DEPARTMENT OF PHYSICS

CBCS With OBE

BACHELOR OF SCIENCE

PROGRAMME CODE - I

COURSE STRUCTURE

(w.e.f. 2022 – 2023 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)

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	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):

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 withMathematics 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 underChoice 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

Basedonpurpose:

Continuous Assessment (internal tests,Assignment,seminar,quiz,Documentation,Caselets,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 UptoK4levels)

Assessment through K1,K2, K3& K4

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- TestI

Section	Marks
A-Multiple Choice Question(3x1mark)	3
B-Short Answer (1x2marks)	2
C-Either Or type(1/2x5marks)	5
D-Open choice type(1/2 x10marks)	10
Total	20

Question Paper Pattern for Continuous Internal Assessment –TestII and III

MultiplechoiceforSection	Marks
A-Multiple Choice Question (6x1mark)	6
B-Short Answer(2x2marks)	4
C-Either Or Type(2/4x5marks)	10
D-Open Choice Type (2/3x 10marks)	20
Total	40

Conducted for 100marks and converted into 20marks

Question Paper Pattern for Summative Examination

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 (3outof 5x10 marks)	30
Total	75

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

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.

BLUE PRINT FOR INTERNAL ASSESSMENT – I

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

Sl. No	CLOs	K- Level	Section A MCQs (No Choice)		Section B Short Answers (No Choice)		Section C (Either or Type)	Section D (Open choice)	Total
			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

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

Sl. No	CLOs	K- Level	Section A MCQs (No Choice)		Section B Short Answers (No Choice)		Section C (Either or Type)	Section D (Open choice)	Total
			No. of Questions	K-Level	No. of Questions	K-Level 1			
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 ShortAnswer (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

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(5x1mark)	5
B-Short Answer(5x2marks)	10
C-Either Or type(3x5marks)	15
D-Open choice type(2/3 x10marks)	20
Total	50

Conducted for 50 marks and converted into25marks

Question Paper Pattern for External Examination

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

BLUE PRINT FOR INTERNAL ASSESSMENT

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

Sl. No	CLOs	K-Level	Section A MCQs (No Choice)		Section B Short Answers (No Choice)		Section C (Either or Type)	Section D (Open Choice)	Total
			No. of Questions	K-Level	No. of Questions	K-Level			
1.	CLO1	Up to K 3	1		1		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	K1	1	K1			
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
	K1	5	10	-	-	15	20
	K2	-	-	20	10	30	40
I	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 MCQs		Section B Short Answers		Section C (Either/or Choice)	Section D (Open Choice)	Total
			No. of Questions	K-Level	No. of Questions	K-Level			
1	CLO 1	Up to K3	2		1		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	K1	1	K1			
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

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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	
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

GEC : Generic Elective Course

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DEPARTMENT OF PHYSICS-UG
Generic Elective Course (For B.ScMaths 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)	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
IIMaths/ 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	Fundamentals of Photography	30	I B.Sc., Physics
			22PHAOCP	Lab inFundamentals of Photography		
II	III&IV	Certificate Course	22PHC	Solar Energy	90	II year students of all other disciplines
			22PHPR	Project in Solar Energy		
III	V	Value Added Course	22PHVAC	Mobile Communication	30	III B.Sc., Physics
			22PHVACPR	Project in Mobile Communication		

				Class: II B.Sc				
		Department of Physics		Class: II B.Sc				
Sem	Course Type	Course Code	Course Title	Credits	Contact Hours/ Week	CIA	SE	Total
III	Core	22OUPH31	Electricity and Electromagnetism	4	4	25	75	100

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

Course Objectives:

1. To understand the basic concepts of electric current.
2. To acquire the knowledge about the thermal effect of electric current.
3. To study the basic concepts of electromagnetic inductance.
4. To learn about AC and DC currents.
5. To study the Maxwell's equation and Electromagnetic waves

Course Content:

Unit I: Magnetic Effect Of Electric Current

Magnetic flux and magnetic induction- Biot Savart law- magnetic induction at a point due to a straight conductor carrying current - magnetic induction at a point on the axis of a circular coil carrying current- torque on a current loop in a uniform magnetic field -amperes circuital law- Movingcoil Ballistic galvanometer-theory -experiment to find charge sensitivity

Unit II: Thermal Effect of Electric Current
Thermoelectricity- Seebeck effect- laws of thermo e.m.f-measurement of thermo e.m.f using potentiometer-Peltier effect-demonstration-Thomson effect-demonstration - Thermodynamics of thermo couple –Thermo electricdiagram – uses-applications.

Unit III : Electromagnetic Induction
Faraday's laws of electromagnetic induction-self induction –self inductance of a long solenoid –toroidal solenoid-determination of L by Rayleigh's methods-Owen's bridge-mutual induction-mutual inductancebetween two co-axial solenoids-experimental determination of mutual inductance –-co-efficient of coupling- energy stored in a coil- eddy currents and its uses.

Unit IV: AC And DC Circuits

Growth and decay of current in LC, LR and CR circuits with d.c.voltages - determination of high resistance by leakage- Alternating Current- j operator method –use of j operator in the study of AC circuits- LCR series resonance circuit -parallel resonane circuit -power in an AC circuit.

Unit V: Maxwell's Equations & Electromagnetic Waves

Introduction-Physical significance of Maxwell's equations- -Displacement current-Plane electromagnetic waves in free space- Propagation of electromagnetic wave through a homogeneous,isotropic dielectric medium-Energy density of electromagnetic wave and Poynting theorem.

Books for Study:

R.Murugesan, *Electricity, ElectroMagnetism and Practical Physics II* ,First edition Vivekanda press, Madurai, 2007

Unit I: Chapter 4.2-4.6,4.9, 4.10,4.16,4.17
Unit II: Chapter 5.1-5.9
Unit III: Chapter 1.1,1.3-1.10
Unit IV: Chapter 2.1-2.4, 3.1,3.5-3.7
Unit V: Chapter 5.1,5.3,5.5,5.7-5.9

Books for Reference:

1.Duggal B.D, Chhabra C.L., *Fundamentals of Electricity and Magnetism* Built: Paperback & Hardbound 4th (Reprint), 2014

2.Murugesan.R, *Electricity&magnetism*, S.Chand&Coy, 6[th]edn New Delhi 2006.

3.Narayanamurthy.M , Nagarathnam.N, *Electricity and magnetism* 4[th]edn, National publishing co, Meerut

4.TayalD. C, *Electricity and Magnetism*, Himalaya Publishing House,New Delhi, 2 edn, 1989

5.VasudevaD.N, *Fundamentals of Magnetism and Electricity* ,S. Chand & Company Ltd, New Delhi, 5[th]Edn, 2011

Web Resources:

1. https://www.youtube.com/watch?v=FltPFgWZnaI
2. https://www.youtube.com/watch?v=j_slBI7nUlk
3. https://www.youtube.com/watch?v=YcfY-C8QAPY
4. https://www.youtube.com/watch?v=O1LKEGJFsJ0
5. https://www.youtube.com/watch?v=C08I_N0HxF8

E-Book:

1. http://himafi.fmipa.unej.ac.id/wp-content/uploads/sites/16/2018/09/Introduction-to-Electrodinamic.pdf
2. file:///D:/Users/EMG/Downloads/electricity-magnetism-and-electromagnetic-theory-9781259004599-1259004597_compress.pdf
3. https://lagboxspace.files.wordpress.com/2014/10/bleaneybleaney-electricitymagnetism2nded_text.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 electric magnetic field and magnetic materials.

Activities to be given:
1. Enhancing the quality of students to understand fundamental magnetic materials.
2. Train the students to solve electromagnetic problems.

Course learning Outcomes (CLOs):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (upto K level)
CLO1	understand the basic concepts of electric current.	K1 to K2
CLO2	acquire the knowledge about the thermal effect of electric current.	K1 to K2
CLO3	study the basic concepts of electromagnetic inductance.	K1 to K3
CLO4	learn about AC and DC currents.	K1 to K3
CLO5	study the Maxwell's equation and Electromagnetic waves	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

LESSON PLAN :

UNIT	DESCRIPTION	HRS	MODE
I	**Magnetic Effect Of Electric Current** Magnetic flux and magnetic induction-Biot Savart law- magnetic induction at a point due to a straight conductor carrying current - magnetic induction at a point on the axis of a circular coil carrying current- torque on a current loop in a uniform magnetic field - amperes circuital law- Moving coil Ballistic galvanometer-theory - experiment to find charge sensitivity	12	Chalk and Talk, PPT, group discussion
II	**Thermal Effect of Electric Current** Thermoelectricity- Seebeck effect- laws of thermo e.m.f–– measurement of thermo e.m.f using potentiometer-Peltier effect-demonstration––Thomson effect- demonstration - thermodynamics of thermo couple –thermo electric diagram –uses-applications.	12	Chalk and Talk, PPT, group discussion
III	**Electromagnetic Induction** Faraday's laws of electromagnetic induction-self induction –self inductance of a long solenoid –toroidal solenoid-determination of L by Rayleigh's methods-Owen's bridge-mutual induction-mutual inductance between two co-axial solenoids-experimental determination of mutual inductance –-co-efficient of coupling- energy stored in a coil- eddy currents and its uses.	12	Chalk and Talk, PPT, group discussion
IV	**AC And DC Circuits** Growth and decay of current in LC,LR and CR circuits with d.c.voltages - determination of high resistance by leakage- Alternating Current- j operator method –use of j operator in the study of AC circuits- LCR series resonance circuit -parallel resonane circuit -power in an AC circuit.	12	Chalk and Talk, PPT, group discussion ,

V	**Maxwell's Equations & Electromagnetic Waves** Introduction-Physical significance of Maxwell's equations- -Displacement current- Plane electromagnetic waves in free space- Propagation of electromagnetic wave through a homogeneous, isotropic dielectric medium-Energy density of electromagnetic wave and Poynting theorem.	12	Chalk and Talk, PPT, group discussion ,

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

Department of Physics				Class: II B.Sc				
Sem	Course Type	Course Code	Course Title	Credits	Contact Hours/ Week	CIA	SE	Total
IV	Core	22OUPH41	Optics and Spectroscopy	4	4	25	75	100

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

Objectives:

1. To understand the basic concepts of dispersion of light.
2. To obtain the knowledge about interference.
3. To study the different types of Diffraction.
4. To acquire the knowledge of the effects of polarization of light.
5. To gain the basic knowledge of types of spectroscopy and its applications.

Unit I Geometrical optics:

Introduction-Aberration-Spherical aberration-Chromatic Aberration- Chromatic Aberration in a Lens-Dispersion by a prism-Refraction through a prism-Angular Dispersions-Dispersive power-Angular and Chromatic Dispersions-Achromatic Combination of prisms-Deviation without Dispersion-Dispersion without Deviation-Direct vision Spectroscope - Huygens Eyepiece-Ramsden Eyepiece-Comparison of Ramsden Eyepiece with Huygens Eyepiece.

Unit II Interference:

Introduction- Condition for interference- Techniques of obtaining interference-Thin Flim- interference due to reflected light- conditions for maxima and minima-variable thickness wedge shaped flim- determination of the wedge angle-Newton's rings- Condition for Bright and Dark rings - Michelson's interferometer (Construction and Working).

Unit III Diffraction:

Introduction-Huygens-Fresnel theory-Rectilinear propagation of light-Zone Plate-Action of a Zone plate for an incident spherical wave front-Fresnel and Fraunhoffer types of

Diffraction-Diffraction at a circular aperture- Fraunhoffer diffraction at a single slit-Fraunhoffer Diffraction at a circular aperture - Plane Diffraction Grating – Determination of wavelength of a spectral line using the transmission grating.

Unit IV Polarization:

Introduction-Double refraction –Huygen's theory of double refraction in uniaxial crystals- Nicol prism-Plane,circularly and elliptically polarised light-Quarter wave plate-Half wave plate-production and deduction of plane circularly and elliptically polarised light-Fresnel's theory of Optical rotation-Laurent's Half-shade polarimeter.

Unit V Spectroscopy:

Infrared spectroscopy-Sources and deductors-uses-Ultraviolet Spectroscopy-Raman Effect-Experimental study of Raman Effect- Quantum theory of Raman Effect-Applications-Nuclear Magnetic Resonance- Nuclear Quadrupole Resonance.

Text Books:

1. Subrahmanyam.N, Brijlal, Avadhanulu.M.N, *Optics*, S.Chand& company Ltd, New Delhi, Twenty Fifth Edition 2012.(Unit I,II,III)
2. Murugesan.R ,Kiruthiga sivaprasath, *Optics And Spectroscopy* ,S.Chand& Company Ltd , New Delhi , first edition , 2013 (Unit IV,V)

Unit I   Chapter   9.1,9.2,9.5,9.10,9.11, 8.1-8.8,10.10-10.12

Unit: II   Chapter   14.4,14.7,14.8,15.1,(15.2.1),15.2.2,15.5,15.5.1,15.5.2,15.5.4,15.6
                                   15.6.1-15.6.3,15.7

Unit: III   Chapter   17.1,17.2,17.4,17.5,17.5.1,17.7,17.8,18.1-18.3
                                   (excluding 18.2.1,18.2.2),18.7,18.7.6

Unit: IV   Chapter   4.1,4.5-4.6,4.8,4.10,4.12-4.14,4.17,4.20

Unit: V   Chapter   5.2,5.3,5.5-5.10

Reference Books:

1.Anuradha De,*Optical fibre and Laser* ,New Age International (p) Lmt ,New Delhi, Second Edition 2009.

2. Ajoyghatak ,*Optics* , Tata McGraw Hill Education PvtLmt , New Delhi, Fifth edition,2012

3. Chakrabarti P.K   ,*Geometrical and Physical Optics* ,New central Book Agency (p) Lmt. Kolkata ,Second Edition 2004

4.SathyaPrakash , *Optics* RatanPrakashanmandir , Agra , Twelfth Revised Edition 2005.

Web Resources / E.Books:

1. https://en.wikipedia.org/wiki/Geometrical_optics
2. https://scholar.harvard.edu/files/david-morin/files/waves_interference.pdf
3. http://instructor.physics.lsa.umich.edu/int-labs/Chapter4.pdf
4. https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SCY1612.pdf

Pedagogy:

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

Rationale for Nature of the course:

Knowledge and skill: The course is the learning and understanding the fundamental ideas of Diffraction, Interference, Polarization and Spectroscopy.

Activities to be given:

1. Enhancing the quality of students by doing the experiments based on the light.
2. Train the students to understanding the concepts of light.

Course learning Outcomes (CLOs):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (upto K level)
CLO1	Understand the angular and chromatic dispersions.	K1 to K2
CLO2	Gain the knowledge about interference.	K1 to K2
CLO3	Apply the concepts of Diffraction.	K1 to K3
CLO4	Analyze the effects of polarization of light	K1 to K3
CLO5	Examine the basics concepts of Spectroscopy and its 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	2	3	2	3	3	3
CLO3	3	3	3	2	3	3
CLO4	3	3	3	3	3	2
CLO5	3	3	3	3	3	3

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

LESSON PLAN :

UNIT	DESCRIPTION	HRS	MODE
I	**Unit I Geometrical optics:** Introduction-Aberration-Spherical aberration-Chromatic Aberration- Chromatic Aberration in a Lens-Dispersion by a prism-Refraction through a prism-Angular Dispersions-Dispersive power-Angular and Chromatic Dispersions-Achromatic Combination of prisms-Deviation without Dispersion-Dispersion without Deviation-Direct vision Spectroscope -Huygens Eyepiece-Ramsden Eyepiece-Comparison of Ramsden Eyepiece with Huygens Eyepiece.	12	Chalk and Talk, PPT, group discussion
II	**Unit II Interference:** Introduction- Condition for interference-Techniques of obtaining interference-Thin Flim- interference due to reflected light-conditions for maxima and minima-variable thickness wedge shaped flim- determination of the wedge angle-Newton's rings-Condition for Bright and Dark rings -	12	Chalk and Talk, PPT, group discussion .

	Michelson's interferometer (Construction and Working).		
III	**Unit III Diffraction:** Introduction-Huygens-Fresnel theory-Rectilinear propagation of light-Zone Plate-Action of a Zone plate for an incident spherical wave front-Fresnel and Fraunhoffer types of Diffraction-Diffraction at a circular aperture- Fraunhoffer diffraction at a single slit- Fraunhoffer Diffraction at a circular aperture.	12	Chalk and Talk, PPT, group discussion ,
IV	**Unit IV Polarization:** Introduction-Double refraction – Huygen's theory of double refraction in uniaxial crystals- Nicol prism-Plane,circularly and elliptically polarised light-Quarter wave plate-Half wave plate-production and deduction of plane circularly and elliptically polarised light-Fresnel's theory of Optical rotation-Laurent's Half-shade polarimeter.	12	Chalk and Talk, PPT, group discussion ,
V	**Unit V Spectroscopy:** Infrared spectroscopy-Sources and deductors-uses-Ultraviolet Spectroscopy-Raman Effect-Experimental study of Raman Effect- Quantum theory of Raman Effect-Applications-Nuclear Magnetic Resonance-Nuclear Quadrupole Resonance.	12	Chalk and Talk, PPT, group discussion ,

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

	Department of Physics				Class: II B.Sc			
Sem	Course Type	Course Code	Course Title	Credits	Contact Hours/ Week	CIA	SE	Total
III & IV	Practical	22OUPH4P	Major Practical-II	3	2	40	60	100

List of Experiments (Any Twelve):

1. Air wedge-determination of thickness of wire

2. Newton's rings –determination of radius of curvature.

3. Spectrometer – Grating –resolving power & dispersive power

4. Carey foster bridge-determination of specific resistance

5. Charge sensitivity-galvanometer

6. Owen's bridge – determination of self inductance of the coil

7. Comparison of emfs-spot galvanometer

8. Comparison of capacitances- using spot galvanometer

9. Maxwell's Bridge- self inductance of the coil.

10. Anderson's Bridge- self inductance of the coil

11. AC frequency - Sonometer

12. Current & voltage sensitivity-spot galvanometer

13. Conversion of voltmeter using spot galvanometer

14. Copper Voltmeter – E.C.E of copper

15. Spectrometer –prism i-i' curve to find refractive index

16. Spectrometer –prism i-d' curve to find refractive index

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. Air wedge-determination of thickness of wire 2. Newton's rings –determination of radius of curvature. 3. Spectrometer – Grating –resolving power & dispersive power 4. Carey foster bridge-determination of specific resistance	6	Demo & Practical Session
II	5. Charge sensitivity-galvanometer 6. Owen's bridge – determination of self inductance of the coil 7. Comparison of emfs-spot galvanometer	6	Demo & Practical Session
III	8. Comparison of capacitances- using spot galvanometer 9. Maxwell's Bridge- self inductance of the coil. 10. Anderson's Bridge- self inductance of the coil	6	Demo & Practical Session
IV	11. AC frequency - Sonometer 12. Current & voltage sensitivity-spot galvanometer 13. Conversion of voltmeter using spot galvanometer	6	Demo & Practical Session
V	14. Copper Voltmeter – E.C.E of copper 15. Spectrometer –prism i-i' curve to find refractive index 16. Spectrometer –prism i-d' curve to find refractive index	6	Demo & Practical Session

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

Department of Physics				Class: II B.Sc				
Sem	Category	Course Code	Course Title	Credits	Contact Hours / Week	CIA	SE	Total
III	Generic Elective Course	22OUCHGEPH3	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,shanthapublication,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**

LESSON PLAN :

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.	6	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 .	6	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.	6	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. | 6 | 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. | 6 | Chalk and Talk, group discussion |

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

Department of Physics				Class: II B.Sc				
Sem	Category	Course Code	Course Title	Credits	Contact Hours/ Week	CIA	SE	Total
IV	Generic Elective Course	22OUCHGEPH4	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 :IIConduction, 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.AroraC. 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

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:

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.	6	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.	6	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.	6	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.	6	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.	6	Chalk and Talk, PPT presentations, quiz,

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

	Department of Physics				Class: II B.Sc			
Sem	Category	Course Code	Course Title	Credits	Contact Hours/ Week	CIA	SE	Total
III &IV	Generic Elective Course	22OUCHGEPH4P	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 Non-uniform bending using optic lever method

3. Young's modulus by cantilever- load depression graph.

4. Young's modulus by cantilever – Oscillation 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 Non-uniform bending using optic lever method. 3. Young's modulus by cantilever- load depression graph.	6	Demo & Practical Session
II	4. Young's modulus by cantilever – Oscillation 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	6	Demo & Practical
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	6	Demo & Practical Session

Course designer
Mrs.P.Revathi
Mrs.M.R.Gurulakshmi

Department of Physics				Class: II B.Sc				
Sem	Course Type	Course Code	Course Title	Credits	Contact Hours/ Week	CIA	SE	Total
III	Generic Elective Course	22OUMAGE PH3	Physics-III Electricity and Electronics	4	4	25	75	100

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

Course Objectives:

1. To understand the basic concepts of electric fields.
2. To acquire the knowledge about the magnetic fields.
3. To understand the properties of semiconductor materials.
4. To study the basic concepts of Transistor.
5. To learn about logic gates.

Course Content:

Unit: I

Current , Resistance and Electrical Measurements

Current and current density-Expression for current density-Equation of continuity-Ohm's law and electrical conductivity-Kirchhoff's laws-Application of Kirchhoff's laws to Whetstone's network-Sensitivity of Whetstone's bridge-Carey foster bridge-Potentiometer-Calibration of Ammeter-Calibration of voltmeter.

Unit: II

Thermo-Electricity

Seebeck effect- Laws of thermo e.m.f- Measurement of thermo-EMF using potentiometer-Peltier effect- Thomson effect-Thermodynamics of Thermocouple-Thermo electric diagrams-Uses of Thermoelectric Diagrams.

Unit : III

Semiconductor Physics

Semiconductor-Intrinsic semiconductor-Extrinsic semiconductor-n type semiconductor-p type semiconductor-pn junction-properties of pn junction-Appling D.C.Voltage Across pn Junction or Biasing a pn Junction-Current flow in a forward biased pn junction-Volt ampere characteristics of pn junction.

Unit :IV

Transistor

Transistor- Transistor action- Transistor as an amplifier-Transistor connections- Common base connection- characteristics of Common base connection -Common emitter connection-characteristics of Common emitter connection -Common collector connection

Unit : V

Logic gates

Decimal to binary conversion-Binary to decimal conversion-Octal number system-Hexadecimal number system- OR gate-AND gate-NOT gate-Combination of basic logic gates-NAND Gate as a universal Gate- Boolean theorems- DeMorgans theorems

Text Books:

1.Murughesan .R, *Electricity and Magnetism*,Sixth Edition, S.Chand And Company Ltd, New Delhi,2006(UNIT-I,II)
2.Mehta V.K, Rohit Mehta Principles of electronics, Eleventh edition, S.Chand and Company Ltd,New ,Delhi 2012(UNIT-III,IV,V)

 Unit I   - Chapters 6.1-6.4,6.6,7.1,7.2
 Unit II   - Chapters 8.1-8.8
 Unit III - Chapters 5.1,5.8-5.11,5.14-5.18
 Unit IV   - Chapters 8.1,8.4,8.6-8.10,8.12,8.13
 Unit V   - Chapters 26.5-26.8,26.12-26.16,26.21,26.22

Books for Reference:

1.Duggal B.D, Chhabra C.L., *Fundamentals of Electricity and Magnetism* Built: Paperback & Hardbound 4th (Reprint), 2014

2.Murugesan.R, *Electricity&magnetism*, S.Chand&Coy, 6thedn New Delhi 2006.

3.Narayanamurthy.M , Nagarathnam.N, *Electricity and magnetism* 4thedn, National publishing co, Meerut

4.TayalD. C, *Electricity and Magnetism*, Himalaya Publishing House,New Delhi, 2 edn, 1989

5.VasudevaD.N, *Fundamentals of Magnetism and Electricity* ,S. Chand & Company Ltd, New Delhi, 5thEdn, 2011

Web Resources / E.Books:

1. https://byjus.com/physics/seebeck-effect

2. https://isaacphysics.org/concepts/cp_kirchhoffs_laws

3. https://www.toppr.com/ask/content/concept/intrinsic-semiconductor-210417

4. https://rnsinstituteoftechnology.org/wp-content/uploads/2020/04/principles-of-electronics-s-chand-v-k-mehta-rohit-mehta.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 electric field , semiconductor materials.

Activities to be given:
1. Enhancing the quality of students to understand fundamentals of electricity.
2. Train the students to know about the logic gates.

Course learning Outcomes (CLOs):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (upto K level)
CLO1	understand the basic concepts of electric fields.	K1 to K2
CLO2	acquire the knowledge about the magnetic fields.	K1 to K2
CLO3	To understand the properties of semiconductor materials.	K1 to K3
CLO4	To study the basic concepts of OP-AMP.	K1 to K3
CLO5	To learn about logic gates.	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

LESSON PLAN :

UNIT	DESCRIPTION	HRS	MODE
I	**Current Resistance and Electrical Measurements** Current and current density-Expression for current density-Equation of continuity-Ohm's law and electrical conductivity-Kirchhoff's laws-Application of Kirchhoff's laws to Whetstone's network-Sensitivity of Whetstone's bridge-Carey foster bridge-Potentiometer-Calibration of Ammeter-Calibration of voltmeter-Measurement of low resistance kelvin double bridge method-capacitance of capacitor(Kelvin's Null method)	6	Chalk and Talk, PPT, group discussion
II	**Thermo-Electricity** Seebeck effect- Laws of thermo e.m.f-Measurement of thermo-EMF using potentiometer- Peltier effect- Thomson effect-Thermodynamics of Thermocouple-Thermo electric diagrams-Uses of Thermoelectric Diagrams.	6	Chalk and Talk, PPT, group discussion

III	**Semiconductor Physics** Semiconductor-Intrinsic semiconductor-Extrinsic semiconductor-n type semiconductor-p type semiconductor-pn junction-properties of pn junction-Appling D.C.Voltage Across pn Junction or Biasing a pn Junction-Current flow in a forward biased pn junction-Volt ampere characteristics of pn junction.	6	Chalk and Talk, PPT, group discussion
IV	**Transistor** Transistor- Transistor action- Transistor as an amplifier-Transistor connections- Common base connection- characteristics of Common base connection -Common emitter connection-characteristics of Common emitter connection -Common collector connection	6	Chalk and Talk, PPT, group discussion ,
V	**Logic gates** Decimal to binary conversion-Binary to decimal conversion-Octal number system-Hexadecimal number system- OR gate-AND gate-NOT gate-Combination of basic logic gates- NAND Gate as a universal Gate- Boolean theorems-DeMorgans theorems	6	Chalk and Talk, PPT, group discussion ,

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

Department of Physics				Class: II B.Sc				
Sem	Category	Course Code	Course Title	Credits	Contact Hours/ Week	CIA	SE	Total
IV	Generic Elective Course	22OUMAGEPH4	Physics – IV Optics	4	4	25	75	100

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

Course Objectives:

1. To study the basic concepts of geometrical optics.

2. To comprehend the theory of interference.

3. To understand the basics and the types of Diffraction.

4. To know the theory of Polarization of light.

5. To understand the basics of LASER.

Course content:

Unit: I   Geometrical optics

Convex lens-Principal Focus and Focal Planes-Refraction through a thin lens-Dispersion of Light - Dispersion through a Prism-Cauchy's Formula- Achromatism in Prisms-Dispersion without Deviation-Direct vision Spectroscope- Spherical aberration in a lens-Chromatic aberration in a lens - Achromatic Combination of Lenses.

Unit: II   Interference

Introduction-Theory of interference fringes – Displacement of fringes - Colours of thin films-Newton's rings-Determination of wavelength of sodium light by Newton's rings – Determination of refractive index of a liquid by Newton's rings-Michelson's interferometer.

Unit: III   Diffraction

Introduction-Fresnel's explanation of rectilinear propagation of light-Zone plate-Diffraction at a thin wire-Fraunhofer diffraction at a single slit-Fraunhofer diffraction at a double slit-Resolving power of telescope-Resolving power of prism-Resolving power of a plane diffraction grating.

Unit: IV   Polarisation

Introduction-Polarisation of Light-Polarisation by reflection-Pile of plates-Law of Malus-Double refraction- Huygen's theory of double refraction in uniaxial crystals-Huygen's construction for double refraction in uniaxial crystals- Nicol prism - Quarter wave plate-Half wave plate.

Unit: V   Laser

The Einstein Coefficients –Relation between Einstein's A and B coefficients- Population Inversion – The Line shape function – Carbon Dioxide Laser – Dye Laser – Nd: YAG Laser – Resonators – Open resonators - The Quality Factor Q -Properties of Laser Beam – Monochromaticity – Directionality.

Text Books:

1. Murugesan.R ,Kiruthiga sivaprasath, *Optics And Spectroscopy* ,S.Chand& Company Ltd , New Delhi , First edition , Reprint 2013

UNIT I :	Chapter 1	1.1-1.3, 1.7-1.11, 1.16, 1.20
UNIT II :	Chapter	2.1-2.2, 2.4,2.5, 2.8- 2.11
UNIT III :	Chapter 3	3.1-3.3, 3.9-3.11,3.20,3.23,3.24
UNIT IV :	Chapter 4	4.1-4.8, 4.12,4.13
UNIT V :	Chapter 12	12.1 - 12.5
	Chapter 23	23.1, 23.4, 23.6 - 23.9

Reference books:

1.Ajoy Ghatak, *Optics,* 5th edition, Tata McGraw Hill Education Private Limited, New Delhi,2012.

2.Feynman.R, Leighton.R.B and Sands.M- *The Feynman Lectures on Physics,* Vol II Pearson education 2013

3.Halliday.D, Resnick .R and Krane-*Physics volume II*- Wiley India (p)Ltd,New delhi,fifth edition.

4. KhannaDr.H.RGulati.R,*Optics*, Chand & Co, New Delhi, 1979

5. Subrahmanyam Brijlal.N,Avadhanulu.M.N, *Optics*, S.Chand& company Ltd,New Delhi, Twenty Fifth Edition 2012

Web Resources/ E.Books:

1. https://pubs.aip.org/aapt/pte/article-abstract/43/4/254/275167/Web-Resources-for- \

Teaching-Introductory-Optics?redirectedFrom=fulltext

2. https://www.khanacademy.org/science/physics/geometric-optics

3. https://www.merriam-webster.com/dictionary/optics

4. https://study.com/academy/lesson/optics-physics-overview-types.html

5.https://www.researchgate.net/publication/243716006_Web_Resources_for_Teaching_Intro

ductory_Optics_Optics_simulations

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 of optics.

Activities to be given:

The knowledge of theory acquired by the students will enable them to do the lab experiments.

Course learning Outcomes (CLOs):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (Upto K level)
CLO1	Study the basic concepts of geometrical optics.	K1 to K2
CLO2	Comprehend the theory of interference.	K1 to K2
CLO3	Understand the basics and the types of Diffraction.	K1 to K2
CLO4	Know the theory of Polarization of light.	K1 to K3
CLO5	Understand the basic formation of Spectroscopy.	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

LESSON PLAN:

UNIT	DESCRIPTION	HRS	MODE
I	**Geometrical optics** Convex lens-Principal Focus and Focal Planes-Refraction through a thin lens-Dispersion of Light - Dispersion through a Prism-Cauchy's Formula- Achromatism in Prisms-Dispersion without Deviation-Direct vision Spectroscope- Spherical aberration in a lens-Chromatic aberration in a lens - Achromatic Combination of Lenses.	6	Chalk and Talk, PPT, group discussion.
II	**Interference** Introduction-Theory of interference fringes-Fresnel's Biprism- Displacement of fringes - Colours of thin films-Newton's rings-Determination of wavelength of sodium light by Newton's rings – Determination of refractive index of a liquid by Newton's rings-Michelson's interferometer.	6	Chalk and Talk, PPT, group discussion
III	**Diffraction** Introduction-Fresnel's explanation of rectilinear propagation of light-Zone plate- Diffraction at a thin wire-Fraunhofer diffraction at a single slit-Fraunhofer diffraction at a double slit-Resolving power of telescope-Resolving power of prism-	6	Chalk and Talk, PPT.

	Resolving power of a plane diffraction grating.		
IV	**Polarisation** Introduction-Polarisation of Light-Polarisation by reflection-Pile of plates-Law of Malus-Double refraction- Huygen's theory of double refraction in uniaxial crystals-Huygen's construction for double refraction in uniaxial crystals- Nicol prism - Quarter wave plate-Half wave plate.	6	Chalk and Talk, group discussion.
V	**Spectroscopy** Introduction- Infrared spectroscopy -Rayleigh's scattering-Raman effect-Discovery - Experimental study of Raman effect-Quantum theory of Raman effect-Applications-Nuclear magnetic resonance.	6	Chalk and Talk, PPT.

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

	Department of Physics				Class: II B.Sc			
Sem	Course Type	Course Code	Course Title	Credits	Contact Hours/ Week	CIA	SE	Total
III & IV	Practical	22OUMAGEPH4P	GEC : Physics Practical-II	1	2	40	60	100

List of Experiments (Any Twelve):

1. Mirror galvanometer-voltage and current sensitiveness

2. Series resonance -LCR

3. Air wedge- thickness of wire

4. Dispersive power of a prism –spectrometer

5. Grating- normal incidence-spectrometer

6. Newton's rings determination of radius of curvature

7. Logic gates –AND,OR,NOT,-using discrete components

8. Logic gates-NAND,NOR-using discrete components

9. Verification of De Morgan's theorem using IC's

10. Diode characteristics

11. Zener diode characteristics

12. OP-amp as an adder

13. OP-amp as a subtractor

14. Parallel resonance – LCR

15. Spectrometer –prism i-i' curve to find refractive index

16. Spectrometer –prism i-d' curve to find refractive index

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.Mirror galvanometer-voltage and current sensitiveness 2. Series resonance -LCR 3. Air wedge- thickness of wire 4. Dispersive power of a prism –spectrometer	6	Demo & Practical Session
II	5.Grating- normal incidence-spectrometer 6. Newton's rings determination of radius of curvature 7. Logic gates –AND,OR,NOT,-using discrete components	6	Demo & Practical Session
III	8.Logic gates-NAND,NOR-using discrete components 9. Verification of De Morgan's theorem using IC's 10. Diode characteristics	6	Demo & Practical Session
IV	11.Zener diode characteristics 12. OP-amp as an adder 13. OP-amp as a subtractor	6	Demo & Practical Session
V	14.Parallel resonance – LCR 15. Spectrometer –prism i-i' curve to find refractive index 16. Spectrometer –prism i-d' curve to find refractive index	6	Demo & Practical Session

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