and g using Bifilar pendulum.
- 7. Determination of Young's modulus by stretching of wire with known masses.
- 8. Verification of Hook's law by stretching of wire method.
- 9. Determination of Young's modulus by uniform bending load depression graph.
- 10. Determination of Young's modulus by non-uniform bending scale & telescope.
- 11. Determination of Young's modulusby cantilever load depression graph.
- 12. Determination of Young's modulus by cantilever oscillation method
- 13. Determination of Young's modulus by Koenig's method (or unknown load)
- 14. Determination of rigidity modulus by static torsion.
- 15. Determination of Y, n and K by Searle's double bar method.
- 16. Determination of surface tension & interfacial surface tension by drop weight method.
- 17. Determination of co-efficient of viscosity by Stokes' method terminal velocity.
- 18. Determination of critical pressure for streamline flow.
- 19. Determination of Poisson's ratio of rubber tube.
- 20. Determination of viscosity by Poiseullie's flow method.
- 21. Determination radius of capillary tube by mercury pellet method.
- 22. Determination of g using compound pendulum.

Books for Reference:

1. M.N.Srinivasan, S.Balasubramanian, R.Ranganathan(2007), *A Text Book of Practical Physics*, Sultan Chand & Sons.

2. Indu Prakash & Ramakrishna (2008), *A Text Book of Practical Physics*, Kitab Mahal Agencies.

E.M.G Yadava Women's College, Madurai-14.

3. S.R. GovindaRajan, T. Murugaiyan, S. SundaraRajan (2006), *Practical Physics*,

Rochouse & Sons.

Web Resources/ E.Books:

1.http://www.tndte.gov.in/site/wp-content/uploads/2016/08/Engineering-physics.pdf

2.https://www.ugc.ac.in/pdfnews/5512002_B.SC.-PHYSICAL-SCIENCE-

PHYSICS.pdf

3.https://www.academia.edu/34783511/Practical_Physics_for_Degree_Students_Gias_U

ddin_an d_Shahabuddin

4.<u>https://www.academia.edu/35371782/PHYSICS_LABORATORY_MANUAL_UG_Co</u> urses_I_and_II_Semester1.UG course OBE.docx

Pedagogy: Demonstration and Practical sessions.

	Topics to be Covered	Hours	Mode
UNII	Topics to be Covered	110015	Mode
Ι	 Determination of rigidity modulus without mass using Torsional pendulum. Determination of rigidity modulus with masses using Torsional pendulum. Determination of moment of inertia of an irregular body. Verification of parallel axes theorem on moment of inertia. 	9	Demo & Practical Session
Π	 Verification of perpendicular axes theorem on moment of inertia. Determination of moment of inertia and g using Bifilar pendulum. Determination of Young's modulus by stretching of wire with known masses. Verification of Hook's law by stretching of wire method. 	9	Demo & Practical Session
III	 9. Determination of Young's modulus by uniform bending – load depression graph. 10. Determination of Young's modulus by non-uniform bending – scale & telescope. 11. Determination of Young's modulusby cantilever – load depression graph. 12. Determination of Young's modulus by cantilever – oscillation method. 	9	Demo & Practical Session
IV	 12. Determination of Young's modulus by Cantilevel – Oscination method. 13. Determination of Young's modulus by Koenig's method – (or unknown load) 14. Determination of rigidity modulus by static torsion. 15. Determination of Y, n and K by Searle's double bar method. 16. Determination of surface tension & interfacial surface tension by drop weight method. 		Demo & Practical Session
V	17. Determination of viscosity by Poiseullie's flow method.18. Determination adius of capillary tube by mercury pellet method.19. Determination of g using compound pendulum.	9	Demo & Practical Session

LESSON PLAN : TOTAL HOURS(45 HRS)

Course Designer: Mrs. P.Revathi Mrs. M.R.Gurulakshmi

	Department of Physics							B.Sc
Sem	Category	Course Title	Credits	Contact	CIA	SE	Total	
					Hours / Week			
Ι	Skill Enhancement	23OUPHSECN1	Physics For	2	2	25	75	100
	Course SEC 1 (NME)		Everyday Life					

Nature of the Course								
Knowledge and Skill Oriented	Knowledge and Skill OrientedEmployability OrientedEntrepreneurship oriented							
√								

Course Objectives:

- 1. To Understand the concepts of mechanical objects.
- 2. To Acquire the basic Knowledge of optical instruments and laser.
- 3. To Understand the concepts behind the physics of home appliances.
- 4. To Study the basic properties of solar energy.
- 5. To Acquire the knowledge about the Indian physicist and their contributions.

Course Content:

Unit I: MECHANICAL OBJECTS: spring scales – bouncing balls –roller coasters – bicycles –rockets and space travel.

Unit II: OPTICAL INSTRUMENTS AND LASER: vision corrective lenses– polaroid glasses – UV protective glass – polaroid camera – color photography – holography and laser.

Unit III: PHYSICS OF HOME APPLIANCES: bulb – fan – hair drier –television – air onditioners – microwave ovens – vacuum cleaners

Unit IV: SOLAR ENERGY: Solar constant – General applications of solarenergy – Solar water heaters – Solar Photo – voltaic cells – General applications of solar cells.

Unit V: INDIAN PHYSICIST AND THEIR CONTRIBUTIONS: C.V.Raman, Homi Jahangir Bhabha, Vikram Sarabhai, Subrahmanyan Chandrasekhar, Venkatraman Ramakrishnan, Dr. APJ Abdul Kalam and their contribution to science and technology.

Books for Study:

1. The Physics in our Daily Lives, Umme Ammara, GugucoolPublishing,

Hyderabad, 2019.

2.For the love of physics, Walter Lawin, Free Press, New York, 2011.

Books for Reference:

1. Physics in Daily Life, Jo Hermans ,EDP Science, 2003 – 2011.

E.M.G Yadava Women's College, Madurai-14.

 Physics in Our Lives, Dr. Hameed A. Khan Prof. Dr. M. M. Qurashi Engr. Tajammul Hussain Mr. Irfan Hayee, Commission on Science and Technology for Sustainable Development in the South, Islamabad, 2005.

Web resources/ E-Books:

- 1. <u>https://www.ukessays.com/essays/sciences/the-role-of-physics-in-our-daily-lives.php</u>
- 2. https://en.wikipedia.org/wiki/Physics_of_the_Future
- 3. https://excerpts.numilog.com/books/9782759807055.pdf

Pedagogy:

Chalk and Talk, PPT, Group discussion, OHP presentations, Quiz, On the spot test, youtube Links, Open book test and Virtual Labs.

Rationale for nature of Course

Knowledge and Skill: Study of the Physics for everyday life leads to information which is of practical value to the physicist. It gives us information about the physics concepts how useful in every day in our life. Students who undergo this course are successfully bound to get a better insight and understanding of the subject.

Activities to be given:

1.Enhancing the quality of students to understand the basic physics concepts behind in everyday life.

2. Train the students to understand the applications of the basic physics concepts behind in everyday life.

Course Learning Outcomes (CLOs):

CLO	Course Learning Outcomes	Knowledge According to Bloom's Taxonomy(upto K level)
CLO1	Understand the concepts of mechanical objects.	K1 to K3
CLO2	Acquire the basic Knowledge of optical instruments and laser.	K1 to K3
CLO3	Understand the concepts behind the physics of home appliances.	K1 to K3
CLO4	Study the basic properties of solar energy.	K1 to K3
CLO5	Acquire the knowledge about the Indian physicist and their contributions	K1 to K3

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs) (SCIENCE)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	3	2	3	3	3
CLO2	3	3	2	3	3	3
CLO3	3	3	3	3	3	3
CLO4	3	3	2	3	3	3
CLO5	3	3	3	3	3	3

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs) (ARTS)

			()			
	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2	3	3	2	3	3
CLO2	3	3	3	3	3	3
CLO3	3	3	3	3	3	3
CLO4	3	3	3	2	3	3
CLO5	3	3	3	2	3	3
						-

1-Basic Level

2- Intermediate Level

3- Advanced Level

LESSON PLAN: TOTAL HOURS (30 Hrs)

UNIT	DESCRIPTION	Hrs	MODE
т	MECHANICAL OBJECTS: spring scales - bouncing balls -roller	6	Chalk and Talk, PPT,
1	coasters – bicycles –rockets and space travel.	0	quiz, on the spot test
	OPTICAL INSTRUMENTS AND LASER: vision corrective		Chalk and Talk, PPT,
II	lenses- polaroid glasses - UV protective glass - polaroid camera -	6	quiz, on the spot test
	color photography – holography and laser.		
	PHYSICS OF HOME APPLIANCES: bulb – fan – hair drier –		Chalk and Talk, PPT,
III	television – air onditioners – microwave ovens – vacuum cleaners	6	quiz, on the spot test
	SOLAR ENERGY: Solar constant – General applications of solar		Chalk and Talk, PPT,
IV	energy – Solar water heaters – Solar Photo – voltaic cells – General	6	quiz on the spot test
	applications of solar cells.		
	INDIAN PHYSICIST AND THEIR CONTRIBUTIONS:		
V	C.V.Raman, Homi Jehangi rBhabha, Vikram Sarabhai,	6	Seminar, PPT
v	SubrahmanyanChandrasekhar, Venkatraman Ramakrishnan, Dr. APJ	0	presentation, Quiz on
	Abdul Kalam and their contribution to science and technology.		the Spot test

Course Designer: Mrs.B.Subha Mrs. S.Manimozhi

		C	Class: I B	.Sc				
Sem	Category	Course Code	Course Title	Credits	Contact Hours / Week	CIA	SE	Total
Ι	Foundation Course	23OUPHFC1	Introductory Physics	2	2	25	75	100

Nature of the Course					
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship oriented			
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Course Objectives:

- 1. To Understand the concepts vectors.
- 2. To Acquire the basic Knowledge of different forces, present in Nature
- 3. To Understand the concepts of Quantify energy in different process.
- 4. To Study the basics of different types of motions.
- 5. To Acquire the knowledge about the properties of matter.

Course Content:

UNIT I:Vectors, scalars –examples for scalars and vectors from physical quantities – addition, subtraction of vectors – resolution and resultant of vectors – units and dimensions– standard physics constants.

UNIT II: Different types of forces–gravitational, electrostatic, magnetic, electromagnetic, nuclear –mechanical forces like, centripetal, centrifugal, friction, tension, cohesive, adhesive forces.

UNIT III: Different forms of energy– conservation laws of momentum, energy –types of collisions –angular momentum– alternate energy sources–real life examples.

UNIT IV: Types of motion– linear, projectile, circular, angular, simple harmonic motions – satellite motion – banking of a curved road –stream line and turbulent motions – wave motion – comparison of light and sound waves – free, forced, damped oscillations.

UNIT V: Surface tension – shape of liquid drop – angle of contact – viscosity–lubricants – capillary flow – diffusion – real life examples– properties and types of materials in daily use-conductors, insulators– thermal and electric.

Books for Study:

1. D.S.Mathur, 2010, Elements of Properties of Matter, S.Chand & Co

2. BrijLal & N. Subrahmanyam, 2003, Properties of Matter, S. Chand & Co.

Books for Reference:

1. H.R. Gulati, 1977, Fundamental of General Properties of Matter, Fifth edition, S.Chand & Co.

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Web resources/ E-Books:

1. <u>http://hyperphysics.phy-</u>

astr.gsu.edu/hbase/permot2.htmlhttps://science.nasa.gov/ems/

2. https://eesc.columbia.edu/courses/ees/climate/lectures/radiation_hays/

Pedagogy:

Chalk and Talk, PPT, group discussion, quiz, on the spot test.

Rationale for nature of Course

Knowledge and Skill: To help students get an overview of Physics before learning their core courses. To serve as a bridge between the school curriculum band the degree programme.

Activities to be given:

- 1. Enhancing the quality of students to solve the problems related to Physics.
- 2. Train the students to apply concept of properties of matter.

LESSON PLAN: TOTAL HOURS (30HRS)

UNIT	Details	Hours	Mode
Ι	Vectors, scalars –examples for scalars and vectors from physical quantities – addition, subtraction of vectors – resolution and resultant of vectors – units and dimensions– standard physics constants.	6	Chalk and Talk, PPT, quiz, on the spot test
II	Different types of forces–gravitational, electrostatic, magnetic, electromagnetic, nuclear –mechanical forces like, centripetal, centrifugal, friction, tension, cohesive, adhesive forces.	6	Chalk and Talk, PPT, quiz, on the spot test
III	Different forms of energy– conservation laws of momentum, energy –types of collisions –angular momentum– alternate energy sources–real life examples.	6	Chalk and Talk, PPT, quiz, on the spot test
IV	Types of motion– linear, projectile, circular, angular, simple harmonic motions – satellite motion – banking of a curved roads – stream line and turbulent motions – wave motion – comparison of light and sound waves – free, forced, damped oscillations.	6	Chalk and Talk, PPT, quiz on the spot test
V	Surface tension – shape of liquid drop – angle of contact – viscosity–lubricants – capillary flow – diffusion – real life examples– properties and types of materials in daily use- conductors, insulators– thermal and electric.	6	Seminar, PPT presentation, Quiz on the Spot test

Course Designer: Ms. E.Chris Monica Mrs. M.Hemalatha

Department of Physics							Class: I B.Sc		
Sem	Category Course Course Title Credits Contact Hours				CIA	SE	Total		
		Code			/ Week				
II	Core Course - 3	23OUPH21	Heat, Thermodynamics	5	5	25	75	100	
			and Statistical Physics						

Nature of the Course						
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship oriented				
~						

Course Objectives:

- 1. To Understand the fundamentals of Heat capacities.
- 2. To Acquire the basic Knowledge of Thermodynamic laws.
- 3. To Understand the concept of entropy in reversible & irreversible process.
- 4. To Study the concepts of heat transfer.
- 5. To Acquire the knowledge about different types of statistics.

Course Content:

UNIT I:CALORIMETRY: specific heat capacity – specific heat capacity of gases CP& CV– Meyer's relation – Joly's method for determination of CV – Regnault's methodfor determination of CP

LOW TEMPERATURE PHYSICS: Joule-Kelvin effect – porous plug experiment – Joule-Thomson effect –Boyletemperature – temperature of inversion – liquefaction of gas by Linde's Process – adiabatic demagnetisation.

UNIT II:THERMODYNAMICS-I: zeroth law and first law of thermodynamics – P-V diagram – heat engine –efficiency of heatengine – Carnot's engine, construction, working and efficiency of petrol engine and diesel engines – comparison of engines.

UNIT III:THERMODYNAMICS-II: second law of thermodynamics – entropy of an ideal gas – entropy change in reversible and irreversible processes – T-S diagram –thermodynamical scale oftemperature – Maxwell's thermodynamical relations –Clasius- Clapeyron's equation (first latent heat equation) – third law of thermodynamics – unattainability of absolute zero – heat death.

UNIT IV: HEAT TRANSFER: modes of heat transfer: conduction, convection and radiation.

Conduction: thermal conductivity – determination of thermal conductivity of a good conductor by Forbe's method – determination of thermal conductivity of a bad conductor by Lee'sdisc method.

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Radiation: black body radiation (Ferry's method) – distribution of energy in black body radiation – Wien's law and Rayleigh Jean's law –Planck's law of radiation – Stefan's law – deduction of Newton's law of cooling from Stefan's law.

UNIT V:STATISTICAL MECHANICS: definition of phase-space – microand macro states – ensembles –different types of ensembles – classical and quantum Statistics – Maxwell-Boltzmann statistics – expression for distribution function – Bose-Einstein statistics – expression for distribution function – Bose-Einstein statistics – expression for distribution function – comparison of three statistics.

Book for study:

- 1. Brijlal &N. Subramaniam, 2000, Heat and Thermodynamics, S. Chand& Co.
- 2. Narayanamoorthy&KrishnaRao, 1969,Heat,Triveni Publishers,Chennai.
- V.R.Khanna&R.S.Bedi, 1998 1st Edition, Text book of Sound, Kedharnaath Publish & Co, Meerut
- Brijlal and N. Subramanyam, 2001, Waves and Oscillations, Vikas Publishing House, New Delhi.
- 5. Ghosh, 1996, Text Book of Sound, S.Chand&Co.
- 6. R.Murugeshan & Kiruthiga Sivaprasath, Thermal Physics, S.Chand& Co.

Books for References:

- J.B.Rajam & C.L.Arora, 1976, Heat and Thermodynamics, 8thedition, S.Chand& Co. Ltd.
- 2. D.S.Mathur, Heat and Thermodynamics, Sultan Chand & Sons.
- Gupta, Kumar, Sharma, 2013, Statistical Mechanics, 26thEdition, S. Chand & Co.
- 4. Resnick, Halliday&Walker, 2010, Fundamentals of Physics, 6thEdition.
- Sears, Zemansky, Hugh D. Young, Roger A. Freedman, 2021 University Physics with Modern Physics 15th Edition, Pearson.

Web resources/E-Books:

- 1. <u>https://youtu.be/M_5KYncYNyc</u>
- 2. <u>https://www.youtube.com/watch?v=4M72kQulGKk&vl=en</u>
- 3. https://www.khanacademy.org/science/physics/thermodynamics
- 4. <u>https://data-flair.training/blogs/heat-sources-classification-thermodynamics/</u>
- 5. <u>https://www.britannica.com/science/thermodynamics</u>

Pedagogy:

Chalk and Talk, PPT, group discussion, quiz, on the spot test.

Rationale for nature of Course

Knowledge and Skill: The course is the learning and understanding the phenomena connected with measurement of temperature, concepts of specific heat capacities of matter and applications of thermodynamics.

Activities to be given:

- 1. Enhancing the quality of students to understand the theory of gases.
- 2. Train the students to solve more thermodynamically related problems.

Course Learning Outcomes (CLOs):

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

		Knowledge
CLO	Course Learning Outcomes	According to Bloom's
		Taxonomy(upto K level)
CLO1	Acquires knowledge on how to distinguish between temperature and	K1 to K3
	heat. Introduce him/her to the field of thermometry and explain	
	practical measurements of high temperature as well as low temperature	
	physics. Student identifies the relationship between heat capacity,	
	specific heat capacity. The study of Low Temperature Physics sets the	
	basis for the students to understand cryogenics, superconductivity,	
	super fluidity and Condensed Matter Physics.	
CLO2	Derive the efficiency of Carnot's engine. Discuss the implications of	K1 to K3
	the laws of Thermodynamics in diesel and petrol engines.	
CLO3	Able to analyze performance of thermodynamic systems viz efficiency	K1 to K3
	by problems. Gets an insight into thermodynamic properties like	
	enthalpy, entropy.	
CLO4	Study the process of thermal conductivity and apply it to good and bad	K1 to K4
	conductors. Quantify different parameters related to heat, relate them	
	with various physical parameters and analyse them.	
CLO5	Interpret classical statistics concepts such as phase space, ensemble,	K1 to K4
	Maxwell-Boltzmann distribution law. Develop the statistical	
	interpretation of Bose-Einstein and Fermi-Dirac . Apply to quantum	
	particles such as photon and electron.	

		0		0		
	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	3	2	3	3	3
CLO2	3	3	2	3	3	3
CLO3	3	3	3	3	3	3
CLO4	3	3	2	3	3	3
CLO5	3	3	3	3	3	3

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

1-Basic Level2- Intermediate Level3- Advanced LevelLESSON PLAN: TOTAL HOURS(60HRS)

UNIT	Details	Hours	Mode
I	CALORIMETRY: specific heat capacity – specific heat capacity of gases CP& CV–Meyer's relation – Joly's method for determination of CV – Regnault's method for determination of CP LOW TEMPERATURE PHYSICS: Joule-Kelvin effect – porous plug experiment – Joule- Thomson effect –Boyle temperature – temperature of inversion – liquefaction of gas by Linde's Process – adiabatic demagnetisation.	12	Chalk and Talk, PPT, quiz, on the spot test
II	THERMODYNAMICS-I: zeroth law and first law of thermodynamics – P-V diagram – heat engine –efficiency of heatengine – Carnot's engine, construction, working and efficiency of petrol engine and diesel engines – comparison of engines.	12	Chalk and Talk, PPT, quiz, on the spot test
III	THERMODYNAMICS-II: second law of thermodynamics – entropy of an ideal gas – entropy change in reversible and irreversible processes – T-S diagram –thermodynamical scale oftemperature – Maxwell's thermodynamical relations –Clasius- Clapeyron's equation (first latent heat equation) – third law of thermodynamics – unattainability of absolute zero – heat death.	12	Chalk and Talk, PPT, quiz, on the spot test
IV	HEAT TRANSFER: modes of heat transfer: conduction, convection and radiation. <i>Conduction</i> : thermal conductivity – determination of thermal conductivity of a good conductor by Forbe's method – determination of thermal conductivity of a bad conductor by Lee'sdisc method. <i>Radiation</i> : black body radiation (Ferry's method) – distribution of energy in black body radiation – Wien's law and Rayleigh Jean's law –Planck's law of radiation – Stefan's law – deduction of Newton's law of cooling from Stefan's law.	12	Chalk and Talk, PPT, quiz on the spot test
V	STATISTICAL MECHANICS: definition of phase-space – microand macro states – ensembles –different types of ensembles – classical and quantum Statistics – Maxwell-Boltzmann statistics – expression for distribution function – Bose-Einstein statistics – expression for distribution function – Fermi-Dirac statistics – expression for distribution function – comparison of three statistics.	12	Seminar, PPT presentation, Quiz on the Spot test

Course Designer: Mrs. P.Revathi Mrs. M.R.Gurulakshmi

Department of Physics							Class: I B.Sc	
Sem	Category	Course	Course Title Credits Contact		CIA	SE	Total	
		Code			Hours /			
					Week			
II	Core Course -4	23OUPH2P	Practical – II: Heat,	3	3	40	60	100
			oscillations, waves & Sound					

List of experiments: (Any Eight)

- 1. Determination of specific heat by cooling graphical method.
- 2. Determination of thermal conductivity of good conductor by Searle's method.
- 3. Determination of thermal conductivity of bad conductor by Lee's disc method.
- 4. Determination of thermal conductivity of bad conductor by Charlaton's method.
- 5. Determination of specific heat capacity of solid.
- 6. Determination of specific heat of liquid by Joule's electrical heating method (applying radiation correction by Barton's correction/graphical method),
- 7. Determination of Latent heat of a vaporization of a liquid.
- 8. Determination of Stefan's constant for Black body radiation.
- 9. Verification of Stefan's-Boltzmans law.
- 10. Determination of thermal conductivity of rubber tube.
- 11. Helmholtz resonator.
- 12. Velocity of sound through a wire using Sonometer.
- 13. Determination of velocity of sound using Kunds tube.
- 14. Determination of frequency of an electrically maintained tuning fork
- 15. To verify the laws of transverse vibration using sonometer.
- 16. To verify the laws of transverse vibration using Melde's apparatus.
- 17. To compare the mass per unit length of two strings using Melde's apparatus.
- 18. Frequency of AC by using sonometer.

Books for References:

1. M.N.Srinivasan, S.Balasubramanian, R.Ranganathan(2007), *A Text Book of Practical Physics*, Sultan Chand & Sons.

2. Indu Prakash &Ramakrishna(2008), *A Text Book of Practical Physics*, Kitab Mahal Agencies.

3. S.R. GovindaRajan, T. Murugaiyan, S. SundaraRajan (2006), *Practical Physics*, Rochouse& Sons.

Web Resources/ E-Books:

1.http://www.tndte.gov.in/site/wp-content/uploads/2016/08/Engineering-physics.pdf

2.<u>https://www.ugc.ac.in/pdfnews/5512002_B.SC.-PHYSICAL-SCIENCE-</u>

PHYSICS.pdf

3.https://www.academia.edu/34783511/Practical_Physics_for_Degree_Students_Gias_U

ddin_an d_Shahabuddin

4.<u>https://www.academia.edu/35371782/PHYSICS_LABORATORY_MANUAL_UG_Co</u> <u>urses_I_and_II_Semester1.UG_course_OBE.docx</u>

Pedagogy

Demonstration and Practical sessions.

LESSON PLAN: TOTAL HOURS(45 HRS)

UNIT	Topics to be Covered	Hours	Mode
	1. Determination of specific heat by cooling – graphical method.		
	2. Determination of thermal conductivity of good conductor by Searle's method.		Dama P
Ι	3. Determination of thermal conductivity of bad conductor by Lee's disc method.	Q	Denio & Practical
	4. Determination of thermal conductivity of bad conductor by Charlaton's method.	,	Session
	5. Determination of specific heat capacity of solid.		
	6. Determination of specific heat of liquid by Joule's electrical heating method		Demo &
II	(applying radiation correction by Barton's correction/graphical method),	9	Practical
	7. Determination of Latent heat of a vaporization of a liquid.		Session
	8. Determination of Stefan's constant for Black body radiation.		
	9. Verification of Stefan's-Boltzmans law.		Dama 6
Ш	10. Determination of thermal conductivity of rubber tube.	9	Demo & Practical
111	11. Helmholtz resonator.		Session
	12. Velocity of sound through a wire using Sonometer.		Debbion
	13. Determination of velocity of sound using Kunds tube.	0	D P
IV	14. Determination of frequency of an electrically maintained tuning fork.	9	Demo & Practical
IV	15. To verify the laws of transverse vibration using sonometer.		Session
	16. To verify the laws of transverse vibration using Melde's apparatus.		Debbion
	17. To compare the mass per unit length of two strings using Melde's apparatus.	9	Demo &
V	18. Frequency of AC by using sonometer.		Practical
			Session

Course Designer: Ms. E.Chris Monica Mrs. M.Hemalatha

Department of Physics						Class: I B.Sc		
Sem	Category	Course Code	Course Title	Credits	Contact Hours / Week	CIA	SE	Total
II	Skill Enhancement Course -2 (NME)	230UPHSECN2	Astrophysics	2	2	25	75	100

Nature of the Course					
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship oriented			
V					

Course Objectives:

- 1. To Understand the concepts of telescope.
- 2. To Acquire the basic Knowledge of solar system.
- 3. To Understand the concepts of eclipses.
- 4. To Study about the classification of galaxies.
- 5. To Acquire the knowledge about the activities in astro physics.

Course Content :

UNIT I: TELESCOPES: Optical telescopes – magnifying power, brightness, resolving power and f/a ratio – types of reflecting and refracting telescopes – detectors and image processing – radio telescopes –Hubble space telescope.

UNIT II:SOLAR SYSTEM: Bode's law of planetary distances – meteors, meteorites, comets, asteroids – Kuiper belt – Oort cloud – detection of gravitational waves – recent advances in astrophysics

UNIT III:ECLIPSES: types of eclipses – solar eclipse – total and partial solareclipse – lunar eclipse – total and partial lunar eclipse – transits. **THE SUN:** physical and orbital data – solar atmosphere – photosphere – chromosphere – solar corona – prominences – sunspots – 11yearsolar cycle – solar flares

UNIT IV:STELLAR EVOLUTION: H-R diagram – birth & death of low mass, intermediate mass and massive stars – Chandrasekar limit – whitedwarfs – neutron stars – pulsars – black holes – supernovae.

GALAXIES: classification of galaxies – galaxy clusters –interactionsof galaxies, dark matter and super clusters – evolving universe.

UNIT V:ACTIVITIES IN ASTROPHYSICS:

- (i) Basic construction of telescope
- (ii) Develop models to demonstrate eclipses/planetary motion

- (iii) Night sky observation
- (iv) Conduct case study pertaining to any topic in this paper

Visit to any one of the National ObservatoriesAny three activities to be done compulsorily.

Book for study:

- 1. Kumaravelu, Susheela Kumaravelu, (2014) Astronomy, 10th Edition;
- 2. Michael Zeilik, Stephen Gregory Astronomy And Astrophysics, 4TH Edition.

Books for References:

- BaidyanathBasu, (2001). <u>An introduction to Astrophysics</u>, Secondprinting, Prentice Hall of India (P) Ltd, New Delhi
- K.S.Krishnaswamy, (2002), <u>Astrophysics a modern perspective</u>, New Age International (P) Ltd, New Delhi.
- Shylaja, B.S. &Madhusudan, H.R., (1999), <u>Eclipse: A CelestialShadow Play</u>, Orient BlackSwan,

Web resources/ E-Books:

- 1. https://letstalkscience.ca/educational-resources/backgrounders/optical-telescopes
- 2. <u>https://www.txstate-epdc.net/types-of-eclipses-and-how-they-work</u>

Pedagogy:

Chalk and Talk, PPT, group discussion, quiz, on the spot test.

Rationale for nature of Course:

Knowledge and Skill: Study of the astrophysics leads to information which is of practical value to the physicist. It gives us information about the sun and eclipses. Students who undergo this course are successfully bound to get a better insight and understanding of the subject.

Activities to be given:

- 1. Enhancing the quality of students to understand the eclipses.
- 2. Train the students to understand about the astrophysics.

Course Learning Outcomes (CLOs):

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

CLO	Course Learning Outcomes	Knowledge According to Bloom's Taxonomy(upto K level)
CLO1	Explain about the types of telescopes	K1 to K3
CLO2	Explain their knowledge of understanding about solar system	K1 to K3
CLO3	Explain the basic concept of sun and eclipses	K1 to K3
CLO4	Describe about the galaxies and stellar evolution	K1 to K3
CLO5	Gain knowledge about the activies in astrophysics	K1 to K3

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs) (SCIENCE)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	3	2	3	3	3
CLO2	3	3	2	3	3	3
CLO3	3	3	3	3	3	3
CLO4	3	3	2	3	3	3
CLO5	3	3	3	3	3	3

$\label{eq:mapping} \mbox{ Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs) }$

(ARTS)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	2	3	3	2	3	3
CLO2	3	3	3	3	3	3
CLO3	3	3	3	3	3	3
CLO4	3	3	3	2	3	3
CLO5	3	3	3	2	3	3

1-Basic Level 2- Intermediate Level 3- Advanced Level

LESSON PLAN: TOTAL HOURS(30HRS)

UNIT	Details	Hours	Mode
	TELESCOPES: Optical telescopes – magnifying power, brightness,		Chalk and
Ι	resolving power and f/a ratio - types of reflecting and refracting	C	Talk, PPT,
	telescopes - detectors and image processing - radio telescopes -	0	quiz, on the
	Hubble space telescope.		spot test
	SOLAR SYSTEM: Bode's law of planetary distances – meteors,		Chalk and
TT	meteorites, comets, asteroids - Kuiper belt - Oort cloud - detection	6	Talk, PPT,
11	of gravitational waves – recent advances in astrophysics	0	quiz, on the
			spot test
	ECLIPSES: types of eclipses – solar eclipse – total and partial		Chalk and
	solareclipse – lunar eclipse – total and partial lunar eclipse – transits.		Talk, PPT,
III	THE SUN: physical and orbital data – solar atmosphere –	6	quiz, on the
	photosphere- chromosphere - solar corona - prominences -		spot test
	sunspots – 11 yearsolar cycle – solar flares		
	STELLAR EVOLUTION: H-R diagram – birth & death of low		
	mass, intermediate mass and massive stars - Chandrasekhar limit	6	Chalk and
IV	 whitedwarfs – neutron stars – pulsars – black holes – supernovae. 		Talk, PPT,
1,	GALAXIES: classification of galaxies – galaxy clusters –	Ū	quiz on the
	interactions of galaxies, dark matter and super clusters – evolving		spot test
	universe.		
	ACTIVITIES IN ASTROPHYSICS:		
	(i) Basic construction of telescope		Seminar,
	(ii) Develop models to demonstrate eclipses/planetary motion		PPT
V	(iii) Night sky observation	6	presentation,
	(iv) Conduct case study pertaining to any topic in this paper		Quiz on the
	Visit to any one of the National ObservatoriesAny three activities to be		Spot test
	done compulsorily.		

Course Designer: Ms. S.Priyanka Mrs. S.Ameer Nisha Bibi

Department of Physics						C	lass: I	B.Sc
Sem	Category	Course Code	Course Title	Credits	Contact Hours / Week	CIA	SE	Total
II	DSEC 3	23OUPHSEC3	Electricity	2	2	25	75	100

Nature of the Course						
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship oriented				
	 ✓ 					

Course Objectives

- 1. To Understand the fundamentals of Electrostatics.
- 2. To get the basic Knowledge about current electricity.
- 3. To Understand the concept of Capacitors.
- 4. To Acquire the knowledge about AC.
- 5. To study the Thermo Electric Effects.

Course Content:

UNIT I: Electrostatics: Electric field and flux – Gauss law-Derivation of Coulomb's law from Gauss law-Differential form(Maxwell equation)-Field due to a uniformly charged sphere – Coloumb's theorem –Mechanical force on the surface of a charged conductors –Potential-Electric potential –Potential due to a point charge-equipotential surface-relation between field and potential-electric potential energy.

UNIT II: Current electricity :Current –Current density- Expression for current density – Resistance and resistivity-Kirchhoff's laws –Application to Wheat stone's network –Carey foster's bridge –Determination of resistivity and temperature coefficient of resistance – Potentiometer –measurement of potential and calibration of voltmeter and Ammeter.

UNIT III: Capacitors: Introduction –Concept of capacitance –capacitance of an isolated spherical conductor –parallel plate capacitor with a dielectric- Dielectric strength.

UNIT IV: Alternating currents :Introduction –Impedance ,Reactance and Admittance-Alternating voltage applied across a resistance –Alternating voltage applied across an inductance- Alternating voltage applied across a capacitance.

UNIT V: Thermo electricity: Introduction –Seebeck effect- variation of thermo - emf with temperature –Peltier effect –Explanation of Seebeck and Peltier effect-Peltier coefficient – Thomson effect and its prediction -EMF in a thermocouple.

E.M.G Yadava Women's College, Madurai-14.

Book for Study:

- 1. Palaniappan.M, *Electricity and electromagnetism*, L.M.N Publication, Madurai, First Edition, 2002.
- 2. Satyaprakash, *Electricity and magnetism*, Pragati Prakashan, meetur, Twenty Sixth Edition 2011.

Books for Reference:

- Basudev Ghosh, *Foundations of Electricity and Magnetism*, Books and Allied (p) Ltd, Kolkata, Third Edition, 2012.
- Chattopadhay. D, Rakshit.P.C , *Electricity and Magnetism*, New Central Book Agency (P) Ltd, Kolkata, Fifth Edition, 2004.
- 3. Murugesan .R , *Electricity & Magnetism*, S. Chand & Company Ltd ,New Delhi, Sixth Edition, 2004.
- 4. Tayal.D. C., *Electricity and Magnetism*, Himalaya Publishing House, Mumbai, Second Edition, 1989.
- 5. Vasudeva.D.N., *Fundamentals of Magnetism and Electricity* ,S. Chand & Company Ltd , New Delhi, Fifth Edition, 2011.

Web resources/ E-Books:

- 1. https://pressbooks.bccampus.ca/basicelectricity/
- 2. https://ncert.nic.in/ncerts/l/jesc112.pdf
- 3. https://library.honolulu.hawaii.edu/c.php?g=288263&p=1922022
- 4. <u>https://ess.inflibnet.ac.in/subject_list.php?subject=Electrical+and+Electronic+Engineerin</u> g
- 5. https://nios.ac.in/media/documents/SrSecLibrary/LCh-008.pdf

Pedagogy:

Chalk and Talk, PPT, group discussion, quiz, on the spot test.

Rationale for nature of Course

Knowledge and Skill: The course is the learning and understanding the fundamentals of electrostatics, current electricity and various types of Thermo electric effects.

Activities to be given:

- 1. Enhancing the quality of students to understand the theory of current electricity.
- 2. Train the students to do the experiments related to electrostatics.

Course Learning Outcomes (CLOs):

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

CLO	Course Learning Outcomes	Knowledge According to Bloom's Taxonomy (upto K level)
CLO1	Understand the fundamentals of Electrostatics	K1 to K3
CLO2	Get the basic Knowledge about current electricity	K1 to K3
CLO3	Understand the concept of Capacitors.	K1 to K3
CLO4	Acquire the knowledge about AC.	K1 to K3
CLO5	Study the Thermo Electric Effects.	K1 to K3

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	3	2	3	3	3
CLO2	3	3	2	3	3	3
CLO3	3	3	3	3	3	3
CLO4	3	3	2	3	3	3
CLO5	3	3	3	3	3	3
	4 0 1 7		10 / 7			1

1-Basic Level 2- Intermediate Level 3- Advanced Level

LESSON PLAN: TOTAL HOURS(30HRS)

UNIT	Details	Hours	Mode
	Electrostatics: Electric field and flux – Gauss law-Derivation of		
	Coulomb's law from Gauss law-Differential form(Maxwell		Chalk and
	equation)-Field due to a uniformly charged sphere -Coloumb's		Talk, PPT,
Ι	theorem -Mechanical force on the surface of a charged conductors	6	quiz, on the
	-Potential-Electric potential -Potential due to a point charge-		spot test
	equipotential surface-relation between field and potential-electric		
	potential energy.		
	Current electricity :Current -Current density- Expression for		
	current density -Resistance and resistivity-Kirchhoff's laws -		Chalk and
п	Application to Wheat stone's network -Carey foster's bridge -		Talk, PPT,
11	Determination of resistivity and temperature coefficient of	6	quiz, on the
	resistance - Potentiometer -measurement of potential and		spot test
	calibration of voltmeter and Ammeter.		

	Capacitors: Introduction –Concept of capacitance –capacitance of an		Chalk and
	isolated spherical conductor -parallel plate capacitor with a dielectric-		Talk, PPT,
111	Dielectric strength.		quiz, on the
			spot test
	Alternating currents :Introduction –Impedance ,Reactance and Admittance-Alternating voltage applied across a resistance – Alternating voltage applied across an inductance- Alternating voltage applied across a capacitance.		Chalk and
IV.			Talk, PPT,
IV			quiz on the
			spot test
	Thermo electricity: Introduction -Seebeck effect- variation of		Seminar, PPT
V	thermo - emf with temperature -Peltier effect -Explanation of		presentation,
v	Seebeck and Peltier effect-Peltier coefficient -Thomson effect and		Quiz on the
	its prediction -EMF in a thermocouple.		Spot test
1			

Course Designer: Mrs. P.Revathi Mrs. M.R.Gurulakshmi

EVALUATION (PRACTICAL) For core and Generic Elective course

Internal (Formative)	: 40 marks
External (Summative)	: 60 marks
Total	:100 marks

Question Paper Pattern for Internal Practical Examination: 40 Marks

S.No	Components	Marks
1	Model test - I	10
2	Model test - II	10
3	Observation note	10
4	Record book	10
	Total	40

Question Paper Pattern for External Practical Examination (Major): 60 Marks

S.No	Components	Marks
1	Experimental Procedure	20
2	Readings	20
3	Calculation	15
4	Result	5
	Total	60

Question Paper Pattern for External Practical Examination (Major): 60 Marks

In respect of external examinations passing minimum is **35% for Under Graduate** Courses and in total, **aggregate of 40%**.

Latest amendments and revisions as per UGC and TANSCHE norm is taken into consideration to suit the changing trends in the curriculum.

Department of Physics							: I B.S	c Maths
Sem	Category	Course Code	Course Title	Credits	Contact Hours /	CIA	SE	Total
					Week			
Ι	Allied 1:	23OUMAGEPH1	Allied Physics – I	3	4	25	75	100

Nature of the Course						
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship oriented				
\checkmark						

Course Objectives:

- 1. To Understand the concepts of Waves and Ultrasonics.
- 2. To Acquire the basic Knowledge of Elasticity and viscosity.
- 3. To Understand the concepts of heat and thermodynamics.
- 4. To Study the basic contents of electricity and magnetism.
- 5. To Acquire the knowledge about the digital electronics.

Course Content :

Unit I: WAVES, OSCILLATIONS AND ULTRASONICS: simple harmonic motion (SHM) – composition of two SHMs at right angles (periods in the ratio 1:1) – Lissajous figures – uses – laws of transverse vibrations of strings – determination of AC frequency using sonometer (steel and brass wires) – ultrasound – production – piezoelectric method – application of ultrasonics: medical field – lithotripsy, ultrasonography–ultrasonoimaging-ultrasonics in dentistry – physiotheraphy, opthalmology – advantages of noninvasive surgery – ultrasonics in green chemistry.

Unit II: PROPERTIES OF MATTER: *Elasticity*: elastic constants – bendingof beam – theory of non- uniform bending – determination of Young's modulus by non-uniform bending – energy stored in a stretched wire –torsion of a wire – determination of rigidity modulus by torsional pendulum. *Viscosity*: streamline and turbulent motion – critical velocity – coefficient of viscosity – Poiseuille's formula – comparison of viscosities – burette method. *Surface tension*: definition – molecular theory – droplets formation– shape, size and lifetime – COVID transmission through droplets, saliva– drop weight method – interfacial surface tension.

Unit III: HEAT AND THERMODYNAMICS: Joule-Kelvin effect – Joule- Thomson porous plug experiment – theory – temperature of inversion- liquefaction of Oxygen– Linde's process of liquefaction of air– liquid Oxygen for medical purpose– importance of cryocoolers – thermodynamic system – thermodynamic equilibrium – laws of thermodynamics – heat engine – Carnot's cycle – efficiency – entropy change of entropy in reversible and irreversible process.

E.M.G Yadava Women's College, Madurai-14.

Unit IV: ELECTRICITY AND MAGNETISM: potentiometer – principle – measurement of thermo emf using potentiometer –magnetic field due to a current carrying conductor – Biot-Savart's law – field along the axis of the coil carrying current – peak, average and RMS values of ac current and voltage – power factor and current values in an AC circuit – types of switches in household and factories– Smart wifi switches- fuses and circuit breakers in houses

Unit V: DIGITAL ELECTRONICS AND DIGITAL INDIA: logic gates, OR, AND, NOT, NAND, NOR, EXOR logic gates – universal building blocks – Boolean algebra – De Morgan's theorem – verification – overview of Government initiatives: software technological parks under MeitY, NIELIT- semiconductor laboratories under Dept. of Space – an introduction to Digital India

Books for Study:

1. R.Murugesan (2018), AlliedPhysics, S. Chand&Co, NewDelhi.

Books for Reference:

- Resnick Halliday and Walker(2018).Fundamentals of Physics(11thedition),John Willey and Sons, Asia Pvt. Ltd., Singapore.
- V.R.Khannaand R.S.Bedi (1998), TextbookofSound1stEdn.Kedharnaath Publish &Co, Meerut.
- N.S.Khareand S.S.Srivastava (1983), Electricity and Magnetism10thEdn., AtmaRam&Sons, New Delhi.
- 4. D.R.Khannaand H.R.Gulati (1979).Optics, S. Chand&Co.Ltd., New Delhi.
- 5. V.K.Metha (2004). Principles of electronics 6thEdn. S.Chand and compa

Web Resources/ E-Books:

- 1. <u>https://youtu.be/M_5KYncYNyc</u>
- 2. <u>https://youtu.be/ljJLJgIvaHY</u>
- 3. <u>https://youtu.be/7mGqd9HQ_AU</u>
- 4. https://youtu.be/h5jOAw57OXM
- 5. <u>https://learningtechnologyofficial.com/category/fluid-mechanics-lab/</u>
- 6. <u>http://hyperphysics.phy-</u>astr.gsu.edu/hbase/permot2.html
- 7. https://www.youtube.com/watch?v=gT8Nth9NWPM
- 8. <u>https://www.youtube.com/watch?v=9mX</u> OMzUruMQ&t=1s
- 9. <u>https://www.youtube.com/watch?v=m4u-</u> <u>SuaSu1s&t=3s</u>
- 10. https://www.biolinscientific.com/blog/what-are- surfactants-and-how-do-they-work

Pedagogy:

Chalk and Talk, PPT, group discussion, OHP presentations, quiz, on the spot test and Virtual Labs.

Rationale for nature of Course

Knowledge and Skill: Study of the properties of matter leads to information which is of practical value to the physicist. It gives us information about the thermal properties and digital electronics.

Activities to be given:

1.Enhancing the quality of students to understand the wave oscillation and heat and thermodynamics.

2. Train the students to understand the properties of matter and digital electronics.

Course Learning Outcomes (CLOs):

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

		Knowledge
CLO	Course Learning Outcomes	According to Bloom's
		Taxonomy(upto K level)
CL01	Understand the concepts of Waves and Ultrasonics	K1 to K3
CLO2	Acquire the basic Knowledge of Elasticity and viscosity	K1 to K3
CLO3	Understand the concepts of heat and thermodynamics.	K1 to K4
CLO4	Study the basic contents of electricity and magnetism	K1 to K3
CLO5	Acquire the knowledge about the digital electronics	K1 to K4

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	3	2	3	3	3
CLO2	3	3	2	3	3	3
CLO3	3	3	3	3	3	3
CLO4	3	3	2	3	3	3
CLO5	3	3	3	3	3	3

1-Basic Level 2- Intermediate Level 3- Advanced Level

LESSON PLAN : TOTAL HOURS(60HRS)

UNIT	DESCRIPTION	Hrs	MODE
	ELASTICITY: Hooke's law - stress-strain diagram - elastic		Chalk and
I	constants -Poisson's ratio - relation between elastic constants and	12	Talk, PPT,
	Poisson's ratio – work done in twisting a wire - twisting couple on a		quiz, on the
	cylinder - rigidity modulus by static torsion-torsional pendulum		spot test
	(with and without masses)		
	BENDING OF BEAMS: cantilever- expression for Bending		
	moment - expression for depression at the loaded end of the		
Π	cantilever- oscillations of a cantilever - expression for time period -		Chalk and
	experiment to find Young's modulus - non-uniform bending-	12	Talk, PPT,
	experiment to determine Young's modulus by Koenig's method -		quiz, on the
	uniform bending - expression for elevation - experiment to		spot test
	determine Young's modulus using microscope		
	FLUID DYNAMICS:		
	Surface tension: definition – molecular forces- excess pressure		
	inside a curved liquid surface – application to spherical and cylindrical drops and bubbles -determination of surface tension by		
			Chalk and
III	Jaegar's method-variation of surface tension with	12	Talk, PPT,
	temperature. Viscosity: definition - streamline and turbulent flow -	12	quiz, on the
	rate of flow of liquid in a capillary tube - Poiseuille's formula -		spot test
	corrections - terminal velocity and Stoke's formula- variation of		
	viscosity with temperature		
	WAVES AND OSCILLATIONS: Simple Harmonic Motion		
	(SHM) – differential equation of SHM – graphical representation of		
	SHM – composition of two SHM in a straight line and at right angles		Chalk and
IV	- Lissajous's figures- free, damped, forced vibrations - resonance and	12	Talk, PPT,
	sharpness of resonance. Laws of transverse vibration of strings -		quiz on the
	sonometer : determination of AC frequency using sonometer -		spot test
	determination of frequency usingMelde's string apparatus.		
	ACOUSTICS OF BUILDINGS AND ULTRASONICS:		
	Intensity of sound - decibel - loudness of sound-reverberation-		Seminar,
V	Sabine's reverberation formula – acoustic intensity – factors	12	PPT
Ť	affecting the acoustics of buildings. Ultrasonic waves: production of	12	presentation,
	ultrasonic waves - Piezoelectric crystal method - magnetostriction		Quiz on the
	effect – application of ultrasonicwaves		Spot test

Course Designer: Mrs.B.Subha Mrs. S.Manimozhi

Sem	Category	Course Code	Course Title	Credits	Contact Hours	CIA	SE	Total
					/ Week			
Ι	Allied Practical 1:	23OUMAGEPH1P	Allied Physics	2	2	40	60	100
			Practical-I					

Nature of the Course							
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship oriented					
 ✓ 							

List of Experiments: (Any Seven)

- 1. Young's modulus by non-uniform bending using pin and microscope
- 2. Young's modulus by non-uniform bending using optic lever, scale and telescope
- 3. Rigidity modulus by static torsion method.
- 4. Rigidity modulus by torsional oscillations without mass
- 6. Surface tension and interfacial Surface tension drop weight method
- 7. Comparison of viscosities of two liquids burette method
- 8. Specific heat capacity of a liquid half time correction
- 9. Verification of laws of transverse vibrations using sonometer
- 10. Calibration of low range voltmeter using potentiometer
- 11. Determination of thermo emf using potentiometer
- 12. Verification of truth tables of basic logic gates using ICs
- 13. Verification of De Morgan's theorems using logic gate ICs.
- 14. Use of NAND as universal building block.

Books for Reference:

- 1. M.N.Srinivasan, S.Balasubramanian, R.Ranganathan(2007), A Text Book of Practical Physics, , Sultan Chand & Sons.
- 2. Indu Prakash &Ramakrishna(2008), A Text Book of Practical Physics, Kitab Mahal Agencies
- S.R. GovindaRajan, T. Murugaiyan, S. SundaraRajan(, 2006), Practical Physics, Rochouse& Sons.

Web resources/ E-Books:

- 1. <u>http://www.tndte.gov.in/site/wp-content/uploads/2016/08/Engineering-physics.pdf</u>
- 2. <u>https://www.ugc.ac.in/pdfnews/5512002_B.SC.-PHYSICAL-SCIENCE-_PHYSICS,-</u> <u>CHEMISTRY,-MATHEMATICS_-CB.pdf</u>

- 3. https://www.academia.edu/34783511/Practical_Physics_for_Degree_Students_Gias_ Uddin_and_Shahabuddin
- 4. https://www.academia.edu/35371782/PHYSICS_LABORATORY_MANUAL_UG_ Courses_I_and_II_Semester1.UG course OBE.docx_

Pedagogy:

Demonstration and Practical sessions.

LESSON PLAN: TOTAL HOURS(30HRS)

TINITT	Dataila	No. of	Mode of	
UNII	Details	Hours	Teaching	
Ι	 Young's modulus by non-uniform bending using pin and microscope. Young's modulus by non-uniform bending using optic lever, scale and telescope. Rigidity modulus by static torsion method. 	6	Demo & Practical Session	
Π	 4. Rigidity modulus by torsional oscillations without mass 5. Surface tension and interfacial Surface tension – drop weight method. 6. Comparison of viscosities of two liquids – burette method. 	6	Demo & Practical Session	
III	 7. Specific heat capacity of a liquid – half time correction 8. Verification of laws of transverse vibrations using sonometer. 9. Calibration of low range voltmeter using potentiometer 	6	Demo & Practical Session	
IV	10. Determination of thermo emf using potentiometer11. Verification of truth tables of basic logic gates using ICs	6	Demo & Practical Session	
V	12. Verification of De Morgan's theorems using logic gate ICs.13. Use of NAND as universal building block.	6	Demo & Practical Session	

Course Designer: Mrs.B.Subha Mrs. S.Manimozhi

Department of Physics						Class	: I B.S	c Maths
Sem	Category	Course Code	Course Title	Credits	Contact Hours	CIA	SE	Total
					/ Week			
II	Allied II	230UMAGEPH2	Allied Physics – II	3	4	25	75	100

Nature of the Course				
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship oriented		
 ✓ 				

Course Objectives:

- 1. To Understand the concepts of interference.
- 2. To Acquire the basic Knowledge of atom models.
- 3. To Understand the concepts of nuclear models.
- 4. To Study about the special theory of relativity.
- 5. To Acquire the knowledge about the semiconductor physics.

Course Content

UNIT I :OPTICS: interference – interference in thin films – colors of thin films – air wedge – determination of diameter of a thin wire by air wedge – diffraction – diffraction of light vs sound – normal incidence – experimental determination of wavelength using diffraction grating (no theory) – polarization – polarization by double reflection – Brewster's law – optical activity – application

in sugar industries

UNIT II :ATOMIC PHYSICS: atom models – Bohr atom model – mass number – atomic number – nucleons – vector atom model – various quantum numbers – Pauli's exclusion principle – electronic configuration – periodic classification of elements – Bohr magneton – Stark effect –Zeeman effect (elementary ideas only) – photo electric effect – Einstein's photoelectric equation – applications of photoelectric effect: solar cells, solar panels, optoelectric devices

UNIT III :NUCLEAR PHYSICS: nuclear models – liquid drop model – magic numbers – shell model – nuclear energy – mass defect – binding energy – radioactivity – uses – half life – mean life - radio isotopes and uses –controlled and uncontrolled chain reaction – nuclear fission – energy released in fission – chain reaction – critical reaction – critical size- atom bomb – nuclear reactor –breeder reactor – importance of commissioning PFBR in our country – heavy water disposal, safety of reactors: seismic and floods –introduction to DAE, IAEA – nuclear fusion –thermonuclear reactions – differences between fission and fusion.

UNIT IV: INTRODUCTION TO RELATIVITY AND GRAVITATIONAL WAVES:

Frame of reference – Postulates of special theory of relativity – Galilean transformation equations – Lorentz transformation equations – Derivation – length contraction – time dilation – twin paradox – mass-energy equivalence –introduction on gravitational waves, LIGO, ICTS opportunities at International Centre for Theoretical Sciences.

UNIT V :SEMICONDUCTOR PHYSICS: p-n junction diode – forward and reverse biasing – characteristic of diode – zener diode – characteristic of zener diode – voltage regulator – full wave bridge rectifier – construction and working – advantages (no mathematical treatment) – USB cell phone charger –introduction to e-vehicles and EV charging stations

Books for Study:

- 1. R.Murugesan (2005), Allied Physics, S.Chand & Co, NewDelhi.
- 2. K. Thangarajand D. Jayaraman (2004), Allied Physics, Popular Book Depot, Chennai.
- 3. Brijlal and N.Subramanyam (2002), Text book of Optics, S.Chand & Co, New Delhi.
- 4. R.Murugesan (2005), Modern Physics, S.Chand & Co, NewDelhi.
- 5. A.Subramaniyam Applied Electronics, 2ndEdn., National Publishing Co., Chennai.
- 6. Subramaniyam Applied Electronics, 2ndEdn., National Publishing Co., Chennai.

Books for References:

- Resnick Halliday and Walker (2018), Fundamentals of Physics, 11thEdn., John Willey and Sons, Asia Pvt.Ltd., Singapore.
- 2. D.R.Khannaand H.R. Gulati (1979).Optics, S.Chand & Co.Ltd., New Delhi.
- 3. A.Beiser (1997)Concepts of Modern Physics, Tata Mc Graw Hill Publication, NewD elhi.
- Thomas L. Floyd (2017), Digital Fundamentals, 11thEdn., Universal Book Stall, NewDelhi.
- V.K.Metha(2004), Principles of electronics, 6thEdn.S.Chandand Company, New Delhi.

Web resources/E-Books:

- 1. https://www.berkshire.com/learning-center/delta-p- facemask/
- 2. <u>https://www.youtube.com/watch?v=QrhxU47gtj4htt</u>
- 3. ps://www.youtube.com/watch?time_continue=318&v=D38Bjg

UdL5U&feature=emb_logo

4. <u>https://www.youtube.com/watch?v=JrRrp5F-Qu4</u>

- 5. https://www.validyne.com/blog/leak-test-using-pressure-transducers/
- 6. https://www.atoptics.co.uk/atoptics/blsky.htm -
- 7. https://www.metoffice.gov.uk/weather/learn-about/weather/optical-effects

Pedagogy: Chalk and Talk, PPT, group discussion, quiz, on the spot test. **Rationale for nature of Course:**

Knowledge and Skill: Study of the allied physics-II leads to information which is of practical value to the physicist. It gives us information about the nuclear models ,atom models. Students who undergo this course are successfully bound to get a better insight and understanding of the subject.

Activities to be given:

- 1. Enhancing the quality of students to understand about the semiconductor device.
- 2. Train the students to understand the theory by conducting the experiments.

Course Learning Outcomes (CLOs):

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

		Knowledge
CLO	Course Learning Outcomes	According to Bloom's
		Taxonomy(upto K level)
CLO1	Explain the concepts of interference diffraction using principles of Superposition	K1 to K3
	of waves and rephrase the concept of polarizationbased on wave patterns	
CLO2	Outline the basic foundation of different atom models and various experiments	K1 to K3
	establishing quantum concepts. Relate theimportance of interpreting improving	
	theoretical models based on observation. Appreciate interdisciplinary nature of	
	science and in solar energy related applications.	
CLO3	Summarize the properties of nuclei, nuclear forces structure of atomic nucleus	K1 to K4
	and nuclear models. Solve problems on delay rate half-life and mean-life.	
	Interpretnuclear processes like fission and fusion. Understand theimportance of	
	nuclear energy, safety measures carried and getour Govt. agencies like DAE	
	guiding the country in the nuclear field.	
CLO4	To describe the basic concepts of relativity like equivalence principle, inertial	K1 to K3
	frames and Lorentz transformation. Extend their knowledge on concepts of	
	relativity and vice versa. Relate this with current research in this field and get an	
	overview ofresearch projects of National and International importance,	
	like LIGO, ICTS, and opportunities available.	
CLO5	Summarize the working of semiconductor devices like junction diode, Zener	K1 to K4
	diode, transistors and practical devices we daily use like USB chargers and	
	EV charging stations	

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	3	2	3	3	3
CLO2	3	3	2	3	3	3
CLO3	3	3	3	3	3	3
CLO4	3	3	2	3	3	3
CLO5	3	3	3	3	3	3

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)



LESSON PLAN: TOTAL HOURS(60 HRS)

UNIT	Details	Hours	Mode
Ι	OPTICS: i nterference – interference in thin films –colors of thin films – air wedge –		Chalk and
	determination of diameter of a thin wire by air wedge – diffraction – diffraction of light		Talk, PPT,
	vs sound - normal incidence - experimental determination of wavelength using	12	quiz, on the
	diffraction grating (no theory) - polarization - polarization by double reflection -		spot test
	Brewster's law – optical activity – application in sugar industries		
	ATOMIC PHYSICS: atom models - Bohr atom model - mass number - atomic		
	number - nucleons - vector atom model - variousquantum numbers - Pauli's exclusion		Chalk and
т	principle - electronic configuration - periodic classification of elements - Bohr		Talk, PPT,
11	magneton – Stark effect –Zeeman effect (elementary ideas only) – photo electric effect	12	quiz, on the
	- Einstein's photoelectric equation - applications of photoelectric effect: solar cells,		spot test
	solar panels, optoelectric devices		
	NUCLEAR PHYSICS: nuclear models – liquid drop model – magic numbers – shell		
	model - nuclear energy - mass defect - binding energy - radioactivity - uses - half		
	life – mean life - radio isotopes and uses –controlled and uncontrolled chain reaction –		
	nuclear fission – energy released in fission – chain reaction – critical reaction – critical		Chalk and
111	size- atom bomb - nuclear reactor -breeder reactor - importance of commissioning		Talk, PPT,
	PFBR in our country – heavy water disposal, safety of reactors: seismic and floods –	10	quiz, on the
	introduction to DAE, IAEA - nuclear fusion -thermonuclear reactions - differences	12	spot test
	between fission and fusion.		
	INTRODUCTION TO RELATIVITY AND GRAVITATIONAL		
	WAVES: Frame of reference – Postulates of special theory of relativity – Galilean	10	Chalk and
IV	transformation equations – Lorentz transformation equations – Derivation – length	12	Talk, PPT,
	contraction – time dilation – twin paradox – mass-energy equivalence –introduction		quiz on the

	on gravitational waves, LIGO, ICTS opportunities at International Centre for		spot test
	Theoretical Sciences.		
	SEMICONDUCTOR PHYSICS: p-n junction diode – forward and reverse biasing		Seminar,
	- characteristic of diode - zener diode - characteristic of zener diode - voltage		PPT
V	regulator - full wave bridge rectifier - construction and working - advantages (no	12	presentation,
	mathematical treatment) – USB cell phone charger –introduction to e-vehicles and EV		Quiz on the
	charging stations		Spot test

Course Designer: Ms. S.Priyanka Mrs. S.Ameer Nisha Bibi

Department of Physics					Class: I B.Sc			
Sem	Category	Course Code	Course Title	Credits	Credits Contact Hours		SE	Total
					/ Week			
II	Allied Practical II	23OUMAGEPH2P	Allied Practical-II	2	2	40	60	100

Nature of the Course				
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship oriented		
 ✓ 				

LIST OF EXPERIMENTS : (Any Seven)

- 1. Radius of curvature of lens by forming Newton's rings
- 2. Thickness of a wire using air wedge
- 3. Wavelength of mercury lines using spectrometer and grating
- 4. Refractive index of material of the lens by minimum deviation
- 5. Refractive index of liquid using liquid prism
- 6. Determination of AC frequency using sonometer
- 7. Specific resistance of a wire using PO box
- 8. Thermal conductivity of poor conductor using Lee's disc
- 9. Determination of figure of merit table galvanometer
- 10. Determination of Earth's magnetic field using field along the axis of a coil
- 11. Characterisation of Zener diode
- 12. Construction of Zener/IC regulated power supply
- 13. Construction of AND, OR, NOT gates using diodes and transistor
- 14. NOR gate as a universal building block

Books for References:

- M.N.Srinivasan, S.Balasubramanian, R.Ranganathan(2007), A Text Book of Practical Physics, Sultan Chand & Sons.
- 2. Indu Prakash & Ramakrishna (2008), *A Text Book of Practical Physics*, Kitab Mahal Agencies.

Web resources/E-Books:

- 1. <u>https://www.youtube.com/watch?v=jcpnOJHS3TE</u>
- 2. <u>https://www.youtube.com/watch?v=-0etuKdDu2g</u>
- 3. https://www.youtube.com/watch?v=9lqwSaIDm2g
- 4. <u>https://www.youtube.com/watch?v=Z6Nds10n7rs</u>
- 5. <u>https://www.youtube.com/watch?v=mQM-5o3pBaU</u>

Pedagogy:

Demonstration and Practical sessions.

LESSON PLAN: TOTAL HOURS(30HRS)

UNIT	Details	Hours	Mode
	1. Radius of curvature of lens by forming Newton's rings		Demo & Practical
т	2. Thickness of a wire using air wedge	6	Session
1	3. Wavelength of mercury lines using spectrometer and	0	
	grating		
	4. Refractive index of material of the lens by minimum		
п	deviation		
11	5. Refractive index of liquid using liquid prism	6	Demo & Practical
	6. Determination of AC frequency using sonometer		Session
	7. Specific resistance of a wire using PO box		Demo & Practical
III	8. Thermal conductivity of poor conductor using Lee's disc	6	Session
	9. Determination of figure of merit table galvanometer		
	10. Determination of Earth's magnetic field using field along		
IV/	the axis of a coil	6	Demo & Practical
IV	11. Characterisation of Zener diode	0	Session
	12. Construction of Zerner/IC regulated power supply		
	13. Construction of AND, OR, NOT gates using diodes and		
V	transistor	6	Demo & Practical
	14. NOR gate as a universal building block		Session

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