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

CBCS With OBE

BACHELOR OF SCIENCE

PROGRAMME CODE - I

COURSE STRUCTURE

(w.e.f. 2022 – 2023 Batch onwards)

Annexure -15

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)

DEPARTMENT OF PHYSICS – UG

(w.e.f. 2022– 2023 Batch onwards)

CBCS with OBE

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	Lead lifelong 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):

PSOs	Graduate Attributes	After completion of B.Sc Physics the students will be able to	PO Addressed
PSO-1	Knowledge & Proficiency	Acquire Knowledge and to Understand the academic field of Physics and applications of Basic Physics.	PO1
PSO-2	Problem analysis	Demonstrate the application of physics concepts, laws and principles with necessary experimental background and assess their consequences.	PO2
PSO-3	Problem Solving	Apply Mathematical techniques with emphasis on application of Physics.	PO2
PSO-4	Modern tool usage	Interpret physics concepts, processes and results effectively using Modern tool usage.	PO4
PSO-5	Social responsibility	Acquire specific knowledge on the various fields like thin film, crystal growth and nanotechnology.	PO6
PSO-6	Lifelong learning	To promote Students employability for a job oriented in Physics in particular and other relevant post graduate studies	PO5
PSO-7	Ethical & Moral and Spiritual Values	Ability to engage in lifelong learning with a high level of enthusiasm and commitment to improve knowledge.	PO6
PSO-8	Leadership, Team work & Communication	To improve communication abilities, engage the students in independent and group activities of projects.	PO3

Qualification for Admission

Candidates should have passed the Higher Secondary Examination with Mathematics as one of the stream, conducted by the Board of Higher Education, Government of Tamilnadu, CBSC & 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

Courses of Study with Credit Distribution for B.Sc Physics

Category	No.of Courses	No.of Credits
Part-I	4	12
Part –II	4	12
Major Core Paper	11	47
Discipline Specific Elective Courses	3	12
Generic Elective Courses (Maths & Chemistry)	12	18+18
Skill Enhancement Courses	6	12
Inter Disciplinary Courses	2	4
Ability Enhancement Compulsory Courses	2	4
NSS/Physical Education	1	1
Total	45	140

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)
2. **Based on Domain Knowledge: (for UG Up to K4 levels)**
   Assessment through K1, K2, K3 & K4

Annexure -15

EVALUATION (THEORY)
(PART I / PART II / PART III)

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

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

Components	**Marks**
Test (Average of three tests) (Conducted for 100 marks and converted into 20 marks)	**20**
Assignment(Quiz/ Documentation/ Case lets/ ICT based Assignment/ Mini Projects)	**5**
Total	**25**

- ✓ **Centralized system** of Internal Assessment Tests
- ✓ There will be **Three Internal Assessment** Tests
- ✓ Duration of Internal assessment test will be **1 hour for Test I and 2 hours for Test II and III** respectively.
- ✓ 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

Section		**Marks**
A-Multiple Choice Question	(3x1 mark)	3
B-Short Answer	(1x2 marks)	2
C-Either Or type	(1/2x 5 marks)	5
D-Open choice type	(1/2 x 10 marks)	10
Total		20

Question Paper Pattern for Continuous Internal Assessment -Test II and III

Multiple choice for Section		**Marks**
A- Multiple Choice Question	(6x1 mark)	6
B-Short Answer	(2x2 marks)	4
C-Either Or Type	(2/4 x5 marks)	10
D-Open Choice Type	(2/3 x 10 marks)	20
Total		40

Conducted for 100 marks and converted into 20 marks

Annexure -15

Question Paper Pattern for Summative Examination

Section	Marks
A- Multiple choice Questions without Choice (10x1 mark)	10
B-Short Answer without choice (5x2 marks)	10
C-Either Or type (5/10 x5 marks)	25
D-Open Choice type (3out of 5x10 marks)	30
Total	75

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

Distribution of Marks in % with K Levels CIA I, II, III & External Assessment

Blooms Taxonomy	Internal Assessment			External Assessment
	I	II	III	
Knowledge (K1)	12%	12%	12%	13%
Understanding (K2)	44%	22%	22%	21%
Apply (K3)	44%	33%	33%	33%
Analyze (K4)	-	33%	33%	33%

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

Annexure -15

BLUE PRINT FOR INTERNAL ASSESSMENT – I

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

Sl. No	CLOs	K- Level	Section A		Section B		Section C	Section D	Total
			MCQs (No Choice)		Short Answers (No Choice)		(Either or Type)	(Open choice)	
			No. of Questions	K-Level	No. of Questions	K-Level			
1	CLO 1	Up to K3	3	(K1)	1	K1	2 (K2) (Each set of questions must be in the same level)	1 (K2) & 2 (K3)	
No. of Questions to be asked			3		1		2	3	9
No. of Questions to be answered			3		1		1	1	6
Marks for each question			1		2		5	10	-
Total Marks for each section			3		2		5	10	20

BLUE PRINT FOR INTERNAL ASSESSMENT – II

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

Sl. No	CLOs	K- Level	Section A		Section B		Section C	Section D	Total
			MCQs (No Choice)		Short Answers (No Choice)		(Either or Type)	(Open choice)	
			No. of Questions	K-Level	No. of Questions	K-Level			
1	CLO 2	Up to K3	3	(K1/ K2)	1	(K1/ K2)	2 (K2) / 2 (K4) (Each set of questions must be in the same level)	2 (K3) & 1 (K4)	
2	CLO 3	Up to K4	3	(K1/ K2)	1	(K1/ K2)			
No. of Questions to be asked			6		2		4	3	15
No. of Questions to be answered			6		2		2	2	12
Marks for each question			1		2		5	10	-
Total Marks for each section			6		4		10	20	40

Annexure -15

BLUE PRINT FOR INTERNAL ASSESSMENT – III

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

Sl. No	CLOs	K- Level	Section A		Section B		Section C	Section D	Total
			MCQs (No Choice)		Short Answers (No Choice)		(Either or Type)	(Open choice)	
			No. of Questions	K-Level	No. of Questions	K-Level			
1	CLO 4	Up to K3	3	(K1/ K2)	1	(K1/ K2)	2 (K2) / 2 (K4) (Each set of questions must be in the same level)	2 (K3) & 1 (K4)	
2	CLO 5	Up to K4	3	(K1/ K2)	1	(K1/ K2)			
No. of Questions to be asked			6		2		4	3	15
No. of Questions to be answered			6		2		2	2	12
Marks for each question			1		2		5	10	-
Total Marks for each section			6		4		10	20	40

Distribution of Marks with K Levels CIA I, CIA II and CIA III

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
I	K1	3	2	-	-	5	12
	K2	-	-	10	10	20	44
	K3	-	-	-	20	20	44
	K4	-	-	-	-	-	-
	Marks	**3**	**2**	**10**	**30**	**45**	**100**
II	K1	5	2	-		7	12
	K2	1	2	10	-	13	22
	K3	-	-	-	20	20	33
	K4	-	-	10	10	20	33
	Marks	**6**	**4**	**20**	**30**	**60**	**100**
III	K1	5	2	-		7	12
	K2	1	2	10	-	13	22
	K3	-	-	-	20	20	33
	K4	-	-	10	10	20	33
	Marks	**6**	**4**	**20**	**30**	**60**	**100**

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

Sl. No	CLOs	K- Level	Section A		Section B		Section C (Either/ or Type)	Section D (open choice)	Total
			MCQs (No choice)		Short Answers (No choice)				
			No. of Questions	K-Level	No. of Questions	K-Level			
1	CLO 1	Up to K3	2	K1/K2	1	K1/K2	2 (K3 & K3)	1(K2)	
2	CLO 2	Up to K3	2	K1/K2	1	K1/K2	2(K2 & K2)	1(K3)	
3	CLO 3	Up to K4	2	K1/K2	1	K1/K2	2 (K4 &K4)	1(K4)	
4	CLO 4	Up to K 3	2	K1/K2	1	K1/K2	2 (K3 & K3)	1(K3)	
5	CLO 5	Up to K 4	2	K1/K2	1	K1/K2	2 (K4 & K4)	1(K4)	
No. of Questions to be asked			10		5		10	5	30
No. of Questions to be answered			10		5		5	3	23
Marks for each question			1		2		5	10	
Total Marks for each section			10		10		25	30	75 (Marks)

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

Annexure -15

EVALUATION (THEORY)

(PART IV - SEC, IDC, AECC (EVS & Value Education)

PART V - NSS / Physical Education)

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

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

Components	Marks
Test (Conducted for 50 marks and converted into 25 marks)	**25**

- ✓ There will be Only one Internal Assessment Test
- ✓ Duration of Internal assessment test will be 2 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

Section	Marks
A-Multiple Choice Question (5x1 mark)	5
B-Short Answer (5x2 marks)	10
C-Either Or type (3x 5 marks)	15
D-Open choice type (2/3 x 10 marks)	20
Total	50

Conducted for 50 marks and converted into 25 marks

Question Paper Pattern for External Examination

Section	Marks
A-Multiple Choice Question (10x1 mark)	10
B-Short Answer (5x2 marks)	10
C-Either Or type (5x 5 marks)	25
D-Open choice type (3/5 x 10 marks)	30
Total	75

Annexure -15

BLUE PRINT FOR INTERNAL ASSESSMENT

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

Sl. No	CLOs	K-Level	Section A		Section B		Section C	Section D	Total
			MCQs (No Choice)		Short Answers (No Choice)		(Either or Type)	(Open Choice)	
			No. of Questions	K-Level	No. of Questions	K-Level			
1.	CLO1	Up to K 3	1	K1	1	K1	4(K2) & 2(K3) (Each set of questions must be in the same level)	1(K2) & 2(K3)	
2.	CLO2	Up to K 3	1		1				
3.	CLO3	Up to K 3	1		1				
4	CLO4	Up to K 3	1		1				
5	CLO5	Up to K 3	1		1				
No. of Questions to be asked			5		5		6	3	19
No. of Questions to be answered			5		5		3	2	15
Marks for each question			1		2		5	10	
Total Marks for each section			**5**		**10**		**15**	**20**	**50**

Distribution of Marks with K Levels - CIA

CIA	K Levels	Section A MCQ	Section B (Short Answers)	Section C (Either/Or Choice)	Section D (Open Choice)	Total Marks	% of Marks
I	K1	5	10	-	-	15	20
	K2	-	-	20	10	30	40
	K3	-	-	10	20	30	40
	K4	-	-	-	-	-	-
	Marks	**5**	**10**	**30**	**30**	**75**	**100**

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

Sl. No	CLOs	K-Level	Section A		Section B		Section C (Either/or Choice)	Section D (Open Choice)	Total
			MCQs		Short Answers				
			No. of Questions	K-Level	No. of Questions	K-Level			
1	CLO 1	Up to K3	2	K1	1	K1	3(K2) & 2(K3) (Each set of questions must be in the same level)	2(K2) & 3(K3)	
2	CLO 2	Up to K3	2		1				
3	CLO 3	Up to K3	2		1				
4	CLO 4	Up to K 3	2		1				
5	CLO 5	Up to K 3	2		1				
No. of Questions to be asked			10		5		10	5	30
No. of Questions to be answered			10		5		5	3	23
Marks for each question			1		2		5	10	
Total Marks for each section			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)	Section D (Open Choice)	**Total Marks**	% of Marks without choice
K1	10	10	-	--	**20**	16
K2	-	-	30	20	**50**	42
K3	-	-	20	30	**50**	42
Total Marks	10	10	50	50	**120**	100

Annexure -15

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

DEPARTMENT OF PHYSICS-UG
(with Allied Maths and Allied Chemistry)
CBCS with OBE
COURSE STRUCTURE
(w.e.f. 2022-2023 Batch onwards)

Sem	Part	Subject code	Title of the Course	Teaching hrs.(Per week)	Duration of exam (hrs)	Marks allotted			Credits
						C.A	S.E	Total	
I	I	**22OU1TA1**	**Part-I** Tamil	6	3	25	75	100	3
	II	**22OU2EN1**	**Part-II** English	6	3	25	75	100	3
	III	**22OUPH11**	**Core:** Mechanics, Properties of Matter and Sound	4	3	25	75	100	4
			Core: Major Practical – I	2	-	-	-	-	-
		22OUPHGEMA1	**GEC**: Mathematics – I Theory of Equations, Trigonometry, Analytical Geometry 3D and vector Calculus	6	3	25	75	100	4
	IV	**22OUPHSE11**	**SEC:** Basic Electronics	2	3	25	75	100	2
		22OUPHSE12	**SEC:** Introduction to MS Office and Internet	2	3	25	75	100	2
		22OUPHID1	**IDC:** Energy Physics	2	3	25	75	100	2
II	I	**22OU1TA2**	**Part-I** Tamil	6	3	25	75	100	3
	II	**22OU2EN2**	**Part-II** English	6	3	25	75	100	3
	III	**22OUPH21**	**Core:** Heat and Thermodynamics	4	3	25	75	100	4
		22OUPH2P	**Core:** Major Practical – I	2	3	40	60	100	3
		22OUPHGEMA2	**GEC:** Mathematics – II Calculus, Differential Equations and Applications	6	3	25	75	100	5
	IV	**22OUPHSE21**	**SEC:** Basic Instrumentation Skill	2	3	25	75	100	2
		22OUPHSE22	**SEC:** Renewable Energy and Energy Harvesting	2	3	25	75	100	2
		22OUPHID2	**IDC:** Astrophysics	2	3	25	75	100	2
III	I	**22OU1TA3**	**Part-I** Tamil	6	3	25	75	100	3

	II	**22OU2EN3**	**Part-II** English	6	3	25	75	100	3
	III	**22OUPH31**	**Core:** Electricity and Electromagnetism	4	3	25	75	100	4
			Core: Major Practical -II	2	-	-	-	-	-
		22OUPHGEMA3	**GEC:** Mathematics – III Algebra and Statistics	6	3	25	75	100	4
		22OUPHGECH3	**GEC:** Chemistry-I Physical Chemistry	4	3	25	75	100	4
			GEC: Practical I- Inorganic Qualitative Analysis	2	-	-	-	-	-
IV	I	**22OU1TA4**	**Part-I** Tamil	6	3	25	75	100	3
	II	**22OU2EN4**	**Part-II** English	6	3	25	75	100	3
	III	**22OUPH41**	**Core:** Optics and Spectroscopy	4	3	25	75	100	4
		22OUPH4P	**Core:** Major Practical – II	2	3	40	60	100	3
		22OUPHGEMA4	**GEC:** Mathematics – IV Linear Programming	6	3	25	75	100	5
		22OUPHGECH4	**GEC** : Chemistry-II Organic and Physical Chemistry	4	3	25	75	100	4
		22OUPHGECH4P	**GEC** : Practical I- Inorganic Qualitative Analysis	2	3	40	60	100	1
V	III	**22OUPH51**	**Core:** Atomic Physics	4	3	25	75	100	4
	III	**22OUPH52**	**Core:** Programming with C	4	3	25	75	100	4
	III		**DSEC –I**	4	3	25	75	100	4
			Core: Major Physics Practical – III	3	-	-	-	-	-
			Core: Major Electronics Practical – IV	3	-	-	-	-	-
			Major Elective –Project	2	-	-	-	-	-
		22OUPHGECH5	**GEC**: Chemistry-III Inorganic Physical and Medicinal Chemistry	4	3	25	75	100	4
			GEC: Practical II- Volumetric Analysis	2	-	-	-	-	-
	IV	**22OUPHSE5**	**SEC:** Opto Electronics	2	3	25	75	100	2
		22OUAECEV5	**AECC:** Environmental Studies	2	3	25	75	100	2
	III	**22OUPH61**	**Core:** Solid State Physics	4	3	25	75	100	4

VI	III	**22OUPH62**	**Core:** Nuclear Physics	4	3	25	75	100	4
	III		**DSEC –II**	4	3	25	75	100	4
		22OUPH61P	**Core:** Major Physics Practical – III	3	3	40	60	100	5
		22OUPH62P	**Core:** Major Electronics Practical – IV	3	3	40	60	100	5
			DSEC -III Project	2	3	20	80	100	3
		22OUPHGECH6	**GEC**: Chemistry-IV Analytical and Inorganic Chemistry	4	3	25	75	100	4
		22OUPHGECH6P	**GEC**: Practical II- Volumetric Analysis	2	3	40	60	100	1
	IV	**22OUPHSE6**	**SEC:** Microprocessor Fundamentals	2	3	25	75	100	2
		22OUAECVE6	**AECC:** Value education	2	3	25	75	100	2
	V	**22OU5NS4/ 22OU5PE4**	Extension Activities NSS/Phy. Education	-	3	25	75	100	1
			Total	180					140

GEC : Generic Elective Course
SEC : Skill Enhancement Course
DSEC : Discipline Specific Elective Course
AECC: Ability Enhancement Compulsory Course
IDC : Inter Disciplinary Course

DSEC: Discipline Specific Elective Course:

Semester V (DSEC I- Choose any one)

1. Analog and Digital Electronics - 22OUPHDSE5A
2. Numerical Methods - 22OUPHDSE5B

Semester VI (DSEC II- Choose any one)

1. Relativity and Quantum Mechanics - 22OUPHDSE6A
2. Nanophysics - 22OUPHDSE6B

DSEC -III Project - 22OUPHDSEPR6

Annexure -15

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Re –accredited (3rd cycle) with Grade A+ and CGPA 3.51 by NAAC

DEPARTMENT OF PHYSICS-UG

Generic Elective Course (For B.Sc Maths and Chemistry)
CBCS with OBE

COURSE STRUCTURE

(w.e.f. 2022-2023 Batch onwards)

Class	Sem	Sub Code	Title of the paper	Teaching hrs(Per week)	Duration Of exam (hrs)	Marks allotted			
						C. A	S.E	Total	Credits
I Maths/ II Chemistry	I/III	**22OUMAGEPH1/ 22OUCHGEPH3**	**GEC**: Physics – I Mechanics and Properties of Matter	4	3	25	75	100	4
			GEC : Physics Practical-I	2	-	-	-	-	-
I Maths/ II Chemistry	II/IV	**22OUMAGEPH2/ 22OUCHGEPH4**	**GEC :** Physics – II Thermal Physics	4	3	25	75	100	4
		22OUMAGEPH2P/ 22OUCHGEPH4P	**GEC :** Physics Practical-I	2	3	40	60	100	1
II Maths/ III Chemistry	III/V	**22OUMAGEPH3/ 22OUCHGEPH5**	**GEC :** Physics – III Electricity and Electronics	4	3	25	75	100	4
			GEC : Physics Practical-II	2	-	-	-	-	-
II Maths/ III Chemistry	IV/VI	**22OUMAGEPH4/ 22OUCHGEPH6**	**GEC :** Physics – IV Optics	4	3	25	75	100	4
		22OUMAGEPH4P/ 22OUCHGEPH6P	**GEC :** Physics Practical-II	2	3	40	60	100	1

NOTE:

The students are permitted to obtain additional credits (Optional)

1. MOOCs / SWAYAM / NPTEL Courses (Online)
2. Project

Compulsory Courses:

Year	Semester	Nature of Course	Course code	Title of the Course	Hours	Offered to students of
I	I	Add on Course	22PHAOC 22PHAOCP	Fundamentals of Photography Lab in Fundamentals of Photography	30	I B.Sc., Physics
II	III &IV	Certificate Course	22PHC 22PHPR	Solar Energy Project in Solar Energy	90	II year students of all other disciplines
III	V	Value Added Course	22PHVAC 22PHVACPR	Mobile Communication Project in Mobile Communication	30	III B.Sc., Physics

Annexure -15

Department of Physics				Class: I B.Sc				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/ Week**	**CIA**	**SE**	**Total**
I	Core	22OUPH11	Mechanics, Properties of Matter and Sound	4	4	25	75	100

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

Course Objectives:

1. To learn the basic concepts of laws and forces.
2. To gain the knowledge of Moment of Inertia and concepts of dynamic bodies
3. To Understand the concept of Gravitation field and Potential
4. To demonstrate practical knowledge in the Elastic and Viscosity properties.
5. To Study the behaviour of sound waves and also its properties.

Course Content:

Unit : I Mechanics: Significance of Conservation laws-Concepts of work, power and energy-Conservative forces-Energy- Conservation of linear momentum-Collision—Calculation of final velocities of colliding particles(one dimension only)-Systems of variable mass-The Rocket.

Unit: II Dynamics of Rigid Bodies: Rigid body –Torque-Angular momentum-Moment of inertia (Radius of Gyration)–General theorems on moment of inertia (Perpendicular and Parallel axis theorem) -Particular cases of moment of inertia(circular disc, circular ring, solid sphere).

Unit:III Gravitation: Newton's law of gravitation-Experimental determination of gravitational constant (G) using Boy's method- Kepler's laws -Compound pendulum(to find value of g and T using bar pendulum)

Viscosity-Viscosity- Newton's law of viscous flow-Coefficient of viscosity- Equation of continuity of flow- Bernoulli's theorem - Applications of Bernoulli's theorem (Venturimeter, Pitot tube).

Unit :IV Elasticity: Introduction– Load, Stress and strain – Hooke's law -Different types of Elasticity – Poisson's ratio-Relations connecting the elastic constants –Determination of Young's modulus for a material(for a thick Bar) -Bending moment – Determination of Elastic constant (Searle's method).

Unit :V Sound : Simple harmonic motion – Linearity and superposition principle –Wave motion -Characteristics of wave motion-Transverse wave motion- Longitudinal wave motion-Definitions-Relation between frequency and wavelength-Properties of longitudinal progressive wave-Stationary waves-Properties of stationary longitudinal waves- Melde's experiment – Acoustics-Reverberation-Factors affecting the Acoustics of buildings-Requisite for Good Acoustics.

Books for Study:

1.Mathur.D.S, Revised by Hemne P.S , (2012)**,** *Mechanics* , First Revised Edition, S. Chand & Co.,New Delhi.

Unit: I Chapter 5.1-5.4, 6.1, 6.9, 6.10, 6.12

Unit: II Chapter 11.1-11.4, 11.7, 11.9

Unit: III Chapter 12.2, 12.3, 12.40, 7.7.2, 15.2, 15.3, 15.6, 15.8, 15.10

Unit: IV Chapter 13.1-13.3, 13.7, 13.11, 13.12, 13.14(ii), 14.5, 14.13(i)

2.Subramaniam.N and Brijlal, (1995), *A Text Book of Sound*, Second Revised Edition, S. Chand & Co.,New Delhi.

Unit: V Chapter 1.3,1.10,4.1,4.3-4.8,6.1,6.2,7.5,10.14,10.15,10.20,10.22

Books for Reference:

1.Brijlal and Subramanyam.N, (1994), *Waves & Oscillations* , Vikas Publishing House Pvt. Ltd. Noida,

2.Gupta.A.B, (2011), *College physics*, *Volume I* , First edition, Books and Allied (P) Ltd, Kolkata,

3.Murugesan.R, (2010), *Mechanics and Mathematical Methods*, Third edition, S.Chand and Co, New Delhi.

4.Mathur.D.S , (2012), *Elements of properties of matter*, ,First Edition, Reprint S.Chand and Co New Delhi.

5.Paul.A.Tipler, (2003), *Physics*, *Volume I*, First edition, CBS Publishers and Distributors, New Delhi.

Web Resources / E.Books:

1. https://www.britannica.com/science/conservation-law
2. https://www.vedantu.com/physics/rigid-bodies
3. https://www.livescience.com/52628-simple-harmonic-motion.html
4. https://www.uou.ac.in/sites/default/files/slm/BSCPH-101.pdf

Pedagogy:

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

Rationale for Nature of the course:

Knowledge and skill: The course is the learning and understanding the fundamental ideas of conservation Law, Gravitational Law, Kepler's Law and sound.

Activities to be given:

1. Enhancing the quality of students to solve fundamental mechanic problem.
2. Train the students to understanding the properties of sound.

Course learning Outcomes (CLOs):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (upto K level)
CLO1	Understand the basic level of laws and forces	K1 to K2
CLO2	Gain knowledge about Moment of Inertia and concepts of dynamic bodies	K1 to K2
CLO3	Apply the concepts of Gravitational force and potential	K1 to K3
CLO4	Analyze the significance of Elasticity	K1 to K3
CLO5	Examine the role of sound in various applications	K1 to K4

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

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

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

Annexure -15

LESSON PLAN : TOTAL HOURS(60HRS)

UNIT	DESCRIPTION	HRS	MODE
I	**Unit :I Mechanics:** Significance of Conservation laws-Concepts of work, power and energy-Conservative forces-Energy- Conservation of linear momentum-Collision—Calculation of final velocities of colliding particles(one dimension only)-Systems of variable mass-The Rocket.	12	Chalk and Talk, PPT, group discussion
II	**Unit :II Dynamics of Rigid Bodies:** Rigid body – Torque-Angular momentum-Moment of inertia (Radius of Gyration)–General theorems on moment of inertia (Perpendicular and Parallel axis theorem) - Particular cases of moment of inertia(circular disc, circular ring, solid sphere).	12	Chalk and Talk, PPT, group discussion
III	**Unit :III Gravitation:** Newton's law of gravitation-Experimental determination of gravitational constant (G) using Boy's method- Kepler's laws -Compound pendulum(to find value of g and T using bar pendulum) **Viscosity**-Viscosity- Newton's law of viscous flow-Coefficient of viscosity- Equation of continuity of flow- Bernoulli's theorem - Applications of Bernoulli's theorem (Venturimeter, Pitot tube).	12	Chalk and Talk, PPT, group discussion
IV	**Unit :IV Elasticity:** Introduction– Load, Stress and strain – Hooke's law -Different types of Elasticity – Poisson's ratio-Relations connecting the elastic constants –Determination of Young's modulus for a material(for a thick Bar) -Bending moment – Determination of Elastic constant (Searle's method).	12	Chalk and Talk, PPT, group discussion ,

V	**Unit :V Sound :**Simple harmonic motion – Linearity and superposition principle –Wave motion - Characteristics of wave motion-Transverse wave motion- Longitudinal wave motion-Definitions-Relation between frequency and wavelength-Properties of longitudinal progressive wave-Stationary waves-Properties of stationary longitudinal waves- Melde's experiment –Acoustics-Reverberation-Factors affecting the Acoustics of buildings-Requisite for Good Acoustics.	12	Chalk and Talk, PPT, group discussion ,

Course Designer:
Mrs.B.Subha,
Ms.S.Priyanka

Annexure -15

Department of Physics				Class: I B.Sc				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/ Week**	**CIA**	**SE**	**Total**
I	Skill Enhancement Course	22OUPHSE11	Basic Electronics	2	2	25	75	100

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

Course Objectives:

1. To study the basic concepts about resistors and capacitors.
2. To comprehend the theory of inductors.
3. To understand the basics and the special types of diodes.
4. To know the physics behind semiconductors and their types.
5. To understand the basic formation of transistor and its configuration

Course content:

Unit – I Resistors: Resistors – Resistor types –Wire wound resistors- Carbon composition resistors – Carbon film resistors – Cermet film resistors – Metal film resistors –Power rating – value tolerance – Variable resistors – Resistor colour code –Resistance colour bands. **Capacitors:** Capacitors – Capacitor connected to a battery – Capacitance – Factors controlling capacitance – Types of capacitors – Fixed capacitors – Variable capacitors.

Unit – II Inductor: Inductor-Comparison of different cores –Inductance of an inductor – Another definition of inductance –Mutual inductance – Coefficient of coupling – Variable inductors – Inductors in series or parallel without M – Series combination with M.

Unit – III Diodes: Ideal diode – The Real diode - Diode circuits with DC and AC voltage sources – Zener diode – Voltage regulation – Tunnel diode – Schottky diode - Thermistor.

Unit – IV Semiconductor and Types of Semiconductors: Semiconductor – Types of Semiconductor -Intrinsic semiconductor – extrinsic semiconductor – N type – P type semiconductors – Majority and minority carriers – Mobile charge carriers and immobile ions.

Unit – V Transistor: Bipolar Junction Transistor- Transistor Biasing–Important biasing Rule-Transistor Circuit Configuration-CB, CE - Relation between α and β - CC Configurations-Relation between Transistor Currents.

Books for Study:

1. Theraja B.L, (2012), "*Basic electronics"*, Second Edition, S.Chand and Company Limited, New Delhi,.

Unit: I	**Chapter 5**	**5.2 – 5.12, 5.14, 5.15, 5.35 – 5.41**
Unit: II	**Chapter 5**	**5.19 - 5.27**
Unit: III	**Chapter 14**	**14.4 – 14.6**
	Chapter 15	**15.1, 15.2, 15.6, 15.10, 15.12**
Unit: IV	**Chapter 12**	**12.22 – 12.27**
Unit: V	**Chapter 18**	**18.1-18.3, 18.6-18.11**

Reference Books:

1**.** Ghosh. B, (2011) *Fundamental Principles of Electronics* , Second Edition Books and Allied (P) Ltd, Kolkata.

2. Halkias.C, Millman .J, (2012) *Integrated Electronics*, Tata McGraw Hill Education Private Limited, New Delhi.

3. Robert L, Boylest, Louis Nashelsky, (2002) ,*Electronics Devices and Circuit Theory*, Eighth Edtion, Prentice Hall of India Private Limited, New Delhi,.

4. Salivahanan.S and Suresh Kumar N, (2012) *Electronic Devices and Circuits*,, Second Edition, Tata McGraw Hill Education Private Limited, New Delhi.

5. Sedha.R.S, (2006) ,*Applied Electronics*, Sixth Edition, S.Chand and Company LTD, New Delhi.

Web Resources/ E.Books:

1. https://www.tutorialspoint.com/basic_electronics/basic_electronics_transistors.htm
2. https://www.semiconductors.org/semiconductors-101/what-is-a-semiconductor/
3. https://www.explainthatstuff.com/howtransistorswork.html
4. https://physics.iitd.ac.in/assets/uploads/teaching-labs/LCR_Study.pdf
5. http://www.freebookcentre.net/electronics-ebooks-download/Lecture-Notes-On-Electronic-Devices-And-Circuits.html

Pedagogy:

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

Rationale for nature of Course:

Knowledge and skill: This course will enable the students to comprehend the theory, concepts, configurations and working principles of electronic devices like resistor, inductor, capacitor, transistor and semiconductors and their applications in electronic circuits.

Activities to be given:

The knowledge of various devices acquired by the students will enable them to solve problems involving circuits and design circuits for various physical applications.

Course learning Outcomes (CLOs):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (Upto K level)
CLO1	Study the different types of resistors and color coding	K1 to K2
CLO2	Comprehend the theory inductor concepts	K1 to K2
CLO3	Understand the concepts of capacitors	K1 to K2
CLO4	Understand the basic formation of transistor and its configuration	K1 to K3
CLO5	Know the physics behind semiconductors and their types.	K1 to K3

K1- Remembering and recalling facts with specific answers

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

K3- Application oriented, Justifying the statement and deriving inferences

Mapping of Course Outcomes (CLOs) with Program Outcomes (POs)

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

1. Basic level 2.Intermediate level 3. Advance level

Annexure -15

LESSON PLAN: Total Hours (30HRS)

UNIT	DESCRIPTION	HRS	MODE
I	**Resistors:** Resistors – Resistor types –Wire wound resistors- Carbon composition resistors – Carbon film resistors – Cermet film resistors – Metal film resistors –Power rating – value tolerance – Variable resistors – Resistor colour code –Resistance colour bands. **Capacitors:** Capacitors – Capacitor connected to a battery – Capacitance – Factors controlling capacitance – Types of capacitors – Fixed capacitors – Variable capacitors.	6	Chalk and Talk, PPT, group discussion.
II	**Inductor:** Inductor-Comparison of different cores – Inductance of an inductor – Another definition of inductance –Mutual inductance – Coefficient of coupling – Variable inductors – Inductors in series or parallel without M – Series combination with M.	6	Chalk and Talk, PPT, group discussion
III	**Diodes:** Ideal diode – The Real diode - Diode circuits with DC and AC voltage sources – Zener diode – Voltage regulation – Tunnel diode – Schottky diode - Thermistor.	6	Chalk and Talk, PPT.
IV	**Semiconductor and Types of Semiconductors:** Semiconductor – Types of Semiconductor -Intrinsic semiconductor – extrinsic semiconductor – N type – P type semiconductors – Majority and minority carriers – Mobile charge carriers and immobile ions.	6	Chalk and Talk, group discussion.
V	**Transistor:** Bipolar Junction Transistor- Transistor Biasing–Important biasing Rule-Transistor Circuit Configuration-CB, CE - Relation between α and β - CC Configurations- Relation between Transistor Currents.	6	Chalk and Talk, PPT.

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

Annexure -15

Department of Physics				Class: I B.Sc				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/ Week**	**CIA**	**SE**	**Total**
I	Skill Enhancement Course	22OUPHSE12	Introduction to MS Office and Internet	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 Ms-word.
2. To study the concepts of formatting workbooks.
3. To acquire the knowledge of power-point.
4. To apply the knowledge of using internet
5. To analyze the advantage of email.

Course content:

Unit: I MS Word: About MS Word- 2000 – File Menu – Edit Menu – Insert Menu – Format Menu – Tools Menu – Window Menu – Help Menu

Unit: II MS Excel: About Excel – Formatting Worksheets – Charts – Link – Share – Protect – Audit Workbooks

Unit: III MS Power point: About Power Point – View, Insert & Edit in Presentation – Formatting in Presentations – Inserting Pictures - Slide Show in Presentations

Unit: IV Internet: Introduction - How does internet work ? - History of the Internet – www. – web browser – Search Engines

Unit: V E-mail: Introduction- e- mail work – use e-mail – e-mail name and address – e-mail ethics- advantages and disadvantages.

Books for study:

1. C.Nellai Kannan, (2008), *M.S Office* , fifth edition ,Nels publication.

Unit I : Pages 5 – 23 , 32-91, 100 - 103

Unit II : pages 107 - 168

Unit III : pages 177 – 232

2. Alexis Leon Mathews Leon, (2012), *Internet for everyone,* 15 edition ,Leon press.

Unit IV : pages 5 – 10, 43 – 46, 48-50, 64,65

Unit V : pages 99 – 114

Books for reference:

1.Bittu Kumar , (2017), *Mastering MS OFFICE* , first edition,V&S publishers.
2.Ramesh Bangia, (2010), *Learning Microsoft office*, first edition, Khanna Book Publishing Company.
3. S.S.Shrivastava, (2008), MS-Office, first edition ,Laxmi publications.
4. Linda Foulkes, (2019), *Learn Microsoft office*, Packt Publishing Limited.
5. Joan Lambert, *(2021),Microsoft office* ,first edition, Microsoft Press.

Web Resources / E.Books:

1.https://book.jobscaptain.com/view/?pdfid=1nwqGtMYK-hSBCaJJiqh4urP2aQAPuOro

2. file:///D:/Users/EMG/Downloads/656949ebook%20(2).pdf

3. https://library.ku.ac.ke/wp-content/downloads/2011/08/Bookboon/Office-programs/microsoft-office-word.pdf

Pedagogy:

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

Rationale for Nature of the course:

Employability Oriented: The course is the learning of essential basis for understanding the concepts of Microsoft office.

Activities to be given:

1. Enhancing the quality of students to know the basic of computer.
2. Train the students to use the internet.

Course learning Outcomes (CLOs):

CLO	Course Outcomes Statement	Knowledge According to Bloom' Taxonomy(upto K level)
CLO1	Understand the fundamentals of Ms-word	K1 to K2
CLO2	Study the concepts of formatting workbooks	K1 to K2
CLO3	Acquire the knowledge of power-point	K1 to K3
CLO4	Apply the knowledge of using internet	K1 to K3
CLO5	Analyze the advantage of email	K1 to K3

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

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

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	2	2	3	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	3	3	3

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

LESSON PLAN : TOTAL HOURS(30HRS)

UNIT	DESCRIPTION	HRS	MODE
I	**MS Word:** About MS Word- 2000 – File Menu – Edit Menu – Insert Menu – Format Menu – Tools Menu – Window Menu – Help Menu	6	Chalk and Talk, PPT, group discussion , quiz, on the spot test and Virtual Labs
II	**MS Excel:** About Excel – Formatting Worksheets – Charts – Link – Share – Protect – Audit Workbooks	6	Chalk and Talk, PPT, group discussion , quiz, on the spot test and Virtual Labs
III	**MS Power point:** About Power Point – View, Insert & Edit in Presentation – Formatting in Presentations – Inserting Pictures - Slide Show in Presentations	6	Chalk and Talk, PPT, group discussion , quiz, on the spot test and Virtual Labs
IV	**Internet:**What is the Internet? – History of the Internet – Internet services and Accessibility – Uses of the Internet – Protocols – Search Engines	6	Chalk and Talk, PPT, group discussion, quiz, on the spot test and Virtual Labs
V	**E-mail:** Basics of E-mail – Getting an e-mail account- Sending and receiving emails – Accessing sent emails – Using emails – Document collaboration – Instant Messaging - Netiquettes	6	Chalk and Talk, PPT, group discussion , quiz, on the spot test and Virtual Labs

Course Designer:

Mrs.B.Subha,
Ms.S.Priyanka

Annexure -15

Department of Physics				Class: I UG				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/ Week**	**CIA**	**SE**	**Total**
I	Inter Disciplinary Course	22OUPHID1	Energy Physics	2	2	25	75	100

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

Course Objectives

1. To learn the basic concepts of fundamentals of energy.
2. To gain the knowledge of application of solar energy.
3. To understand the concept of nature of winds.
4. To demonstrate knowledge in the biomass resources.
5. To study about the application of ocean energy.

Course Content:

Unit:I Fundamentals of Energy Science: Introduction-Energy, Economy and social development - Classification of Energy Resources-Importance of Non–Conventional energy sources-Advantages and Disadvantages of conventional energy sources-Environmental aspects of energy.

Unit:II Solar Energy: Introduction-solar collectors-solar water heater-solar industrial Heating System-Solar refrigeration and air conditioning system-Solar cookers.

Unit:III Wind Energy: Introduction-Origin of winds-Nature of winds-Wind turbine sitting-Major application of wind power-Environmental aspects- Wind energy programme in India.

Unit:IV Biomass Energy: Introduction- Photosynthesis process -Biomass Resources-Biomass conversion Technologies- Biogas production from waste biomass.

Unit:V Ocean Energy: Introduction-Tidal Energy- Origin and Nature of Tidal Energy – Limitations of Tidal energy-Wave Energy- Power in Waves- Ocean thermal Energy- Ocean thermal Energy Conversion Technology.

Book for study:

1. Khan B.H, (2017), *Non-conventional Energy Resources*, Third reprint ,Tata McGraw Hill Education Private Limited, New Delhi.

Unit : I **Chapters 1.1,1.2,1.4,1.6,1.9,1.12**

Unit : II **Chapters 5.1,5.2(5.2.1-5.2.6),5.3,5.5,5.6,5.7**

Unit : III **Chapters 7.1-7.5, 7.13, 7.14**

Unit : IV **Chapters 8.18.2,8.4,8.5,8.10(8.10.1-8.10.6)**

Unit : V **Chapters 10.1,10.2,,10.2.1,10.2.2,10.3,10.3.1,10.4,10.4.2**

Reference Books:

1. Kothari D.P, Singal k.c. , Rakeshranjan, (2011), *Renewable energy source and emerging technologies* , First Edition, PHI learning private limited, New Delhi.

2.Rai G.D, (2008), *Solar energy utilization*, Fourth Edition, Khanna Publishers, New Delhi.

3. Solanki.C.S , (2009), *Renewable energy technologies* , First Edition ,PHI learning private limited, New Delhi.

4.TiwariG.N, (2013), *Solar energy fundamentals, design modeling and applications*, First Edition Reprint, Narosa Publishing house, NewDelhi.

5. Twidell.J, Weir.T, (2013),*Renewable Energy Resources*, , Second Edition, Taylor and Francis, Abbigndon,Oxon.

Web Resources/ E.Books:

1. **https://www.teachoo.com/11071/3163/Classification-of-Energy-Resources/category/Concepts**
2. **https://en.wikipedia.org/wiki/Solar_energy**
3. **https://www.energy-northwest.com/energy101/energysources/Pages/Biomass.aspx**
4. **https://easyengineering.net/non-conventional-energy-resources-khan/**

Pedagogy:

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

Rationale for Nature of the course:

Entrepreneurship oriented: The course is the learning of essential basis for understanding the different types of renewable energy resources and their applications.

Activities to be given

1. Enhancing the quality of students to understand the different types of energy,.
2. Train the students to analyze the usage of energy in various forms.

Course learning Outcomes (CLOs):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (upto K level)
CLO1	Learning the basic concepts of fundamentals of energy.	K1 to K2
CLO2	Gain the knowledge of application of solar energy.	K1 to K2
CLO3	Understanding the concept of nature of winds.	K1 to K3
CLO4	Demonstrate knowledge in the biomass resources.	K1 to K3
CLO5	5. Study about the application of ocean energy.	K1 to K3

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

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	3	3	3	3
CLO5	3	3	3	3	3	3

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

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

Annexure -15

LESSON PLAN : TOTAL HOURS(30HRS)

UNIT	DESCRIPTION	HRS	MODE
I	**Unit :I Fundamentals of Energy Science:** Introduction-Energy, Economy and social development - Classification of Energy Resources-Importance of Non–Conventional energy sources-Advantages and Disadvantages of conventional energy sources-Environmental aspects of energy.	6	Chalk and Talk, PPT, group discussion
II	**Unit :II Solar Energy:** Introduction-solar collectors-solar water heater-solar industrial Heating System-Solar refrigeration and air conditioning system-Solar cookers.	6	Chalk and Talk, PPT, group discussion
III	**Unit :III Wind Energy:** Introduction-Origin of winds-Nature of winds-Wind turbine sitting-Major application of wind power-Environmental aspects- Wind energy programme in India. **Viscosity**-Viscosity- Newton's law of viscous flow-Coefficient of viscosity- Equation of continuity of flow- Bernoulli's theorem - Applications of Bernoulli's theorem (Venturimeter, Pitot tube).	6	Chalk and Talk, PPT, group discussion ,
IV	**Unit :IV Biomass Energy:** Introduction- Photosynthesis process - Biomass Resources-Biomass conversion Technologies- Biogas production from waste biomass.	6	Chalk and Talk, PPT, group discussion
V	**Unit : V Ocean Energy:** Introduction-Tidal Energy- Origin and Nature of Tidal Energy –Limitations of Tidal energy-Wave Energy- Power in Waves- Ocean thermal Energy- Ocean thermal Energy Conversion Technology.	6	Chalk and Talk, PPT, group discussion ,

Course Designer:
Mrs.B.Subha,
Ms.S.Priyanka

Annexure -15

Department of Physics				Class: I B.Sc				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/ Week**	**CIA**	**SE**	**Total**
II	Core	22OUPH21	Heat and Thermodynamics	4	4	25	75	100

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

Course Objectives

1.To Understand the fundamentals of Heat capacities.

2. To Study the concepts of conduction,convection,& radiation.

3. Acquire the knowledge various liquefaction process.

4. Apply the concept of kinetic theory of matter.

5. Analyze the relation of entropy in reversible &irreversible process.

Course Content:

Unit: I Calorimetry

Definitions – Newton's law of cooling-Specific heat of liquid by Joule's electrical method -– Two Specific heats(C_p &C_V) of a gas(Mayer's relation) – Specific heat of a gas at constant volume by Joly's Differential Steam Calorimeter-Specific heat of a gas at constant pressure by Regnault's method- Dulong and Petit's law.

Unit: II Transmission of Heat and Radiation

Introduction – Coefficient of thermal conductivity- Lee's disc method for bad conductors-Spherical shell method (Radial flow of heat)- Cylindrical flow of heat -

Thermal Radiation – Applications of heat radiation - Blackbody-Black body in practice-Stefan-Boltzmann law-Wien's Displacement law- Rayleigh-Jeans law-Planck's Radiation law-Planck's Quantum Postulates-Experimental verification of Stefan's law.

Unit: III Low Temperature physics

Introduction-Liquefaction of air Linde's Process-Principle of Cascaded cooling Liquefaction of oxygen- Liquefaction of Hydrogen- Liquefaction of Helium (k.Onne's method)-Helium I &Helium II.

Unit: IV Kinetic Theory of Gas

Kinetic model (Postulates of kinetic theory of gases)-Degrees of freedom - Maxwell's law of equipartition of energy- Specific heats of Mono –Di and polyatomic gas-Adiabatic Expansion of an Ideal gas-Mean free path.

Unit: V Thermodynamics

First Law of Thermodynamics- Adiabatic process- Isothermal process-Carnot's Ideal heat engine - Second Law of thermodynamics- change in entropy – Change in Entropy in adiabatic process- change of entropy in reversible cycle- change of entropy in irreversible process– Relation of thermodynamical Potentials with their variables(Maxwell's equations).

Book for study:-

1. Brijlal, Dr.Subramanyam, Hemne.P. S. Reprint (2018), Heat *Thermodynamics and Statistical Physics* ,S.Chand & Company Ltd,New Delhi.

Unit I	**Chapters**	**14.1,14.5,14.6,14.10,14.11,14.12,14.17**
Unit: II	**Chapters**	**15.1,15.11,15.13,15.14, 8.1,8.4,8.6,8.7,8.12,8.14,8.15, 8.17,8.18, 8.22**
Unit: III	**Chapter**	**7.8,7.9-7.12**
Unit: IV	**Chapters**	**1.3,1.18,1.19,1.21,1.24,3.2.**
Unit: V	**Chapters**	**4.7,4.10.4,4.10.7,4.23,4.28,5.2,5.3,5.4,5.6,6.7.**

Reference Books:

1.Arora C. L. Rajam J. B (1979), *Heat and Thermodynamics for Degree Students*, Eighth Edition, S. Chand & Company Ltd ,New Delhi.

2.Daniel V. Schroeder (2012), *An Introduction to Thermal Physics*, First Edition, Pearson Education, New Delhi.

3. Gupta A.B, Roy A.B (2002), *Thermal Physics* , First Edition,Books & Allied(P) Ltd, Kolkata.

Web Resources / E.Books:

1. https://www.khanacademy.org/science/physics/thermodynamics
2. https://data-flair.training/blogs/heat-sources-classification-thermodynamics/
3. https://www.britannica.com/science/thermodynamics

Pedagogy:

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

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 thermodynamical related problems .

Course Learning Outcomes (CLOs):

CLO	Course Learning Outcomes	Knowledge According to Bloom's Taxonomy(upto K level)
CLO1	Understand the fundamentals of Heat capacities	K1 to K3
CLO2	Study the concepts of conduction, convection,& radiation	K1 to K3
CLO3	Acquire the knowledge of heat energy	K1 to K3
CLO4	Apply the phenomena of viscosity.	K1 to K4
CLO5	Analyze the relation of entropy in reversible &irreversible process	K1 to K4

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

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

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

Annexure -15

LESSON PLAN : TOTAL HOURS (60HRS)

UNIT	DESCRIPTION	HRS	MODE
I	**Calorimetry** Definitions – Newton's law of cooling-Specific heat of liquid by Joule's electrical method –-Two Specific heats(C_p &C_V) of a gas(Mayer's relation) – Specific heat of a gas at constant volume by Joly's Differential Steam Calorimeter-Specific heat of a gas at constant pressure by Regnault's method- Dulong and Petit's law	12	Chalk and Talk, PPT, quiz, on the spot test
II	**Transmission of Heat and Radiation** Introduction – Coefficient of thermal conductivity-Lee's disc method for bad conductors-Spherical shell method (Radial flow of heat)- Cylindrical flow of heat -Thermal Radiation – Applications of heat radiation - Blackbody-Black body in practice-Stefan-Boltzmann law-Wien's Displacement law- Rayleigh-Jeans law-Planck's Radiation law-Planck's Quantum Postulates-Experimental verification of Stefan's law	12	Chalk and Talk, OHP quiz, on the spot test
III	**Low Temperature physics** Introduction-Liquefaction of air Linde's Process-Principle of Cascaded cooling Liquefaction of oxygen-Liquefaction of Hydrogen- Liquefaction of Helium (k.Onne's method)-Helium I &Helium II	12	Chalk and Talk, PPT, group discussion , OHP and You tube Links
IV	**Kinetic Theory of Gas** Kinetic model (Postulates of kinetic theory of gases)-Degrees of freedom - Maxwell's law of equipartition of energy- Specific heats of Mono –Di and polyatomic gas-Adiabatic Expansion of an Ideal gas-Mean free path	12	Chalk and Talk, OHP,PPT presentations, quiz,
V	**Thermodynamics** First Law of Thermodynamics- Adiabatic process-Isothermal process-Carnot's Ideal heat engine - Second Law of thermodynamics- change in entropy – Change in Entropy in adiabatic process- change of entropy in reversible cycle- change of entropy in irreversible process–Relation of thermodynamical Potentials with their variables(Maxwell's equations)	12	Chalk and Talk, PPT, group discussion , OHP presentations, quiz, open book test

Course Designer:

Mrs. P.Revathi

Mrs.S.Ameer Nisha Bibi

Annexure -15

Department of Physics				Class: I B.Sc				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/ Week**	**CIA**	**SE**	**Total**
II	Skill Enhancement Course	22OUPHSE21	Basic Instrumentation Skill	2	2	25	75	100

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

Course Objectives

1. To understand the concept of Ammter, voltmeter, ohmmeter.
2. To study the concepts of Multimeter .
3. To study about transducers.
4. To acquire the knowledge of CRO.
5. To acquire the knowledge about measuring Instruments.

Course Content:

Unit :I Ammeter, Voltmeter, Ohmmeter-Ammeter – DC voltmeter –Digital voltmeter-Ohmmeter-Series type ohmmeter – shunt type ohmmeter.

Unit :II Multimeter-Digital multimeter – Measurement of resistance – measurement of inductance – measurement of capacitance – measurement of Q

Unit :III Transducer Introduction-Capacitive transducer-Inductive transducer-Linear variable differential transducers-Oscillation transducers-Potentiometric transducer-Resistance thermometer**.**

Unit : IV Cathode ray oscilloscope-CRO - Vertical and horizontal voltage amplifiers-Power supply circuits– Cathode ray tube – Special Oscilloscopes- Applications of CRO.

Unit :V Measuring Instruments- Frequency meter –Time meter-Energy meter –Power meter –Watt meter –Electrodynamometer Watt meter.

Book for study:-

1. Salivahanan.S, N.Sureshkumar, A (2012), *Electronic devices &circuits*, , Third Edition,Tata MC Graw Hill Publishing Company Limited, New Delhi.

Unit: I Chapters 23.3,23.4,23.6,23.7

Unit: II Chapters 23.8-23.9.4

Unit: III Chapters 21.1-21.6,21.8

Unit: IV Chapters 23.1-23.2.5

Unit: V Chapters 23.10-23.14.1

Reference Books:

1.Albert D. Helfrick, William D.cooper (2011), *Modern Electronics Instrumentation and Measurement techniques*, First Edition, PHI Learning Private Limited, New Delhi.

2.Basudev Ghosh (2011), *Fundamental Principles of Electronics*, Second Edition, Books and Allied (p) Ltd, Kolkata.

3.Jose Robin .G,Ubald Raj .A (2004), *Basic Electronics and Applied Electronics*, First Edition, Indira Publication, Marthandam.

4.Kalsi .H.S (2003), *Electronic Instrumentation*, Third Edition, Tata MC Graw Hill Publishing Company Limited, New Delhi.

5. RanganC.S, SarmaG.R,Mani (2012), VSV *Instrumentation Devices& systems* , Second Edition, Tata McGraw-Hill Education Private Limited, New Delhi.

Web Resources / E.Books:

1. https://www.tutorialspoint.com/electronic_measuring_instruments/electronic_measuring_instruments_basics_of_oscilloscopes.htm
2. http://www.hunter.cuny.edu/physics/courses/physics222/repository/files/pdf/ElectronicsLab8.pdf
3. file:///D:/Users/EMG/Downloads/basics-of-digital-multimeters.pdf
4. https://learnabout-electronics.org/Downloads/Power%20Supplies%20Module%2001.pdf
5. https://circuitglobe.com/classification-of-measuring-instruments.html

Pedagogy:

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

Rationale for nature of Course:

Knowledge and Skill : To make students to know and gain the knowledge about different types of Electronic instruments.

Activities to be given:

1.Enhancing the quality of students to understand the fundamentals of electronic instruments.

2.Train the students to handle the measuring instruments.

Course learning Outcomes (CLOs):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (upto K Level)
CLO1	Understand the fundamentals of Ammeter, voltmeter, ohmmeter.	K1 to K2
CLO2	Study the concepts of Multimeter.	K1 to K2
CLO3	Acquire the knowledge of Transducers	K1 to K2
CLO4	Acquire the knowledge of concepts of CRO.	K1 to K3
CLO5	Acquire the knowledge about measuring Instruments.	K1 to K3

K1- Remembering and recalling facts with specific answers

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

K3- Application oriented- Solving Problem

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

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

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

Annexure -15

LESSON PLAN : TOTAL HOURS (30HRS)

UNIT	DESCRIPTION	HRS	MODE
I	**Ammeter, Voltmeter, Ohmmeter-**Ammeter – DC voltmeter –Digital voltmeter-Ohmmeter-Series type ohmmeter – shunt type ohmmeter.	6	Chalk and Talk, PPT, quiz
II	**Multimeter-**Digitalmultimeter – Measurementofresistance – measurement of inductance –measurementof capacitance – measurement of Q	6	Chalk and Talk, quiz
III	**Transducer** Introduction-Capacitive transducer-Inductive transducer-Linear variable differential transducers-Oscillation transducers-Potentiometric transducer-Resistance thermometer**.**	6	Chalk and Talk, PPT, group discussion ,
IV	**Cathode ray oscilloscope-**CRO - Vertical and horizontal voltage amplifiers- Power supply circuits– Cathode ray tube – Special Oscilloscopes-Applications of CRO.	6	Chalk and Talk, PPT presentations, quiz,
V	**Measuring Instruments-** Frequency meter –Time meter-Energy meter –Power meter –Watt meter – Electrodynamometer Watt meter.	6	Chalk and Talk, PPT, group discussion

Course Designer:

Mrs. P.Revathi
Mrs.S.Ameer Nisha Bibi

Annexure -15

Department of Physics				Class: I B.Sc				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/ Week**	**CIA**	**SE**	**Total**
II	Skill Enhancement Course	22OUPHSE22	Renewable Energy And Energy Harvesting	2	2	25	75	100

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

Course Objectives:

1. To study the basic concepts of solar energy and its applications.
2. To understand the origin, nature and applications of wind power.
3. To acquire the knowledge about tidal energy.
4. To learn about the various aspects of biomass energy.
5. To Study the origin, distribution, types and application of geothermal energy.

Unit – I Solar Energy: Introduction –The Sun – The Earth – Sun Earth radiation spectrum- Solar Collectors – Flat plate collector – solar water heater – Solar cooker – Box type solar cooker – Paraboloidal dish type solar cooker – Solar PV systems – Classification – Stand-alone solar PV system- Grid interactive solar PV system.

Unit – II Wind Energy Harvesting: Introduction –Origin of Winds –Major application of wind power Wind Turbine siting – Horizontal axis wind turbine (HAWT) - Vertical axis wind turbine (VAWT) – Effects of wind speed and grid condition.

Unit – III Ocean energy: Introduction – Tidal energy- Origin and nature of tidal energy – Limitations of tidal energy – Tidal energy technology – Tidal range power.

Unit – IV Biomass energy: Introduction – Photosynthesis process- Biofuels – Biomass resources – Biomass conversion technologies - classification of Biogas plants.

Unit – V Geothermal energy: Introduction – Applications- origin and distribution of geothermal energy – Types of geothermal resources – Geothermal energy in India.

Books for Study:

1. Khan B.H, (2017) *Non-conventional Energy Resources*, Third reprint, Tata McGraw Hill Education Private Limited, New Delhi.

Unit : I **Chapters 4,5,6** **4.1 -4.4, 5.2 – 5.3, 5.7, 6.9,6.10**

Unit : II **Chapters 7** **7.1, 7.2, 7.5, 7.8.1-7.8.2, 7.11**

Unit : III **Chapters 10** **10.1, 10.2,10.2.1-10.2.3**

Unit : IV Chapters 8 8.1, 8.2, 8.3, 8.4, 8.5, 8.9.1

Unit : V Chapters 9 9.1, 9.2, 9.3, 9.4, 9.7

Reference Books:

1. Kothari D.P, Singal k.c. , Rakeshranjan, (2011) *Renewable energy source and emerging technologies*, First Edition, PHI learning private limited, New Delhi.

2. Rai G.D, (2008) *Solar energy utilization*, Fourth Edition, Khanna Publishers, New Delhi.

3. Solanki.C.S , (2009) *Renewable energy technologies*, First Edition , PHI learning private limited, New Delhi.

4. TiwariG.N, (2013) *Solar energy fundamentals, design modeling and applications*, First Edition, Narosa Publishing house, NewDelhi.

5.Twidell.J, Weir.T, (2013) *Renewable Energy Resources*, Second Edition, Taylor and Francis, Abbigndon,Oxon,.

Web Resources/ E.Books:

1.https://news.energysage.com/advantages-and-disadvantages-of-renewable-energy/

2. https://www.toppr.com/guides/physics/sources-of-energy/conventional-sources-of-energy/

3. https://www.nrel.gov/research/re-biomass.html

4. https://www.syntechbioenergy.com/blog/biomass-advantages-disadvantages

5. https://www.irena.org/geothermal

Pedagogy:

Chalk and Talk, PPT, group discussion, quiz, field visit and seminar.

Rationale for nature of Course:

Knowledge and Skill: This course is mainly employability and skill development for energy resources in the current scenario.

Activities to be given:

1. Activities having direct bearing on skill development/ Employability / Entrepreneurship
2. The activity is mainly perceptive knowledge in the field of energy resources.

Course learning Outcomes (CLOs):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (upto K level)
CLO1	Study the basic concepts of solar energy and its applications.	K1 to K2
CLO2	Understand the origin, nature and applications of wind power	K1 to K2
CLO3	Acquire the knowledge about tidal energy.	K1 to K2
CLO4	Learn about the various aspects of biomass energy.	K1 to K3
CLO5	Study the origin, distribution, types and application of geothermal energy.	K1 to K3

K1- Remembering and recalling facts with specific answers

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

K3- Application oriented, Justifying the statement and deriving inferences

Mapping of Course Outcomes(CLOs) with Program Outcomes(POs)

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

1. Basic level 2.Intermediate level 3. Advance level

Annexure -15

LESSON PLAN: Total Hours (30HRS)

UNIT	DESCRIPTION	HRS	MODE
I	**Solar Energy** Introduction –The Sun – The Earth – Sun Earth radiation spectrum-Solar Collectors – Flat plate collector – solar water heater – Solar cooker – Box type solar cooker – Paraboloidal dish type solar cooker – Solar PV systems – Classification – Stand-alone solar PV system- Grid interactive solar PV system.	6	Chalk and Talk, PPT, group discussion.
II	**Wind Energy Harvesting** Origin of Winds –Major application of wind power Wind Turbine siting – Horizontal axis wind turbine (HAWT) - Vertical axis wind turbine (VAWT) – Effects of wind speed and grid condition.	6	Chalk and Talk, PPT, group discussion.
III	**Ocean energy:** Introduction – Tidal energy- Origin and nature of tidal energy – Limitations of tidal energy – Tidal energy technology – Tidal range power.	6	Chalk and Talk, PPT.
IV	**Biomass energy:** Introduction – Photosynthesis process- Biofuels – Biomass resources – Biomass conversion technologies - classification of Biogas plants.	6	Chalk and Talk, group discussion.
V	**Geothermal energy:** Introduction – Applications-origin and distribution of geothermal energy – Types of geothermal resources – Geothermal energy in india.	6	Chalk and Talk, PPT.

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

Department of Physics				Class: I UG				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/ Week**	**CIA**	**SE**	**Total**
II	Inter Disciplinary Course	22OUPHID2	Astrophysics	2	2	25	75	100

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

Course Objectives

1. To understand the concepts history of Astronomy.
2. To study the concepts of earth motion in space.
3. To learn about tidal dynamics and various moon phases.
4. To study the Milky Way Constellations and the starry universe.
5. To understand how stars are formed and their varied characteristics.

Course Content:

Unit: I History of astronomy Acient Astronomy – Surya sidhanta – Modern Astronomy – Tycho Brahe – John Kepler – Galileo – Sir Isaac Newton – Edmund Halley – M.Leavitt.

Unit II The earth The zones of earth- shape of the earth- radius of the earth- rotation of earth- Foucault's pendulum experiment-gyroscope experiment.

Unit: III The moon Introduction- phases of moon- successive phases of moon- lunar librations- summer and winter full moons- path of the moon with respect to the sun- Surface structure of the moon- The tides.

Unit: IV The stellar universe Introduction- Stellar motion- Solar motion- Constellation- The milky way-survey of constellations-winter constellations-spring constellations-summer constellations-autumn constellations

Unit: V Stars Introduction- Distance of stars- Magnitude of stars- Absolute magnitudes- The colour and size of the stars- Star clusters.

Book for study:

1. Kumara velu. S, Susheela kumaravelu (2007), *Astronomy* , Second Revised Edition, Sivakasi Art printers,sivakasi.

Unit : I	**Chapter:19**	**Page No[601-608]**
Unit II	**Chapter:3**	**Page No[98,116,126,128-130]**
Unit :III	**Chapter:12**	**Page No[372,375,377,379,381,388,390]**
Unit :IV	**Chapter:18**	**Page No[565,566,581,583,584-599]**
Unit :V	**Chapter:18**	**Page No[567,569,571,577]**

Reference books:

1. Abhyankar .K.D (2001), *Astro Physics-Stars and Galaxies*,First Edition, University Press (India) Ltd, Hyderabad.
2. BaidyanathBasu, Tanuka Chattopadhyay, Sudhindra Nath Biswas (2010), *An Introduction to Astro Physics*,Second Edition, PHL Learning Private Ltd, New Delhi.
3. Kumara velu. S, Susheela kumaravelu (2002), *Space Research*, First Edition, Sivakasi Art printers,sivakasi.
4. Singhal.R.P (2009),*Elements of Space Physics*, First Edition, PHL Learning Private Ltd, New Delhi.

Web Resources / E.Books:

1. https://www.pdfdrive.com/astronomy-and-astrophysics-in-the-new-millennium-d162480648.html
2. https://www.pdfdrive.com/an-invitation-to-astrophysics-world-scientific-series-in-astronomy-and-astrophysic-d185561503.html
3. https://www.pdfdrive.com/an-introduction-to-modern-astrophysics-d187564147.html
4. https://www.pdfdrive.com/the-astronomy-book-d183972482.html
5. https://drive.google.com/file/d/1z6WZ2npYWzcxfyVh3kJ9TrdClj2Piajk/view

Pedagogy:

Chalk and Talk, PPT, Group discussion , Quiz and Open book test.

Rationale for nature of Course:

Knowledge and skill:

This concept makes unexpectedly large contributions to formal and informal science education given the small number of research astronomers. This course also provides promising opportunities for international cooperation.

Activities to be given:

1.Students shall be asked to collect out line of solar system

2. Enchancing quality of student to analyze the structure of earth and moon.

Course learning Outcomes (CLOs):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (upto K level)
CLO1	Understand the Ancient Astronomy and Modern Astronomy.	K1 to K3
CLO2	Remembering and recalling the zones, shape, and radius of the earth.	K1 to K3
CLO3	Apply the knowledge to identify structure of the moon.	K1 to K3
CLO4	Analyze the significance of the milky way.	K1 to K3
CLO5	Evaluating the colour and size of the stars.	K1 to K3

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

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

(SCIENCE)

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

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

Annexure -15

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

(ARTS)

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

LESSON PLAN : TOTAL HOURS (30HRS)

UNIT	DESCRIPTION	HRS	MODE
I	**History of astronomy** Acient Astronomy – Surya sidhanta – Modern Astronomy – Tycho Brahe – John Kepler – Galileo – Sir Isaac Newton – Edmund Halley – M.Leavitt.	6	Chalk and Talk, PPT, group discussion
II	**The earth** The zones of earth- shape of the earth- radius of the earth- rotation of earth-Foucault's pendulum experiment-gyroscope experiment.	6	Chalk and Talk, PPT, quiz
III	**The moon** Introduction- phases of moon- successive phases of moon- lunar librations- summer and winter full moons- path of the moon with respect to the sun- Surface structure of the moon- The tides.	6	Chalk and Talk, quiz
IV	**The stellar universe** Introduction- Stellar motion- Solar motion- Constellation- The milky way- survey of constellations-winter constellations- spring constellations-summer constellations- autumn constellations	6	Chalk and Talk, PPT, group discussion
V	**Stars** Introduction- Distance of stars- Magnitude of stars- Absolute magnitudes- The colour and size of the stars- Star clusters.	6	Chalk and Talk, PPT presentations, quiz

Course Designer:

Mrs. M.R. Gurulakshmi
Dr. (Mrs). Ariya Nachiar

Department of Physics				Class: I B.Sc				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/ Week**	**CIA**	**SE**	**Total**
I& II	Core	22OUPH2P	Major Practical-I	3	2	40	60	100

List of experiments (Any Twelve) :

1. Young's modulus-uniform bending using Pin & Microscope method.
2. Young's modulus-uniform bending using optic lever method
3. Young's modulus-non-uniform bending using Pin & Microscope method
4. Young's modulus-non-uniform bending using optic lever method
5. Rigidity modulus by Torsion pendulum.
6. Compound pendulum-To find g and K
7. Potentiometer- low range-voltmeter calibration
8. Potentiometer-ammeter calibration
9. Sonometer- To determine the unknown frequency
10. Sonometer – To determine the A.C frequency
11. Melde's string – To determine frequency of the vibrator
12. Lee's Disc method-To determine the thermal conductivity of Bad conductor
13. Newton's law of cooling –To determine specific heat capacity of liquid
14. Stoke's method – To find the viscosity of liquid.

Reference Books:

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

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,-CHEMISTRY,-MATHEMATICS_-CB.pdf

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

UNIT	Topics to be Covered	Hours	Mode
I	1. Young's modulus-uniform bending using Pin & Microscope method. 2. Young's modulus-uniform bending using optic lever method 3. Young's modulus-non-uniform bending using Pin & Microscope method	6	Demo & Practical Session
II	4. Young's modulus-non-uniform bending using optic lever method 5. Rigidity modulus by Torsion pendulum. 6. Compound pendulum-To find g and K	6	Demo & Practical Session
III	7. Potentiometer- low range-voltmeter calibration 8. Potentiometer-ammeter calibration 9. Sonometer- To determine the unknown frequency	6	Demo & Practical Session
IV	10. Sonometer – To determine the A.C frequency 11. Melde's string – To determine frequency of the vibrator 12. Lee's Disc method-To determine the thermal conductivity of Bad conductor	6	Demo & Practical Session
V	13. Newton's law of cooling –To determine specific heat capacity of liquid 14. Stoke's method – To find the viscosity of liquid	6	Demo & Practical Session

Course Designer:
Dr. (Mrs). Ariya Nachiar
Mrs. Gurulakshmi

Annexure -15

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.

Annexure -15

Department of Physics				Class: I B.Sc				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/ Week**	**CIA**	**SE**	**Total**
I	Generic Elective Course	22OUMAGEPH1	Physics-I Mechanics and Properties of Matter	4	4	25	75	100

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

Course Objectives:

1. To acquire the knowledge about force, power and energy.
2. To understand the concepts of rotational motion.
3. To import the knowledge of gravitation.
4. To expose the knowledge of materials based on their moduli of elasticity
5. To understand the basic properties of Viscosity.

Course Content:

UNIT: I Force, Power and Energy: The basic Forces in nature-Central forces – Conservative forces-Non conservative forces-Friction-Limiting friction, Co efficient of friction and Angle of friction-Laws of friction-Experiment to determine the coefficient of friction–Energy-Kinetic energy- Potential energy- Power.

UNIT :II Rotational Motion: Angular velocity-Angular acceleration- -Centripetal force – Centrifugal force- Torque –Angular momentum-Expression for torque in rotational motion-Expression for angular momentum of a rotating rigid body - Moment of inertia –Perpendicular axes theorem –Theorem of parallel axes-Moment of Inertia of circular disc, circular ring, Solid sphere .

UNIT: III Gravitational motion: Kepler's law of planetary motion –Newton's law of gravitation-Mass and Density of the Earth-Determination of G-Boy's method – The compound pendulum-Determination of g with compound pendulum-Variation of g with latitude, altitude and depth- artificial satellites.

UNIT : IV Elasticity: Different moduli of Elasticity-Poisson's ratio-Bending of beams – expressions for the bending moment-Depression of the loaded end of a cantilever-Determination of Young's modulus by uniform and non uniform bending – Torsion of a

cylinder -Torsional oscillations of a body-Rigidity modulus by Torsion pendulum.

UNIT :V Viscosity: Introduction – Derivation of Poiseuille's formula –Poiseuille's method for determining coefficient of viscosity of a liquid – Equation of continuity- Bernoulli's Theorem- Applications of Bernoulli's theorem –Venturimeter –Pitot Tube.

Books for Study:

1. Murugehsan.R, (2012) *Mechanics Properties of Matter and Sound*, First edition, shantha publication,Madurai.

Unit: I	**Chapter 1.1-1.8, 1.11-1.14**
Unit: II	**Chapter 2.1, 2.2, 2.4-2.9, 2.12- 2.15, 2.17,2.18,2.21**
Unit: III	**Chapter 3.1-3.9**
Unit: IV	**Chapter 4.1-4.8, 4.10, 4.12, 4.13**
Unit: V	**Chapter 5.1-5.7**

Reference Books:

1.Brijlal and Subramanyam.N, (1994) *Waves & Oscillations* , Second Edition, Vikas Publishing House Pvt. Ltd. Noida.

2.Gupta.A.B. (2011) *College physics, Volume I,* First edition ,Books and Allied (P) Ltd, Kolkata.

3. Murugesan.R, (2010) *Mechanics and Mathematical Methods* ,Third edition, S.Chand and Co, New Delhi,.

4.Mathur.D.S, (2012) *Elements of properties of matter*, First Edition ,S.Chand and Co New Delhi .

5. Paul.A.Tipler, *(*2003) *Physics, Volume I,* second edition, CBS Publishers and Distributors, New Delhi,.

Web Resources / E.Books:

1. https://www.toppr.com/guides/physics/mechanical–properties–of– solids /
2. http://www.scienceclarified.com/everyday/Real–Life–Chemistry–Vol–3–Physics–Vol–
3. https://blog.biolinscientific.com/why–is–surface–tension–important
4. http://www.physics.usyd.edu.au/teach_res/hsp/sp/mod31/m31_strings.htm
5. https://www.careerdune.com/2017/10/importance–of–viscosity–in–real–life.html

Pedagogy:

Chalk and Talk, PPT, Group discussion, Quiz, on the spot test and seminar.

Rationale for nature of Course:

Knowledge and Skill Oriented: This course will enable the students to understand about the fundamental ideas on rotational motion of rigid bodies, sound, gravitational fields and to learn the basics of elasticity for different materials.

Activities to be given:

To train the students to identify the suitable materials based on their elasticity.

Course learning Outcomes (CLOs):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (upto K level)
CLO1	Acquire the knowledge about force, power and energy.	K1 to K2
CLO2	Understand the concepts of rotational motion.	K1 to K2
CLO3	Import the knowledge of gravitation.	K1 to K3
CLO4	Expose the knowledge of materials based on their moduli of elasticity	K1 to K3
CLO5	Understand the basic properties of sound.	K1 to K4

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

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

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

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

Annexure -15

LESSON PLAN : TOTAL HOURS (60HRS)

UNIT	DESCRIPTION	HRS	MODE
I	**Force, Power and Energy**: The basic Forces in nature-Central forces – Conservative forces-Non conservative forces-Friction-Limiting friction, Co efficient of friction and Angle of friction-Laws of friction-Experiment to determine the coefficient of friction–Energy-Kinetic energy- Potential energy-Power.	12	Chalk and Talk, PPT,
II	**Rotational Motion:** Angular velocity-Angular acceleration- -Centripetal force – Centrifugal force-Torque –Angular momentum-Expression for torque in rotational motion-Expression for angular momentum of a rotating rigid body - Moment of inertia –Perpendicular axes theorem –Theorem of parallel axes-Moment of Inertia of circular disc, Solid sphere .	12	Chalk and Talk, seminar
III	**Gravitational motion:** Kepler's law of planetary motion –Newton's law of gravitation-Mass and Density of the Earth-Determination of G-Boy's method – The compound pendulum-Determination of g with compound pendulum-Variation of g with latitude ,altitude and depth- artificial satellites.	12	Chalk and Talk, group discussion
IV	**Elasticity**: Different moduli of Elasticity-Poisson's ratio-Bending of beams –expressions for the bending moment-Depression of the loaded end of a cantilever-Determination of Young's modulus by uniform and non uniform bending – Torsion of a cylinder -Torsional oscillations of a body-Rigidity modulus by Torsion pendulum.	12	Chalk and Talk, PPT quiz
V	**Viscosity:** Introduction **–** Derivation of Poiseuille's formula –Poiseuille's method for determining coefficient of viscosity of a liquid – Equation of continuity- Bernoulli's Theorem- Applications of Bernoulli's theorem –Venturimeter –Pitot Tube.	12	Chalk and Talk, group discussion

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

Annexure -15

Department of Physics				Class: I B.Sc				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/ Week**	**CIA**	**SE**	**Total**
II	Generic Elective Course	22OUMAGEPH2	Physics-II Thermal physics	4	4	25	75	100

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

Course Objectives

1. To comprehend the fundamental ideas behind thermal expansion and adiabatic change.
2. To learn about convection and conduction in relation to the atmosphere.
3. To acquire the knowledge about radiation laws.
4. To understand the concepts of kinetic theory of gases.
5. To study the various thermodynamics laws.

Course Content:

Unit: I Thermal expansion: Linear expansion of solids- Linear expansivity of crystals-Determination of α by Air Wedge method- Expansion of anisotropic solids–Thermostat-Bimetallic thermostat -Isothermal change-Adiabatic change-Equation for the adiabatic change of a perfect gas-The two specific heat capacities of a gas-Difference between the two specific heat capacities–Joly's differential steam calorimeter for finding C_v-Regnault's method to find C_p.

Unit :II Conduction, Convection: Introduction-Lee's disc method of determining the thermal conductivity of bad conductor-Analogy between heat flow and electric current-Wiedemann - Franz law- Convection –Convection in the atmosphere- Lapse rate- Green house effect-Atmospheric pollution.

Unit :III Radiation: Introduction-Stefan's law –Determination of Stefan's constant by filament heating method –Solar constant –Determination of solar constant by water flow Pyrheliometer-Temperature of the sun - Solar spectrum-Energy distribution in black body spectrum- Statement of Planck's law of radiation-Wien's law -Rayleigh Jean's law.

Unit: IV Kinetic theory of gases: Postulates of the kinetic theory of gases- Expression for the pressure of a gas-Mean free path-Transport phenomena-Expression for the coefficient of Diffusion and viscosity-Expression for the coefficient of thermal conductivity -Degrees of freedom-Boltzmann's law of equipartition of energy-Atomicity of gases.

Unit: V Thermodynamics: Heat engine-Expression for the efficiency of a Carnot's engine-Carnot's theorem -Second law of thermodynamics-Entropy-Changes of entropy in Carnot's cycle-Change of entropy in conversion of ice into steam -Joule Kelvin effect- Porous Plug experiment–Theory of Porous Plug experiment-Superconductivity.

Book for study:

1.Murugeshan.R (2012), *Thermal Physics,* First Edition, shantha publication , Madurai,.

Unit : I Chapter 1.1 -1.4,1.7,1.8, 2.1-2.7
Unit :II Chapter 3.1-3.4,4.2,4.3,4.5,4.6
Unit :III Chapter 5.1-5.6,5.8-5.12
Unit :IV Chapter 6.1-6.7,6.9-6.11
Unit :V Chapter 7.1-7.7,8.1-8.3,8.5

Reference Books:

1. Arora C. L. Rajam J. B (1979), *Heat and Thermodynamics for Degree Student* ,Eigth Edition, S. Chand & Company Ltd ,New Delhi.
2. Daniel V. Schroeder (2012), *An Introduction to Thermal Physics* ,First Edition, Pearson Education, New Delhi.
3. Gupta A.B, Roy A.B (2002), *Thermal Physics*, First Edition, Books & Allied (P) Ltd, Kolkata,.
4. Panat.P.V (2011), *Thermodynamics and Statistical Mechanics*, First Edition, Narosa Publishing House, Kolkata.
5. Saxena.A.K (2010), *An Introduction to Thermodynamics and Statistical Mechanics*, First Edition, Narosa Publishing House, Kolkata.

Web Resources / E.Books:

1. https://www.pdfdrive.com/concepts-in-thermal-physics-e33413164.html

2. https://engineeringbookspdf.com/concepts-in-thermal-physics-second-edition-pdf-free-download/5537/
3. http://www.phys.ubbcluj.ro/~zneda/statfiz/books/Thermal%20physics%20-%20Kittel.pdf
4. https://www.yumpu.com/en/user/registration?utm_content=reg-pdf-download
5. https://www.readallbooks.org/book/an-introduction-to-thermal-physics/#download

Pedagogy:

Chalk and Talk, PPT, Group discussion, Quiz and Open book test.

Rationale for nature of Course:

Knowledge and Skill:

The course is the combined study of thermodynamics, statistical mechanics and kinetic theory of gases. this course to provide a general introduction to each of three core heat related subject.

Activities to be given:

1.Students shall be asked to make documentation of Temperature of the sun as a group activity.

2.Train the student to analyze the kinetic theory of gases.

Course learning Outcomes (CLOs):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy(upto K level)
CLO1	Understanding the basics concept of Isothermal changes	K1 to K2
CLO2	Recalling and understand the Green house effect and Atmospheric pollution.	K1 to K3
CLO3	Apply the knowledge to identify the difference between Wien's law -Rayleigh Jean's law.	K1 to K3
CLO4	Analyze the significance of Mean free path and transport phenomena of gases	K1 to K4
CLO5	Study about the efficiency of a Carnot's engine	K1 to K4

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

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

Annexure -15

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

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

1.Basic Level 2.Intermediate Level 3. Advanced Level

LESSON PLAN: TOTAL HOURS (60HRS)

UNIT	DESCRIPTION	HRS	MODE
I	**Unit: I Thermal expansion**: Linear expansion of solids-Linear expansivity of crystals-Determination of α by Air Wedge method- Expansion of anisotropic solids–Thermostat-Bimetallic thermostat -Isothermal change-Adiabatic change-Equation for the adiabatic change of a perfect gas-The two specific heat capacities of a gas-Difference between the two specific heat capacities–Joly's differential steam calorimeter for finding C_v-Regnault's method to find C_p.	12	Chalk and Talk, PPT, group discussion
II	**Unit: II Conduction, Convection:** Introduction-Lee's disc method of determining the thermal conductivity of bad conductor-Analogy between heat flow and electric current-Wiedemann -Franz law- Convection –Convection in the atmosphere- Lapse rate- Green house effect- Atmospheric pollution.	12	Chalk and Talk, PPT, quiz
III	**Unit: III Radiation**: Introduction-Stefan's law –Determination of Stefan's constant by filament heating method –Solar constant –Determination of solar constant by water flow Pyrheliometer-Temperature of the sun - Solar spectrum-Energy distribution in black body spectrum-Statement of Planck's law of radiation-Wien's law -Rayleigh Jean's law.	12	Chalk and Talk, quiz
IV	**Unit: IV Kinetic theory of gases:** Postulates of the kinetic theory of gases- Expression for the pressure of a gas-Mean free path-Transport phenomena-Expression for the coefficient of Diffusion and viscosity-Expression for the coefficient of thermal conductivity -Degrees of freedom-Boltzmann's law of equipartition of energy-Atomicity of gases.	12	Chalk and Talk, PPT, group discussion

V	**Unit:V Thermodynamics:** Heat engine-Expression for the efficiency of a Carnot's engine- Carnot's theorem -Second law of thermodynamics-Entropy-Changes of entropy in Carnot's cycle-Change of entropy in conversion of ice into steam -Joule Kelvin effect- Porous Plug experiment–Theory of Porous Plug experiment-Superconductivity.	12	Chalk and Talk, PPT presentations, quiz,

Course Designer:

Mrs. M.R. Gurulakshmi

Annexure -15

Department of Physics				Class: I B.Sc				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/ Week**	**CIA**	**SE**	**Total**
I& II	Generic Elective Course	22OUMAGEPH2P	Physics Practical-I	1	2	40	60	100

List of Experiments(Any Twelve):

1. Young's modulus-uniform bending using Pin & Microscope method.
2. Young's modulus-uniform bending using optic lever method
3. Young's modulus-non-uniform bending using Pin & Microscope method.
4. Young's modulus-non-uniform bending using optic lever method
5. Rigidity modulus by Torsion pendulum.
6. Rigidity modulus by Searle's method.
7. Compound pendulum-To find g and K
8. Potentiometer- low range-voltmeter calibration
9. Potentiometer-ammeter calibration
10. Sonometer-To determine A.C frequency
11. Sonometer- To determine the unknown frequency
12. Sonometer- Verification of Laws
13. Melde's string –To determine frequency of the vibrator
14. Lee's Disc method-To determine the thermal conductivity of Bad conductor

Reference Books:

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

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,-CHEMISTRY,-MATHEMATICS_-CB.pdf

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

UNIT	Topics to be Covered	Hours	Mode
I	1. Young's modulus-uniform bending using Pin & Microscope method. 2.Young's modulus-uniform bending using optic lever method 3.Young's modulus-non-uniform bending using Pin & Microscope method	6	Demo & Practical Session
II	4.Young's modulus-non-uniform bending using optic lever method 5.Rigidity modulus by Torsion pendulum. 6.Rigidity modulus by Searle's method.	6	Demo & Practical Session
III	7.Compound pendulum-To find g and k 8.Potentiometer- low range-voltmeter calibration 9.Potentiometer-ammeter calibration	6	Demo & Practical Session
IV	10.Sonometer – To determine the A.C frequency 11.Sonometer-To determine the unknown frequency 12.Sonometer-Verification of laws.	6	Demo & Practical Session
V	13.Melde's string – To determine frequency of the vibrator 14.Lee's Disc method-To determine the thermal conductivity of Bad conductor	6	Demo & Practical Session

Course Designer:
P.Revathi
S.Ameer Nisha Bibi