MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE

(An Autonomous College)

Affiliated to Periyar University, Salem | Accredited by **NAAC** with 'A' Grade
Recognized by **UGC** under Section 2(f) & 12 (B)

MUTHAYAMMAL
COLLEGE OF ARTS
AND SCIENCE
(Autonomous) | Learn. Lead

ESTD-1994 A UNIT OF **VANETRA** GROUP

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DEGREE OF BACHELOR OF SCIENCE

Learning Outcomes – Based Curriculum Framework
– Choice Based Credit System

Syllabus for B.Sc., Physics
(Semester Pattern)

(For Candidates admitted from the academic year
2021 -2022 and onwards)

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Post Graduates will be able to promote learning environment to meet the Industry expectation.

PEO2: Post Graduates will be incorporated the critical thinking with good Communication and Leadership skills to become a self-employed.

PEO3: Post Graduates will be upholding the human values and environmental sustenance for the betterment of the society.

GRADUATE ATTRIBUTES

The Graduate Attributes of B. Sc PHYSICS are:

GA 1 Analytical Reasoning

GA 2 Critical Thinking

GA 3 Problem Solving Skills

GA 4 Communication Skills

GA 5 Leadership Quality

GA 6 Team work

GA 7 Lifelong Learning

PROGRAMME OUTCOMES

PO1: Graduates will acquire dynamic skills through proper perception of the course objectives that leads to scientific and

   Analytical comprehension of the concepts;

PO2: Graduates will focus on sustainable goals that might bring about spherical

   Developments

PO3: Graduates will infuse a spirit converging on bricking a team work, interpersonal and

   Administrative skills to think critically and execute effectively

PO4: Graduates will apply reasoning appropriately to scale the humps in learning and solute

   them to the core.

PO5: Graduates will engage the skills obtained in independent and collaborative learning as

   a perennial process.

DEPARTMENT OF PHYSICS

Vision

To redefine the scope of higher education by infusing into each of our pursuits, initiatives that will encourage intellectual, emotional, social and spiritual growth, there by nurturing a generation of committed, Knowledgeable and socially responsible citizens.

Mission

*To Ensure State of the world learning experience

* To espouse value based Education

*To empower rural education

*To instill the sprite of entrepreneurship and enterprise

*To create a resource pool of socially responsible world citizens

PROGRAMME SPECIFIC OUTCOMES

After the successful completion of M. Sc PHYSICS program, the students are expected to

PSO1: Gained the ability to identify and analyze complex Physics problems using the principles of Physics with suitable mathematical tools.

PSO2: Developed skills to communicate effectively with peers, professionals and society at large and demonstrate professional ethics

PSO3: Molded to adopt, absorb and develop innovative ideas

PSO4: Inculcate scientific temper and motivate student to take up further research

PSO5: Exhibited effective individual talent, and engaged themselves in lifelong learning and dissemination.

S.No.	PART	STUDY COMPONENTS	COURSE_CODE	TITLE OF THE COURSE	Hrs. Lect.	Hrs. Lab.	CREDIT	CIA	ESE	TOTAL
				SEMESTER - I						
1	I	LANGUAGE - I	21M1UFTA01	TAMIL - I	5		3	25	75	100
2	II	LANGUAGE - II	21M1UCEN01	COMMUNICATIVE ENGLISH - I	5		3	25	75	100
3	III	DSC THEORY - I	21M1UPHC01	PROPERTIES OF MATTER AND ACOUSTICS	5		5	25	75	100
4	III	DSC PRACTICAL - I	21M2UPHP01	PRACTICAL : PHYSICS - I		3				
5	III	GEC THEORY - I	21M1UMAA01	ALLIED: ALGEBRA AND CALCULUS	5		4	25	75	100
6	III	GEC PRACTICAL - I	21M2UMAAP2	PRACTICAL : ALLIED MATHAMETICS		2				
7	IV	AECC - VALUE EDUCATION	21M1UVED01	YOGA	2		2	100		100
8	IV	PROFESSIONAL ENGLISH - I	21M1UPES01	PROFESSIONAL ENGLISH FOR PHYSICAL SCIENCE - I	3		2	25	75	100
				TOTAL	25	5	19	225	375	600
				SEMESTER - II						
1	I	LANGUAGE - I	21M2UFTA02	TAMIL - II	5		3	25	75	100
2	II	LANGUAGE - II	21M2UCEN02	COMMUNICATIVE ENGLISH - II	5		3	25	75	100
3	III	DSC THEORY - II	21M2UPHC02	MECHANICS	5		5	25	75	100
4	III	DSC PRACTICAL - I	21M2UPHP01	PRACTICAL : PHYSICS - I		3	3	40	60	100
5	III	GEC THEORY - II	21M2UMAA02	ALLIED:DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS	5		4	25	75	100
6	III	GEC PRACTICAL - I	21M2UMAAP2	PRACTICAL : ALLIED MATHAMETICS		2	2	40	60	100
7	IV	AECC - ENVIRONMENTAL STUDIES	21M2UEVS01	ENVIRONMENTAL STUDIES	2		2	100		100
8	IV	PROFESSIONAL ENGLISH - II	21M2UPES02	PROFESSIONAL ENGLISH FOR PHYSICAL SCIENCE - II	3		2	25	75	100
				TOTAL	25	5	24	305	495	800

S.No.	PART	STUDY COMPONENTS	COURSE_CODE	TITLE OF THE COURSE	Hrs. Lect.	Hrs. Lab.	CREDIT	MARKS CIA	MARKS ESE	MARKS TOTAL
SEMESTER - III										
1	I	LANGUAGE - I	21M3UFTA03	TAMIL - III	5		3	25	75	100
2	II	LANGUAGE - II	21M3UCEN03	COMMUNICATIVE ENGLISH - III	5		3	25	75	100
3	III	DSC THEORY - III	21M3UPHC03	OPTICS AND SPECTROSCOPY	6		5	25	75	100
4	III	DSC PRACTICAL - II	21M4UPHP02	PRACTICAL : PHYSICS - II		3				
5	III	GEC THEORY - III	21M3UCHA01	ALLIED :CHEMISTRY - I	5		4	25	75	100
6	III	GEC PRACTICAL - II	21M3UCHAP1	PRACTICAL : ALLIED CHEMISTRY I		2				
7	IV	SEC THEORY - I	21M3UPHS01	SEC-I	2		2	25	75	100
8	IV	NMEC - I	21M3UELN01	NMEC-I	2		2	25	75	100
				TOTAL	25	5	19	150	450	600
SEMESTER - IV										
1	I	LANGUAGE - I	21M4UFTA04	TAMIL - IV	5		3	25	75	100
2	II	LANGUAGE - II	21M4UCEN04	COMMUNICATIVE ENGLISH - IV	5		3	25	75	100
3	III	DSC THEORY - IV	21M4UPHC04	THERMAL AND STATISTICAL PHYSICS	6		5	25	75	100
4	III	DSC PRACTICAL - II	21M4UPHP02	PRACTICAL : PHYSICS - II		3	3	40	60	100
5	III	GEC THEORY - IV	21M4UCHA02	ALLIED: CHEMISTRY - II	5		4	25	75	100
6	III	GEC PRACTICAL - II	21M4UCHAP1	PRACTICAL : ALLIED CHEMISTRY I		2	2	40	60	100
7	IV	SEC THEORY - II	21M4UPHS02	SEC-II	2		2	25	75	100
8	IV	NMEC - II	21M4UELN06	NMEC - II	2		2	25	75	100
9	IV	NAAN MUTHALVAN		DIGITAL SKILLS FOR EMPLOYABILITY-OFFICE FUNDAMENTALS	-	.	.	.	.	.
				TOTAL	25	5	24	230	570	800

MUTHAYAMMAL COLLEGE OF ARTS & SCIENCE

S.No.	PART	STUDY COMPONENTS	COURSE_CODE	TITLE OF THE COURSE	Hrs. Lect.	Hrs. Lab.	CREDIT	CIA	ESE	TOTAL
				SEMESTER - V						
1	III	DSC THEORY - V	21M5UPHC05	ELECTRICITY AND MAGNETISM	6		5	25	75	100
2	III	DSC THEORY - VI	21M5UPHC06	QUANTUM MECHANICS AND RELATIVITY	6		5	25	75	100
3	III	DSE THEORY - I	21M5UPHE01	ELECTIVE-I	5		5	25	75	100
4	III	DSE THEORY - II	21M5UPHE02	ELECTIVE-II	5		5	25	75	100
5	III	DSC PRACTICAL - III	21M6UPHP03	PRACTICAL : PHYSICS - III		3				
6	III	DSC PRACTICAL - IV	21M6UPHP04	PRACTICAL : PHYSICS - IV		3				
7	IV	SEC THEORY - III	21M5UPHS03	SEC-III	2		2	25	75	100
8		INTERNSHIP	21M5UPHIS1	INTERNSHIP	-		-	-	-	-
				TOTAL	24	6	22	125	375	500
				SEMESTER - VI						
1	III	DSC THEORY - VII	21M6UPHC07	ATOMIC PHYSICS	5		5	25	75	100
2	III	DSC THEORY - VIII	21M6UPHC08	NUCLEAR PHYSICS	5		5	25	75	100
3	III	DSE THEORY - III	21M6UPHE04	ELECTIVE-III	5		4	25	75	100
4	III	DSE THEORY - IV	21M6UPHE05	ELECTIVE-IV	5		4	25	75	100
5	III	DSC PRACTICAL - III	21M6UPHP03	PRACTICAL : PHYSICS - III		3	3	40	60	100
6	III	DSC PRACTICAL - IV	21M6UPHP04	PRACTICAL : PHYSICS - IV		3	3	40	60	100
7	III	PROJECT WORK	21M6UPHPR1	PROJECT WORK			3	40	60	100
8	III	ONLINE - COMPETITIVE EXAMINATION	21M6UPHOE1	PHYSICS FOR COMPETITIVE EXAM			2	100		100
9	IV	SEC THEORY- IV	21M6UPHS04	SEC - IV	2		2	25	75	100
10	V	EXTENSION ACTIVITY	21M6UEXA01	EXTENSION ACTIVITY	-	-	1	-	-	-
11	IV	Elective Naan Mudhalavan Skill based		DATA ANALYTICS AND Tbleau	-	-	-	-	-	-
				TOTAL	22	6	32	345	555	900

				OVERALL TOTAL	146	32	140	1380	2820	4200
	Extra Credit		21M6UPHEC1	MOOC Courses offered in SWAYAM / NPTEL	-	-	2	-	-	-
	Value Added Course			HOW THINGS WORK	-	-	2			

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UG- REGULATION

1. Internal Examination Marks - Theory

Components	Marks
CIA I & II	15
Attendance	5
Assignment	5
Total	25

Attendance Percentage	Marks
96 % to 100%	5
91% to 95%	4
86% to 90%	3
81% to 85%	2
75% to 80%	1
Below 75%	0

2. QUESTION PAPER PATTERN FOR CIA I, II AND ESE (3 HOURS) MAXIMUM: 75 Marks

SECTION - A (10 Marks)   (Objective Type)

Answer ALL Questions

ALL Questions Carry EQUAL Marks   (10 x 1 = 10 marks)

SECTION - B (10 Marks)   (Short Answer)

Answer ALL Questions

ALL Questions Carry EQUAL Marks   (5 x 2 = 10 marks)

SECTION - C (25 Marks)   (Either or Type)

Answer any FIVE questions

ALL Questions Carry EQUAL Marks

Either or Type.   (5 x 5 = 25 marks)

SECTION - D (30 Marks)   (Analytical Type)

Answer any THREE Questions out of FIVE questions

ALL Questions Carry EQUAL Marks   (3 x 10 = 30 marks)

(Syllabus for CIA-I 2.5 Unit , Syllabus for CIA-II All 5 Unit)

2 a) Components for Practical CIA.

Components	Marks
CIA -I	15
CIA - II	15
Observation Note	5
Attendance	5
Total	40

2. b) Components for Practical ESE.

Components	Marks
Completion of Experiments	50
Record	5
Viva	5
Total	60

3. Guidelines for Value Education Yoga and Environmental Studies (Part IV)

- The Course Value Education Yoga is to be treated as 100% CIA course which is offered in I Semester for I year UG students.

- The Course Environmental Studies is to be treated as 100% CIA course which is offered in II Semester for I year UG students.

- Total Marks for the Course=100

Components	Marks
Two Tests (2 x 30)	60
Field visit and report (10 + 10)	20
Two assignments (2 x 10)	20
Total	100

The passing minimum for this course is 40%

- In case, the candidate fails to secure 40% passing minimum, he / she may have to reappear for the same in the subsequent odd/even semesters.

4. Guidelines for Extension Activity (Part V)

- At least two activities should be conducted within semester consisting of two days each.
- The activities may be Educating Rural Children, Unemployed Graduates, Self Help Group etc.

The marks may be awarded as follows

No of Activities	Marks
2 x 50 (Each Activity for two days)	100

5. Internship/ Industrial Training, Mini Project and Major Project Work

Internship /Industrial Training		Mini Project	Major Project Work		
Components	Marks	Marks	Components		Marks
CIA*² Work Diary Report Viva -voce Examination	25 50 25	- 50 50	CIA a) Attendance b) Review / Work Diary*¹	10 Marks 30 Marks	40
Total	100	100	ESE*² a) Final Report b) Viva-voce	40 Marks 20 Marks	60
			Total		100

*¹ Review is for Individual Project and Work Diary is for Group Projects (Group consisting of minimum 3 and maximum 5)

*²Evaluation of report and conduct of viva voce will be done jointly by Internal and External Examiners

6. Guidelines for Competitive Exams- Online Mode (Part III)- Online Exam 3 hours

Components	Marks
100 Objective Type Questions 100*1=100 Marks	100

Objective type Questions from Question Bank.

- The passing minimum for this paper is 40%
- In case, the candidate fails to secure 40% passing minimum, he / she may have to reappear for the same in the subsequent semesters.

4. Guidelines for Extension Activity (Part V)

- At least two activities should be conducted within semester consisting of two days each.
- The activities may be Educating Rural Children, Unemployed Graduates, Self Help Group etc.

The marks may be awarded as follows

No of Activities	Marks
2 x 50 (Each Activity for two days)	100

5. Internship/ Industrial Training, Mini Project and Major Project Work

Internship /Industrial Training		Mini Project	Major Project Work		
Components	Marks	Marks	Components		Marks
CIA*² Work Diary Report Viva -voce Examination	25 50 25	- 50 50	CIA a) Attendance b) Review / Work Diary*¹	10 Marks 30 Marks	40
Total	100	100	ESE*² a) Final Report b) Viva-voce	40 Marks 20 Marks	60
			Total		100

*¹ Review is for Individual Project and Work Diary is for Group Projects (Group consisting of minimum 3 and maximum 5)

*²Evaluation of report and conduct of viva voce will be done jointly by Internal and External Examiners

6. Guidelines for Competitive Exams- Online Mode (Part III)- Online Exam 3 hours

Components	Marks
100 Objective Type Questions 100*1=100 Marks	100

Objective type Questions from Question Bank.

- The passing minimum for this paper is 40%
- In case, the candidate fails to secure 40% passing minimum, he / she may have to reappear for the same in the subsequent semesters.

	B. Sc-Physics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C	
21M1UPHC01	PROPERTIES OF MATTER AND ACOUSTICS	DSC THEORY - I	I	5	4	1	-	5	

Objective	To impart the basic concepts of properties of matter to make the students realize the concepts in day-to-day life. To enable the students to understand waves and oscillations to make them appreciate the flavor of physics in sound.

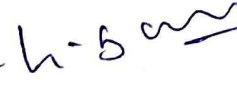| Unit	Course Content	Knowledge Levels	Sessions
I	**ELASTICITY:** Bending of beams- Expression for bending moment -Young's modulus - theory and experiment (uniform and non-uniform bending) - using pin and microscope method- I - section Girders Cantilever-Depression of the loaded end of a Cantilever - experimental determination scale and telescope method - Torsion of a body - expression for a couple per unit twist – work done in twisting a wire - determination of rigidity modulus – Static torsion method with scale and telescope -Torsional pendulum - rigidity modulus and moment of inertia. (L-9,T-3 Hours)	K1-K2	12
II	**VISCOSITY:** Definition of Coefficient of viscosity with unit and dimension -Streamline and turbulent flow - expression for critical velocity-Poiseuille's formula for the coefficient of viscosity and its correction- determination of coefficient of viscosity by capillary flow method (Poiseuille's method) - comparison of viscosities by Ostwald's viscometer – Variations of viscosity of a liquid with temperature - lubrication- applications of viscosity. (L-9,T-3 Hours)	K2-k3	12
III	**SURFACE TENSION :** Definition of surface tension with unit and dimension- Molecular theory – Surface energy – formation of drops- the angle of contact – excess of pressure inside and over curved surfaces- application to cylindrical and spherical drops and bubbles – Experimental determination of surface tension (Jaeger's method) – drop weight method of determining	K2-k3	12

	surface tension and interfacial surface tension - determination surface tension by Quincke's method - a variation of surface tension with temperature.(L-9,T-3 Hours)		
IV	**WAVES AND OSCILLATIONS:** Simple harmonic motion - Free, Damped, Forced vibrations and Resonance - Sharpness of resonance Phase of resonance - Quality factor- Examples of forced and resonant vibration - Fourier's Theorem - Application to saw tooth wave and square wave - Intensity & loudness of sound - Decibels - Intensity levels - Noise pollution. (L-9,T-3 Hours)	K2-k3	12
V	**ACOUSTICS &ULTRASONICS:** **Acoustics:** Musical sound - characteristics of musical sound and noise - reverberation and time of reverberation -derivation of Sabine's formula -determination of absorption coefficient - Acoustic aspects of halls and auditoria. **Ultrasonic:** Production - Piezoelectric method - Magnetostriction method - detection methods - properties - applications. (L-9,T-3 Hours)	K1-k2	12
Course Outcome	CO1: Define the behavior and properties of solids and fluids.	K1	
	CO2: Students understand to describe knowledge about viscosity and lubrication.	K2	
	CO3: Execute the value of 'g' at various places.	K3	
	CO4: Compare Poisson ratio for different materials.	K4	
	CO5: Evaluate simple experiments related to mechanics and properties of matter.	K5	
Learning Resources			
Text Books	1. D.S. Mathur,Elements of properties of matter, S.Chand & Company Ltd., New Delhi (2010). 2. R.Murugeshan, Properties of matter and acoustics, S. Chand & Co, New Delhi (2012) 3. Brij Lal and N. Subrahmanyam, Properties of matter, Eurasia Publishing House Limited (2005) 4. N. Subrahmanyam and Brij Lal, A Text Book of Sound,Vikas Publication House Pvt Ltd, New Delhi (1999).		

Reference Books	1. Richard P. Feynman,Lectures on Physics. Vol. I & II, The New Millennium Edition (2012) 2. David Halliday and Robert Resnick, Fundamentals of Physics, Wiley Plus, (2013) 3. B.H. Flowers and E. Mendoza,Properties of Matter, Wiley Plus, 1991. 4. H.R. Gulati, Fundamentals of General properties of matter, S. Chand 2012. 5.Hugh D. Young and Roger A. Freedman, University Physics with Modern Physics, Sears & Zemansky's 14th Edition (2015)
Website Link	1. https://physics.info/elasticity/ 2. https://silver.neep.wisc.edu/~lakes/PoissonIntro.html 3. https://www.insula.com.au/physics/1279/L7.html 4. https://schools.aglasem.com/46834 5. https://schools.aglasem.com/47259 6. https://opentextbc.ca/physicstestbook2/chapter/elasticity-stress-and-strain/ 7. https://www.lehman.edu/faculty/anchordoqui/chapter21.pdf

CO Mapping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	S	S	M	S	S	S
CO2	S	M	S	S	S	S	M	M	S	S
CO3	S	M	M	M	S	S	M	S	S	S
CO4	S	S	S	M	S	S	M	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

Tutorial Schedule	1. Estimate of gravitational potential due to various objects at a point outside, inside and at the centre of the objects 2. Estimate the Poisson's ratio of a rubber tube 3. Evaluate the surface energy of a soap bubble
Teaching and Learning Methods	Chalk and talk method Power Point Presentation
Assessment Methods	Assignment, unit test conducting, model test conducting, Experimentally demonstrate

Designed By	Verified By	Approved By
V.Satheeshkumar For R.A<i>zhy</i>	Dr. M. Revathi H&D	A-h-b

B. Sc-Physics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2UPHP01	PRACTICAL: PHYSICS - I	DSC PRACTICAL - I	I	3	-	-	3	3

Objective	To understand and apply the principle of physics by doing related experiments in properties of Matter, Optics, Electricity and Basic Electronics.

S.No.	List of Experiments (Any 16 Experiments)	Knowledge Levels	Sessions
1	Compound Pendulum-Determination of g and k.	K2	3
2	Young's modulus (q) - Non-uniform bending - pin and microscope- unknown mass.	K2	3
3	Young's modulus (q) - Uniform bending - Optic lever method- scale and telescope - unknown mass.	K2	3
4	Rigidity modulus - Static torsion apparatus - unknown mass.	K3	3
5	Coefficient of Viscosity - graduated burette and radius by mercury pellet method.	K3	3
6	Surface Tension- Capillary rise method.	K3	3
7	Sonometer - frequency of a tuning fork and- R.D of solid and liquid.	K4	3
8	Specific heat capacity of solids by the method of mixtures- Half time correction	K4	3
9	Coefficient of Thermal conductivity of bad conductor-Lees disc method.	K2	3
10	Spectrometer-Refractive Index of a solid prism.	K3	3
11	Spectrometer-Grating - Normal incidence - Determination of wavelength of mercury spectral lines.	K3	3
12	Potentiometer-low range voltmeter calibration.	K2	3
13	Potentiometer-low range ammeter calibration.	K4	3
14	Post Office Box- Energy band-gap of a thermistor.	K4	3
15	Moment of a magnet - deflection magnetometer - TANC position.	K3	3
16	Moment of magnet- circular coil - Deflection magnetometer.	K3	3
17	Low range power pack.	K3	3

18	Junction and Zener diode characteristics.	K4	3
19	Logic gates using IC's - truth table verification (AND, OR, NOT, NAND, NOR, EXOR)	K2	3
20	Transistor characteristics -CE configuration.	K3	3
Course Outcome	CO1: Students recall the basic experiments related to mechanics and also get familiar with various measuring instruments would learn the importance of accuracy of measurements.	K1	
	CO2: Students describe practical knowledge about electricity and magnetism and measurements such as: Resistance, Voltage, current etc.	K2	
	CO3: Execute the practical knowledge of wave motion doing experiments: Tuning fork, electric vibrations.	K3	
	CO4: students to analyze experimental learning methods.	K4	
	CO5: Support the laws and concepts of Physics.	K5	

Learning Resources

Text Books	1.S.L. Gupta and V.Kumar - Practical Physics - Pragati Prakashan - 25th Edition (2002) 2. M.N.Srinivasan, S. Balasubramanian, R. Ranganathan, A textbook of PRACTICAL PHYSICS, Sultan Chand and sons educational publishers, New Delhi. Edition 2017
Reference Books	1. M.K Subramanian, S.Padmanathan, S.Somasundaram, B.Sc Practical Physics, Apsara Publications, Trichy, revised edition (2020). 2. C.C.Ourseph, C.Rangarajan, R. Balakrishnan - A Text Book of Practical Physics - S.Viswanathan Publisher - Part II (1996)
Website Link	1. https://bscphysicspractical.blogspot.com/2019/12/bsc-first-year-practical-physics.html 2. https://www.lnmiit.ac.in/Department/Physics/uploaded_files/lab-manual.pdf 3.https://youtu.be/m8yAALCE0LE 4.https://www.youtube.com/watch?v=NKHftUT-vaM 5.https://www.youtube.com/watch?v=4WQvuDadZFM 7.https://youtu.be/w23IkGUChag

CO Mapping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	M	S	S	S	M	S	S
CO2	S	S	S	M	S	S	S	S	S	S
CO3	S	M	S	M	S	S	S	M	S	S
CO4	S	M	S	M	S	S	S	S	S	S
CO5	S	M	S	M	S	S	S	S	S	S
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

Tutorial Schedule	-
Teaching and Learning Methods	Demonstration and practical Sessions
Assessment Methods	To conduct Model Practical

Designed By	Verified By	Approved By
Mr.V.Satheeskumar	Dr. M. REVATHI	A.h. 5

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2UPHC02	MECHANICS	DSC THEORY - II	II	5	4	1	-	5

Objective	To know the fundamentals of projectile motion, the centre of gravity, SHM, Hydrostatics and Dynamics of rigid bodies and to provide the basis of the classical approach of Lagrangian Mechanics

Unit	Course Content	Knowledge Levels	Sessions
I	**PROJECTILE:** Definition of Range, Time of flight and Angle of projection - Range up and down an inclined plane maximum range - two directions of projections for a given velocity and range. **IMPACT:** Laws of impact - coefficient of restitution - the impact of a smooth sphere on a fixed smooth plane - Direct impact between two smooth spheres - Loss of kinetic energy indirect impact - velocity change in oblique impact between two smooth spheres-Loss of kinetic energy in an oblique impact. (L-9,T-3 Hours)	K1-K3	12
II	**CENTRE OF GRAVITY:** Definition - Centre of gravity of a solid cone, Solid hemisphere, hollow hemisphere and a tetrahedron - Centre of Buoyancy. **FRICTION:** Introduction - Static, Dynamic, Rolling and Limiting Friction - Laws of friction - the angle of friction - resultant reaction and cone of fiction - equilibrium of a body on an inclined plane under the action of a force. (L-9,T-3 Hours)	K1-K3	12
III	**SIMPLE HARMONIC MOTION:** Composition of two SHM's of same period along a straight line and at the right angles to each other -Lissajou's figures - Experimental methods for obtaining Lissajou's figures - Applications. **RIGID BODY DYNAMICS:** Compound pendulum - Centers of oscillation and suspension - determination of g and k - Bifilar pendulum - Parallel and non-parallel threads - Centre of mass - Conservation of linear and angular momentum - Variable mass Rocket propulsion.	K1-K4	12

	(L-9,T-3 Hours)		
IV	**HYDROSTATICS:** Concurrent forces - Parallel forces -couple - static equilibrium of rigid body - the centre of pressure of rectangular and triangular lamina - Metacentric height and its determination. **HYDRODYNAMICS:** Equation of continuity of flow - Euler's equation of unidirectional flow - Torricelli's theorem - Bernoulli's theorem and its applications - Venturimeter. (L-9,T-3 Hours)	K1-K4	12
V	**LAGRANGIAN DYNAMICS:** Mechanics of system of particles - Conservation of energy - Constraints of motion Generalized coordinates and the transformation equation - simple illustration for the transformation equation - Configuration space - the principle of virtual work - D'Alembert's principle - Lagrange's formulation for conservation theorems -Hamiltonian- Hamilton,s Equation. (L-9,T-3 Hours)	K1-K3	12
Course Outcome	CO1: Recall the fundamentals of projectile motion and Impact	K1	
	CO2: Describe the centre of gravity and Friction.	K2	
	CO3: Execute the Simple Harmonic Motion and basics of Rigid body.	K3	
	CO4:Analyze the concepts of Hydrostatics and Hydrodynamics	K4	
	CO5: Appraise the basis of the classical approach of Lagrangian Mechanics.	K5	

Learning Resources

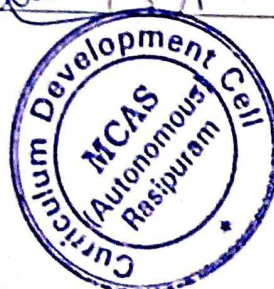|	
Text Books	1. R.Murugeshan, Mechanics and Mathematical Physics, S.Chand & Company Ltd, 2008, 3rd Edn. 2.M.Narayanamurthi and N.Nagarathinam Dynamics, The National Publishing Company 2008,8rd Edn.
Reference Books	1. Herbert Goldstein Classical Mechanics Addition Wesley Publications, 2005. 2. D.S. Mathur, Mechanics, S.Chand& Company Ltd., 2000, 3rd Edn. 3. The Feynman Lectures on Physics, Volumes 1 & 1, Narosa Publishing House, 1998 4. Murray R. Spiegel, Theoretical Mechanics, Schaum's Outline Series, McGraw-Hill Book Co,SI(Metric) Edition,1987 5.Pande, H. D., Singh, S.N., and Lal, R.N., "A Text Book of Mechanics" First Edition, Dominant Publishers Pvt. Ltd., New Delhi, 2014.

Website Link	1.https://www.lehman.edu/faculty/anchordoqui/chapter21 2.pdfhttps://www.real-world-physics-problems.com/example-mechanics- 3.problems.htmlhttps://www.uou.ac.in/sites/default/files/slm/BSCPH-101.pdf 4.http://www.scottishschools.info/Websites/SchSecValeOfLeven/UserFiles/file/Lear ning/Physics/Higher/Unit%201%20-%20Outcomes%20&%20Summary%20Notes.pdf 5.http://www.physics.usyd.edu.au/super/physics_tut/worksheets/regPofM.pdf

CO Mapping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	M	M	S	S	M	L	S
CO2	S	L	M	L	M	M	S	S	S	S
CO3	M	M	L	S	M	S	S	S	S	M
CO4	S	M	M	S	M	S	S	S	M	S
CO5	M	L	M	M	M	M	M	M	M	M
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

Tutorial Schedule	Explain the terms gravitational potential and Gravitational field and Estimate of the Moment of Inertia of different objects about different axes.
Teaching and Learning Methods	Chalk and Talk method, PowerPoint presentation, Group Discussion.
Assessment Methods	Assignment, unit test, model test , Continuous assessment test, Internal exam , Pre semester exam

Designed By	Verified By	Approved By
Dr.M.Meenachi H.Hum	Dr.M.REVATHI	A-h 5am

B. Sc-Physics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3UPHC03	OPTICS AND SPECTROSCOPY	DSC THEORY-III	III	6	4	2	-	5

Objective	The students should acquire knowledge basic properties of light. They should be familiar with the behavior of light in different medium. To Understand the gain knowledge towards geometrical and physical optics.

Unit	Course Content	Knowledge Levels	Sessions
I	**Geometrical Optics:** Geometrical Optics - Introduction (Convex lens - Principal Focus and Focal Planes - Cardinal Points) - Aberration in lenses - Spherical aberration in Lenses - Methods of minimizing spherical aberration - Condition for Minimum Spherical Aberration of two thin lenses separated by a distance - Definition of coma, astigmatism and curvature of field, distortion - a chromatic aberration in a lens – achromatic combination of lenses - Condition for achromatism of two thin lenses placed in a contact - Condition for achromatism of two thin lenses separated by a finite distance - Eye piece - Ramsdens Eyepiece - Huygens Eyepiece - Comparision of two eyepieces. (L-9 , T-3 Hours)	K1-K3	12
II	**Interference and Interferometer:** The principle of superposition - coherent sources - types of coherent sources- Double slit interference (theory of interference fringes) - Fresnel's Biprism - wedge shaped films (Air Wedge) - Theory - Experiment to measure the diameter of a thin wire - Testing a surface for planeness - Newtons Rings - Determination of Wavelength of Sodium light by Newtons rings - - Michelson interferometer - Types of Fringes and applications.(Determination of wavelength of monochromatic light - difference in wavelength between two neighbouring spectral lines) - Febry - perot interferometer. (L-9 , T-3 Hours)	K2-K4	12

III	**Diffraction and Optical Instruments:** Diffraction - Fresnel diffraction - Fraunhofer diffraction - Rectilinear propagation of light - Zone plate - Comparison of zone plate with convex lens - Fraunhofer diffraction pattern with N slits (diffraction grating) – normal incidence - absent and overlapping spectra of a diffraction grating - Resolving power - Rayleigh criterion for resolution - Resolving power of a Telescope, Prism, Microscope and Grating. (L-9 , T-3 Hours)	K2-K4	12
IV	**Polarization and Optical Activity:** Polarization - Plane of polarization and vibration - Double refraction - Nicol prism as polarizer and analyzer - Huygen's theory of double refraction in uniaxial crystal - Double image polarizing prisms - Quarter wave plate - Half wave plate - Production and Detection of plane, partially, elliptically and circularly polarized lights - Babbinet's Compensator. Optical activity - Specific Rotation - Laurents half shade polarimeter - Optical rotation by magnetic and electric fields. (L-9 , T-3 Hours)	K3-K5	12
V	**Spectroscopy:** Region of Electromagnetic Spectrum - Energy states of the atom - Wave and Particle properties of EMR - Interaction of low energy electromagnetic radiation with matter - UV and IR Spectroscopy - Basic Principle, Instrumentation and applications – Laser - Principle of laser(Absorption, Transmission, Stimulated absorption, Spontaneous and Stimulated emission) - Population Inversion - Optical pumping - Ruby Laser - He-Ne laser - Carbon dioxide laser - Semiconductor laser - Applications - Holography - Recording an reconstruction - Application of holography. (L-9 , T-3 Hours)	K1-K3	12
Course Outcome	**CO1:** Remember the behavior of light on passing through lens, prism, thin film and grating.	K1	
	CO2: Understand the phenomena of light like Interference, diffraction, polarization and population inversion.	K2	
	CO3: To apply the concepts of diffraction and also the resolving power of different optical instruments.	K3	
	CO4: Analyze and apply the concepts of dispersive power, refractive index, resolving power, double refraction, specific rotation and optical pumping for different material sized light.	K4	
	CO5: The students are evaluating the perceptions will help to understand the spectroscopic techniques and learn the working principle of Lasers, holography and their applications	K5	
Learning Resources			
Text Books	1. R Murugesan,Optics and Spectroscopy, S.Chand Publishing, 5th Edition (2013) 2. Aruldhas, Molecular structure and spectroscopy, 2nd ed. EEE., (2007)		

	3. Banwell C.N. &McCagh,Fundamentals of Molecular Spectroscopy, Tata McGraw Hill Publishing Co. Ltd. 4th edition, (1994)
	4. R.Murugeshan and Kiruthigasivaprasath,Optics and Spectroscopy, S.Chand&Co. (2010)
Reference Books	1. Subrahmanyam and Brijlal,A textbook of OPTICS,S.Chand& Co., (2001)
	2. Ajoy Kumar Ghatak,K.Thyagarajan,Optoelectronics, Cambridge University Press (1989)
Website Link	1. https://www.youtube.com/watch?v=ML7HcZo6laE
	2. https://www.khanacademy.org/science/physics/light-waves/introduction-to-lightwaves/v/polarization-of-light-linear-and-circular
	3. https://nptel.ac.in/courses/104/104/104104085/

CO-PO Maping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PSO3	PSO4	PSO5
CO1	M	S	S	M	M	M	L	M	M	S
CO2	M	S	S	M	M	S	S	M	L	S
CO3	S	S	M	M	M	S	M	S	M	M
CO4	M	S	S	M	S	M	M	S	L	S
CO5	S	M	L	S	S	S	M	S	S	S
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

Tutorial Schedule	1. Assignments
	2. Group discussion and Create resume for various professions
Teaching and Learning Methods	chalk and talk
Assesment Methods	CIA,ESE,Pre-Semester Examination

Designed By	Verified By	Approved By
M.SARANYA	DT· M·REVATHI	

B. Sc-Physics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4UPHP02	PRACTICAL : PHYSICS - II	DSC PRACTICAL - II	III	3	-	-	3	3

Objective	Students are understand and apply the principle of physics by doing related experiments in properties of matter, optics, electricity, electromagnetism and basic electronics.

S.No.	List of Experiments (Any 16 Experiments)	Knowledge Levels	Sessions
1	Young's modulus - Cantilever - depression - (Static method) - (Scale and telescope)	K3	3
2	Young's modulus - Cantilever oscillations - (Dynamic method)	K4	3
3	Rigidity modulus - Static torsion	K2	3
4	Specific heat capacity of a liquid by cooling-verification of Newton's law	K3	3
5	Air wedge - Thickness of a wire and its insulation.	K3	3
6	M and BH - deflection magnetometer Tan A and TAN B position	K4	3
7	Field along the axis of a coil - deflection magnetometer - determination of BH.	K3	3
8	Potentiometer - Ammeter calibration	K2	3
9	Sonometer-Frequency of AC	K2	3
10	Newton's Ring-Sodium lamp (Microscope)	K3	3
11	Spectrometer-i-d curve	K5	3
12	Carey Foster Bridge	K4	3
13	Spectrometer-Grating by minimum Deviation-Determination of wavelength of mercury lamp.	K3	3
14	Thermal Conductivity of a bad conductor - Lee's disc method	K3	3

15	Bridge rectifier	K4	3
16	BG - Comparison of Capacities	K5	3
17	Potentiometer - Calibration of low range voltmeter	K3	3
18	Zener diode - Voltage regulator using four diodes and percentage of regulation	K4	3
19	Verification of De Morgan's theorem	K4	3
20	NAND and NOR gates as universal building block (Construction of AND, OR & NOT)	K5	3
Course Outcome	CO1: Remember the knowledge of the potentiometer and to apply it for various experiments.	K1	
	CO2: Understand the usage of basic laws and theories to determine various properties of the materials given.	K2	
	CO3: Apply the knowledge of physical optics using spectrometer.	K3	
	CO4: Analyze the concepts of Young's Modulus of different substances.	K4	
	CO5: Evaluate the characteristics of various diodes and construct power supply.	K5	

Learning Resources

Text Books	1.M.N. Srinivasan, S. Balasubramanian, R. Ranganathan, A textbook of PRACTICAL PHYSICS, Sultan Chand and sons educational publishers, New Delhi. Edition (2017) 2.M.K Subramanian, S.Padmanathan, S.Somasundaram, B.Sc Allied Physics Practical, Apsara Publications, Trichy, revised edition (2020)
Reference Books	1.C.C.Ourseph, C.Rangarajan, R. Balakrishnan - A Text Book of Practical Physics - S.Viswanathan Publisher - Part II (1996) 2.S.L. Gupta and V.Kumar - Practical Physics - PragatiPrakashan - 25th Edition (2002)
Website Link	1.https://youtu.be/m8yAALCE0LE 2.https://youtu.be/Su8TvWW-j0g 3.https://youtu.be/QezZal4Gllg 4.https://youtu.be/M-q_CqgQ1W8 5.https://youtu.be/w23lkGUChag

CO Mapping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	M	S	S	S	S	S	S
CO2	S	S	S	M	S	S	S	S	S	S
CO3	S	M	S	M	S	S	S	S	S	S
CO4	S	M	S	M	S	S	S	S	S	S
CO5	S	M	S	M	S	S	S	S	S	S
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

Tutorial Schedule	-
Teaching and Learning Methods	Demonstration and practical Sessions
Assessment Methods	To conduct Model Practical and formula test

Designed By	Verified By	Approved By
Dr.M.REVATHI	Dr. M. REVATHI	A-h. 5aw

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4UPHC04	THERMAL AND STATISTICAL PHYSICS	DSC THEORY - IV	IV	6	4	2	-	5

Objective	The objective of this course is to develop a working knowledge of the laws and methods of thermodynamics and elementary statistical mechanics and to use this knowledge to explore various applications.

Unit	Course Content	Knowledge Levels	Sessions
I	**THERMOMETRY AND CALORIMETRY:** Concept of heat and temperature - types of thermometers - Centigrade, Fahrenheit and Rankine scales - relation between Centigrade, Fahrenheit and Rankine scales - liquid thermometers - Platinum resistance thermometer - Calendar and Griffith's bridge - Seebeck effect - Peltier effect - Peltier coefficient - Thomson effect - Thomson coefficient. **Calorimetry:** Defintions - Regnault's method of mixtures - specific heat capacity of liquids - Specific heat capacity of gases - Cp and Cv - Cp by Joly's differential steam calorimeter method - Cv by Regnault's method. (L-9,T-3 Hours)	K1-K3	12
II	**THERMODYNAMICS I :** Thermodynamic variables and equation of state - limitations - Zeroth law of thermodynamics - First law of thermodynamics - Heat engines - Carnot's theorem - Otto engine (Petrol engine) - Disel engine - Reversible and irreversible process - Second law of thermodynamics - Entropy - Change in entropy in reversible and irreversible process - Temperature - entropy diagram (T.S) - Maxwell Thermodynamical relations. (L-9,T-3 Hours)	K1-K3	12
	THERMODYNAMICS II : Joule - Thomson's effect - Porous plug experiment - Theory	K2-K3	12

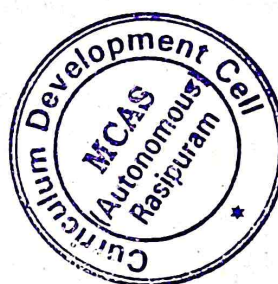|			
III	of Porous Plug experiment - Definition of temperature of inversion - Liquefaction of gases - Liquefaction of Air - Linde's process - Liquefaction of Helium - Liquefaction of Hydrogen - Adiabatic demagnetization -Practical applications of low temperature - Refrigerator - Electrolux refrigerator (Vapour absorption machine). (L-9,T-3 Hours)		
IV	TRANSMISSION OF HEAT: Thermal Conductivity -definition - Coefficient of thermal conductivity - Good and Bad Conductor - thermal conductivity of a bad conductor by Lee's disc method - Blackbody radiation - definition - Wien's Displacement law - Rayleigh Jean's law - Planck's law - Stefan's law and experimental verification of Stefan's law - Solar constant - temperature of the sun -Angstrom's Pyrheliometer. (L-9,T-3 Hours)	K2 - K4	12
V	STATISTICAL PHYSICS : Position space - momentum space - phase space - mu-space - gamma space - Microstate and Macrostate - Thermodynamic probability - fundamental postulates of statistical mechanics - Maxwell - Boltzmann distribution law - Application of Maxwell Boltzmann distribution law to an ideal gas - Bose Einstein Distribution law - Application of Bose Einstein distribution law - Fermi-Dirac distribution law - F.D energy distribution function -Application of Fermi-Dirac distribution law . (L-9,T-3 Hours)	K3 - K5	12
Course Outcome	CO1: Understand the nature of calorimetry by specific heat of solids and law of thermodynamics and entropy.	K1	
	CO2: Student can understand the efficiency of idealized engines such as the Carnot cycle, the otto cycle, and the Disel cycle.	K2	
	CO3: Understanding the low temperature physics.	K3	
	CO4: Analyses thermal conductivity and black body radiation.	K4	
	CO5: Appraise account of micro and macro states in thermodynamically potentials and ensembles.	K5	
Learning Resources			

Text Books	1. R.Murugeshan and Kiruthiga Sivaprasad ,Thermal Physics,S.Chand & Co.,New Delhi, 2021. 2. Brijlal and Subrahmanyam, Heat and Thermodynamics, S.Chand & Co, 2002. 3. Brijlal, Subrahmanyam and Hemne, Heat thermodynamics and Statistical physics, S. Chand & Co, 2014. 4. S.K.Roy, Thermal Physics and Statistical Mechanics, New Age International (P) Limited Publishers, New Delhi. 5. Gupta, A. B. and Roy, H. P., "Thermal physics", First Edition, Books and Allied Publishers Pvt. Ltd., Kolkata, 2011.
Reference Books	1. D.S. Mathur, Heat and thermodynamics, S.Chand & Co., 2000. 2. S.S.Singhal, J.P.Agarwal, Sathyaprakash, Heat thermodynamics and statistical Physics, Pragati Prakashan, 2001.
Website Link	1.https://www.vsc.science.runl.html. 2.https://www.physics.weber.edu.

CO Mapping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	S	S	S	S	S	S
CO2	S	M	S	S	S	S	S	M	S	S
CO3	S	S	M	S	S	S	S	M	S	S
CO4	S	M	M	M	M	S	M	M	M	S
CO5	M	S	M	S	S	S	M	L	M	M
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

Tutorial Schedule	-
Teaching and Learning Methods	Chalk and talk method Power Point Presentation
Assessment Methods	Assignments , Unit test conducting, Model test conducting

Designed By	Verified By	Approved By
M.SARANYA	Dr.M.REVATHI	

B. Sc-Physics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5UPHC05	ELECTRICITY AND MAGNETISM	DSC THEORY - V	V	6	4	2	-	5

Objective	To provide comprehensive knowledge and understanding of the basics of Electricity and Magnetism. To expose the students to the applications of Electricity and Magnetism.

Unit	Course Content	Knowledge Levels	Sessions
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- amperes circuital law- magnetic field inside a long solenoid - toroid- Lorent'z force on a moving charge-direction of force-torque on a current loop in a uniform magnetic field -Moving coil Ballistic galvanometer-theory - experiment to find charge sensitivity and absolute capacity of a capacitor. (L-9,T-3 Hours)	K1-K4	12
II	**THERMAL AND CHEMICAL 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-thermopile- Faradays laws of electrolysis- electrical conductivity of an electrolyte-specific conductivity. (L-9,T-3 Hours)	K2-K4	12

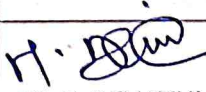|			
III	**ELECTROMAGNETIC INDUCTION** Faraday's laws of electromagnetic induction-self induction -self inductance of a long solenoid -toroidal solenoid-determination of L by Anderson's and Rayleigh's methods-Owen's bridge-mutual induction-mutual inductance between two co-axial solenoids-experimental determination of mutual inductance -co-efficient of coupling- energy stored in a coil- eddy currents-uses - Earth inductor. (L-9,T-3 Hours)	K1-K4	12
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 -growth and decay of charge in LCR circuit- conditions for the discharge to be oscillatory -frequency of oscillation.Resistance in an AC circuit-Inductance in an AC circuit - Capacitance in an AC circuit- (L-9,T-3 Hours)	K1-K4	12
V	**MAXWELL'S EQUATION & ELECTROMAGNETIC WAVES** Introduction- Maxwell's equations- -Displacement current-Poynting vector- Electromagnetic waves in free space-Hertz experiment for production and detection of EM waves - Wave equations for Electric field and Magnetic field-monochromatic plane waves-EM waves in a matter-Reflection and Transmission at normal incidence and oblique incidence-Polarization by reflection. (L-9,T-3 Hours)	K1-K4	12
Course Outcome	**CO1:** Understand fundamental of electricity and magnetism and electromagnetic waves apply the knowledge of electricity and magnetism to technological advances.	K1	
	CO2: Identify and explain chemical, thermal and magnetic effect of electric current, analyses and solves electrical circuits with dc and ac source.	K2	

	CO3: Give the laws of electromagnetic induction.	K3	
	CO4: Identify and explain chemical, thermal and magnetic effect of electric current, analyses and solves electrical circuits with dc and ac source.	K4	
	CO5: To develop problem solving skills in Maxwell's equations.	K5	

Learning Resources

Text Books	1. R. Murugeshan, Electricity and Magnetism (2008) S Chand & Co, New Delhi 2. BrijLal & Subramanyam, Electricity and Magnetism,(2005) 3. Ratan Prakashan Mandir Publishers, Agra 4. M.Narayanamurthy & N.Nagarathnam, Electricity & Magnetism, NPC pub., Revised edition.
Reference Books	1. D.N.Vasudeva - Electricity and Magnetism (Twelfth revised edition). 2. K.K.Tiwari - Electricity and Magnetism - (S.Chand &Co.) 3. D.Halliday, R.Resnick and J.Walker, Fundamentals of Physics - Electricity and Magnetism (2011), Wiley India,Pvt Ltd. 4. David J. Griffith, Introduction to Electrodynamics, (2012) PHI, New Delhi.
Website Link	1. https://nptel.ac.in/courses/115106122 2. https://dducollegedu.ac.in/Datafiles/cms/ecourse%20content/lec-16.pdf

CO -PO Mapping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	S	S	S	M	S	S
CO2	S	S	M	S	M	M	S	M	M	M
CO3	M	M	S	M	S	M	M	S	S	S
CO4	S	S	S	S	S	S	S	M	M	M

CO5	S	M	S	S	M	M	S	M	M	S
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

Tutorial Schedule	DISCUSSION OF ONE MARKS CONDUCTING QUIZ
Teaching and Learning Methods	GROUP DISCUSSION
Assessment Methods	CIA PRE SEMESTER EXAMINATION END SEMESTER EXAMINATION

Designed By	Verified By	Approved By
Dr.M.MEENACHI	DR.M.REVATHI	

(Dr. S. SHAHITHA)

B.Sc - Physics Syllabus LOCF - CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5UPHC06	QUANTUM MECHANICS AND RELATIVITY	DSC THEORY - VI	V	6	4	2	-	5

Objective	To interpret the wave theory of matter with various theoretical and experimental evidences. To derive and use Schrodinger's wave equation and also learn about various operators. To solve Schrodinger's wave equation for simple problems and analyse to understand the solutions.To understand the theory of relativity, its postulates and the consequences.To learn the importance of transformation equations and also to differentiate between special and general theory of relativity.

Unit	Course Content	Knowledge Levels	Sessions
I	Wave Nature of Matter: Inadequacy of classical mechanics - Black body radiation - Quantum theory - Photo electric effect - Compton effect -Wave Particle Duality - Expressions for de-Broglie wavelength - Davisson and Germer's experiment - G.P. Thomson experiment - Phase and group velocity and relation between them - Wave packet . (L-9,T-3 Hours)	K1	12
II	Uncertainty Principle:Introduction - Uncertainty Principle - Elementary proof between - Displacement and Momentum - Energy and Time - Physical Significance of Heisenberg's Uncertainty Principle - Illustration - Diffraction of electrons through a slit - Gamma ray microscope thought experiment - Applications. (L-9,T-3 Hours)	K2	12
III	Schrödinger's Wave Equation: Introduction - Wave function for a free particle - Schrödinger's one-dimensional wave equation - Time-dependent and Time independent - Limitations of wave function - Normalization of wave function Postulates of Quantum Mechanics -Ehrenfest's theorem - Statement and proof. (L-9,T-3 Hours)	K3	12
IV	Spherical Symmetrical systems: Three dimensional Schrödinger's wave equation -Hydrogen atom - Wave equation for the Motion of an electron - Separation of variables - Azimuthal wave equation and its solution - Radial wave equation and its solutions - Polar wave equation and its solution - Ground size of the Hydrogen atom. (L-9,T-3 Hours)	K4	12
V	Relativity:Galilean Transformation equation - Ether	K5	12

	Hypothesis - Michelson-Morley experiment - Explanation of the Negative results - special theory of Relativity - Lorentz transformation equation - Length contraction - Time dilation - Addition of Velocities - Variation of Mass with velocity - Mass energy equivalence. (L-9,T-3 Hours)		
Course Outcome	CO1: Acquire the knowledge of wave nature of matter and its experimental verification.	K1	
	CO2: Understand Heisenberg uncertainity principle and apply it to verify problems in atomic and nuclear Physics.	K2	
	CO3: Apply the basic to construct and solve the particle equations in one dimension form.	K3	
	CO4: Apply the basic to construct and solve the particle equations in dimension and threedimension form.	K4	
	CO5: Acquire knowledge of Relativity theory and its application in day to day life.	K5	

	Learning Resources		
Text Books	1. Kamal Singh, S.P Singh - Elements of Quantum Mechanics,S. Chand & Co. (2005). 2. S.P Singh, M. K Bagde, Quantum Mechanics, S. Chand & Co., second edition (2004). 3. R Murugesan - Modern Physics, S .Chand & Co. (2016).		
Reference Books	1. SathyaPrakash, C.K.Singh - Quantum Mechanics, KedarNath Ram Nath&Co (1997). 2. Schiff - Quantum Mechanics,Tata McGraw-Hill, second edition, (1968).		
Website Link	1. https://www.youtube.com/playlist?list=PLbMVogVj5nJTDMhThY9xu2Tvg0u1RPuxO 2.https://medium.com/predict/what-is-quantum-mechanics-what-is-theory-of-relativityfdbe87eb9c79 3. https://www.askiitians.com/revision-notes/physics/special-theory-of-relativity/		

CO - PO Mapping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	M	M	M	S	N	M	M
CO2	S	S	S	M	S	S	M	N	S	S
CO3	M	S	S	S	S	S	S	S	S	S
CO4	S	M	M	S	S	S	S	N	S	S
CO5	M	M	S	S	S	S	S	S	M	S
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

Tutorial Schedule	UNIT-1 Discuss about the basic postulates of quantum mechanics.
	UNIT-2 Discuss about operators.
	UNIT-3 Study Schrodinger's 1D wave equation for simple problems.
	UNIT-4 Discuss about Schrodinger's 3D wave equation.
	UNIT-5 Discuss about transformation and general theory of relativity.
Teaching and Learning Methods	1. Chalk and talk method 2. Power Point Presentation 3. Group discussion 4. Kahooot 5. Moodle cloud 6. Google class room
Assessment Methods	1.Continuous Assessment Test I, II & Model 2. Assignment 3.End Semester Examinations

Designed By	Verified By	Approved By
Dr.C.INDIRA PRIYADHARSINI	Dr.M.REVATHI	[Dr. S. SHANTHA]

B. Sc - Physics Syllabus LOCF - CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6UPHP03	PRACTICAL : PHYSICS - III	DSC PRACTICAL - III	V	3	-	-	3	3
Objective	To understand and apply the principle of physics by doing related experiments in properties of Matter, Optics, Electricity and electromagnetism.							

S.No	List of Experiments (Any 14 Experiments)	Knowledge Levels	Sessions
1	Koenig's method - Uniform bending - determination of Young's Modulus	K4	3
2	Koenig's method - Non Uniform bending - determination of Young's Modulus	K4	3
3	Cantilever - Young's modulus (q) - mirror and Telescope	K3	3
4	Torsion Pendulum - Rigidity modulus of a wire	K3	3
5	Bifilar pendulum - Parallel threads	K3	3
6	Spectrometer – i-i' curve-Refractive index	K4	3
7	Spectrometer - Small angled prism - Refractive index.	K4	3
8	Spectrometer - Cauchy's constant.	K4	3
9	Refractive index of a lens - by Newton's Rings method	K4	3
10	Spectrometer - Dispersive power of a grating	K5	3

11	Field along the axis of a coil - Vibration Magnetometer	K4	3
12	Carey Foster's bridge - temperature coefficient of resistance	K4	3
13	Coefficient of viscosity - ungraduated burette - radius by mercury pellet	K4	3
14	Potentiometer - calibration of high range voltmeter	K5	3
15	Comparison of two low resistances by a potentiometer	K3	3
16	Potentiometer - EMF of a thermocouple	K4	3
17	Deflection magnetometer - m and BH - Tan C position	K4	3
18	Copper Voltameter - M and B_H	K5	3
19	Absolute capacity of a Capacitor - Ballistic Galvanometer (B.G)	K5	3
20	Comparison of mutual Inductance using B.G	K5	3
Course Outcome	CO1:Remember the knowledge of potentiometer and it to apply for various experiments.	K1	
	CO2:Understand the usage of basic laws and theories to determine various properties of the material given.	K2	
	CO3:Apply the knowledge of physical optics using spectrometer.	K3	
	CO4:Analyze the concepts of Young's Modulus of different substances.	K4	
	CO5:Execute the practical knowledge of various experiments.	K5	

	Learning Resources		
Text Books	1. M.N.Srinivasan, S Balasubramanian, R Ranganathan, A textbook of PRACTICAL PHYSICS, Sultan Chand and sons educational publishers, New Delhi. Edition 2017. 2.M.K Subramanian, S.Padmanathan, S.Somasundaram, B.Sc Physics Practical, Apsara Publications, Trichy, Revised edition 2020.		
Reference Books	1. C.C.Ourseph, C.Rangarajan, R. Balakrishnan - A Text Book of Practical Physics - S.Viswanathan Publisher - Part II (1996). 2. S.L. Gupta and V.Kumar - Practical Physics - PragatiPrakashan - 25th Edition (2002). 3. Ouseph, Srinivasan & Vijayendran, Practical Physics.		
Website Link	1. https://youtu.be/ECQlMpaOwrg 2. https://youtu.be/j2k5zs8iwzc 3. https://youtu.be/TYO1hUyX10o 4. https://youtu.be/MpwaDlBZC20 5. https://youtu.be/bWgflbbUaSs		

CO - PO Mapping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO2	S	M	M	S	S	S	M	S	S	M
CO3	S	M	S	M	S	M	S	S	M	S
CO4	M	S	S	S	S	S	S	M	S	S
CO5	S	S	M	S	S	S	M	S	S	S
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

Tutorial Schedule	
Teaching and Learning Methods	Demonstration and Practical Sessions
Assessment Methods	To Conduct Model practical

Designed By	Verified By	Approved By
M.SARANYA	Dr.M.REVATHI	

(Dv. S. SHANTHA)

B. Sc - Physics Syllabus LOCF - CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6UPHP04	PRACTICAL : PHYSICS - IV	DSC PRACTICAL - IV	V	3	-	-	3	3

Objective	To perform basic experiments on characteristics of electronic devices and then get into the applications such as amplifiers, oscillators, counters, multivibrators. Perform fundamental experiments on microprocessor 8085 and learn to write programs by themselves.

Unit	List of Experiments(Any 16 Experiments)	Knowledge Levels	Sessions
1	RS-Flip flops using NAND and NOR gates	K1	3
2	Half adder / Half subtractor using IC	K1	3
3	Full adder / Full subtractor using IC	K1	3
4	Encoder and decoder	K1	3
5	NAND as universal building block	K1	3
6	NOR as universal building block	K1	3
7	Astable multivibrator - IC 555 timer	K2	3
8	Astable multivibrator using transistor	K3	3
9	Monostable multivibrator using IC 555 timer	K2	3
10	Monostable multivibrator using transistor	K3	3
11	FET - characteristics	K4	3
12	UJT - characteristics	K4	3
13	SCR - characteristics	K4	3
14	Operational amplifier - inverting amplifier and non-inverting amplifier	K4	3

15	Operational amplifier - differentiator & integrator	K4	3
16	Operational amplifier - Differential amplifier	K5	3
17	Microprocessor 8085 - addition (8 bit only)	K5	3
18	Microprocessor 8085 - subtraction (8 bit only)	K5	3
19	Microprocessor 8085 - multiplication (8 bit only)	K5	3
20	Microprocessor 8085 - division (8 bit only)	K5	3
Course outcome	CO1: Remember the basic concept of gates.	K1	
	CO2: Understand special transistor experiments.	K2	
	CO3: Apply the operational amplifier applications.	K3	
	CO4: Analyze the operational amplifier circuits.	K4	
	CO5: Design the Microprocessor 8085.	K5	

Learning Resources

Text Books	1. S.L.Gupta and Kumar pragati prakashan - Practical physics - 25th Edition(2002). 2. M.N .Srinivasan - A text book of practical physics,New delhi,edition(2017).
Reference Books	1.Visvanathan , A text book of practical physics ,publisher prat II (1966). 2. M.K.Subramanian,S,Padmanathan S.Somasundaran - B.Sc practical physics , Apsara publications,Trichy ,Revised edition(2020).
Website Link	https://www.leybold-shop.com/physics/physics-experiments/electronics.html https://www.amazon.in/Practical-Physics-Electronics-C-C-Ouseph/dp/818715621X https://www.etechnophiles.com/best-electronics-books/ https://en.wikibooks.org/wiki/Practical_Electronics

CO - PO Mapping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PSO3	PSO4	PSO5
CO1	M	M	S	S	S	S	S	S	S	M
CO2	S	S	S	M	S	S	L	S	M	S
CO3	S	M	S	M	S	S	M	S	S	S
CO4	S	S	S	S	S	S	M	S	S	S
CO5	S	M	S	S	M	S	S	S	S	S
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

Tutorial Schedule	-
Teaching and Learning Methods	Demonstration and practical sessions
Assessment Methods	To conduct model practical

Designed By	Verified By	Approved By
L.MOHANA	Dr.M.REVATHI	[Dr. S. SHANTHA]
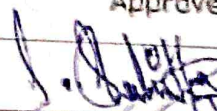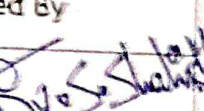
B. Sc Physics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5UPHIS1	INTERNSHIP	INTERNSHIP	V	-	-	-	-	-

Objective	Learn to appreciate work and its function in the economy and develop work habits and attitudes.

S. No.	Guidelines for Internship Training Programme	Knowledge Levels	Session
1	The student should undergo **15 Days Internship** training in any individual students have to identify the Institution / Industry / University of their choice during the vacation which falls at the end of the 4th Semester.		
2	The training bridges the gap between the theoretical knowledge gained in the college and the practical application of the same in the industry / company / stores. The student will have a better exposure about the workplace and its nuances.		
3	Schedule of visit to be made by the staff is to be prepared by the HOD / Staff-in-charge.		
4	The trainees should strictly adhere to the rules and regulations and office timings of the institutions to which they are attached.		
5	A Staff member of a Department (Guide) will be monitoring the performance of the Candidate.		
6	The students should maintain a daily logbook where the student should record his details of the training.		
7	The trainees have to obtain a certificate on successful completion of the internship from the chief executive of an organization.	K2-K4	
8	The student should submit an attendance certificate to the institution for 15 days internship training from an organization.		
9	Internship Training Report (30 – 50 pages) should be prepared by the student and submitted in a month's time and at the end of the semester student should present the report with a power point presentation.		
10	Industrial training reports shall be prepared by the students under the supervision of the faculty of the department.		
11	Industrial training report must contain the following: Cover page Copy of training certificate, Profile of an industry report about the work undertaken by them during the tenure of training observation about the concern findings.		
12	Practical viva – voce examination will be conducted with internal & external examiners at the end of the 5th semester.		
13	Report Evaluation: External Viva-Voce examination will be conducted and the Report Evaluation is Highly Commended/ Commended.		
Course	CO1: Apply new techniques and ideas in field of physics	K3	

Outcome	CO2: Analyze the results of new initiatives	K4
	CO3: Create a new work plan with greater output	K6
	CO4: Create a framework of work execution ideas	K6
	CO5: Create a detailed technical work plan and terminologies to be followed in industry.	K6

Learning Resources

Text Books	1.J.C. Brice"Crystal Growth Processes" John Wiley and Sons, New York
Reference Books	1. Smith Donald. L"Thin Film Deposition" McGraw Hill, London., 2. A. Goswami "Thin film fundamentals" New Age International Pub.,
Website Link	1.http://gen.lib.rus.ec/physics 2.https://www.sanfoundry.com/best-reference-books-msc-physics/

B.Sc - Physics LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3PPHIS1	INTERNSHIP	INTERNSHIP	III	-	-	-	-	2

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	M	S	S	S	S
CO2	S	M	S	S	S	S	M	S	S	S
CO3	M	S	S	M	S	M	S	S	S	S
CO4	M	M	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	M	S	S	S	S

Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG		

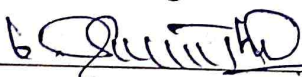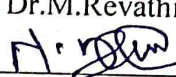| Tutorial Schedule	-
Teaching and Learning Methods	-
Assessment Methods	CIA - Highly Commended/ Commended. 1. Work Log Book 2. Training Report and Viva-Voce

Designed By	Verified By	Approved By
Dr. M.REVATHI	Dr. M.REVATHI	

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6UPHC07	ATOMIC PHYSICS	DSC Theory - VII	VI	5	4	1	-	5
Objective	To provide an introductory account of the atomic structure and the impact of X-rays.							

Unit	Course Content	Knowledge Levels	Sessions
I	**Photo Electric Effect:** Photoelectric effect – Lenard's method to determine e/m for photoelectrons – Richardson and Compton experiment – relation between photoelectric current and retarding potential – relation between velocity of photoelectrons and frequency of light – failure of electromagnetic theory – Einstein's light quantum hypothesis and photoelectric equation – experimental verification of photoelectric equation – Millikan's experiment. (L-9, T-3 Hours)	K1-K2	12
II	**THE ELECTRON AND POSITIVE RAYS:** e/m of electron by Dunnington's method -charge of electron by Millikan's oil drop method - properties of positive rays -e/m of positive rays by Thomson's parabola method (problems calculation of e/m ratio of positive rays)-mass spectrographs and uses- Bainbridge and Dempster's mass spectrographs (L-9, T-3 Hours)	K2-K3	12
III	**ATOMIC STRUCTURE:** Sommerfield's relativistic atom model -vector atom model - various quantum numbers - L-S and J-J coupling - Pauli's exclusion principle -magnetic dipole moment of an electron due to orbital and spin motion - Bohr magneton - Stern and Gerlach experiment - Lande 'g' factor - Excitation, Ionisation and critical potentials - Davis and Goucher's method (L-9, T-3 Hours)	K3-K4	12
IV	**SPLITTING OF SPECTRAL LINES** Optical spectra - spectral notation and selection rules - fine structure of sodium D-line - Zeeman effect - experimental arrangement and classical theory of normal Zeeman effect - Larmor's theorem -quantum theory of normal Zeeman effect - anomalous Zeeman effect -explanation of splitting of D_1 and D_2 lines of sodium - Paschen Back effect - Stark effect (Qualitative only). (L-9, T-3 Hours)	K2-K4	12
V	**X-Rays** Production of X-rays - properties-absorption of X-rays - X-ray absorption edges - Bragg's law - Bragg's X-ray spectrometer - the powder crystal method - Laue's method - Rotating crystal	K2-K4	12

	method -X-ray spectra- continuous spectra - characteristic spectra-Moseley's law - importance - width of spectral lines - Doppler broadening-collision broadening - Compton effect-theory and experimental verification. (L-9, T-3 Hours)		
Course Outcome	CO1: Outline photoelectric effect and the terms related to it, State laws of photoelectric emission, explain experiments and applications of photoelectric effect, Solve problems based on photoelectric equation.	K1	
	CO2: List the properties of electrons and positive rays, define specific charge of positive rays, know different mass spectrographs.	K2	
	CO3: Explain different atom models, Describe different quantum numbers and different coupling schemes.	K3	
	CO4: Differentiate between excitation and ionization potentials, Explain Davis and Goucher's experiment, apply selection rule, Analyze Paschen-Back effect, Compare Zeeman and Stark effect.	K4	
	CO5: Outline X-rays production, explain Braggs law, powder and rotating crystal methods and study the importance of Mosley's law, compton effect.	K5	

Learning Resources	
Text Books	1. R. Murugesan, Modern Physics, S. Chand & Co. 2. Brijlal & N. Subrahmanyam, Atomic & Nuclear Physics, S. Chand & Co. 3. J. B. Rajam, Modern Physics, S. Chand & Co. 4. Sehgal&Chopra, Modern Physics, Sultan Chand, New Delhi 5. Avadhahnulu, An Introduction to Lasers - Theory and Applications, M.N., S.Chand& Co., New Delhi, 2001.
Reference Books	1. Perspective of Modern Physics, Arthur Beiser, McGraw Hill. 2. Modern Physics, S. Ramamoorthy, National Publishing & Co. 3. Laser and Non-Linear Optics by B.B.Laud, Wiley Easter Ltd.,New York,1985.
Website Link	1. http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html 2. https://makingphysicsfun.files.wordpress.com/2015/01/photoelectric-effect.pptx 3. https://www.khanacademy.org/science/physics/quantum-physics/in-in-nuclei/v/types-of-decay 4. https://www.khanacademy.org/science/in-in-class-12th-physics-india/nuclei

CO-PO Mapping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PS03	PSO4	PSO5
CO1	S	S	S	S	S	S	S	M	S	M
CO2	S	S	M	S	M	S	S	M	M	M
CO3	S	S	S	M	S	S	M	S	S	S
CO4	M	S	S	S	S	M	S	M	M	M
CO5	S	M	S	S	M	S	S	M	M	S
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					
Tutorial Schedule	Assignment, Group discussion, Quiz, Problem solving sessions in Einstein's equation									
Teaching and Learning Methods	Chalk and talk method PowerPoint Presentation									
Assessment Methods	CIA, Pre-Semester examination, End-Semester examination									

Designed By	Verified By	Approved By
Dr.K.Sangeetha	Dr.M.Revathi	[Dr. S. SHANTHA]

B. Sc - Physics Syllabus LOCF - CBCS with effect from 2021 - 2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6UPHC08	NUCLEAR PHYSICS	DSC THORY - VIII	VI	5	4	1	-	5

Objective	To acquire knowledge on static properties of nuclei and its stability. To understand the background of various nuclear models. To know about different modes of decay and interaction of nuclear radiations with matter.

Unit	Course Content	Knowledge Levels	Sessions
I	**Properties and structure of Nuclei:** General properties of nucleus- binding energy - BE/A curve - significance - proton electron theory- proton neutron theory -Nuclear forces -characteristics -Meson theory of nuclear forces - Yukava Potential- Nuclear models. (L-9,T-3 Hours)	K1-K3	12
II	**Radio Activity:** Fundamental laws of radio activity -theory of α ,β and Y decay- properties of alpha, beta and gamma rays - neutrino and its properties-electron capture. -nuclear isomers- Mossabauer effect - applications- Radio carbon dating- radio isotopes - uses. (L-9,T-3 Hours)	K1-K4	12
III	**Nuclear Reactions:** Kinematics of nuclear reaction-Nuclear fission -Nuclear fusion - Nuclear reactor-uses - atom bomb - hydrogen bomb- fusion reactor -plasma confinement-artificial transmutation- Q value of nuclear reaction-types of nuclear reaction. (L-9,T-3 Hours)	K1-K5	12
IV	**Nuclear Detectors and Particle Accelerators:** Neutron sources and properties- Detectors-G.M.Counter-	K1-k5	12

	scintillation counter- bubble chamber-Wilson cloud chamber-Accelerators-cyclotron-synchrocyclotron-betatron-synchrotrons. (L-9,T-3 Hours)		
V	Elementary Particles: Elementary particles-introduction-particles and antiparticles-antimatter-the fundamental interaction-elementary particle quantum numbers-conservation laws and symmetry-the quark model. (L-9,T-3 Hours)	KI-K5	12
Course Outcome	CO1: Remember the basic concept of Properties and structure of Nuclei.	K1	
	CO2: Understand the Radio Activity.	K2	
	CO3: Apply the nuclear reaction-Nuclear fission -Nuclear fusion - Nuclear reactor.	K3	
	CO4: Analyze the Nuclear Detectors and Particle Accelerators .	K4	
	CO5: Design the Elementary Particles.	K5	

Learning Resources

Text Books	1 N. Subrahmanyam and Brijlal,.Atomic and Nuclear Physics , S Chand & Co.,New Delhi (1996). 2. Tayal D.C., Himalaya, Nuclear Physics Publishing House,Mumbai(2006). 3.R.C.Sharma, K.Nath Nuclear Physics,& Co., Meerut (2000). 4. Irving Kaplan, Nuclear Physics,Narosa Publishing house, New Delhi.
Reference Books	1. R.R.Roy and B.P.Nigam, Nuclear Physics , New Age International (P) Ltd., NewDelhi (1997). 2. Longo, McGraw-Hill, Fundamentals of Elementary Particle Physics. 3. Serge., W.A. Benjamin, Nuclei and Particles, USA. 4. ML Pandya and RPS Yadav, Kedarnath Ram Nath ,Elements of Nuclear Physics,Meerut.
Website Link	https://www.nap.edu/read/6288/chapter/ https://libguides.wigan-leigh.ac.uk/c.php? https://www.fysik.lu.se/en/research/nuclear-physics

CO - PO Mapping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PSO3	PSO4	PSO5
CO1	M	S	M	S	S	S	M	S	M	M
CO2	S	S	S	M	S	S	L	S	M	S
CO3	S	M	S	M	S	S	M	S	S	S
CO4	S	S	S	S	M	S	M	S	S	S
CO5	S	M	S	S	M	S	M	S	S	S
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

Tutorial Schedule	Problem solving session
Teaching and Learning Methods	Chalk and talk method Power point presentation.
Assessment Methods	Assignment , unit test conducting ,model test conducting.

Designed By	Verified By	Approved By
L.MOHANA	Dr.M.REVATHI	

B.Sc., Physics LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6UPHPR1	PROJECT WORK	PROJECT WORK	VI		-	-		3
Objective	Demonstrate a technical knowledge in their selected project topic. Undertake problem identification, formulation and solution. Develop plans with relevant people to achieve the goals of the project.							

Details	Course Content	Knowledge Levels	Sessions
	PROJECT PREPARATION FORMAT		
Cover Page & Title Page	**Cover Page & Title Page:** The fonts and locations of various items on this page should be exactly as shown in a specimen copy.		
Inside cover page	Inside cover page Same as cover page.		
Bonafide Certificate	**Bonafide Certificate:** The Bonafide Certificate shall be in double line spacing using Font Style Times New Roman and Font Size 14.		
Acknowledgement	**Acknowledgement:** This should not exceed one page.		
Abstract	**Abstract:** Abstract should be one page synopsis of the project report typed double line spacing, Font Style Times New Roman and Font Size 14.		
Contents	**Table of Contents:** The table of contents should list all headings, sub headings after the table of contents page, as well as any titles preceding it. The title page and Bonafide Certificate will not find a place among the items listed in the Table of Contents. One and a half spacing should be adopted for typing the matter under this head.		
Tables	**List of Tables:** The list should use exactly the same captions as they appear above the tables in the text. 1.5 spacing should be adopted for typing the matter under this head.		
Figures	**List of Figures:** The list should use exactly the same captions as they appear below the figures in the body of the text. One and a half spacing should be adopted for typing the matter under this head. All charts, graphs, maps, photographs and diagrams should be designated as figures. X and Y axes titles are mandatory for all the graphs.		
Symbols	**List of Symbols, Abbreviations and Nomenclature:** 1.5 spacing should be adopted or typing the matter under this head. Standard symbols, abbreviations etc. should be used.		
Chapters	**Chapter I - Introduction:** Statement of the		

	Problem, Significance, Need for the study, Objectives		
	Chapter II- Review of literature		
	Chapter III- Methodology: Tools used, Procedures, Hypothesis.		
	Chapter IV- Results and Discussion: Tables and Figures, Statistical Presentations, Hypothesis Testing.		
	Chapter V- Summary and conclusion		
	Chapter VI- Scope of the Project		
	References		

Guidelines For Project Preparation

Numbering	• Every page in the project report, except the project report title page, must be accounted for and numbered. • The page numbering, starting from acknowledgements and till the beginning of the introductory chapter, should be printed in small Roman numbers, i.e, i, ii, iii, iv.. • The page number of the first page of each chapter should not be printed (but must be accounted for). All page numbers from the second page of each chapter should be printed using Arabic numerals, i.e. 2,3,4,5.. • All printed page numbers should be located at the right corner at the bottom of the page.	K4-K6	
Chapters	• Use only Arabic numerals. Chapter numbering should be centered on the top of the page using large bold print. <Size 14><Times New Roman>	K4-K6	

TEXT

Regular Text	Regular Text: Times Roman 12 pts and normal print.	K4-K6	
Chapter Heading	Chapter Heading - Times Roman 14 pts. Bold and capital.	K4-K6	
Section Headings	Section Headings - Times roman 12 pts. Bold and capital.	K4-K6	
Subsection Headings	Subsection Headings - times roman 12 pts. bold print and Leading capitals i.e, only first letter in each word should be in capital.	K4-K6	
Special Text	Special Text- Italics/Superscript /Subscript/Special symbols, etc., as per necessity. Special text may include footnotes, endnotes, physical or chemical symbols, mathematical notations, etc.	K4-K6	
Sections	Sections: Use only Arabic numerals with decimals. Section numbering should be left justified using bold print. Example: 1.1, 1.2, 1.3, etc.	K4-K6	
Sub Sections	Sub Sections: Use only Arabic numerals with two decimals. Subsection numbering should be left Justified using bold print. Example: 1.1.1, 1.1.2, 1.1.3, etc.	K4-K6	

References	Use only Arabic numerals. Serial numbering should be carried out based on Alphabetical order of surname or last name of first author. The format is written like, author name followed by year followed by title of the work followed by details of the journal. Same font as regular text, serial number and all authors names to be in bold print. Title and Journal names should be in italic. One Author: Williams, G. State and Society in. Onco State, Nigeria, Afrographika, 1980. Two Authors: Phizacklea, A & Miles, R. Labour and Racism. London, Routledge & Kegan Paul, 1980. 3+ Authors: O'Donovan, P., et al. The United States. Amsterdam, Time-Life International, 1966.	K4-K6	
Typing Instructions	Typing Instructions: The impression on the typed copies should be black in color. One and a half spacing should be used for typing the general text. The general text shall be typed in the Font style 'Times New Roman' and Font size 12. Use A4 (210 mm X 297 mm) bond un-ruled paper (80 gsm) for all copies submitted. Use one side of the paper for all printed/typed matter.	K4-K6	
Justification	Justification: The text should be fully justified	K4-K6	
Margins	Margins: The margins for the regular text are as follows LEFT - 1.5" RIGHT - 1" TOP - 1" BOTTOM - 1"	K4-K6	
Paragraph Spacing	Use 6 pts before & 6 pts after paragraphs. All paragraphs in the seminar/project report should be left justified completely, from the first line to the last line. Use 1.5 spacing between the regular text and quotations. Provide double spaces between: (a) From top of page to chapter title, (b) Chapter title and first sentence of a chapter, Use single spacing (a) In footnotes and endnotes for text. (b) In explanatory notes for tables and figures. (c) In text corresponding to bullets, listings, and quotations in the main body of seminar/project report. (d) Use single space in references and double space between references.	K4-K6	-
Tables	All tables should have sharp lines, drawn in black ink, to separate rows/columns as and when necessary. Tables should follow immediately after they are referred to for the first time in the text. Splitting of paragraphs, for	K4-K6	

	including tables on a page, should be avoided. Provide double spaces on the top and the bottom of all tables to separate them from the regular text, wherever applicable. The title of the table etc. should be placed on the top of the table. The title should be centered with respect to the table. The titles must be in the same font as the regular text and should be single spaced.		
Figures	All figures, drawings, and graphs should be drawn in black ink with sharp lines and adequate contrast between different plots if more than one plot is present in the same graph. The title of the figure etc. should be placed on the bottom of the figure. Figures should follow immediately after they are referred to for the first time in the text. Splitting of paragraphs, for including figures on a page, should be avoided. Provide double spaces on the top and the bottom of all figures to separate them from the regular text, wherever applicable. Figures should be centered with respect to the figure. The titles must be in the same font as the regular text and should be single spaced. The title format is given below: Fig. <blank><chapter number>.<serial number><left indent><figure	K4-K6	
Page Dimension & Binding Specifications	The project report should be prepared in A4 size. The dissertation shall be properly bound; The bound front cover should indicate in Silver and embossed letter.		
Course Outcome	Co:1 Identification of research idea	K4	
	Co:2 Analyze of problem solving skills	K4	
	Co:3 Analyze sources for conduct of Research	K4	
	Co:4 Evaluate the research report	K5	
	Co:5 Create the research report	K6	

Learning Resources

Text Books	1. M.A.Shah, Principles of Nanoscience and Nanotechnology, Tokeer Ahmad. 2. S.Chand & Company Limited,Nano Technology, Rakesh Rathi, New Delhi.
Reference Books	1.De Jongh J, Kulwer Academic Publishers,Physics and Chemistry of Metal cluster components, Dordrecht.
Website Link	1. http://gen.lib.rus.ec/physics

B. Sc- Physics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards									
Course Code	Course Title		Course Type		Sem	Hours	L	T	P	C

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6UPHPR1	PROJECT WORK	PROJECT WORK	VI		-	-		3

CO-PO Mapping

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	M	S	S	S	M	S	S	S
CO2	S	S	S	S	S	M	S	S	S	S
CO3	S	S	S	S	S	S	S	S	M	M
CO4	S	S	S	M	S	S	S	S	M	M
CO5	M	M	M	S	S	M	M	S	M	S

Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG

Tutorial Schedule	-
Teaching and Learning Methods	-
Assessment Methods	EA - 100% 1. Project Report - 50 Marks 2. Viva-Voce - 50 Marks 3. Total - 100 Marks

Designed By	Verified By	Approved By
Dr. M.REVATHI	Dr. M.REVATHI	

B.Sc., Physics for Competitive Examination Syllabus -LOCF-CBCS-Pattern with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6UPHOE1	PHYSICS FOR COMPETITIVE EXAMINATION	Self study Online - Competitive Examination	VI	-	-	-	-	2

Objective	Creating the awareness on competitive examination among students. Imparting knowledge about the appearing for Competitive Examination and it impacts and developing an attitude of appearing for such exams.

Course Content	Knowledge Levels	Sessions
A fundamental/systematic or coherent understanding of the academic field of Physics, its different learning areas and applications in basic Physics like Mechanics, Material science, Nuclear and Particle Physics, Solid state physics, Atomic and Molecular Physics, Mathematical Physics, properties of matter, Quantum mechanics and relativity, Classical mechanics, Electronics, heat and thermodynamics, energy physics, microprocessor and its applications and its linkages with related inter disciplinary areas, Physical sciences, Atmospheric Physics, Information Technology; This course aims to give a holistic view of all the topics which comprised of some factual text points, multiple choice questions (MCQ), it is extremely suitable for students pursuing their higher degree in University/institute for their entrance exams, students preparing for various national and state level competitive entrance exams such as ICAR-JRF/SRF/NET/ARS, IARI/NDRI Ph.D., SAUs; CSIR/UGC-NET/JRF/SRF; ICMR, DBT, GATE, BARC, IISc, JNU, BHU, etc. to get admission in Ph.D. in Physics. In addition, it is also useful for UPSC and states PSC. Rules for creating MCQ pattern. 1. Objective type online examination will be conducted at the end of 4th semester. 2. Questions must be taken from all previous question papers of CSIR-NET, SET, NEET, UPSC, IBPS and Common Entrance Test for Ph.D. 3. Test critical thinking. Multiple choice questions to test the superficial knowledge. Learners to interpret facts, evaluate situations, explain cause and	K1-K6	

effect, make inferences, and predict results.

4. Emphasize Higher-Level Thinking

Use memory-plus application oriented questions. These questions require students to recall principles, rules or facts in a real life context.

Eg.1

Ability to Justify Methods and Procedures

Which of the following measurements is not a unit of distance?
(A) Ammeter
(B) Cubit
(C) Parsec
(D) angstrom

Eg.2

Ability to Interpret Cause-and-Effect Relationships

What happens to your weight when you are in a lift which goes down?
(A)Decreases
(B)Increases
(C)Decreases and then increases
(D)Increases and then decreases

5. Mix up the order of the correct answers

Keep correct answers in random positions and don't let them fall into a pattern that can be detected

6. Use a Question Format

Multiple-choice items to be prepared as questions (rather than

incomplete statements)

Incomplete Statement Format:

The capital of California is in Direct Question Format------ Less

effective.

In which of the following cities is the capital of California? -This is Best format.

7. Keep Option Lengths Similar

Avoid making your correct answer the long or short answer

8. Avoid the "All the Above" and "None of the Above" Options

Students merely need to recognize two correct options to get the answer correct

9. HOD's instruct to the faculty to prepare minimum 500 questions booklet (cumulatively for each programme) with solutions and circulate among the students.

10. Each Department to prepare the Questions (MCQ pattern with four answers) and submit to ICT.

Course Outcome	CO1: emphasis is given for in depth and quantitative understanding of physical parameters which describe behaviour of the system subjected to various boundary conditions	K1
	CO2: These physical parameters include mechanical, thermal, optical, electrical, magnetic properties.	K2
	CO3: The system of study is from nano scale structure through micro, mesa and bulk systems.	K3
	CO4: The prescribed course runs through various topics which include Vector integration, Gauss and Stoke's theorem, Matrices, Tensors etc.	K4
	CO5: The special functions covered are quite useful in solving transfer of heat in different geometries.	K5
Learning Resources	1.G.Gurumoorthy,Objective physics, publishers S.Viswanathan, first edition,1998 .	
	2.R.K.Gupta, Objective physics, Arihant Publications,2021	
	3. S.Chands, Objective physics, publishers Dr.Mahesh Jain,2014	
	4.Satya Prakash Arya, Objective physics,publisher MTG Learning Media,2011	
	5. Dr.M.Arumugam, Engineering physics,publisher anuradha agencies,2011	

Reference Books:1. sathaya prakash , objective physics, publisher A.S.Prakashan, Meerut,2010

Website link	https://testbook.com/learn/physics/
	L-Lecture T-Tutorial P-Practical

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	M	S	S	M	M	S	M
CO2	S	S	S	M	M	S	S	S	S	S
CO3	M	L	S	S	S	S	S	S	S	M
CO4	S	M	M	S	M	M	L	S	M	S
CO5	S	M	M	M	L	M	M	S	M	S

Level of Correlation between CO and PO		L-LOW	M-MEDIUM	S-STRONG

Tutorial Schedule	TNPSC, IBPS, UPSC, RRB, SSC, GATE, TRB Old question papers -solutions -online mock test
Teaching and Learning Methods	Self study.
Assessment Methods	100 multiple choice questions through computer based online examinations passing minimum is 50%

Designed By	Verified By	Approved By
Dr.M.REVATHI	Dr.M.REVATHI	(Dr. S. Shankari)

Elective Subjects Details
SYLLABUS - CBCS PATTERN
EFFECTIVE FROM THE ACADEMIC YEAR 2021-2022 Onwards
LIST OF ELECTIVES

S.NO	SEM	SUB_CODE	TITLE OF THE SUBJECT
1	V	21M5UPHE01	MATHEMATICAL PHYSICS
2	V	21M5UPHE02	ENERGY PHYSICS
3	V	21M5UPHE03	ASTRONOMY,ASTROPHYSICS AND COSMOLOGY
4	VI	21M6UPHE04	LASER TECHNOLOGY AND ITS APPLICATION
5	VI	21M6UPHE05	SOLID STATE PHYSICS
6	VI	21M6UPHE06	CONCEPT OF MODERN PHYSICS

B. Sc -Physics Syllabus LOCF - CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5UPHE01	MATHEMATICAL PHYSICS	DSE THEORY - I	V	5	4	1	-	5

Objective	To enable the students to acquire the problem solving ability. Apply the equations for the situation of different physical problems. Motivate the students to apply the mathematical principles of in their day - to - day life.

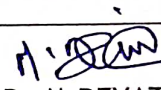| Unit	Course Content	Knowledge Levels	Sessions
I	**MATRICES:** Introduction - special types of Matrices - Solution of linear equation - Cramer's rule - characteristics matrix and characteristics equation of a matrix - eigen values and eigenvectors - sub space and null space - Diagonalization of matrices - Cayley-Hamilton theorem - Simple Problems. (L - 9,T - 3 Hours)	K1-k4	12
II	**SPECIAL FUNCTIONS:** Definition - Beta function - Gamma function - Fundamental properties of Gamma function - Transformation of Gamma function- Different forms of Beta function - Relation between Beta and Gamma functions - Simple Problems. (L - 9,T - 3 Hours)	K2 - k4	12
III	**VECTOR CALCULUS:** vector differentiation - directional - derivatives - definition and Physical significance of gradient, divergence, curl - Laplace operators - vector identities - line, surface and volume integrals - statement, proof and simple problems for Gauss's divergence theorem, Stoke's theorem, Green's theorem. (L - 9,T - 3 Hours)	K2 - k4	12

IV	**NUMERICAL METHOD:** **CURVE FITTING:** Principle of least square - Fitting a straight line - Fitting a parabola - Fitting an exponential curve - Linear regression - Simple Problems. (L - 9,T - 3 Hours)	K1 - k3	12
V	**NUMERICAL INTEGRATION:** Numerical Integration - Quadrature formula - Trapezoidal and Simpson's 1/3 and 3/8 rule - Guassian 2 Point and 3 Point Quadrature formula - Simple Problems. (L - 9,T - 3 Hours)	K1 - k4	12
Course Outcome	CO1: Recall the mathematical knowledge for the description of physical phenomena	K1	
	CO2: Understand the basic concept of Grad Div and Curl and hence verify Gauss, Greens and Stroke's theorem	K2	
	CO3: Apply Matrices in the study of electrical circuits, Quantum Mechanics and Optics.	K3	
	CO4: Analyze gamma and beta functions and their applications.	K4	
	CO5: Demonstrate of common numerical methods and how they are used to obtain approximate solutions to otherwise intractable mathematical problems.	K5	
Learning Resources			
Text Books	1. B. D. Gupta, Mathematical Physics, Vikas Publishing House, 2009. 2. Sathiya Prakash, Mathematical Physics, S.Chand, New Delhi, 2nd edition, 2004. 3. H. K. Dass, Dr. Rama Verma - Mathematical Physics (S. Chand Publishing). 4. A. Singaravelu, Numerical methods, Meenakshi Agency, Chennai 2008. 5. P.Kandasamy, K.Thilagavathy, K. Gunavathi - Numerical methods, S.Chand, 2016.		

Reference Books	1. R.Murugeshan, Mechanics and Mathematical Physics, S.Chand & Company Ltd., New Delhi , Third Revised Edition (2008) . 2.Numerical Analysis, B.D.Gupta, Konark Publishers, New Delhi,2013. 3.S.S. Sastry, Introductory methods of numerical analysis, Prentice Hall of India, New Delhi 2012.
Website Link	1. https://nptel.ac.in/course.html/Physics/Matrix%20analysis%20and%20with%20applications. 2. 2.https://www.youtube.com/watch?v=bZU2wzJRGtU 3. https://www.youtube.com/watch?v=6Y8VhEGa86l 4. https://www.youtube.com/watch?v=e9FQRE_mLKs

CO - PO Mapping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	M	M	S	M	M	S	S	M
CO2	S	S	S	M	S	M	S	S	M	M
CO3	M	M	M	S	M	S	S	N	S	S
CO4	S	M	S	M	S	M	M	S	M	S
CO5	S	S	S	M	M	S	M	S	S	M
Level of Correlation between CO and PO	L- LOW		M- MEDIUM		S- STRONG					

Tutorial Schedule	Open - book problem solving
Teaching and Learning Methods	Chalk and Talk Method Group Discussion Interactions
Assessment Methods	CIA ESE Pre - Semester examinations

Designed By	Verified By	Approved By
M.SARANYA	Dr.M.REVATHI	

(Dr. S. SHAHITHA)

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21MSUPHEO2	ENERGY PHYSICS	DSE THEORY - II	V	5	4	1		5

Objective	To describe the conditions under which positive and negative work are done and to use the work equation to calculate the amount of work done. To define potential energy, to identify the two forms and the variables that affect the amount of each form, and to calculate the potential energy possessed by an object.

Unit	Course Content	Knowledge Levels	Sessions
I	**CONVENTIONAL AND NON-CONVENTIONAL ENERGY SOURCES :** Classification of energy resources - consumption trend of primary energy resources - importance of non-conventional energy sources - energy chain - common forms of energy - advantages and disadvantages of conventional energy sources - salient features of non-conventional energy sources - environmental aspects of energy. (L-10,T-2 Hours)	K1-K2	12
II	**SOLAR ENERGY :** The sun as a source of energy - extraterrestrial and terrestrial radiations - spectral energy distribution of solar radiation - solar collectors - classification - comparison of concentrating and non-concentrating types (flat-plate type) of solar collectors - performance indices - liquid flat-plate collector - solar cookers - box-type solar cooker - I-V Characteristics - equivalent circuit - solar PV systems - lighting - medical refrigeration. (L-10,T-2 Hours)	K1-K2	12
III	**WIND ENERGY AND BIOMASS ENERGY** Origin of winds - wind turbine siting - major applications of wind power - horizontal axis wind turbine (HAWT) - wind energy conversion systems (WECS) - usable forms of biomass, their composition and fuel properties - *biomass resources - biomass gasification - downdraft type - biomass liquefaction - classification of biogas plants. (L-10,T-2 Hours)	K2-K3	12
IV	**GEOTHERMAL ENERGY AND OCEAN ENERGY** Geothermal energy applications - types of geothermal resources - origin and nature of tidal energy - limitation of		

	tidal energy - tidal energy technology - *ocean thermal energy conversion technology (OTEC). (L-10,T-2 Hours)		K2-K3	12
V	**ENERGY STORAGE** Storage of hydro energy - storage batteries - storage of solar energy - heat storage system - photovoltaic conversion - solar cells - limitations - photovoltaic array - storage of high pressure air in the caverns - shaft-driven fly wheel - chemical conversion method - *solid polymer electrolytes - storage of hydrogen - hydrogen as fuel - fuel cells. (L-10,T-2 Hours)		K3-K4	12
Course Outcome	CO1: know the various sources of conventional and non-conventional energy		K1-K2	
	CO2: interpret the different energy conversion methods and its applications		K1-K2	
	CO3: distinguish conventional and non-conventional energy sources		K2-K3	
	CO4: debate the challenges and problems associated with the use of various energy sources		K2-K3	
	CO5: discuss the need of renewable energy resources for both domestic and industrial application		K3-K4	

	Learning Resources
Text Books	1. Khan,B. H.,"Non-Conventional Energy Resources",Second Edition,Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2012. 2. Koteswara Rao, M. V. R., "Energy Resources: Conventional & Non-Conventional", Second Edition, BS Publications, Hyderabad, 2006.
Reference Books	1. Kothari, D. P. Singal, K. C. and Ranjan, R., "Renewable Energy Sources and Emerging Technologies",First Edition, PHI Learning Pvt. Ltd., New Delhi, 2011. 2. Singh, B. P., "Alternate Sources of Energy", First Edition, Bhasker Publications, Kanpur, 2010. 3. Tiwari, G. N., "Solar Energy", Second Edition, Narosa Publishing House Pvt. Ltd., New Delhi,2016. 4. Sukhatme, S. P., "Solar Energy", Second Edition, Tata McGraw-Hill Publishing Company Ltd.,New Delhi, 1989. 5. Kirubakaran, V. and Seerangarajan, R., "Renewable Energy and Energy Conservation", First Edition, APH Publishing Corporation, New Delhi, 2012.
Website Link	1.https://books.google.co.in/books?id=s3gBfTFCBy4C&printsec=frontcover&source=gbs_atb&redir_esc=y#v=onepage&q&f=false 2. https://freevideolectures.com/course/2352/power-system-generation-transmission-and-distribution/5 3. https://ocw.mit.edu/courses/edgerton-center/ec-711-d-lab-energy-spring-

2011/solar/lecture-4,-solar-energy/
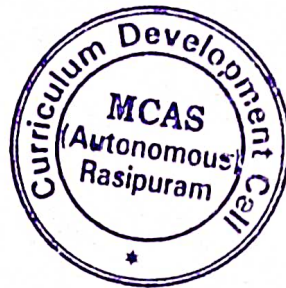4. http://www.vssut.ac.in/lecture_notes/lecture1428910296.pdf
5. https://www.irena.org/solar

CO -PO Mapping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	S	S	M	S	S	S
CO2	M	M	S	M	S	M	S	S	S	S
CO3	S	M	M	M	S	M	S	S	M	S
CO4	S	S	S	S	M	S	S	S	S	M
CO5	M	S	M	M	M	M	M	S	S	S
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

Tutorial Schedule	1. Discuss salient features of conventional and non-conventional energy recourses 2. Design a box type solar cooker 3. Discuss biomass and biogas production techniques 4. Discuss OTEC as sustainable energy resources 5. Compare the efficiencies of different energy devices
Teaching and Learning Methods	Chalk and Talk Method, Interactions
Assessment Methods	Assignments, Unit test conducting, Model test conducting

Designed By	Verified By	Approved By
V.SATHEESHKUMAR	Dr.M.REVATHI	[Dr. S. SHANTHA]

B. Sc - Physics Syllabus LOCF- CBCS with effect from 2021 - 2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5UPHE03	ASTRONOMY, ASTROPHYSICS AND COSMOLOGY	DSE THEORY - III	V	5	3	2	-	5

Objective	Astrophysics creates physical theories of small to medium-size objects and structures in the universe. Astronomy measures the positions, luminosities, motions and other characteristics of celestial objects. Cosmology covers the cosmos' largest structures and the universe as a whole.

Unit	Course Content	Knowledge Levels	Sessions
I	**Unit I: Astronomy** Introductory History of Astronomy, Kepler's Laws of Planetary Motion, Newtonian Concept of Gravity, Overview of the major constituents of the universe, Formation of Solar System, planet types, planet atmospheres, extra solar planets, Methods of detection of extra solar planets, Distance measurements in astronomy, Hubble's law. (L - 9,T - 3 Hours)	K1 – K3	12
II	**Unit II: Stellar and Galactic Astrophysics** Stars-general Distances to stars, binary stars, visual binary, eclipsing binary, spectroscopic binary, Measuring stellar radii,spectral classification of stars, luminosity classification of stars, HR diagram, Stellar population,Black holes, Milky way, Hubble classification of galaxies, Spiral galaxies, Elliptical galaxies, Irregular galaxies, Dwarf galaxies. (L - 9,T - 3 Hours)	K2 – K4	12
III	**Unit III: Elements of General Relativity** Curved space-time, Eotvos experiment and the equivalence principle, Equation of geodesic, Christoffel symbols, Schwarzschild geometry and black holes, FRW geometry and the expanding universe. Riemann curvature, Einstein	K4	12

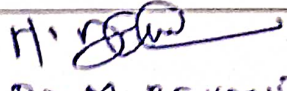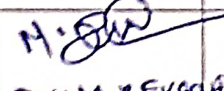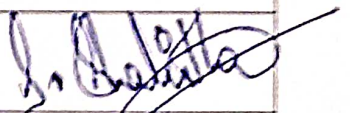|				
	equations. (L - 9,T - 3 Hours)			
IV	**Unit IV: Cosmology** Early universe and decoupling, Neutrino temperature, nucleo synthesis, relative abundances of hydrogen, helium, deuterium, Radiation and matter-dominated phases, Cosmic microwave background radiation, its isotropy and anisotropy properties, COBE and WMAP experiments. (L - 9,T - 3 Hours)	K3 - K4	12	
V	**Unit V: Experimental Techniques** Telescopes and Detectors – optical, infrared, radio, x-rays, gamma-rays, neutrinos and cosmic rays, Gravitational radiation, Detection of dark matter and Dark Energy Astronomy from Space, Imaging – focal plane imagers, PSF and Spectroscopy, Polarimetry, Astrometry, Solar telescopes, Surveys, Astronomical databases, Virtual Observatory. (L - 9,T - 3 Hours)	K4 - K5	12	
Course Outcome	**CO1:**Understand and apply basic physics and computational techniques to solve problems in astrophysics, and interpret the results.	K1		
	CO2: Acquire knowledge of the Physical universe and its evolution.	K2		
	CO3: Define and use fundamental principles and techniques of astronomy and astrophysics.	K3		
	CO4: Designed for anyone who is interested in learning more about modern astronomy.	K4		
	CO5: Familiarize and appreciate the field of astronomy and its relation with various allied fields of Science viz.,Physics, Biology, Chemistry, Mathematics, Geology, meteorology etc. as it is multidisciplinary in nature.	K5		
	Learning Resources			

Text Books	1. T. Padmanabhan: Theoretical Astrophysics, volume 1-3, Cambridge University Press, 2000. 2. S. Weinberg: Gravitation and Cosmology, John Wily and Sons, New York, 1972. 3. J.V. Narlikar: Introduction to Cosmology, 3rd Edition, Cambridge University Press, 2002. 4. Bradley W. Carroll & Dale A. Ostlie:An introduction to Modern Astrophysics, 2nd Edition, Cambridge University Press, 2007. 5. T.T. Arny: Explorations, An Introduction to Astronomy, McGraw Hill, New York, 2007. 6. M. Zeilik and E.V.P. Smith: Introductory Astronomy and Astrophysics, 2nd Edition, Saunders College Publishing, Philadelphia, PA, USA, 1987. 7. D. Clayton: Introduction to Stellar Evolution and Nucleosynthesis, The University of Chicago Press, Chicago and London, 1968. 8. C.R. Kitchin, Astrophysical Techniques, Taylor and Francis Group, LLC, 1995.
Reference Books	1. M. Rowan-Robinson: Cosmology, 3rd Edition, Oxford University Press, New York, 1996. 2. E.W. Kolb and M.S. Turner: The Early Universe, Avalon Publishing, 1994. 3. A. Liddle: An Introduction to Modern Cosmology, 3rd Edition, John Wiley and Sons Ltd, 2015. 4. J.B. Hartle: Gravity, Dorling Kindersley Pvt. Ltd, 2003. 5. V. Mukhanov: Physical Foundations of Cosmology, Cambridge University Press, 2005. 6. Shu F - The physical universe, University of California, 1982.
Website Link	1. https://byjus.com/jee/keplers-laws/ 2. https://www.planetary.org/articles/wobbly-stars-the-astrometry-method 3. https://www.space.com/16080-solar-system-planets.html

CO - PO Mapping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	M	S	M	M	S	S	M
CO2	M	S	M	S	M	S	S	M	M	S
CO3	M	M	M	S	M	S	M	S	S	M
CO4	S	S	S	M	S	S	S	M	S	S
CO5	M	M	S	S	S	M	S	S	M	S
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

Tutorial Schedule	Discussing One marks
Teaching and Learning Methods	Chalk and Talk Method Power point presentation Group Discussion Interactions
Assessment Methods	Assignments CIA ESE

Designed By	Verified By	Approved By
Dr. M. REVATHI	Dr. M. REVATHI	Dr. S. SHANTHI

B. Sc - Physics Syllabus LOCF - CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6UPHE04	LASER TECHNOLOGY AND ITS APPLICATION	DSE THEORY - IV	VI	5	3	2	-	4

Objective	Laser devices use light to store, transfer, or print images and text; they are also used in a wide range of other applications, including surgery and weaponry. The coherent radiation of the laser gives it special strength.

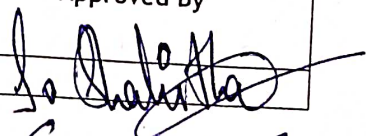| Unit	Course Content	Knowledge Levels	Sessions
I	**Fundamentals of Laser :** Introduction - Principle of laser - Absorption and emission of light - spontaneous emission , stimulated emission - Einstein's relation - Population inversion - Pumping methods - Active medium - Metastable states - Properties of laser - Laser Beam characteristics. (L - 9,T - 3 Hours)	K1 - K2	12
II	**Production of Laser :** Classification of LASERs - Solid state Lasers - Ruby Laser - Nd: YAG Laser - Fiber Lasers - Gas Lasers - Helium - Neon Laser - Argon Laser - CO_2 Laser - Semi conductor Lasers. (L - 9,T - 3 Hours)	K2 - K4	12
III	**Industrial Applications of Laser :** Lasers in material processing - The surface treatments - Drilling - Cutting - Welding - Heat treating - Lasers in Electronics industry - Lasers in nuclear energy - Holography - Recording and reconstruction of hologram. (L - 9,T - 3 Hours)	K2 - K3	12
IV	**Laser in Communication :** Optical data storage - Optic fibre communication - Types of	K2 - K4	12

	optical fiber - Block diagram of Laser communication system - advantages of fibre optic communication - Optical computer - LASER Rangers - LIDAR. (L - 9,T - 3 Hours)		
V	Laser in Medicines: LASER in Medical Applications - LASER in ophthalmology - LASER endoscopy - LASER in Cardiology - LASER in Dentistry - LASER in Urology - LASER safety and hazard. (L - 9,T - 3 Hours)	K3 - K4	12
Course Outcome	CO1:Remember the fundamentals of light and their properties and Explain the basic principle of Laser emission.	K1	
	CO2:Illustrate and explain the principles and design considerations of various lasers, Categorize modes of their operation.	K2	
	CO3:Apply the applications of laser in industries ane execute the obtained knowledge in various technology of applications of Lasers.	K3	
	CO4:Analyse the different types of lasers, Check the work ethics and work place safety.	K4	
	CO5:Implement the significance of modern lasers in communication networking system. Develop the knowledge in production of laser of various types.	K5	

Learning Resources	
Text Books	1. Avadhanulu M.N. Hemne P.S - An introduction to LASERS theory and applications, (Second Edition), S. Chand & Company, New Delhi, 2012. 2. N. Subrahmanyam Brijlal, M. N. Avadhanulu, A Textbook of Optics, 2008. 3.R.Murugesan - Optics and spectroscopy , S. Chand &amp; Co., New Delhi.
Reference Books	1. Nambiyar K.R. LASER: Principles, Types and Applications.2004. 2. S. Nagabhushana, N. Sathyanarayana. Lasers and optical instrumentation, Reprint. 2013.
Website Link	1. https://www.eriesd.org/cms/lib/PA01001942/Centricity/Domain/691/Science-Resource-Guide.pdf 2. https://www.fisica.net/optica/Laser-and-its-Applications.pdf

3. https://www.worldoflasers.com/laserapplmedical.htm
4. https://www.geospatialworld.net/prime/technology-and-innovation/what-is-lidar-technology-and-how-does-it-work/

CO - PO Mapping

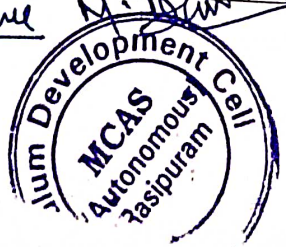| CO NUMBER	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	S	S	M	S	S	S
CO2	M	M	S	M	S	M	S	S	S	S
CO3	S	M	M	M	S	M	S	S	M	S
CO4	S	S	S	S	M	S	S	S	S	M
CO5	M	S	M	M	M	M	M	S	S	S
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

Tutorial Schedule	Discussing One marks
Teaching and Learning Methods	Chalk and Talk Method,PPT, Interactions, Group Discussions
Assessment Methods	Assignments, Unit test conducting, Model test conducting

Designed By	Verified By	Approved By
M.SARANYA	Dr.M.REVATHI	[Dv.S. SHANTHA)

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6UPHE05	SOLID STATE PHYSICS	DSE THEORY - V	VI	5	4	1	-	4

| Objective | To Study about the different bonding in solids. To study about the elementary concepts in lattice dynamics. | | | | | | | |

Unit	Course Content	Knowledge Levels	Sessions
I	**BONDING IN SOLIDS, CRYSTAL STRUCTURE** Types of bonding -ionic bonding -covalent bonding - metallic bonding - hydrogen bonding - Vander-Waals bonding - crystal lattice - unit cell - Bravais' lattices - Miller indices - procedure for finding miller indices -packing of BCC and FCC structures - structures of NaCl and diamond crystals - reciprocal lattice - reciprocal lattice vectors - properties - reciprocal lattices to SC, BCC and FCC structures - Brillouin zones . (L-9,T-3 Hours)	K1-K3	12
II	**ELEMENTARY LATTICE DYNAMICS:** lattice vibrations and phonons: linear monoatomic and diatomic chains. acoustical and optical phonons - Dulong and Petit's Law - Einstein and Debye theories of specific heat of solids - T^3 law (qualitative only)-properties of metals - classical free electron theory of metals(Drude-Lorentz) - Ohm's law - electrical and thermal conductivities - Weidemann-Franz' law -Sommerfeld's quantum free electron theory (qualitative only) - Einstein's theory of specific heat capacity. (L-9,T-3 Hours)	K1-K4	12
III	**MAGNETIC PROPERTIES OF SOLIDS:** permeability, susceptibility, relation between them - classification of magnetic materials - properties of dia, para,ferro, ferri and antiferromagnetism - Langevin'stheory of diamagnetism -	K1-K4	12

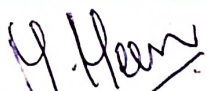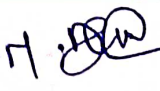|			
	Langevin'stheory of paramagnetism - Curie-Weiss law - Weiss theory of ferromagnetism(qualitative only) - Heisenberg's quantum theory of ferromagnetism - domains - discussion of B-H curve -hysteresis and energy loss - soft and hard magnets - magnetic alloys. (L-9,T-3 Hours)		
IV	DIELECTRIC PROPERTIES OF MATERIALS: polarization and electric susceptibility -local electric field of an atom - dielectric constant and polarisability - polarization processes: electronic polarization- calculation of polarisability - ionic, orientational and space charge polarization -internal field - Clausius-Mosotti relation - frequency dependence of dielectric constant -dielectric loss - effect of temperature on dielectric constant - dielectric breakdown and its types. (L-9,T-3 Hours)	K1-K4	12
V	FERROELECTRIC & SUPERCONDUCTING PROPERTIES OF MATERIALS: Ferroelectric effect - Curie-Weiss Law - ferroelectric domains, P-E hysteresis loop - elementary band theory: Kronig-Penny model - band gap(no derivation) - conductor, semiconductor (P and N type) and insulator -conductivity of semiconductor - mobility - Hall effect - measurement of conductivity (four probe method) - Hall coefficient. Superconductivity: Experimental results - critical temperature -critical magnetic field - Meissner effect -type-I and type-II superconductors - London's equation and penetration depth - isotope effect - idea of BCS theory (no	K1-K5	12

	derivation). (L-9, T-3 Hours)		
Course Outcome	CO1: Classify the different types of bonding and crystal structure .	K1	
	CO2: Understand the lattice dynamics and thus learn the electrical and thermal properties of materials.	K2	
	CO3: Give reason for classifying magnetic material on the basis of their behaviour.	K3	
	CO4: Comprehend the dielectric behavior of materials.	K4	
	CO5: Appreciate the ferroelectric and super conducting properties of materials.	K5	

Learning Resources

Text Books	1. S. O. Pillai - Solid State Physics, Narosa publication 2. Kittel - Introduction to Solid State Physics, Willey Eastern Ltd (2003). 3. Rita John Solid - state Physics, 1st edition, TataMcGraw Hill publishers (2014). 4. J.P. Srivastava -Elements of Solid State Physics, , 2nd Edition, 2006, Prentice-Hall of India. 5. M.A. Wahab - Solid State Physics, , 2011, Narosa Publishing House, ND.
Reference Books	1. Puri & Babber - Solid State Physics - S.Chand&Co. New Delhi. 2. Kittel - Introduction to solid state physics, Wiley and Sons, 7th edition. 3. Raghavan - Materials science and Engineering, PHI. 4. A.J. Dekker - Solid State Physics, McMillan India Ltd.
Website Link	1. https://archive.nptel.ac.in/courses/115/105/115105099/ 2. https://nptel.ac.in/courses/115104109

CO - PO Mapping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PSO3	PSO4	PSO5
CO1	S	M	S	S	S	S	S	M	S	S
CO2	S	S	M	S	M	M	S	M	M	M
CO3	M	M	S	M	S	M	M	S	S	S
CO4	S	S	S	S	S	S	S	M	M	M
CO5	S	M	S	S	M	M	S	M	M	S
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

Tutorial Schedule	DISCUSS ONE MARK AND CONDUCTING QUIZ
Teaching and Learning Methods	GROUP DISCUSSION
Assessment Methods	CIA PRE SEMESTER EXAMINATION END SEMESTER EXAMINATION

Designed By	Verified By	Approved By
Dr.M.MEENACHI	Dr.M.REVATHI	

(Dr. S. SHANTHI)

B. Sc- Physics Syllabus LOCF - CBCS with effect from 2021 - 2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6UPHE06	CONCEPTS OF MODERN PHYSICS	DSE THEORY - VI	VI	5	4	1	-	4

Objective	The two pillars of modern physics are quantum theory and the theory of relativity. Quantum theory explains the physical phenomena at a short scale whereas the theory of relativity describes large-scale physics and gravity. The results of classical theory can be approximated from both theories.

Unit	Course Content	Knowledge Levels	Sessions
I	**ATOMIC MODELS** Atomic structure: Nuclear atom – Rutherford scattering formula – nuclear dimensions – neutron stars. Electron orbits: Planetary model of the atom – failure of classical physics – analysis of Rutherford Model. Atomic spectra: Characteristic line spectrum- spectral series. Ritz combination principle. The Bohr atom. Energy levels and spectra: Emission of photon – origin of line spectra – quantization in the atomic world. Correspondence principle. Nuclear motion. Atomic excitation: Absorption and emission of energy by an atom - Franck-Hertz experiment. (L – 9 , T – 3 Hours)	K1,K2	12
II	**MANY ELECTRON SYSTEM** Electron spin: Exclusion principle - Stern-Gerlach experiment - symmetric and antisymmetric wavefunctions – fermions and bosans - many electron atoms - periodic table. Atomic structures: Shells and subshells of electrons – shell and subshell capacities. Explaining the periodic table: Chemical behavior by electron structure - ionization energy – size – transition elements – Hund's rule. Spin-orbit coupling. Total angular momentum: Quantization of magnitude and direction – LS coupling – term symbols. X-ray spectra: Origin of x-ray spectra – Auger effect. (L – 9 , T – 3 Hours)	K3	12
III	**BAND THEORY OF SOLIDS AND SUPERCONDUCTIVITY** Band theory of solids: Energy band structure – conductors – insulators –		

	semiconductors – impurity semiconductors – optical properties of solids. Semiconductor devices: p–n junction – junction diode – tunnel diode – photodiode – zener diode – junction transistor – FET. Energy bands: Periodicity of a crystal lattice – Brillouin zones – origin of forbidden bands – effective mass. Superconductivity: Introduction - magnetic effects – high-temperature superconductors. Bound electron pairs: Key to superconductivity – flux quantization – Josephson junctions. (L – 9 , T – 3 Hours)	K2,K3	12
IV	**SPECIAL THEORY OF RELATIVITY** Special relativity: Frames of reference – postulates of special relativity- time dilation- clocks at rest and motion - the ultimate speed limit - Doppler effect - the expanding universe -length contraction - Twin paradox. Transformation: Galilean transformation – Lorentz transformation – inverse Lorentz transformation – velocity addition – simultaneity. Electricity and Magnetism. (L – 9 , T – 3 Hours)	K1,K2	12
V	**APPLICATIONS OF RELATIVITY** Relativistic quantities: Relativistic momentum – relativistic mass – relativistic second law - mass and energy – kinetic energy at low speeds - energy and momentum – massless particles – electronvolts. General relativity: Einstein's theory of gravitation - gravity and light – other finding of general relativity. Spacetime: Constancy of speed of light. Direct test of mass-energy relationship. Michelson interferometer experiment. (L – 9 , T – 3 Hours)	K3,K4	12
Course Outcome	CO1: Explain the concepts of modern Physics	K1	
	CO2: Calculate the effects of special relativity on mass and energy of fast moving objects	K2	
	CO3: Compare and correlate theoretical predictions with experimental measurements	K3	
	CO4: Determine the behavior of many electron system	K4	
	CO5: Discuss the band structure of metals and non-metals	K5	
Learning Resources			

Text Books	1. Halliday, D., Resnick, R. and Walker. J., "Principles of Physics" Ninth Edition, Wiley India Pvt. Ltd., New Delhi, 2013. 2. Hewitt, P. G., "Conceptual Physics", Tenth Edition, Dorling Kindersley (India) Pvt. Ltd., New Delhi, 2012. 3. Kakani, S. L. and Kakani, S., "Modern Physics", Second Edition, Viva Books Pvt. Ltd., New Delhi, 2013. 4. Mathews, P. M. and Venkatesan, K., "A Text book of Quantum Mechanics" Second Edition, McGraw Hill Education (India) Pvt. Ltd., Chennai, 2017.
Reference Books	1. Beiser, A., 2012, "Concepts of Modern Physics", Sixth Edition, Tata McGraw-Hill Publishing Company Ltd., New Delhi. 2. Murugeshan, R. and Sivaprasath, K., "Modern Physics", Eighteenth Edition, S. Chand and Company Ltd., New Delhi, 2018. 3. Kulasekarapandian, K. and Arulsankar, A., "Introduction to Special Relativity in 4 days", First Edition, R.N. Publications, Tenkasi, 2020.
Website Link	1. https://www.khanacademy.org/science/chemistry/electronic-structure-of-atoms/electron-configurations-jay-sal?gclid=CjwKCAjwvOHzBRBoEiwA48i6Am90SoEVG7GxLA0H3fNLU9mvp2j5VQRII6WeS0EbjLUNCH4Oa-mG-xoCneYQAvD_BwE&utm_account=Grant&utm_campaignname=Grant_Science_Dynamic 2. https://www.khanacademy.org/science/physics/quantum-physics/photons/a/photoelectric-effect?utm_account=Grant&utm_campaignname=Grant_Science_Dynamic&gclid=CjwKCAjwvOHzBRBoEiwA48i6Aj0RIC6yFgClXWeNZNa84fRg_AFyL1O5chILyAVm04I9qiTbhk6pRhoC57UQAvD_BwE 3. http://hyperphysics.phy-astr.gsu.edu/hbase/hph.html 4. https://courses.lumenlearning.com/boundless-chemistry/chapter/the-structure-of-the-atom/ 5. https://physics.info/photoelectric/

CO – PO Mapping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PSO3	PSO4	PSO5
CO1	M	S	S	M	M	M	L	M	M	S
CO2	M	S	S	M	M	S	S	M	L	S
CO3	S	S	M	M	M	S	M	S	M	M
CO4	M	S	S	M	S	M	M	S	L	S
CO5	S	M	L	S	S	S	M	S	S	S
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

Tutorial Schedule	An electron at rest is released far away from a proton, toward which it moves. a. Show that the de Broglie wavelength of the electron is proportional to $\sqrt{r}$ where r is the distance of the electron from the proton. b. Find the wavelength of the electron when it is $a0$ from the proton. How does this compare with the wavelength of an electron in a ground-state Bohr orbit? c. In order for the electron to be captured by the proton to form a ground-state hydrogen atom, how much energy is lost bythe system.
Teaching and Learning Methods	Chalk and talk method Power Point Presentation
Assessment Methods	Assignment, unit test conducting, model test conducting, Experimentally demonstrate

Designed By	Verified By	Approved By
Dr.M.REVATHI	Dr.M.REVATHI	(Dr. S. SHANMUGA)

SKILL BASED ELECTIVE COURSE DETAILS
SYLLABUS - CBCS PATTERN
EFFECTIVE FROM THE ACADEMIC YEAR 2021-2022 Onwards
LIST OF SBEC COURSES

S.NO	SEM	SUB_CODE	TITLE OF THE SUBJECT
1	III	21M3UPHS01	CAREER COMPETENSY SKILLS
2	IV	21M4UPHS02	MICROPROCESSOR AND ITS APPLICATIONS
3	V	21M5UPHS03	ANALOG AND DIGITAL ELECTRONICS
4	VI	21M6UPHS04	NANO SCIENCE AND TECHNOLOGY
5	V	21M5UPHS05	ATOMOSPHERIC PHYSICS
6	VI	21M6UPHS06	EVERYDAY PHYSICS

B.Sc-Physics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3UPHS01	CAREER COMPETENCY SKILLS	SEC - 1	III	2	2	0	-	2

Objective	Student gain the employability skills and to develop career competency, impart knowledge on preparing resume and group discussion to develop the personality traits and interview skills also.		

	Course Content	Knowledge Levels	Sessions
Unit I	**RESUME FORMATS:** Biodata – Resume – Curriculum vitae (CV) - Tips to create an effective resume – Resume format for various professions. (L-3 Hours)	K1	3
II	**GROUP DISCUSSION:** Group discussion – Definition – Types of group discussion – Importance – Elements of group discussion – Skills for group discussion – preparation of group discussion. (L-3 Hours)	K2-K3	3
III	**TECHNICAL APTITUDE:** Basic aptitudes – Steps to prepare technical test – Critical reasoning skills – Common aptitude types -technical aptitudes for different professions (L-3 Hours)	K3	3
IV	**INTERVIEW SKILLS:** Types of Interviews – Best skills for an Interview – Preparation for an Interview. (L-3 Hours)	K2-K3	3
V	**PERSONALITY:** Four personality types – Personality traits – Body language – Dress code – Ways to improve personality. (L-3 Hours)	K3	3
Course Outcome	CO1: Obtain knowledge of resume formats.	K1	
	CO2:Know how to lead a group.	K2	

CO3: The ability to succeed in competitive exams.	K3	
CO4:Know how to face an interview .	K4	
CO5: Involving students in adapting the techniques of personality development.	K5	

Learning Resources	
Text Books	1.T.S. Jain and Gupta"Interviepws and group discussions" UPKAR'S , E-Books.
Reference Books	1. Ajai B. Kher"Group discussion"Vohra Publisher, Allahabad, India. 2. Ela Kashyap Sharma "Technical Aptitude for Interviews"PHI Learning Private Limited, Delhi,2015.
Website Link	1. https://www.skillsyouneed.com/ps/personal-development.html 2.https://www.isdm.org.in/soft-skills-in/social-sector.

CO-PO Maping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PSO3	PSO4	PSO 5
CO1	S	M	L	M	M	S	M	L	M	S
CO2	S	M	M	S	S	S	M	M	M	M
CO3	M	M	L	M	M	S	M	M	M	M
CO4	M	M	M	M	S	S	M	M	M	M
CO5	S	M	S	S	S	S	M	M	S	S
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

Tutorial Schedule	1. Assignments 2. Group discussion 3.Create resume for various professions
Teaching and Learning Methods	chalk and talk
Assesment Methods	CIA,ESE,Pre-Semester Examination

Designed By	Verified By	Approved By
A.Mohan Dass Gandhi	Dr. M. REVATHI	
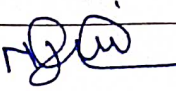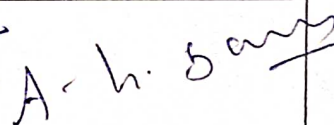
B. Sc-Physics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4UPHS02	MICROPROCESSOR AND ITS APPLICATIONS	SEC - II	IV	2	2	-	-	2

Objective	This course will provide the necessary basic concepts about the 8085 microprocessor's architecture and various functions. It will provide ideas about programming in the microprocessor.

Unit	Course Content	Knowledge Levels	Sessions
I	**ARCHITECTURE:** 8085 Microprocessor – Functional Units (Accumulator, ALU, Register, Counter, Stack Pointer, Flag Register) – 8085 Architecture Block diagram – Pin configuration (Pin diagram). (L-3 hours)	K1-K3	3
II	**ADDRESSING MODES:** Immediate addressing – Register addressing – Direct addressing – Indirect addressing – Implied addressing. (L-3 hours)	K2-K3	3
III	**INSTRUCTION SETS:** Control Instructions – Logical instructions – Branching instructions – Arithmetic instructions – Data transfer instructions – Instructions format – Instruction timings and operation status. (L-3 hours)	K3-K4	3
IV	**PROGRAMMING TECHNIQUES :** Looping – Counting – Indexing – Counter and Time delays – Stack and Subroutines. (L-3 hours)	K4	3
V	**PROGRAMMING AND APPLICATIONS:** Executing a simple program – Addition – Subtraction – Multiplication and division - Ascending order – Descending order - Household devices – Industrial applications. (L-3 hours)	K5	3
Course Outcome	CO1: The student will be able to describe the general architecture and organization of 8085 microprocessors.	K1	
	CO2: Will be able to understand the various functional units and memory modes.	K2	
	CO3: Apply the Mnemonics and Opcodes in the Microprocessor.	K3	
	CO4: Analyze the instruction sets and simple programming techniques.	K4	
	CO5: Develop programming skills using the basic concepts.	K5	

	Learning Resources								
Text Books	1. R. Gaonkar, Microprocessor Architecture, Programming and Application with 8085, Pegram International Publications,(2013) 2. Udayakumar and Umashankar, The 8085 Microprocessor: Architecture, Programming and Interfacing, Pearson, (2008)								
Reference Books	1. D. V Hall, SSSP Rao, Microprocessors and interfacing, McGraw Hill Education, (2017) 2. C.M. Gilmore, Microprocessors Principles and Applications McGraw Hill Education, (1993)								
Website Link	1. https://onlinecourses.nptel.ac.in/noc20_ee42/preview 2https://www.javatpoint.com/microprocessor-applications								

CO Mapping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PSO3	PSO4	PSO5
CO1	S	M	L	M	M	S	M	M	S	S
CO2	S	M	M	S	S	S	M	M	M	S
CO3	M	M	L	M	M	S	M	M	M	M
CO4	M	M	M	M	S	S	M	M	M	M
CO5	S	M	S	S	S	S	M	S	S	S
Level of Correlation between CO and PO	L-LOW		M-MEDIUM	S-STRONG						

Tutorial Schedule	Online seminars ,PPT, Group Discussion and Interaction
Teaching and Learning Methods	Chalk and talk lectures , virtual classroom teaching and PowerPoint Presentation
Assessment Methods	Continuous internal assessment test, pre-semester examination, Assignment, unit test, model test, end semester examination.

Designed By	Verified By	Approved By
Dr.M.REVATHI	Dr. M.REVATHI	

B. Sc - Physics Syllabus LOCF - CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5UPHS03	ANALOG AND DIGITAL ELECTRONICS	SEC - III	V	2	2	-	-	2

Objective	To enable the students to understand the aspects of analog electronics in a lucid and comprehensive manner.

Unit	Course Content	Knowledge Levels	Sessions
I	**Oscillators and Multivibrator:** Feedback principle - Phase shift and Wien Bridge oscillators using transistors -Expression for frequency.Multivibrators- Astable , Monostable and Bistable multi vibrators using transistors. (L - 3 HRS)	K1-K3	3
II	**Special Semiconductor Devices :** clipping and clamping circuits -Field effect Transistor FET- MOSFET- UJT-SCR - characteristics -UJT relaxation oscillator- SCR as a switch. (L - 3 HRS)	K1-K4	3
III	**Operational Amplifier :** Operational Amplifier- characteristics-parameters- applications- Inverting amplifier - Non inverting amplifier - Voltage follower- Adder - Subtractor - Integrator - Differentiator. (L - 3 HRS)	K1-K4	3
IV	**Number Conversion.** decimal, binary, octal, hexadecimal numbers systems and their conversion codes: BCD, gray and excess-3 codes -code conversions- De-Morgan's theorem -universal logic gates (NAND & NOR). (L - 3 HRS)	K1-k5	3
V	**Digital circuts.** Adders, half & full adder – subtractors, half & full subtractor. RS-Flip-flop using NAND and NOR gates , encoder and decoder , BCD to seven segment decoder. (L - 3 HRS)	K1-k5	3

	CO1: Remember the basic concept of Feedback principle.	K1	
	CO2: Understand special semiconductor Devices.	K2	
Course Outcome	CO3: Apply the operational amplifier applications.	K3	
	CO4: Analyze the Number conversion.	K4	
	CO5: Design the digital circuits.	K5	

Learning Resources

Text Books	1. Gupta and Kumar Hand Book of Electronics - PragatiPrakashan - Meerut (2002). 2. V.K. Mehta, Rohit Mehta Principles of Electronics,S. Chand & Co.(2006). 3. M. Arul Thalapathi, Electronics Comptek Publishers (2005). 4.M.K.Bagde and Singh S.P.,Elements of Electronics S. Chand & Co., NewDelhi(1990).
Reference Books	1. Mittal.G.K, Electronic Devices . Publishers Pvt. Ltd., (1993). 2. B.L. Theraja, Basic Electronics S. Chand & Co., (2008). 3. Ambrose and Vincent Devaraj Solid State Electronics, Meera Publication. 4. R.S. Sedha, Applied electronics S. Chand & Co.(1990).
Website Link	1.https://www.analog.com/en/index.html 2.http://analogelectronics.webs.com 3.https://onlinecourses.nptel.ac.in/noc20_ee45/preview 4.https://www.springer.com/journal/10470 5.https://www.ti.com/design-resources/design-tools-simulation/analog-circuits/overview.html

CO -PO Mapping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PSO3	PSO4	PSO5
CO1	M	S	M	S	S	S	M	S	M	M
CO2	S	S	S	M	S	S	L	S	M	S
CO3	S	M	S	M	S	S	M	S	S	S
CO4	S	S	S	S	M	S	M	S	S	S
CO5	S	M	S	S	M	S	M	S	S	S
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

Tutorial Schedule	Problem solving session
Teaching and Learning Methods	Chalk and talk method Power point presentation.
Assessment Methods	Assignment ,unit test conducting ,model test conducting.

Designed By	Verified By	Approved By
L.MOHANA	Dr.M.REVATHI	

(Dr S. SHANTHI)

B.Sc-Physics Syllabus LOCF-CBCS with effect from 2023-2024 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M6UPHS04	NANOSCIENCE AND TECHNOLOGY	SEC - IV	VI	2	2	-	-	2

Objective	To create the basic knowledge in nano materials. To understand the scientific perspective of nanomaterials. To identify the techniques suitable for nanomaterial synthesis. To understand the methods of synthesis, characterization techniques and applications of nanomaterials. To know the significance of nanomaterials.

Unit	Course Content	Knowledge Levels	Sessions
I	**Introduction to Nanoscience and Nanotechnology:** Origins of concepts of nano-sizes of nano- meaning of nano- four generations of nano- definitions in nanotechnology. (L-3 Hours)	K1	3
II	**Types of nanostructures and Nanophysics:** Different types of Nanomaterials (0D,1D,2D& 3D)-quantum dot- quantum wire- quantum well- nanocrystals. (L-6 Hours)	K2	3
III	**Synthesis of Nanomaterials:** Ball Milling, Sputter Deposition, Sol-Gel Processing, Co- Precipitation, Hydrothermal, - Thermal Evaporation - Chemical Vapor Deposition (CVD). (L-6 Hours)	K3	6
IV	**Characterisation Techniques:** Powder X-Ray Diffraction - UV-Vis Absorption Spectroscopy-Photo Luminescence - Scanning Electron Microscopy (SEM) - Transmission Electron Microscopy (TEM). (L-6 Hours)	K4	3
V	**Applications of Nanomaterials:** Nanoelectronics- nanomedicine-chemistryand environment- heavy industry- consumer goods-energy storage and energy conversion devices. (L-6 Hours)	K5	3
Course Outcome	CO1:Apply optical properties of materials at nano scale and analyze the synthesis techniques	K1	
	CO2:Describe the basic science behind the nanophysics.	K2	

	K3	
CO3: Implement the synthesis techniques in tailoring of nanomaterials.	K3	
CO4:analyze various characterization techniques	K4	
CO5: Discern the basic knowledge of nanomaterials to technological applications	K5	

<table>
<tr><td colspan="3" align="center">Learning Resources</td></tr>
</table>

Text Books	1. John D. Miller - A Hand Book on Nanophysics,Dominant, India, 2008. 2. Charles P. Poole, Jr., Frank J. Owens - Introduction to Nanotechnology,Wiley, New Delhi, 2009. 3. Mick Wilson, Kamalikannangora Geoff Smith, Michelle Simmons, BurkhardRaguse - Nanotechnology- Basic Science and Emerging Technologies, Overseas, New Delhi,2005.
Reference Books	1. B.Viswananthan - Nanomaterials,B. Narosa, India,2010. 2. S.Shanmugam - Nanotechnology , MJP Publishers, India, 2008. 3. Asim K Das, Mahua K Das - An Introduction to Nanomaterials and Nanoscience, CBS Publishers,India 2017.
Website Link	1.https://onlinecourses.nptel.ac.in/noc19_mm21/preview

CO - PO Mapping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	S	M	S	M
CO2	S	S	M	S	M	M	S	M	M	M
CO3	M	M	S	M	S	S	M	S	S	S
CO4	M	S	S	S	S	S	S	M	M	M
CO5	S	M	S	S	M	M	S	M	M	S

Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG				

Tutorial Schedule	UNIT-1 Learn the basic definitions in nano. UNIT-2 Discuss about the nanophysics and types of nanomaterials. UNIT-3 Discuss about synthesis types of nanomaterials. UNIT-4 Understand the various characterisation techniques. UNIT-5 Learn various applications of nanomaterials.
Teaching and Learning Methods	1. Chalk and talk method 2. Power Point Presentation 3. Group discussion 4. Kahooot 5. Moodle cloud 6. Google class room
Assessment Methods	1.Continuous Assessment Test I, II & Model 2. Assignment 3.End Semester Examinations

Designed By	Verified By	Approved By
Dr.C.INDIRA PRIYADHARSINI	Dr.M.REVATHI	

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M5UPHS05	ATMOSPHERIC PHYSICS	SEC - V	V	2	2	-	-	2

Objective	To introduce all atmospheric phenomena and their impacts on the Climate.To integrate specific atmospheric processes such as clouds and aerosols into a multidisciplinary analysis of the Earth. To overview the basic characteristics of remote sensing imagery and its applications.To appreciate the role of atmospheric models for large scale weather and climate predict.

Unit	Course Content	Knowledge Levels	Sessions
I	**Unit - I:** **Physical & Dynamic Meteorology** Evolution of the Earth's Atmosphere, Chemical composition, Thermal Structure, Thermodynamics of the Atmosphere, Adiabatic Process - Potential Temperature- Clausius- Clapyeron Equation, Black Body Radiation, Atmospheric Scattering, Rayleigh scattering. (L - 3 Hours)	K1 - K3	3
II	**Unit II: Greenhouse Gases in the Atmosphere** Greenhouse effect, Global warming, Air Pollution and Pollutants, Stratospheric ozone, Tropospheric ozone, Ozone chemistry in troposphere and stratosphere, Photochemical production and destruction of ozone. (L - 3 Hours)	K2 - K3	3
III	**Unit III: Particulate Matter in the Atmosphere** Atmospheric Aerosols, Classification, Sources, Size distribution, Aerosol monitoring techniques, Residence time of Aerosols, Tropospheric Aerosols, Stratospheric Aerosols, Importance of Aerosol research, Satellite Aerosol remote sensing over land. (L - 3 Hours)	K3 - K4	3

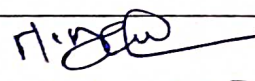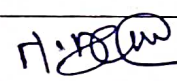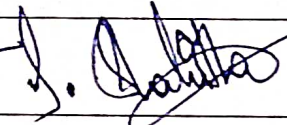|			
IV	**Unit IV: Climate Dynamics** Types of Climate, Climate Classification, Monsoon regions in tropics, Summer and winter circulation monsoon over India, General monsoon circulation (Balance of Mass, Radiation, Angular momentum, Flow across Equator, Global Relationship), Onset and withdrawal features. (L - 3 Hours)	K4 - K5	3
V	**Unit V: Radar Meteorology** Radar Principles and Technology, Radar Signal Processing & Display, Weather Radar- Observation of Precipitating Systems, Estimation of Precipitation, Radar observation of Tropical Storms & Cyclones, Use of Weather Radar in Aviation, Clear Air Radars, Observation of a Clear Air Phenomena. (L - 3 Hours)	K3 - K5	3
Course Outcome	**CO1:**Identify the various processes taking place in the atmosphere such as solar radiation, humidity, precipitation, condensation, nucleation etc.	K1	
	CO2: Determine the effects due the imbalance of the atmospheric processes such as global warming, air pollution, climate change etc.	K2	
	CO3: Apply the microphysics of clouds formation, precipitation,pressure gradient in studying atmosphere changes through remote sensing.	K3	
	CO4: Analyze the Numerical weather prediction in monitoring	K4	
	of climate change.		
	CO5: Generate equation of motion and continuity for the atmospheric modelling.	K5	
	Learning Resources		

Text Books	1. Frederick K. Lutgens and Edward J. Tarbuk - The Atmosphere - 12th Edition, Boston, Pearson, 2013.
	2. J.R. Holton - Dynamic Meteorology -- 4th Edition, Academic Press- New York, 2004.
	3. Guido Visconti - Fundamentals of Physics and Chemistry of the Atmosphere by , Springer, 2016.
	4. R.M Goody and Y.L Yung - Theoretical Basis of Atmospheric Radiation, 2nd Edition, Oxford University Press, 1995.
	5. R.N. Keshvamurthy& M. Shankar Rao - The Physics of Monsoons -- Allied Publishers, 1992.
	6. Henry Sauvegeot - Radar Meteorolog , Published by Artech House, Incorporated, 1992.
Reference Books	1. KshudiramSaha - The Earth's Atmosphere, Its Physics and Dynamics by , Springer, 2008.
	2. K. Mohanakumar - Stratosphere Troposphere Interactions, Springer, 2008.
	3. John Wallace and Peter Hobbs - An introductory survey of Atmospheric Science, 2nd Edition, Academic Press, 2006.
	4. C Jones - Atmospheric Pollution by J, Ventus Publishing Aps, 2008.
Website Link	1. https://www.intechopen.com/chapters/21845
	2. https://climatekids.nasa.gov/greenhouse-effect/
	3. https://byjus.com/free-ias-prep/ncert-notes-geography-koeppen-climate-classification/
	4. https://www.radartutorial.eu/01.basics/Radar%20Principle.en.html
	5. https://www.elprocus.com/radar-basics-types-and-applications/

CO – PO Mapping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PSO3	PSO4	PSO5
CO1	M	S	M	S	M	S	S	S	M	S
CO2	M	M	M	S	S	M	S	N	S	M
CO3	S	S	S	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	S	N	M	S
CO5	M	S	M	M	S	S	M	S	S	M
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

Tutorial Schedule	-
Teaching and Learning Methods	Chalk and Talk Method Group Discussion Interactions
Assessment Methods	Assignments CIA ESE

Designed By	Verified By	Approved By
Dr. M. REVATHI	Dr. M. REVATHI	(Dr. S. SHANTHI)

B. Sc-Physics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21MSUPHS06	EVERY DAY PHYSICS	SEC - VI	VI	2	2	-	-	2
Objective	The aim of the course is to impart knowledge about the working principles and mechanisms of the things and phenomena around us.							

Unit	Course Content	Knowledge Levels	Sessions
I	**General Physics** Newton's Laws of Motion- Kepler's Laws - factors affecting 'g' - free fall- Archimede's Principle - principle of floatation - centre of gravity and centre of buoyancy - Hydraulic machines. (L - 3 Hours)	K1-K2	3
II	**Heat** Different scales of temperature - thermometers- Calorimetry - Principle - specific heat capacity and its applications- Conduction - Convection and Radiation of heat - Latent heat - Pressure Cooker - Black body and Green - House effect. (L - 3 Hours)	K3	3
III	**Sound** Waves and Vibrations: Important definitions - Propagation of sound - velocity of sound - Musical sound and noise - Beats - Echoes and Resonances - Musical instruments -human ear - Doppler Effect - Ultrasonics and Sonar. (L - 3 Hours)	K2-K3	3
IV	**Light:** Important definitions - Umbra and Penumbra - Reflection - Mirrors - Refraction - Lenses - Dispersion - Prisms - Total internal reflection - Human eye and its defects - Simple Optical Devices - fibre optic cable - Colours and Pigments. (L - 3 Hours)	K3	3

	Electricity and Domestic Appliances		
V	Definitions and units of Electrical Parameters - Household wiring and Earthing - Common electrical devices - fuse - switch - sockets - plugs - Heaters - Bulbs - electric iron - kettle - Turning Effect of Electricity - motors and fan. (L - 3 Hours)	K2-K3	3
	CO1: Acquire knowledge and understand basic Physics and its Applications.	K1-K2	
Course Outcome	CO2: Acquire knowledge of Heat and temperature and conversion of Temperature among the different scales of temperature.	K3	
	CO3: Explain the Operation of the Human Ears and Eyes and its defects and methods to correct them.	K2-K3	
	CO4: Describe the function of the Electric Home Appliances and estimate their ratings, power consumptions and bill costs.	K3	
	CO5: Understand the requirement of Renewable energy resources and design of equipments for fruitful energy conversions.	K2-K3	

Learning Resources

Text Books	1. Halliday, Resnick, Walker- Fundamentals of physics, 6th Edition Wiley (2008). 2. Brijlal and N.Subramaniam, Heat and Thermodynamics-S.Chand & Co.,(2002). 3. Brijlal and N.Subramaniam, A Text book of Optics -23ed Edition S.Chand & Co., (2006). 4. N.Subrahmanyam and Brij Lal, A Text Book of Sound, Vikas Publication House Pvt Ltd, New Delhi (1999). 5. Rex Cauldwell ,Wiring a House: 5th Edition by (2014). 6. G.D.Rai, Non-Conventional Sources of Energy, Khanna Publishers, 2009, 4thEdn.
Reference Books	1. Halliday, David & Robert, Resnick, 1995, Physics Vol.I. New Age, International, Chennai 2. Halliday and Robert Resnick - Fundamentals of Physics,David, Wiley Plus, (2013) 3. Umme Ammara, Gugucool -The Physics in our Daily Lives, Publishing, Hyderabad, 2019 4. Sathyaprakash, 1990,Optics,VII edition, RatanPrakashanMandhir, New Delhi. 5. Chetan Singh Solanki, Solar Photvoltaics Fundamentals, Technologies and Applications, 2ndEdition,PHI Learning Private Limited, 2011.

Website Link	1. https://youtu.be/X4_K-XLUIB4
	2. https://silver.neep.wisc.edu/~lakes/PoissonIntro.html
	3. https://science.nasa.gov/ems/
	4. http://www.sound-physics.com/
	5. https://schools.aglasem.com/47259
	6. https://www.youtube.com/watch?v=_MR1Dp8-F8w
	7. https://www.youtube.com/watch?v=jhKejoBqiYc

CO -PO Mapping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PSO3	PSO4	PSO5
CO1	M	S	M	M	S	M	M	M	S	M
CO2	M	S	L	M	M	M	S	S	M	M
CO3	S	M	S	L	M	S	M	M	L	S
CO4	M	M	M	M	L	M	M	L	M	M
CO5	M	L	M	S	M	L	L	M	S	M
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

Tutorial Schedule	Online seminars ,PPT,virtual classroom teaching
Teaching and Learning Methods	Chalk and talk lectures, Group Discussion, Seminar, Interaction and Power Point Presentation etc.
Assessment Methods	Assignment,unit test conducting,model test conducting,Experimantaly demonstrate

Designed By	Verified By	Approved By
V.SATHEESHKUMAR	Dr.M.REVATHI	

(Dr. S. Suruthi)

Allied Subjects for any Degree offered by the Department of UG- PHYSICS
SYLLABUS - CBCS Pattern
EFFECTIVE FROM THE ACADEMIC YEAR 2021-2022 Onwards
LIST OF ALLIED PAPERS

S.No.	SEM	SUB_CODE	TITLE OF THE SUBJECT
1	I/III	21M1UPHA01/21M3UPHA01	ALLIED PHYSICS-I
2	II/IV	21M2UPHA02/21M4UPHA02	ALLIED PHYSICS-II
3	I/III	21M2UPHAP1/21M4UPHAP1	PRACTICAL : ALLIED PHYSICS

B. Sc-Physics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M1UPHA01/ 21M3UPHA01	ALLIED PHYSICS-I	GEC THEORY - I	I/III	5	3	2	-	4

Objective	The concepts of various properties of matter and to impart the knowledge on the basic principle of mechanics, Heat waves, Electromagnetic spectrum and fibre optics communication

Unit	Course Content	Knowledge Levels	Sessions
I	**PROPERTIES OF MATTER:** Stress - Strain - Hooke's law - Different moduli of elasticity - Young's modulus (E) - Rigidity modulus(G) - Bulk modulus(K) - Poisson's ratio - work done in linear, shearing and volume strain - Relation connecting elastic constants and Poisson's ratio - Bending of beams-bending Moment-Measurement of Young's modulus by non-uniform bending and Rigidity modulus by static torsion (Searle's apparatus) scale and telescope method. (L-9,T-3 hours)	K1-K3	12
II	**MECHANICS:** Centre of gravity - General formula- centre of gravity of a solid hemisphere - hollow hemisphere- solid cone - tetrahedron - stability of floating bodies - Meta centre - metacentric height - determination of metacentric height of a ship . (L-9,T-3 hour)	K2	12
III	**Sound, Ultrasonics and Acoustics:** Simple harmonic motion - composition of two simple harmonic motions along a straight line and at right angles to each other - Lissajou's figures and their applications. Ultrasonics production - Magnetostriction oscillator- properties- applications- Acoustics of buildings - Reverberation and Reverberation time - Sabine's formula - Factors affecting the acoustics of buildings. (L-9,T-3 hours)	K3	12
IV	**Thermal Physics:** Newton's law of cooling - verification of Newton's law of cooling - specific heat capacity of a liquid by cooling - Bomb calorimeter - Conduction - coefficient of thermal conductivity - good and bad conductors - Lee's disc method for bad conductors - Stefan's law of radiation - Solar constant -	K3	12

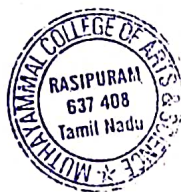|				
	Angstrom's Pyrheliometer - Temperature of the Sun. (L-9,T-3 hours)			
V	**Optics and Spectroscopy :** Electromagnetic spectrum – spectral response to human eye – UV and IR Spectroscopy – Raman Effect – Explanation on the basis of quantum theory – Experimental arrangement – application of Raman Effect – Fibre Optic Communication-Introduction- optical fibre – numerical aperture – coherent bundle – fibre optic communication systems and their advantages. (L-9,T-3 hours)	K1-K3	12	
Course Outcome	**CO1:** Study the elastic behavior and working of torsional pendulum and analyze the expression for young's modulus	K1		
	CO2: Understand the definition of gravity in hemisphere, hollow hemisphere .	K2		
	CO3: Apply the production of ultrasonics by different methods.	K3		
	CO4: Analyze the nature of calorimetry by specific heat of solids and law of thermodynamics and thermal conductivity.	K4		
	CO5: Evaluate the theory and application of UV, IR Spectroscopy and Raman spectroscopy	K5		
Learning Resources				
Text Books	1.R. Murugeshan,Properties of Matter, S. Chand and Co., New Delhi, 2004. 2.R. Murugeshan,Mechanics and Mathematical Methods,S. Chand & Co., 2014. 3.Sundaravelusamy,Allied Physics Paper – I,Priya Publications, 2012.			
Reference Books	1. R. Murugeshan and KiruthigaSivaprasath,Modern Physics, S. Chand & Co, New Delhi (2016). 2. D.S. Mathur, Elements of properties of matter and acoustics, S. Chand & Company Ltd., New Delhi(2010)			
Website Link	1. https://onlinecoures.nptel.ac.in/noc22_ce103/preview 2. http://www.nptel.ac.in/courses/112104026/ 3. http://www.nptel.ac.in/courses/115106090/			

CO-PO Maping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PSO3	PSO4	PSO5
CO1	S	S	M	S	S	S	M	S	S	S
CO2	S	M	S	S	S	S	M	M	S	S

CO3	S	M	M	M	S	S	M	S	S	S
CO4	S	S	S	M	S	S	M	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S
Level of Correlation between CO and PO	L-LOW		M-MEDIUM	S-STRONG						

Tutorial Schedule	Online virtual laboratory, PPT, virtual classroom teaching, Google class room, group discussion
Teaching and Learning Methods	chalk and talk
Assesment Methods	CIA, ESE, Pre-Semester Examination

Designed By	Verified By	Approved By
R.AZHAGARASU	Dr. M.REVATHI	

B.Sc - Physics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2UPHA02 / 21M4UPHA02	ALLIED PHYSICS - II	GEC THEORY - II	II / IV	5	3	2	-	4

Objective	To impart knowledge on the basic concepts of Atomic, Nuclear and Solid State Physics, Electronics and Digital Electronics. To acquire knowledge on their applications

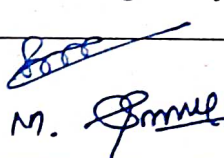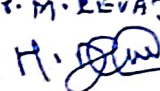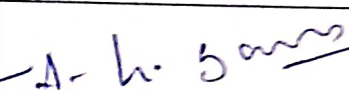| Unit	Course Content	Knowledge Levels	Sessions
I	**ATOMIC PHYSICS** The vector atom model – spatial quantization – the spinning of an electron – quantum numbers associated with the vector atom model – coupling schemes – LS and JJ coupling – Pauli's exclusion principle – Stern and Gerlach experiment – X-rays – production of X- rays – Continuous and characteristic X-ray spectra – Bragg's law powder X-ray diffractometer – industrial and medical applications of X-rays. (L-9,T-3 Hours)	K1 – K3	12
II	**NUCLEAR PHYSICS** General properties of nuclei: Nuclear mass and binding energy – B.E/A versus A curve – nuclear spin and magnetic moment – mass, half-life and spin of neutron – semi-empirical mass formula – Nuclear models and elementary particles: nuclear reactions: cross-section – nuclear fission – liquid drop model – nuclear forces – elementary particles: classification – Quarks and leptons. (L-9,T-3 Hours)	K1 – K3	12
III	**SOLID STATE PHYSICS** Crystal lattice – unit cell – Primitive cell – Basis – Classification of crystals – Bravais lattice as three dimensions – Miller indices and crystal planes - crystal structure – simple cube – body-centred cube – face-centred cube – co-ordination number – atomic radius – packing factor of a simple cubic crystal. Bonding in crystals – ionic bond – covalent bond – metallic bond – molecular bond – hydrogen bond –	K1 – K3	12

	their properties. (L-9,T-3 Hours)			
IV	**ELECTRONICS** Theory of energy bands in crystals – the distinction between conductors, insulators and semiconductors – intrinsic and extrinsic semiconductors – Zener diode characteristics – break down voltage – Zener diode as a voltage regulator. **Operational amplifier:** Ideal operational amplifier – characteristic of an operational amplifier – Inverting and Non inverting amplifiers – Differential amplifier –CMRR – OP amp as a comparator. (L-9,T-3 Hours)	K1 –K4	12	
V	**DIGITAL ELECTORNICS** Number systems – Binary – Octal – Hexadecimal – Boolean Algebra – simplification of Boolean Algebra – De Morgan's theorem and its verification – Basic logic gates – OR, AND, NOT, NAND, NOR, EX-OR gates – logic gates using diodes and transistor(OR, AND, NOT) - NAND & NOR as a Universal Building Block –Half and full Binary adders. (L-9,T-3 Hours)	K1 – K4	12	

	CO1: Classify the vector atom model & amp; type of quantum numbers in atomic physics.	K1
	CO2: Understand the concept of nucleus & amp; nuclear model and various types of chamber in nuclear physics.	K2
Course Outcome	**CO3:** Identify the band theory of solids and understand the working for diodes in electronics.	K3
	CO4: Classify the different types of Electronics.	K4
	CO5: Familiar with the basic analog and digital electronic circuits	K5

Learning Resources	
Text Books	1.R.Murugeshan, Allied Physics I & II, S. Chand & Co, New Delhi (2006) 2. Kittel, Solid-state Physics, Wiley student edition,2007, 8th edition 3. Principles of Electronics, V. K .Mehta S. Chand & Co, New Delhi (2003)
Reference Books	1. Malvino & Leach, Digital Principles & applications, Tata Mc Graw Hill, 1995, 5 th edition. 2.R.Murugeshan and KiruthigaSivaprasath, Modern Physics, S. Chand & Co, New Delhi(2016)

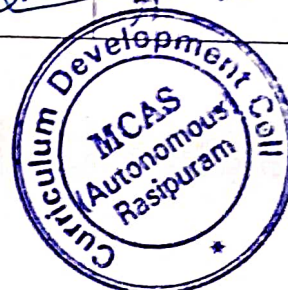| Website Link	1.https://youtu.be/YrjJFQdzxfU 2.https://youtu.be/tKOq1bGfdOQ 3.https://youtu.be/9kBog5wYVKM

CO Mapping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PSO3	PSO4	PSO5
CO1	S	S	M	S	S	S	M	S	S	S
CO2	S	M	S	S	S	S	M	M	S	S
CO3	S	M	M	M	S	S	M	S	S	S
CO4	S	S	S	M	S	S	M	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

Tutorial Schedule	-
Teaching and Learning Methods	Chalk and talk method Power Point Presentation
Assesment Methods	Assignment, unit test conducting, model test conducting

Designed By	Verified By	Approved By
M. *(signature)* 1. P.Thamizharasu 2. M. Laranya	Dr. M. REVATHI H. *(signature)*	*(signature)*

(Seal: Curriculum Development Cell, MCAS Autonomous, Rasipuram)

B. Sc-Physics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2UPHAP1/ 21M4UPHAP1	PRACTICAL : ALLIED PHYSICS	GEC PRACTICAL - I	I/III	2	-	-	2	2

Objective	It is aimed at exposing the undergraduate allied students to the technique of handling simple measuring instrument and also make them measure certain properties of materials.

| S. No.	List of Experiments (Any 16 Experiments)	Knowledge Levels	Sessions
1	Young's modulus (q) - non-uniform bending - pin and microscope.	K1	2
2	Young's modulus (q) - uniform bending - scale and telescope method.	K1	2
3	Static Torsion - Rigidity modulus of a rod.	K2	2
4	Torsion Pendulum - Rigidity modulus of a wire.	K1	2
5	Surface tension and interfacial surface tension of a liquid-drop weight method.	K1	2
6	Sonometer - frequency of a tuning fork.	K1	2
7	Sonometer - AC frequency	K2	2
8	Air Wedge - thickness of a wire.	K2	2
9	Post office Box - Determination of energy Band Gap of the thermistor.	K2	2
10	Spectrometer - Refractive index of a solid prism.	K2	2
11	Spectrometer - grating-normal incidence-Determination of wavelength-mercury lamp.	K1	2
12	Determination of viscosity using a graduated burette.	K2	2
13	Specific heat capacity of a liquid - half time correction.	K3	2

14	Potentiometer - calibration of an ammeter.	K2	2
15	Potentiometer - calibration of low range voltmeter.	K1	2
16	C.F.Bridge - Determination of Specific Resistance of a coil.	K3	2
17	Characteristics of Zener diode.	K2	2
18	Verification of truth tables of AND, OR & NOT gates using ICs.	K1	2
19	Construction of low range power pack using two diodes.	K2	2
20	Verification of De Morgan's theorems.	K3	.2
Course Outcome	CO1: Remember the knowledge of the potentiometer and to apply it for various experiments	K1	
	CO2: Understand the usage of basic laws and theories to determine various properties of the materials given.	K2	
	CO3:Apply the knowledge of physical optics using spectrometer.	K3	
	CO4: Analyze the concepts of Young's Modulus of different substances.	K4	
	CO5: Evaluate the characteristics of various diodes and construct power supply.	K5	

Learning Resources

Text Books	1.M.N. Srinivasan, S. Balasubramanian, R. Ranganathan, A textbook of PRACTICAL PHYSICS, Sultan Chand and sons educational publishers, New Delhi. Edition (2017) 2.M.K Subramanian, S.Padmanathan, S.Somasundaram, B.Sc Allied Physics Practical, Apsara Publications, Trichy, revised edition (2020)
Reference Books	1.C.C.Ourseph, C.Rangarajan, R. Balakrishnan – A Text Book of Practical Physics – S.Viswanathan Publisher – Part II (1996) 2.S.L. Gupta and V.Kumar - Practical Physics - PragatiPrakashan - 25th Edition (2002)
Website Link	1.https://youtu.be/m8yAALCE0LE 2.https://youtu.be/Su8TvWW-j0g 3.https://youtu.be/QezZal4Gllg 4.https://youtu.be/M-q_CqgQ1W8 5.https://youtu.be/w23lkGUChag

CO Mapping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PSO3	PSO4	PSO5
CO1	M	S	S	S	M	L	M	S	M	M
CO2	S	S	L	M	M	M	L	S	M	S
CO3	M	M	S	S	M	L	M	S	S	M
CO4	S	S	M	M	M	S	L	M	S	S
CO5	M	M	S	L	M	M	M	M	S	M
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

Tutorial Schedule	-
Teaching and Learning Methods	Demonstration and practical Sessions
Assessment Methods	To conduct Model Practical

Designed By	Verified By	Approved By
Ms.M.SARANYA	Dr.M.REVATHI	A.h.sur
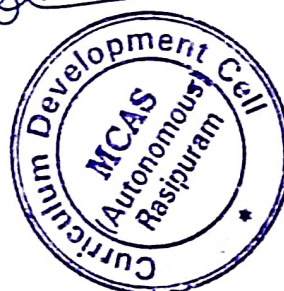
Nonmajor Elective Cource Details
SYLLABUS - CBCS PATTERN
EFFECTIVE FROM THE ACADEMIC YEAR 2021-2022 Onwards
LIST OF NMEC COURSES

S.NO	SEM	SUB_CODE	TITLE OF THE SUBJECT
1	III	21M3UPHN01	PHYSICS IN EVERYDAY LIFE
2	IV	21M4UPHN03	ATOMOSPHERIC PHYSICS
3	III	21M3UPHN02	EVERYDAY PHYSICS
4	IV	21M4UPHN04	ESSENTIAL OF ELECTRICITY

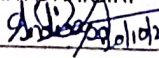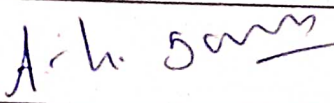## B.Sc-Physics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3UPHN01	PHYSICS IN EVERY DAY LIFE	NMEC-I	III	2	2	-	-	2

Objective	Students can understand the behaviour of matter in everyday life and gain knowledge in properties of matter, electricity and magnetism.

Unit	Course Content	Knowledge Levels	Sessions
I	**MECHANICS :** Motion, Force and Newton's laws-Momentum-projectile and circular motions-gravitation- planetary motion and earth satellites-communication satellites-work, power and energy – energy environment-rotational motion.. (L-3 hours)	K_1 – K2	3
II	**PROPERTIES OF MATTER :** States of matter – binding forces -pressure and thrust – Pascal's law – Archimedes principle –Bernoulli's principle – Formula-Viscosity-measurement of viscosity. (L-3 Hours)	K4	3
III	**ELECTRICITY :** Colomb's law- action of points, lightning arrester-Ohms's law- electric power- electrical safety- electromagnetic induction- Faraday's law- Lenz law-transformers- Mariners' compass. (L-3 Hours)	K3	3
IV	**HEAT AND TEMPERATURE :** Heat – measurement of heat and temperature - heat transfer mechanisms –sources of heat - temperature- definition with SI units- heat vs temperature- effect of pressure on elting point boiling point- thermometer - types of thermometer- Clinical thermometer - Laboratory thermometer-Digital thermometer -Heat engines- steam engines and diesel engine. (L-3 Hours)	K1	3
V	**OPTICS:** Light – nature of light- characteristics of light-properties of light- light sources- natural light source- artificial light source- lens- types of lens- concave and convex lens- uses of lens-optical instruments-Camera, telescope , Microscope -Projector-definition- principle-working andapplications. (L-3 Hours)	K4	3
Course Outcome	**CO1:** Remember the concept of properties of matter and recognize their applications in various real problems.	K1	

	CO2: Understand the capability of doing back-of the envelope calculations in a diversity of situations	K2	
	CO3: Applying the knowledge on heat and thermodynamics, sound and spectroscopy.	K3	
	CO4: Analyze the laws involved in gravitation and elasticity.	K4	
	CO5: Evaluate the concept of geometry of lenses, interference, diffraction and polarization.	K5	

Learning Resources

Text Books	1. R. Murugesan,Properties of Matter and Acoustics, 2nd Edition, S. Chand & Co., Ltd. Reprint (2017). 2. R. Murugesan, Kiruthiga Sivaprasath, Modern Physics, Twelfth Revised Edition, S. Chand& Co. Ltd. Reprint (2006). 3. Brijlal N.subramaniyam,Heat and Thermodynamics, S. Chand & Co. Ltd, Reprint (2006). 4. R. Murugesan ,Electricity and Magnetism, Revised edition, S. Chand & Co., Reprint (2014) 5. N. Subramaniyam, Brijlal and M.N.Avadhanulu, A textbook of Optics, S. Chand & Co, New Delhi (2012)
Reference Books	1. R. Murugeshan and KiruthigaSivaprasath,Modern Physics, S. Chand & Co, New Delhi (2016). 2. D.S. Mathur, Elements of properties of matter and acoustics, S. Chand & Company Ltd., New Delhi(2010)
Website Link	1 https://www.physicstutoronline.co.uk/alevelphysicsnotes/ 2 https://www.askiitians.com/revision-notes/physics/atomic-physics/ 3 www.khanacademy.org/science/physics/elasticity/surface tension 4 https://sites.google.com/brown.edu/lecture-demonstrations/home?authuser=0

CO Mapping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PSO3	PSO4	PSO5
CO1	S	S	M	S	S	S	M	S	S	S
CO2	S	M	S	S	S	S	M	M	S	S
CO3	S	M	M	M	S	S	M	S	S	S
CO4	S	S	S	M	S	S	M	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

Tutorial Schedule	Group discussion Kahooot Moodle cloud Google class room
Teaching and Learning Methods	Chalk and talk method Power Point Presentation
Assesment Methods	CIA, ESE, Pre-Semester Examination

Designed By	Verified By	Approved By
Dr.C. INDIRAPRIYADHARSINI	DD·M· REVATHI	

B. Sc-Physics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3UPHN02	EVERY DAY PHYSICS	NMEC-II	III	2	2	-	-	2
Objective	The aim of the course is to impart knowledge about the working principles and mechanisms of the things and phenomena around us.							

Unit	Course Content	Knowledge Levels	Sessions
I	**General Physics** Newton's Laws of Motion- Kepler's Laws - factors affecting 'g' - free fall- Archimede's Principle - principle of floatation - centre of gravity and centre of buoyancy - Hydraulic machines. (L - 3 Hours)	K1-K2	3
II	**Heat** Different scales of temperature - thermometers- Calorimetry - Principle - specific heat capacity and its applications- Conduction - Convection and Radiation of heat - Latent heat - Pressure Cooker - Black body and Green - House effect. (L - 3 Hours)	K3	3
III	**Sound** Waves and Vibrations: Important definitions - Propagation of sound - velocity of sound - Musical sound and noise - Beats - Echoes and Resonances - Musical instruments -human ear - Doppler Effect - Ultrasonics and Sonar. (L - 3 Hours)	K2-K3	3
IV	**Light:** Important definitions - Umbra and Penumbra - Reflection - Mirrors - Refraction – Lenses - Dispersion – Prisms - Total internal reflection - Human eye and its defects - Simple Optical Devices - fibre optic cable - Colours and Pigments. (L - 3 Hours)	K3	3

V	Electricity and Domestic Appliances Definitions and units of Electrical Parameters - Household wiring and Earthing - Common electrical devices - fuse - switch - sockets - plugs - Heaters - Bulbs - electric iron - kettle - Turning Effect of Electricity - motors and fan. (L - 3 Hours)	K2-K3	3
Course Outcome	CO1: Acquire knowledge and understand basic Physics and its Applications.	K1-K2	
	CO2: Acquire knowledge of Heat and temperature and conversion of Temperature among the different scales of temperature.	K3	
	CO3: Explain the Operation of the Human Ears and Eyes and its defects and methods to correct them.	K2-K3	
	CO4: Describe the function of the Electric Home Appliances and estimate their ratings, power consumptions and bill costs.	K3	
	CO5: Understand the requirement of Renewable energy resources and design of equipments for fruitful energy conversions.	K2-K3	

Learning Resources

Text Books	1. Halliday, Resnick, Walker- Fundamentals of physics, 6th Edition Wiley (2008). 2. Brijlal and N.Subramaniam, Heat and Thermodynamics-S.Chand & Co.,(2002). 3. Brijlal and N.Subramaniam, A Text book of Optics -23ed Edition S.Chand & Co., (2006). 4. N.Subrahmanyam and Brij Lal, A Text Book of Sound, Vikas Publication House Pvt Ltd, New Delhi (1999). 5. Rex Cauldwell ,Wiring a House: 5th Edition by (2014). 6. G.D.Rai, Non-Conventional Sources of Energy, Khanna Publishers, 2009, 4thEdn.
Reference Books	1. Halliday, David & Robert, Resnick, 1995, Physics Vol.I. New Age, International, Chennai 2. Halliday and Robert Resnick - Fundamentals of Physics,David, Wiley Plus, (2013) 3. Umme Ammara, Gugucool -The Physics in our Daily Lives, Publishing, Hyderabad, 2019 4. Sathyaprakash, 1990,Optics,VII edition, RatanPrakashanMandhir, New Delhi. 5. Chetan Singh Solanki, Solar Photvoltaics Fundamentals, Technologies and Applications, 2ndEdition,PHI Learning Private Limited, 2011.

Website Link	1. https://youtu.be/X4_K-XLUIB4
	2. https://silver.neep.wisc.edu/~lakes/PoissonIntro.html
	3. https://science.nasa.gov/ems/
	4. http://www.sound-physics.com/
	5. https://schools.aglasem.com/4725°
	6. https://www.youtube.com/watch?v=_MR1Dp8-F8w
	7. https://www.youtube.com/watch?v=jhKejoBqiYc

CO -PO Mapping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	M	M	S	M	M	M	S	M
CO2	M	S	L	M	M	M	S	S	M	M
CO3	S	M	S	L	M	S	M	M	L	S
CO4	M	M	M	M	L	M	M	L	M	M
CO5	M	L	M	S	M	L	L	M	S	M
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

Tutorial Schedule	Online seminars ,PPT,virtual classroom teaching
Teaching and Learning Methods	Chalk and talk lectures, Group Discussion, Seminar, Interaction and Power Point Presentation etc.
Assessment Methods	Assignment,unit test conducting,model test conducting,Experimantaly demonstrate

Designed By	Verified By	Approved By
V.SATHEESHKUMAR	Dr.M.REVATHI	

B. Sc-Physics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4UPHN03	ATMOSPHERIC PHYSICS	NMEC-III	IV	2	2	-	-	2

Objective	To introduce all atmospheric phenomena and their impacts on the Climate. To integrate specific atmospheric processes such as clouds and aerosols into a multidisciplinary analysis of the Earth. To overview the basic characteristics of remote sensing imagery and its applications. To appreciate the role of atmospheric models for large scale weather and climate predict.

Unit	Course Content	Knowledge Levels	Sessions
I	**Unit - I:** **Physical & Dynamic Meteorology** Evolution of the Earth's Atmosphere, Chemical composition, Thermal Structure, Thermodynamics of the Atmosphere, Adiabatic Process - Potential Temperature-Clausius- Clapyeron Equation, Black Body Radiation, Atmospheric Scattering, Rayleigh scattering. (L - 3 Hours)	K1 - K3	3
II	**Unit II: Greenhouse Gases in the Atmosphere** Greenhouse effect, Global warming, Air Pollution and Pollutants, Stratospheric ozone, Tropospheric ozone, Ozone chemistry in troposphere and stratosphere, Photochemical production and destruction of ozone. (L - 3 Hours)	K2 - K3	3
III	**Unit III: Particulate Matter in the Atmosphere** Atmospheric Aerosols, Classification, Sources, Size distribution, Aerosol monitoring techniques, Residence time of Aerosols, Tropospheric Aerosols, Stratospheric Aerosols, Importance of Aerosol research, Satellite Aerosol remote sensing over land. (L - 3 Hours)	K3 - K4	3

IV	**Unit IV: Climate Dynamics** Types of Climate, Climate Classification, Monsoon regions in tropics, Summer and winter circulation monsoon over India, General monsoon circulation (Balance of Mass, Radiation, Angular momentum, Flow across Equator, Global Relationship), Onset and withdrawal features (L - 3 Hours)	K4 - K5	3	
V	**Unit V: Radar Meteorology** Radar Principles and Technology, Radar Signal Processing & Display, Weather Radar- Observation of Precipitating Systems, Estimation of Precipitation, Radar observation of Tropical Storms & Cyclones, Use of Weather Radar in Aviation, Clear Air Radars, Observation of a Clear Air Phenomena. (L - 3 Hours)	K3 - K5	3	
Course Outcome	**CO1:** Identify the various processes taking place in the atmosphere such as solar radiation, humidity, precipitation, condensation, nucleation etc.	K1		
	CO2: Determine the effects due the imbalance of the atmospheric processes such as global warming, air pollution, climate change etc.	K2		
	CO3: Apply the microphysics of clouds formation, precipitation, pressure gradient in studying atmosphere changes through remote sensing.	K3		
	CO4: Analyze the Numerical weather prediction in monitoring of climate change.	K4		
	CO5: Generate equation of motion and continuity for the atmospheric modelling.	K5		

Learning Resources

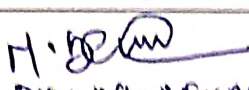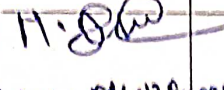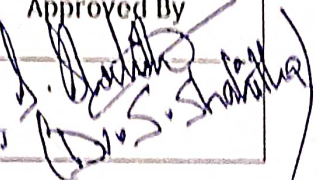|	
Text Books	1. Frederick K. Lutgens and Edward J. Tarbuk - The Atmosphere - 12th Edition, Boston, Pearson, 2013. 2. J.R. Holton - Dynamic Meteorology -- 4th Edition, Academic Press- New York, 2004. 3. Guido Visconti - Fundamentals of Physics and Chemistry of the Atmosphere by , Springer, 2016. 4. R.M Goody and Y.L Yung - Theoretical Basis of Atmospheric Radiation, 2nd Edition, Oxford University Press, 1995. 5. R.N. Keshvamurthy& M. Shankar Rao - The Physics of Monsoons -- Allied Publishers, 1992. 6. Henry Sauvegeot - Radar Meteorolog , Published by Artech House, Incorporated, 1992.
Reference Books	1. KshudiramSaha - The Earth's Atmosphere, Its Physics and Dynamics by , Springer, 2008. 2. K. Mohanakumar - Stratosphere Troposphere Interactions, Springer, 2008. 3. John Wallace and Peter Hobbs - An introductory survey of Atmospheric Science, 2nd Edition, Academic Press, 2006. 4. C Jones - Atmospheric Pollution by J, Ventus Publishing Aps, 2008.
Website Link	1. https://www.intechopen.com/chapters/21845 2. https://climatekids.nasa.gov/greenhouse-effect/ 3. https://byjus.com/free-ias-prep/ncert-notes-geography-koeppen-climate-classification/ 4. https://www.radartutorial.eu/01.basics/Radar%20Principle.en.html 5. https://www.elprocus.com/radar-basics-types-and-applications/

CO - PO Mapping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	M	S	M	S	S	S	M	S
CO2	M	M	M	S	S	M	S	N	S	M
CO3	S	S	S	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	S	N	M	S
CO5	M	S	M	M	S	S	M	S	S	M
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

Tutorial Schedule	
Teaching and Learning Methods	Chalk and Talk Method Group Discussion Interactions
Assessment Methods	Assignments CIA ESE

Designed By	Verified By	Approved By
Dr. M. Devi	Dr. M. Devi	(Dr. S. Shalini)

B. Sc-Physics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4UPHN04	ESSENTIAL OF ELECTRICITY	NMEC-II	IV	2	2	-	-	2

Objective	To impart knowledge on the basic concepts of Electricity, capacitor, and Resistance, types of batteries.

Unit	Course Content	Knowledge Levels	Sessions
I	**Electricity :** Electrification by friction - two kinds of electricity -capacitor -principle of condenser - types of condensers - fixed condenser -variable condenser. (L-3 hours)	K1	3
II	**Condenser:** Condenser boxes - electrolytic condenser - guard ring - condenser -condenser in series - condensers in parallel. (L-3 Hours)	K2	3
III	**Resistance:** Electric field - potential - Ohm's law - electrical energy and power -resistance - types of resistance - fixed resistance - variable resistance. (L-3 Hours)	K2	3
IV	**Electrical circuits:** Colour codes - resistance in series - resistance in parallel - Kirchoff's law - application to Wheatstone's network. (L-3 Hours)	K2	3
V	**Batteries:** Primary cell - Daniel, Lechlanche, Dry cell - Secondary cell - Lead acid, Nickel (Principle only) - Cadmium cell - rechargeable cell. (L-3 Hours)	K2	3
Course Outcome	**CO1:** Remember the concept of construction of different types of batteries.	K1	
	CO2: Understand the different types of Condenser.	K2	
	CO3: Apply the basic concepts of electrostatics to electric field and potential Calculation.	K3	
	CO4: Analyze the concepts of Ohms law, series parallel combination of Condenser.	K4	

	CO5: Evaluate the concept of various laws and series parallel combination of resistances, will be able to write colour codes of resistance		

Learning Resources

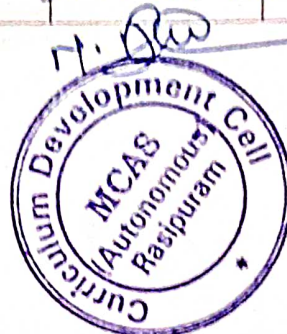| Text Books	1. Electricity and Magnetism,Brijlal and Subramaniam, S. Chand & Co, New Delhi (2016) 2. Electricity and Magnetism, R. Murugeshan, S. Chand & Co, New Delhi (2016)
Reference Books	1. Electricity and Magnetism, D. N. Vasudeva, S. Chand & Co, New Delhi (2016) 2. Electricity and Magnetism,K. K. Tewari, S. Chand & Co, New Delhi (2016) 3. University Physics with Modern Physics Hugh D. Young and Roger A. Freedman, Sears & Zemansky's , 14th Edition (2015)
Website Link	1. https://www.electronics-tutorials.ws/capacitor/cap_2.html 2. https://www.geeksforgeeks.org/capacitors-in-series-and-in-parallel/ 3.https://www.tutorialspoint.com/resistor-types-and-color-code 4.https://www.electronics-tutorials.ws/dccircuits/dcp_4.html 5. https://www.brainkart.com/article/Primary-Cell---Daniel-cell,-Leclanche-cell_541/

CO-PO Mapping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PSO3	PSO4	PSO5
CO1	M	M	M	L	M	S	M	L	M	M
CO2	M	L	M	S	M	M	M	L	M	M
CO3	M	S	L	M	S	S	M	M	M	M
CO4	M	S	M	M	M	S	M	L	M	M
CO5	M	M	L	S	M	S	M	L	M	M
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

Tutorial Schedule	Online seminars ,PPT,virtual classroom teaching
Teaching and Learning Methods	Chalk and talk lectures, Group Discussion, Seminar, Interaction, Experimentally demonstrate and PowerPoint Presentation etc.
Assessment Methods	Assignment, unit test ,model test

Designed By	Verified By	Approved By
Mr.V.Satheeshkumar	Dr.M.REVATHI	

B. Sc-Physics Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
	HOW THINGS WORK	VALUE ADDED COURSE	V	30	25	5		2

Objective	To realize basic working principal of home appliances .To gain basic skill to diagnose fault in home appliances .Categorize various parts of home appliances product. Understand the symptoms in the appliance and identify the fault.

Unit	Course Content	Knowledge Levels	Sessions
I	**DOMESTIC APPLIANCES** Electric bell - Door locks - Fans, Blowers and Centrifugal compressors - Refrigerator – Air conditioning - Vacuum cleaner - Sewing machine - Flat iron- Tape recorder – Washing machine–Fuse	K1-K5	5
II	**Fault finding and repairing :** Tools and equipment use for Repairing and maintenance of Electrical Equipment, Test and Measurement Equipment, Fault identification, Repair and Maintenance of refrigerator and water purifier.	K1-K5	5
III	**Introduction to home appliances** Introduction and Working principal of Refrigerator and water purifier.	K1-K5	5
IV	**List of Experiments: (Hands on Training)** 1. Identify various parts of Refrigerator . 2. To detect and repair faults in Refrigerator. 3. Charging of Refrigerator system. 4. Practice in changing Temperature controller in Refrigerator. . 5. Practice in changing condenser coil in Refrigerator	K1-K5	5

	List of Experiments: (Hands on Training)		
V	1. Installation of water purifier. 2. Identify various parts of water purifier 3. To detect and repair faults in water purifier 4. Practice in changing water electric motor in water purifier 5. Practice in changing float valve lip switch in water purifier	K1-K5	5
Course Outcome	CO1: Identify various parts of Domestics appliances.	K1	
	CO2: Acquire Skill to diagnose the fault of home appliances	K2	
	CO3: Explain basic working principal of home appliances	K3	
	CO4: Identify various parts of home appliances product	K4	
	CO5: To test and detect faults in home appliance and Establish Self business	K5	

Learning Resources

Text Books	1.The Universal Encyclopedia of Machines – How Things Work 1 & 2 –Harper Collins Publishers India- Volume I, 1992. 2.Arora C.P., Refrigeration and Air conditioning II Ed. McGraw-Hill, Pub., 2000. 3.Field technician other Home Appliance Paperback, AISECT Content Group (Author),1 January 2018.
Reference Books	1.How Things Work: The Physics of Everyday Life Loose Leaf – Import, 22 January 2013
Website Link	1.https://www.vedantu.com/revision-notes/cbse-class-12-chemistry-notes-chapter-6-general-principles-and-processes-of-isolation-of-elements 2.https://ncerthelp.com/cbse%20notes/class%2012/chemistry/Chemistry%20Notes%20for%20class%2012%20Chapter%206%20General%20Principles%20and%20Processes%20of%20Isolation%20of%20Elements%20.pdf

CO –PO Mapping

CO NUMBER	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PSO3	PSO4	PSO5
CO1	S	M	S	S	S	S	S	M	S	S
CO2	S	S	M	S	M	M	S	M	M	M
CO3	M	M	S	M	S	M	M	S	S	S
CO4	S	S	S	S	S	S	S	M	M	M
CO5	S	M	S	S	M	M	S	M	M	S
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

Tutorial Schedule	Experimental work and hands on training
Teaching and Learning Methods	Chalk and talk method Power Point Presentation
Assessment Methods	Experimentally demonstrate

Designed By	Verified By	Approved By
Dr.M.REVATHI	Dr.M.REVATHI	