FATIMA COLLEGE (AUTONOMOUS)

Re-Accredited with "A++" Grade by NAAC (Cycle-IV)

74th Rank in India Ranking 2020 (NIRF) by MHRD

Maryland, Madurai- 625 018, Tamil Nadu, India

NAME OF THE DEPARTMENT: RESEARCH CENTRE OF PHYSICS

NAME OF THE PROGRAMME : B.Sc

PROGRAMME CODE : UAPH

ACADEMIC YEAR : 2023-2024

B.Sc. PHYSICS

SEMESTER I				
S. NO.	COURSE CODE	COURSE TITLE	CREDITS	No. of Hours
1.	23P1CC1	Properties of Matter and Sound	4	6
2.	23P1CC2	Physics Practical I	3	3
3.	23P1GEM1	Allied Physics I	4	4
4.	23P1GE2	Digital Logic Fundamentals	4	4
5.	23P1FC	Introductory Physics	2	2
6.	23P1SE1	Physics for Everyday life	2	2
SEMESTER II				
1.	23P2CC3	Heat, Thermodynamics and Statistical Physics	4	6
2.	23P2CC4	Physics Practical II	3	3
3.	23P2GEM2	Allied Physics II	4	4
4.	23P2SE2	Physics in Everyday life	2	2

5.	23P2SE3	Physics of Measuring Instruments	2	2

I B.Sc. PHYSICS

SEMESTER I

For those who joined in 2023 onwards

PROGRAMME CODE	COURSECODE	COURSETITLE	CATEGORY	HRS/ WEEK	CREDITS
UAPH	23P1CC1	PROPERTIES OF MATTER AND SOUND	Theory	6	3

COURSE DESCRIPTION

The objective of this course is to understand the basic properties of matter and sound.

COURSE OBJECTIVES

On completion of the course, the student will be able

- To gain knowledge about the elasticity
- To comprehend the meaning of surface tension
- To conceptualize the viscosity property of liquids and its determination.
- To understand the physics of oscillations and waves
- To know the different methods of producing ultrasonic waves and its applications

UNITS

UNIT I ELASTICITY AND BENDING OF BEAMS [18 HRS]

Elasticity – Definitions(self-study) – Glass is more elastic than rubber – Yield Point, Elastic limit, Elastic Fatigue– Poisson's ratio (Definition only)-Twisting Couple on a cylinder- Application -Torsion Pendulum (without mass)-

Bending of Beams–Bending Moment–Basic assumptions of theory of bending – Beam supported at its ends and loaded in the middle –determination of Y by bending.

UNIT II SURFACE TENSION [18 HRS]

Surfacetension) – Explanation of surface tension – Examples of surface tension-Pressure difference across a spherical surface– Excess of pressure inside a spherical liquid drop–Excess of Pressure inside a soap bubble –angle of contact-Capillarity –Expression for Surface tension – Determination of Surface tension of water–Examples of Capillarity.

UNIT III VISCOSITY [18 HRS]

Viscosity- Stoke's Law – Terminal Velocity - Poiseuille's Method for Coefficient of Viscosity - viscosity of gases and kinetic theory

UNIT IV OSCILLATIONS AND WAVES [18 HRS]

Simple harmonic motion - Differential equation of SHM – Graphical representation of SHM – average kinetic energy of a particle - total energy of a vibrating particle –Simple harmonic oscillations of a loaded spring – Free , damped, Forced vibrations – Resonance

UNIT V ULTRASONICS AND DOPPLER EFFECT [18 HRS]

Ultrasonics – production – piezoelectric crystal method – properties and application (medical and industrial) -Doppler effect- observer at rest and source in motion- source at rest and observer in motion- both source and observer are in motion- effect of wind velocity-tracking of artificial satellites

TEXT BOOKS:

1) Brijlal , N.Subrahmanyam and Jivan Seshan, MECHANICS AND ELECTRODYNAMICS, New Delhi, Eurasia Publishing House(Pvt.) Ltd. Ram Nagar

UNIT I-Chapter 10-10.1,10.2,10.4 -10.6 (Definition only), 10.14, 10.15

10.16- 10.17, 10.18.,10.20,10.23.

UNIT II – Chapter12- 12.1- 12.4, 12.6 - 12.8,12.10,12.13 - 12.16,

UNIT III - 11.9, 11.10, 11.11, 11.15, 11.18

2) N.Subrahmanyam, Brijlal, WAVES AND OSCILLATIONS , Vikas Publishing House Pvt. Ltd

UNIT IV - Chapter 1- 1.1, 1.2, 1.3, 1.4, 1.6, 1.18,

Chapter 3- 3.1, 3.2, 3.3, 3.5, 3.6

UNIT V - Chapter 11 – 11.23, 11.24 (Piezo electric oscillator only) 11.27
Chapter 9 – 9.1 -9.6

REFERENCE BOOKS:

1. Robert Resnick , David Halliday, Kenneth S. Krane, PHYSICS (fifth edition),John Wiley and sons, Inc.

2. Paul G. Hewit - CONCEPTUAL PHYSICS (tenth edition), Pearson education Inc. and Dorling Kindersey Publishing

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT – I : ELASTICITY AND BENDING OF BEAMS				
1.1	Introduction - Elasticity – Glass is more elastic than rubber	2	Chalk & Talk	Black Board
1.2	Yield Point, Elastic limit, Elastic Fatigue– Poisson's ratio (Definition only)-	3	Chalk & Talk	Black Board
1.3	Twisting Couple on Cylinder-	3	Chalk & Talk	Black Board
1.4	Application -Torsion Pendulum	3	Chalk & Talk	Black Board
1.5	Bending of Beams–Bending Moment–Basic assumptions of theory of bending	3	Chalk & Talk	Black Board
1.6	Beam supported at its ends and loaded in the middle	2	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
1.7	Determination of Y by bending.	2	Chalk & Talk	Black Board
UNIT -2 SURFACE TENSION				
2.1	Introduction – Surface tension –	2	Chalk & Talk	Black Board
2.2	Explanation of surface tension – Examples of surface tension	2	Chalk & Talk	Black Board
2.3	Pressure difference across a spherical surface	2	Chalk & Talk	Black Board
2.4	Excess of pressure inside a spherical liquid drop	2	Chalk & Talk	Black Board
2.5	Excess of Pressure inside a soap bubble	2	Chalk & Talk	Black Board
2.6	Angle of contact	3	Chalk & Talk	Black Board
2.7	-Capillarity –Expression for Surface tension	3	Chalk & Talk	Black Board
2.8	Determination of Surface tension of water–Examples of Capillarity	2	Chalk & Talk	Black Board
UNIT -3 VISCOSITY				
3.1	Introduction - Viscosity-	3	Chalk & Talk	Black Board
3.2	Stoke's Law – Terminal Velocity -	4	Chalk & Talk	Black Board
3.3	Poiseuille's Method for Coefficient of Viscosity -	4	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.4	viscosity of gases and kinetic theory	4	Chalk & Talk	Black Board
3.5	Applications	3	Chalk & Talk	Black Board
UNIT -4 OSCILLATIONS AND WAVES				
4.1	Simple harmonic motion	2	Chalk & Talk	Black Board
4.2	Differential equation of SHM –	3	Chalk & Talk	Black Board
4.3	Graphical representation of SHM –	3	Chalk & Talk	Black Board
4.4	average kinetic energy of a particle - total energy of a vibrating particle –	3	Chalk & Talk	Black Board
4.5	Simple harmonic oscillations of a loaded spring – Free , damped, Forced vibrations	5	Chalk & Talk	Black Board
4.6	Resonance	2	Chalk & Talk	Black Board
UNIT -5 ULTRASONICS AND DOPPLER EFFECT				
5.1	Ultrasonics – production	3	Chalk & Talk	Black Board
5.2	piezoelectric crystal method – properties and application (medical and industrial)	4	Chalk & Talk	Black Board
5.3	-Doppler effect- observer at rest and source in motion- source at rest and observer in motion-	4	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
5.4	Doppler effect- both source and observer are in motion	4	Chalk & Talk	Black Board
5.5	effect of wind velocity-tracking of artificial satellites	3	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholas	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

EVALUATION PATTERN

SCHOLASTIC					NON - SCHOLASTI C	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

The best out of two will be taken into account

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Gain knowledge about elasticity and theory of bending of beams	K1,K2	PSO1& PSO2
CO 2	Appreciate the different cases of pressure in liquid drop, spherical surface and soap bubble while learning about phenomena of surface tension and capillarity.	K1,K2,K3	PSO1& PSO2
CO 3	Understand the concept of viscosity and appreciate the Method of Poiseuille for determining Coefficient of Viscosity	K1,K2	PSO1& PSO2
CO 4	Comprehend the meaning of simple harmonic motion and its properties	K1,K2	PSO1& PSO2
CO 5	Understand the different methods of producing ultrasonic waves and its applications	K1,K2,K3	PSO1& PSO2

Mapping of COs with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	2	2	1
CO2	3	3	2	1	2
CO3	3	3	2	2	1
CO4	3	3	2	2	2
CO5	3	3	2	2	1

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	3	2	3	2
CO2	3	2	3	2
CO3	3	2	3	2
CO4	3	2	3	2
CO5	3	2	3	2

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

Dr. L.Caroline Sugirtham

&

Dr. Ancemma Joseph

Forwarded By

Dr. A. SheelaVimala Rani

HoD'S Signature & Name

SEMESTER –I

For those who joined in 2023 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAPH	23P1CC2	Physics Practicals - I	Practical	4	2

COURSE DESCRIPTION

The course provides hands on training to work with basic physics experiments.

COURSE OBJECTIVE/S

Apply various physics concepts to understand properties of matter, set up experimentation to verify theories, quantify and analyse and correlate the results.

Skill-Development
100%

LIST OF EXPERIMENTS

1) Determination of Youngs' Modulus - Uniform bending.(scale & telescope)

2) Determination of Youngs' Modulus - Non-Uniform bending (pin & microscope).

3) Determination of 'g' - Compound pendulum

4) Determination of Surface Tension & Interfacial surface tension - Drop Weight Method

5) Melde's String - Determination of the frequency of vibrator

6) Determination of surface tension - Capillary rise method

7) Specific Heat Capacity of liquid - Method of mixture using Barton's Correction

I B.Sc. Mathematics (Regular & SF)

SEMESTER –I

For those who joined in 2023 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	23P1GEM1	ALLIED PHYSICS-I	ALLIED CORE	4	3

COURSE DESCRIPTION

The course provides a conceptually based exposure to the fundamental principal and processes of significant topics of physics like Waves and Oscillations, Properties of matter, Heat and Thermodynamics, Electricity and Magnetism and Digital Electronics.

COURSE OBJECTIVES

This course will improve the elemental concepts and enhance the intellectual, experimental, analytical skills of the students on Simple Harmonic motion, Elasticity of solid matters, viscosity of liquids and thermal properties of Gas, magnetic effect of electric current, Boolean Algebra.

UNITS

UNIT I: WAVES, OSCILLATIONS AND ULTRASONICS [12HRS]

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

UNIT –II PROPERTIES OF MATTER [12HRS]

Elasticity: elastic constants – bending of beam – theory of non- uniform bending – determination of Young's modulus by non-uniform bending – energy stored in a stretched wire – torsion of a wire – determination of rigidity modulus by torsional pendulum

Viscosity: streamline and turbulent motion – critical velocity – coefficient of viscosity – Poiseuille's formula – comparison of viscosities – burette method,

Surface tension: definition – molecular theory – droplets formation–shape, size and lifetime – COVID transmission through droplets, saliva – drop weight method – interfacial surface tension.

UNIT –III HEAT AND THERMODYNAMICS [12HRS]

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

UNIT –IV ELECTRICITY AND MAGNETISM [12HRS]

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

UNIT –V DIGITAL ELECTRONICS AND DIGITAL INDIA: [12HRS]

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

UNIT –VI DYNAMISM (Evaluation Pattern-CIA only)

New droplet-based electricity generator - The impact of magnetic materials in renewable energy

REFERENCES:

TEXT BOOKS

1. R.Murugesan (2001), AlliedPhysics,S. ChandandCo,NewDelhi.
2. BrijlalandN.Subramanyam (1994), WavesandOscillations,VikasPublishingHouse,NewDelhi.
3. BrijlalandN.Subramaniam (1994), PropertiesofMatter,S.ChandandCo.,NewDelhi.
4. J.B.Rajam and C.L.Arora (1976). Heat and Thermodynamics (8th edition), S.ChandandCo.,New Delhi.
5. R.Murugesan(2005), OpticsandSpectroscopy,S.ChandandCo,NewDelhi.
6. A.Subramaniyam, AppliedElectronics2ndEdn.,NationalPublishingCo.,Chennai

REFERENCE BOOKS

1.ResnickHallidayandWalker(2018).FundamentalsofPhysics(11thedition),JohnWilleyand Sons, Asia Pvt.Ltd., Singapore.

2. V.R.KhannaandR.S.Bedi (1998), TextbookofSound1stEdn. KedharnaathPublishandCo, Meerut.

3. N.S.KhareandS.S.Srivastava (1983), ElectricityandMagnetism10thEdn.,AtmaRamandSons, New Delhi.

4. D.R.KhannaandH.R. Gulati(1979). Optics,S. Chand andCo.Ltd.,New Delhi.

V.K.Metha(2004).Principlesofelectronics6thEdn. S.Chandandcompany.

WEB RESOURCES

1. https://youtu.be/M_5KYncYNyc
2. https://youtu.be/ljJLJgIvaHY
3. https://youtu.be/7mGqd9HQ_AU
4. https://youtu.be/h5jOAw57OXM
5. https://learningtechnologyofficial.com/category/fluid-mechanics-lab/
6. http://hyperphysics.phy-astr.gsu.edu/hbase/permot2.htmlhttps://www.youtube.com/watch?v=gT8Nth9NWPMhttps://www.youtube.com/watch?v=9mXOMzUruMQandt=1shttps://www.youtube.com/watch?v=m4u-SuaSu1sandt=3shttps://www.biolinscientific.com/blog/what-are-surfactants-and-how-do-they-work

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -I WAVES, OSCILLATIONS AND ULTRASONICS				
1.1	Simple harmonic motion (SHM)	1	Chalk & Talk	Black Board
1.2	Composition of two SHMs at right angles (periods in the ratio 1:1)	2	Chalk & Talk	LCD

1.3	Lissajous figures – uses	1	Chalk & Talk	PPT & White board
1.4	Laws of transverse vibrations of strings – determination of AC frequency using sonometer (steel and brass wires)	3	Lecture	LCD
1.5	Ultrasound – production – piezoelectric method – application of ultrasonics: medical field – lithotripsy	2	Discussio n	Black Board
1.6	Ultrasonography –ultrasonoimaging- ultrasonics in dentistry – physiotheraphy, opthalmology	1	Lecture	LCD
1.7	Advantages of noninvasive surgery – ultrasonics in green chemistry.	2	Lecture	LCD
UNIT –II PROPERTIES OF MATTER				
2.1	*Elasticity*: elastic constants	1	Lecture	Green Board, Real samples
2.2	Bending of beam – theory of non- uniform bending	2	Chalk & Talk	Black Board
2.3	Determination of Young's modulus by non-uniform bending – energy stored in a stretched wire	2	Discussio n	PPT & White Board
2.4	Torsion of a wire – determination of rigidity modulus by torsional pendulum	2	Lecture	PPT & White Board

2.5	*Viscosity*: streamline and turbulent motion – critical velocity – coefficient of viscosity	2	Real Model in Lab	Apparatus
2.6	Poiseuille's formula – comparison of viscosities – burette method	1	Real Model in Lab	Apparatus
2.7	*Surface tension*: definition – molecular theory – droplets formation–shape, size and lifetime	1	Lecture	PPT & White Board
2.8	COVID transmission through droplets, saliva – drop weight method – interfacial surface tension.	1	Chalk & Talk	Black Board
UNIT –III HEAT AND THERMODYNAMICS				
3.1	Joule-Kelvin effect – Joule-Thomson porous plug experiment – theory	2	Chalk & Talk	Black Board
3.2	Temperature of inversion – liquefaction of Oxygen– Linde's process of liquefaction of air– liquid	3	Chalk & Talk	LCD
3.3	Oxygen for medical purpose– importance of cryocoolers	1	Chalk & Talk	PPT & White board
3.4	Thermodynamic system – thermodynamic equilibrium – laws of thermodynamics	2	Lecture	LCD
3.5	Heat engine – Carnot's cycle – efficiency	2	Discussio n	Black Board

3.6	Entropy – change of entropy in reversible and irreversible process.	2	Discussio n	Black Board
UNIT –IV ELECTRICITY AND MAGNETISM				
4.1	Potentiometer – principle – measurement of thermo emf using potentiometer	3	Lecture	White Board
4.2	Magnetic field due to a current carrying conductor – Biot-Savart's law – field along the axis of the coil carrying current	3	Lecture	White Board
4.3	Peak, average and RMS values of ac current and voltage – power factor and current values in an AC circuit	3	Chalk & Talk	Black Board
4.4	Types of switches in household and factories	1	Discussio n	Google classroom
4.5	Smart wifi switches- fuses and circuit breakers in houses	2	Lecture	PPT
UNIT –V DIGITAL ELECTRONICS AND DIGITAL INDIA				
5.1	Logic gates, OR, AND, NOT, NAND, NOR , EXOR logic gates	2	Chalk & Talk	Black Board

5.2	Universal building blocks – Boolean algebra	3	Real model in Lab	Apparatus
5.3	De Morgan's theorem – verification	3	Real model in Lab	Microscope
5.6	Overview of Government initiatives: software technological parks under MeitY	2	Real model in Lab	Spectrometer, Prism
5.7	NIELIT- semiconductor laboratories under Dept. of Space	1	Lecture	PPT
5.8	An introduction to Digital India	1	Lecture	PPT

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholas	-	-	-	-	-		5	5	12.5 %

Total	**10**	**10**	**5**	**5**	**5**	**35**	**5**	**40**	**100 %**

CIA	
Scholastic	**35**
Non Scholastic	**5**
	40

EVALUATION PATTERN

SCHOLASTIC					**NON - SCHOLASTI C**	**MARKS**		
C1	**C2**	**C3**	**C4**	**C5**	**C6**	**CIA**	**ESE**	**Total**
10	**10**	**5**	**5**	**5**	**5**	**40**	**60**	**100**

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

The best out of two will be taken into account

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Explain types of motion andextend their knowledge in the study of variousdynamicmotionsanalyzeand demonstrate mathematically. Relate theory with practical applications in medical field.	K1, K2	PSO1, PSO2
CO 2	Explaintheirknowledgeofunderstandingabout materialsandtheir behaviours and apply it to various situations in laboratory and real life. Connect droplet theory with Corona transmission.	K1, K2, K3	PSO3
CO 3	Comprehend basic concept of thermodynamics concept of entropyand associated theorems able to interpret the process of flowtemperaturephysicsinthebackgroundofg rowthof this technology.	K1, K2	PSO3
CO 4	Articulate the knowledge about electric current resistance,capacitance in terms of potential electric field and electric correlatetheconnectionbetweenelectricfieldan	K1, K2	PSO4

	dmagneticfieldandanalyzethemmathematical lyverifycircuitsandapplytheconcepts toconstructcircuitsandstudythem.		
CO 5	Interpret the real life solutions using AND, OR, NOT basiclogicgatesandintendtheirideastounivers albuildingblocks. InferoperationsusingBooleanalgebraandacqu ireelementaryideasofICcircuits.Acquire information about various Govt. programs/ institutions in this field.	K1, K2, K3	PSO5

Mapping of COs with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	3	2	2
CO2	3	3	3	2	2
CO3	3	3	3	2	3
CO4	3	3	3	2	3
CO5	3	3	3	2	3

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	3	2	3	2
CO2	3	2	3	2
CO3	3	2	3	2
CO4	3	2	3	2
CO5	3	2	3	2

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

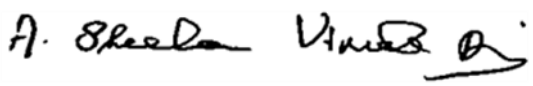
COURSE DESIGNER:

Dr. R.Niranjana Devi

Ms. J. R. Sofia

Dr. J. Selvi

Forwarded By



Dr. A. SheelaVimala Rani

HoD'S Signature & Name

I B.Sc Computer Science

SEMESTER –I

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS

UAPH	**23P1GE2**	**DIGITAL LOGIC FUNDAMENTALS**	**Core**	**4**	**4**

COURSE DESCRIPTION

The course provides a conceptual based exposure to the fundamental principal and processes of significant topics of Digital Electronics which forms the basis for Computer Architecture.

COURSE OBJECTIVES

This course will improve the elemental concepts and enhance the intellectual and analytical skills of the students on Number systems and codes, Circuit analysis and design, Data processing circuits, Flip flop and registers and Counters.

UNIT -I NUMBERS AND SYSTEMS AND CODES [12 HRS]

Binary number System – Octal numbers – hexadecimal numbers – ASCII code – Excess-3 code – Gray Code, Logic Circuits: Inverters – OR Gates – AND Gates- NOR Gates – NAND gates- Exclusive OR Gates.

UNIT –II CIRCUIT ANALYSIS AND DESIGN [12 HRS]

Boolean Algebra – Sum-of-Products method – Truth Table to Karnaugh map – Karnaugh Simplifications – Don't care conditions – product-of-Sums method

UNIT –III Data Processing Circuits [12 HRS]

Multiplexers – Demultiplexers.
Arithmetic circuits: Binary Addition – Binary subtraction – Unsigned Binary numbers – Sign-Magnitude Numbers – 2's Complement representation – 2's Complement Arithmetic – Arithmetic Building Blocks – The Adder-Subtracter

UNIT –IV Flip Flops and registers [12 HRS]

Flip- Flops: RS Flip-Flop – Gated Flip-Flops – Edge Triggered RS Flip flops- Edge Triggered JK flip flop – JK Master Slave Flip Flop. Shift registers: Serial In-Serial Out – Parallel In- Parallel Out

UNIT –V Counters [12 HRS]

Asynchronous Counters – Synchronous Counters (3 bits only) – Mod-3 Counter – Decade Counters, D/A and A/D conversion: Variable – resistor networks, Binary ladder, D/A converter, A/D converter

UNIT –VI DYNAMISM (Evaluation Pattern-CIA only) [2HRS]

Artificial Intelligence-Machine Learning- Robotics

TEXT BOOK:

1. Albert Paul Malvino and Donald P. Leach, *Digital principles and applications*, Tata McGraw-Hill, Sixth Edition

REFERENCE BOOKS:

1. R.P. Jain, *Modern digital Electronics*, Tata McGraw-Hill, III edition,2006
2. Thomas C Bartee , *Digital Computer Fundamentals*, McGraw Hill; 5th edition,1981
3. M. Morris Mano, *Digital Logic and computer design*, Prentice-Hall, 2000

WEB REFERNCES :

1.**http://www.ee.surrey.ac.uk/Projects/Labview/minimisation/karrules.html**

2.**https://www.ebookbou.edu.bd/Books/Text/SST/DCSA/dcsa_2301/Unit-07.pdf**

3.**https://www.tutorialspoint.com/computer_logical_organization/digital_counters.htm**

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**TITLE: NUMBERS AND SYSTEMS AND CODES**			
1.1	Binary number System - Octal numbers - hexadecimal numbers	2	Chalk & Talk	Black Board

1.2	ASCII code	1	Lecture	LCD
1.3	Excess-3 code	1	Chalk & Talk	LCD
1.4	Gray Code	1	Chalk & Talk	LCD
1.5	Inverters – OR Gates – AND Gates	3	Discussio n	Black Board
1.6	NOR Gates - NAND gates	2	Lecture	PPT & White board
1.7	Exclusive OR Gates.	2	Lecture	PPT & White board
UNIT -2	**TITLE: CIRCUIT ANALYSIS AND DESIGN**			
2.1	Boolean Algebra	1	Lecture	LCD, PPT
2.2	Sum-of-Products method	3	Chalk & Talk	Black Board
2.3	Truth Table to Karnaugh map	2	Chalk & Talk	PPT & White Board
2.4	Karnaugh Simplifications - Don’t care conditions	4	Chalk & Talk	Black Board
2.5	product-of-Sums method	2	Chalk & Talk	Black Board
UNIT -3	**TITLE: DATA PROCESSING CIRCUITS**			
3.1	Multiplexers	2	Chalk & Talk	Black Board
3.2	Demultiplexers	2	Chalk & Talk	Black Board
3.3	Binary Addition - Binary subtraction	2	Chalk & Talk	PPT & White board

3.4	Unsigned Binary numbers - Sign-Magnitude Numbers	1	Chalk & Talk	PPT & White board
3.5	2's Complement representation- 2's Complement Arithmetic	2	Chalk & Talk	Black board
3.6	Arithmetic Building Blocks	1	Chalk & Talk	Black board
3.7	The Adder	1	Chalk & Talk	PPT & White board
3.8	The Subtractor	1	Chalk & Talk	PPT & White board
UNIT -4	**TITLE: FLIP FLOPS AND REGISTERS**			
4.1	RS Flip-Flop	1	Lecture	Green Board Charts
4.2	Gated Flip-Flops	1	Lecture	White Board
4.3	Edge Triggered RS Flip flops	2	Chalk & Talk	Black Board
4.4	Edge Triggered JK flip flop	1	Lecture	PPT
4.5	JK Master Slave Flip Flop	2	Chalk & Talk	Black Board
4.6	Serial In-Serial Out	2	Chalk & Talk	Black Board
4.9	Parallel In- Parallel Out	3	Lecture	PPT
UNIT -5	**TITLE: COUNTERS**			
5.1	Asynchronous Counters	2	Chalk & Talk	Black Board
5.2	Synchronous Counters(3 bits only)	2	Chalk & Talk	Black Board
5.3	Mod-3 Counter	1	Chalk & Talk	Black Board

5.4	Decade Counters	1	Chalk & Talk	Black Board
5.5	Variable – resistor networks	2	Chalk & Talk	Black Board
5.6	Binary ladder	2	Chalk & Talk	Black Board
5.7	D/A converter - A/D converter	2	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholas	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA

Scholastic	**35**
Non Scholastic	**5**
	40

EVALUATION PATTERN

SCHOLASTIC					NON - SCHOLASTI C	MARKS		
C1	**C2**	**C3**	**C4**	**C5**	**C6**	**CIA**	**ESE**	**Total**
10	**10**	**5**	**5**	**5**	**5**	**40**	**60**	**100**

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

The best out of two will be taken into account

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	define the different types of number systems and explain the basic and universal logic circuits	K1, K2	PSO1& PSO2
CO 2	simplify the logic expressions using Boolean laws and Kmap	K1, K2	PSO2 & PSO3
CO 3	describe the principles behind the data processing and arithmetic circuits	K1, K2	PSO2 & PSO3
CO 4	explain the working of basic flipflops and design master slave flipflops	K2, K3	PSO3 & PSO4
CO 5	understand the working of shift registers and counters Students will be able to describe D/A and A/D conversion techniques	K2, K3	PSO4 & PSO5

COURSE DESIGNER:

1.Dr. A. Sheela Vimala Rani
2.Dr. Ancemma Joseph
3.Dr. R. Niranjana Devi

Forwarded By

Dr. A. Sheela Vimala Rani

HoD'S Signature & Name

I B.Sc.

SEMESTER –I

For those who joined in 2023 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	23P1SEC1	Physics for Everyday life	Theory	2	2

COURSE DESCRIPTION

Aim of this course is to enable the student to understand the physics concepts in day today life.

COURSE OBJECTIVES

To know where all physics principles have been put to use in daily life and appreciate the concepts with a better understanding also to know about Indian scientists who have made significant contributions to Physics.

UNIT-I **(5 HRS.)**

MECHANICAL OBJECTS:

Spring scales – bouncing balls –roller coasters – bicycles –rockets and space travel.

UNIT-II **(8 HRS.)**

OPTICAL INSTRUMENTS AND LASER

Vision corrective lenses – polaroid glasses – UV protective glass – polaroid camera – colour photography – holography and laser.

UNIT –III **(7 HRS.)**

PHYSICS OF HOME APPLIANCES:

Bulb – fan – hair drier – television – air conditioners – microwave ovens – vacuum cleaners

UNIT –IV **(4 HRS.)**

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

UNIT –V **(6 HRS.)**

INDIAN PHYSICIST AND THEIR CONTRIBUTIONS:

C.V.Raman, HomiJehangirBhabha, Vikram Sarabhai, Subrahmanyan Chandrasekhar, Venkatraman Ramakrishnan, Dr. APJ Abdul Kalam and their contribution to science and technology.

REFERENCES:

1. The Physics in our Daily Lives, UmmeAmmara, GugucoolPublishing, Hyderabad, 2019.
2. For the love of physics, Walter Lawin, Free Press, New York, 2011.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 MECHANICAL OBJECTS				
1.1	Spring scales, bouncing balls	2	Chalk & Talk	Black Board
1.2	Roller coasters, bicycles	2	Chalk & Talk	Black Board
1.3	Rockets and space travel.	1	Chalk & Talk	Black Board
UNIT – 2 OPTICAL INSTRUMENTS AND LASER				
2.1	Vision corrective lenses	2	Chalk & Talk	Black Board
2.2	Polaroid glasses	1	Chalk & Talk	Black Board
2.3	UV protective glass	1	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
2.4	Polaroid camera	1	Chalk & Talk	Black Board
2.5	Colour photography	2	Chalk & Talk	Black Board
2.6	Holography and laser	1	Discussion	Google Class room
UNIT -3 PHYSICS OF HOME APPLIANCES				
3.1	Bulb , fan ,hair drier	2	Lecture	PPT
3.2	Television	1	Chalk & Talk	Black Board
3.3	Air conditioners	1	Lecture	Black Board
3.4	Microwave ovens	1	Chalk & Talk	Black Board
3.5	Vacuum cleaners	2	Chalk & Talk	Black Board
UNIT – 4 SOLAR ENERGY				
4.1	Solar constant – General applications of solar energy	2	Chalk & Talk	Black Board
4.2	Solar water heaters – Solar Photo	1	Chalk & Talk	Black Board
4.3	Voltaic cells – General applications of solar cells.	1	Chalk & Talk	Black Board
UNIT – 5 INDIAN PHYSICIST AND THEIR CONTRIBUTIONS				
5.1	C.V.Raman, HomiJehangirBhabha	2	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
5.2	Vikram Sarabhai, Subrahmanyan Chandrasekhar,	1	Chalk & Talk	Black Board
5.3	Venkatraman Ramakrishnan	1	Chalk & Talk	Black Board
5.4	Dr. APJ Abdul Kalam and their contribution to science and technology	2	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholas	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35

Non Scholastic	**5**
	40

EVALUATION PATTERN

SCHOLASTIC					NON - SCHOLASTI C	MARKS		
C1	**C2**	**C3**	**C4**	**C5**	**C6**	**CIA**	**ESE**	**Total**
10	**10**	**5**	**5**	**5**	**5**	**40**	**60**	**100**

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

The best out of two will be taken into account

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Discuss and illustrate the importance of paying attention to the basic units of physical quantities and the standards accepted for their measurement of mechanical objects	K1, K2	PSO1
CO 2	Describe about the optical instruments and lasers	K1, K2	PSO1 & PSO3
CO 3	Understand the basic concepts of physics in home appliances	K2	PSO1, PSO2&PSO3
CO 4	Understand about solar energy	K3	PSO2 &PSO3
CO 5	To know about the Indian physicist and their contributions to the society.	K2, K3,K4	PSO3,PSO4 & PSO5

Mapping of COs with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	2	2	2	1
CO2	3	2	3	2	1
CO3	3	3	3	1	1
CO4	1	3	3	1	2
CO5	1	2	3	3	3

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	3	2	1	1
CO2	2	3	1	1
CO3	1	2	3	1
CO4	1	3	2	1
CO5	1	3	3	1

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦Weakly Correlated -**1**

COURSE DESIGNER:

Dr. I.Jeyasheela

Dr. Ancemma Joseph

Dr. J. Selvi

Forwarded By

Dr. A. SheelaVimala Rani

HoD'S Signature & Name

I B.Sc.

SEMESTER –I

For those who joined in 2023 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	23P1FC	Introductory Physics	Lecture	2	2

COURSE DESCRIPTION

Aim of this course is to enable the student to understand the basic physics concepts and serve as the foundation to complex concepts.

COURSE OBJECTIVES

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

UNIT-I **(6 HRS.)**

Vectors, scalars –examples for scalars and vectorsfrom physical quantities – addition, subtraction of vectors – resolution and resultant of vectors – units and dimensions– standard physics constants

UNIT-II **(6 HRS.)**

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

UNIT –III **(5 HRS.)**

Different forms of energy– conservation laws of momentum, energy – typesof collisions –angular momentum– alternate energy sources–real life examples

UNIT –IV **(7 HRS.)**

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

UNIT –V **(6 HRS.)**

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

TEXT BOOKS

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

BrijLaland N. Subrahmanyam, 2003, Properties of Matter, S.Chand and Co.

REFERENCEBOOKS

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

WEB RESOURCES

1. http://hyperphysics.phy-astr.gsu.edu/hbase/permot2.htmlhttps://science.nasa.gov/ems/
2. https://eesc.columbia.edu/courses/ees/climate/lectures/radiation_hays/

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1				
1.1	Vectors, scalars –examples for scalars and vectorsfrom physical quantities	2	Chalk & Talk	Black Board
1.2	Addition, subtraction of vectors – resolution and resultant of vectors	2	Chalk & Talk	Black Board
1.3	Units and dimensions– standard physics constants	2	Chalk & Talk	Black Board
UNIT – 2				
2.1	Different types of forces–gravitational, electrostatic, magnetic, electromagnetic, nuclear	2	Chalk & Talk	Black Board
2.2	Mechanical forces like, centripetal, centrifugal	2	Chalk & Talk	Black Board
2.3	Friction, tension, cohesive, adhesive forces	2	Chalk & Talk	Black Board
UNIT -3				
3.1	Different forms of energy– conservation lawsof momentum, energy	2	Lecture	PPT
3.2	Typesof collisions –angular momentum	2	Chalk & Talk	Black Board
3.3	Alternate energy sources–real life examples	1	Discussion	Classroom

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT – 4				
4.1	Types of motion– linear, projectile, circular, angular, simple harmonic motions	3	Chalk & Talk	Black Board
4.2	Satellite motion – banking of a curved roads – stream line and turbulent motions	2	Chalk & Talk	Black Board
4.3	Wave motion – comparison of light and sound waves – free, forced, damped oscillations	2	Chalk & Talk	Black Board
UNIT – 5				
5.1	Surface tension – shape of liquid drop – angle of contact – viscosity	2	Lecture	PPT
5.2	Lubricants – capillary flow – diffusion – real life examples	2	Chalk & Talk	Black Board
5.3	Properties and types of materials in daily use- conductors, insulators – thermal and electric	2	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mk	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	

	s.								
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholas	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

EVALUATION PATTERN

SCHOLASTIC					NON - SCHOLASTI C	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks

C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

The best out of two will be taken into account

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Apply concept of vectors to understand concepts of Physics and solve problems	K1,K2	PSO1& PSO2
CO 2	Appreciate different forces present in Nature while learning about phenomena related to these different forces.	K1,K2,K3	PSO1& PSO2
CO 3	Quantify energy in different process and relate momentum, velocity and energy	K1,K2	PSO1& PSO2
CO 4	Differentiate different types of motions they would encounter in	K1,K2	PSO1& PSO2

	various courses and understand their basis		
CO 5	Relate various properties of matter with their behaviour and connect them with different physical parameters involved.	K1,K2,K3	PSO1& PSO2

Mapping of COs with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	2	2	1
CO2	3	3	2	1	2
CO3	3	3	2	2	1
CO4	3	3	2	2	2
CO5	3	3	2	2	1

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	3	2	3	2
CO2	3	2	3	2
CO3	3	2	3	2
CO4	3	2	3	2
CO5	3	2	3	2

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

Ms. J. R. Sofia

Forwarded By

Dr. A. SheelaVimala Rani

HoD'S Signature & Name

I B.Sc. PHYSICS

SEMESTER II

For those who joined in 2023 onwards

PROGRAMME CODE	COURSE CODE	COURSETITLE	CATEGORY	HRS/ WEEK	CREDITS
UAPH	23P2CC3	HEAT, THERMODYNAMICS AND STATISTICAL PHYSICS	Theory	6	4

COURSE DESCRIPTION

The course provides a conceptual exposure to the fundamental principles of calorimetry, low temperature physics, thermodynamics, heat transfer, conduction and radiation, and significant topics of statistical mechanics.

COURSE OBJECTIVES

On completion of the course, the student will be able to

- Understand the physics of calorimetry and low temperature physics
- Relate the laws of thermodynamics and entropy in everyday life
- Comprehend the theory of heat transfer, conduction and radiation
- Explore the knowledge of statistical mechanics.

UNIT I **[18 HRS]**

CALORIMETRY: Specific heat capacity – specific heat capacity of gases – Meyer's relation – Joly's method for determination of C V – Regnault's method for determination of C P

LOW TEMPERATURE PHYSICS: Joule-Kelvin effect – Porous plug experiment – Joule-Thomson effect –Liquefaction of gas by Linde's Process –Adiabatic demagnetisation.

UNIT II **[18 HRS]**

THERMODYNAMICS-I Thermodynamic system – three classes of system – Zeroth law of thermodynamics – Concept of heat- Thermodynamic equilibrium (quasistatic process process) - First law of thermodynamics – Reversible and irreversible process – Heat Engines – Definition of efficiency - Carnot' s ideal heat engine – Carnot's cycle (P-V diagram) work done by the engine per cycle – efficiency – Internal combustion engine (petrol) .

UNIT III **[18 HRS]**

THERMODYNAMICS – II: Second law of thermodynamics (statement only) – Concept of entropy – Change in entropy – Change in entropy in adiabatic process – reversible cycle – Third law of thermodynamics – zero point energy – Heat death of Universe.

UNIT IV **[18 HRS]**

HEAT TRANSFER , CONDUCTION AND RADIATION: Heat transfer – Conduction – Convection – Radiation – Determination of Thermal conductivity of bad conductor – Lee's method – Radiation – thermal radiation – Applications of heat radiation – Black body –Distribution of

energy in Black body spectrum – Wien's displacement law- Rayleigh Jeans law – (statements only) - Planck's quantum postulates.

UNIT V **[18 HRS]**

STATISTICAL MECHANICS: Definition of phase-space – micro and macro states – ensembles –different types of ensembles – classical and quantum Statistics – Maxwell-Boltzmann statistics — Bose-Einstein statistics – Fermi-Dirac statistics –expression for distribution function – Definition and comparison of three statistics.

Text Book

Heat Thermodynamics and Statistical Physics - BRIJ LAL , Dr. N. SUBRAHMANYAM , P. S. HEMNE

UNIT I
Chapter 14: 14.1, 14.10, 14.11, 14.12
Chapter 2: 2.20, 2.21, 2.24 , Chapter 7 : 7.6, 7.16
UNIT II
Chapter 4 – Introduction (pg107) , 4.1 (pg 108 last para) , -4.2 – pg109 (excluding converse law) ,4.3 , 4.4 , 4.7 (law only) , 4.20 , 4.21 , 4.22 , 4.23 , 4.24, 4.32
UNIT III
Chapter 4 - 4.28 anyone statement) ,
Chapter 5 – 5.1, 5.2, 5.3, 5.4, 5.15, 5.16, 5.18
UNIT IV
Chapter 15 – Introduction – 15.10
Chapter 8 – 8.1, 8.4, 8.6, 8.13, 8.14, 8.15,8.18
UNIT V
Chapter 10: 10.4, 10.10
Chapter 11: 11.1, 11.3 Chapter 12: 12.5, 12.8

REFERENCE BOOKS

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

WEB RESOURCES

1. https://youtu.be/M_5KYncYNyc

2. https://www.youtube.com/watch?v=4M72kQulGKkandvl=en
3. Lecture 1: Thermodynamics Part 1 | Video Lectures | Statistical Mechanics I: Statistical Mechanics of Particles | Physics | MIT OpenCourseWare
4. http://www.freebookcentre.net/Physics/Physics-Books-Online.html

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT – I :CALORIMETRY AND LOW TEMPERATURE PHYSICS				
1.1	Introduction - Calorimetry	1	Chalk & Talk	Black Board
1.2	Specific heat capacity	2	Chalk & Talk	Black Board
1.3	Specific heat capacity of gases – Meyer's relation	2	Chalk & Talk	Black Board
1.4	Joly's method for determination of C V –	2	Chalk & Talk	Black Board
1.5	Regnault's method for determination of C P	2	Chalk &Talk	Black Board
1.6	LOW TEMPERATURE PHYSICS: Joule-Kelvin effect – Porous plug experiment –	3	Chalk & Talk	Black Board
1.7	Joule-Thomson effect	2		
1.8	Liquefaction of gas by Linde's Process	2	Chalk & Talk	Black Board
1.9	Adiabatic Demagnetisation	2		
UNIT -2 THERMODYNAMICS - I				
2.1	Thermodynamic system – three classes of system	2	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
2.2	Zeroth law of thermodynamics	2	Chalk & Talk	Black Board
2.3	Concept of heat- Thermodynamic equilibrium (quasistatic process process)	2	Chalk & Talk	Black Board
2.4	First law of thermodynamics –	2	Chalk & Talk	Black Board
2.5	Reversible and irreversible process – Heat Engines – Definition of efficiency -	2	Chalk & Talk	Black Board
2.6	Carnot' s ideal heat engine – Carnot's cycle (P-V diagram)	3	Chalk & Talk	Black Board
2.7	work done by the engine per cycle – efficiency –	3	Chalk & Talk	Black Board
2.8	Internal combustion engine (petrol) .	2	Chalk & Talk	Black Board
UNIT -3 THERMODYNAMICS - II				
3.1	Introduction - Second law of thermodynamics (statement only)	1	Chalk & Talk	Black Board
3.2	Concept of entropy – Change in entropy	3	Chalk & Talk	Black Board
3.3	Change in entropy in adiabatic process	3	Chalk & Talk	Black Board
3.4	Reversible cycle	3	Chalk & Talk	Black Board
3.5	Third law of thermodynamics.	3	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.6	zero point energy	3	Chalk & Talk	Black Board
3.7	Heat death of Universe	2	Chalk & Talk	Black Board
UNIT -4 HEAT TRANSFER, CONDUCTION AND RADIATION				
4.1	Heat transfer– Conduction – Convection – Radiation –	4	Chalk & Talk	Black Board
4.2	Determination of Thermal conductivity of bad conductor – Lee's method	2	Chalk & Talk	Black Board
4.3	Radiation – thermal radiation	2	Chalk & Talk	Black Board
4.4	Applications of heat radiation –	2	Chalk & Talk	Black Board
4.5	Black body –Distribution of energy in Black body spectrum	2	Chalk & Talk	Black Board
4.6	Wien's displacement law-	2	Chalk & Talk	Black Board
4.7	Rayleigh Jeans law – (statements only)	2	Chalk & Talk	Black Board
4.8	Planck's quantum postulates	2	Chalk & Talk	Black Board
UNIT -5 STATISTICAL MECHANICS				
5.1	Introduction - Definition of phase-space	2	Chalk & Talk	Black Board
5.2	micro and macro states	2	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
5.3	ensembles –different types of ensembles	2	Chalk & Talk	Black Board
5.4	classical and quantum Statistics	3	Chalk & Talk	Black Board
5.5	Maxwell-Boltzmann statistics	3	Chalk & Talk	Black Board
5.6	Bose-Einstein statistics – Fermi-Dirac statistics	4	Chalk & Talk	Black Board
5.7	Comparison of three statistics	2	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %

Non Scholas	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

EVALUATION PATTERN

SCHOLASTIC					NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks

C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

The best out of two will be taken into account

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Students will be able to comprehend the concept of calorimetry gaining knowledge on the determination of specific heat capacities of gases	K1, K3	PSO1,PSO2, PSO3
CO 2	Students will be able to understand the first and second law of thermodynamics and its application on efficiency of heat engines	K1, K2,K3	PSO1,PSO2, PSO3
CO 3	Students will be able to describe the meaning of entropy and measure the change of entropy in adiabatic processes	K2,K3	PSO2, PSO3

CO 4	Students will be able to explore into the physics of heat transfer, conduction and radiation	K1,K2,K3	PSO1,PSO2, PSO3
CO 5	Students will be able to conceptualize the basics of statistical mechanics and compare and appreciate the three statistics	K1,K3& K4	PSO1,PSO2

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	2	1
CO2	3	3	3	1	2
CO3	2	3	2	2	1
CO4	3	3	3	2	2
CO5	3	3	2	2	1

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	3	2	3	2
CO2	3	2	3	2
CO3	3	2	3	2
CO4	3	2	3	2
CO5	3	2	3	2

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

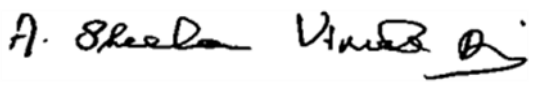
COURSE DESIGNER:

Dr.L.CarolineSugirtham

&

Dr.Ancemma Joseph

Forwarded By



Dr. A. SheelaVimala Rani

HoD'S Signature & Name

SEMESTER –II

For those who joined in 2023 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAPH	23P2CC4	Physics Practicals - II	Practical	4	2

COURSE DESCRIPTION

The course provides hands on training to work with basic physics experiments on Elasticity and heat and sound.

COURSE OBJECTIVE/S

Apply their knowledge gained about the concept of heat and sound waves and set up experimentation to verify theories , quantify and analyse and correlate the results.

LIST OF EXPERIMENTS

1) Determination of Rigidity Modulus - Static torsion(scale & telescope).
2) Determination of Rigidity Modulus of the wire - Torsional Pendulum
3) Determination of Young's Modulus - Cantilever Depression
4) Determination of Viscosity - Capillary Flow Method
5) Specific Latent Heat of Ice - Method of mixture using Barton's Correction
6) Specific Heat Capacity of liquid - Newton's Law of cooling
7) Comparison of viscosities of two liquids
8) Determination of Thermal Conductivity of Bad Conductor - Lee's disc Method

I B.Sc. Mathematics (Regular & SF)

SEMESTER –II

For those who joined in 2023 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	23P2GEM2	ALLIED PHYSICS-II	ALLIED CORE	4	3

COURSE DESCRIPTION

The course provides a conceptually based exposure to the fundamental principal and processes of significant topics of physics like Optics, Atomic physics, Nuclear Physics, Relativity and Gravitational waves and Semiconductor physics.

COURSE OBJECTIVES

This course will improve the basic concepts of optics, modern Physics, concepts of relativity and quantum physics, nuclear physics & semiconductor physics.

UNITS

UNIT I: OPTICS [12HRS]

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

UNIT –II ATOMIC PHYSICS [12HRS]

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

UNIT –III NUCLEAR PHYSICS [12HRS]

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

UNIT –IV INTRODUCTION TO RELATIVITY AND GRAVITATIONAL WAVES [12HRS]

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

UNIT –V SEMICONDUCTOR PHYSICS: [12HRS]

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

UNIT –VI DYNAMISM (Evaluation Pattern-CIA only)

Role of interference in applications-working of pocket calculators and cd players.

REFERENCES:

TEXT BOOKS

1. 1. R.Murugesan (2005), AlliedPhysics,S.ChandandCo,NewDelhi.
2. K.ThangarajandD.Jayaraman(2004), AlliedPhysics,PopularBookDepot,Chennai.
3. BrijlalandN.Subramanyam(2002), TextbookofOptics,S.ChandandCo,NewDelhi.
4. R.Murugesan (2005), ModernPhysics,S.ChandandCo,NewDelhi.
5. A.SubramaniyamAppliedElectronics, 2nd Edn.,NationalPublishingCo.,Chennai.

REFERENCE BOOKS

1. Resnick Halliday andWalker (2018), Fundamentals of Physics, 11th Edn.,JohnWilleyandSons, Asia Pvt.Ltd.,Singapore.
2. D.R.KhannaandH.R. Gulati (1979).Optics, S.ChandandCo.Ltd.,New

Delhi.

3. A.Beiser (1997), Concepts of Modern Physics, Tata McGraw Hill Publication,NewDelhi.
4. Thomas L. Floyd (2017), Digital Fundamentals, 11thEdn., Universal Book Stall, NewDelhi.
5. V.K.Metha(2004), Principles of electronics, 6thEdn. ,S.Chand and Company, New Delhi.

WEB RESOURCES

1. https://www.berkshire.com/learning-center/delta-p-facemask/https://www.youtube.com/watch?v=QrhxU47gtj4https://www.youtube.com/watch?time_continue=318andv=D38BjgUdL5Uandfeature=emb_logo
2. https://www.youtube.com/watch?v=JrRrp5F-Qu4
3. https://www.validyne.com/blog/leak-test-using-pressure-transducers/
4. https://www.atoptics.co.uk/atoptics/blsky.htm -
5. https://www.metoffice.gov.uk/weather/learn-about/weather/optical-effects

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -I OPTICS				
1.1	interference – interference in thin films –colors of thin films	1	Chalk & Talk	Black Board
1.2	air wedge – determination of diameter of a thin wire by air wedge	2	Chalk & Talk	LCD
1.3	diffraction – diffraction of light vs sound	1	Chalk & Talk	PPT & White board
1.4	normal incidence – experimental determination of wavelength using diffraction	3	Chalk & Talk	LCD

	grating (no theory) – polarization			
1.5	Polarization by double reflection	2	Chalk & Talk	Black Board
1.6	Brewster's law – optical activity – application in sugar industries	3	Chalk & Talk	Black Board
UNIT –II ATOMIC PHYSICS				
2.1	atom models – Bohr atom model	1	Chalk & Talk	Black Board
2.2	mass number – atomic number – nucleons – vector atom model – various quantum numbers	2	Chalk & Talk	Black Board
2.3	Pauli's exclusion principle – electronic configuration – periodic classification of elements	2	Chalk & Talk	Black Board
2.4	Bohr magneton – Stark effect –Zeeman effect (elementary ideas only)	2	Lecture	PPT & White Board
2.5	photo electric effect	1	Chalk & Talk	Black Board
2.6	Einstein's photoelectric equation	2	Chalk & Talk	Black Board
2.7	applications of photoelectric effect: solar cells, solar panels, optoelectric devices	2	Chalk & Talk	Black Board
UNIT –III NUCLEAR PHYSICS				

3.1	nuclear models – liquid drop model	2	Chalk & Talk	Black Board
3.2	magic numbers – shell model – nuclear energy – mass defect – binding energy – radioactivity – uses – half life – mean life - radio isotopes and uses	3	Chalk & Talk	LCD
3.3	controlled and uncontrolled chain reaction	1	Chalk & Talk	Black Board
3.4	nuclear fission – energy released in fission – chain reaction – critical reaction – critical size- atom bomb – nuclear reactor	2	Lecture	LCD
3.5	breeder reactor – importance of commissioning PFBR in our country – heavy water disposal, safety of reactors: seismic and floods	2	Chalk & Talk	Black Board
3.6	introduction to DAE, IAEA – nuclear fusion – thermonuclear reactions – differences between fission and fusion.	2	Chalk & Talk	Black Board
UNIT –IV INTRODUCTION TO RELATIVITY AND GRAVITATIONAL WAVES:				
4.1	frame of reference – postulates of special theory of relativity – Galilean transformation equations	3	Chalk & Talk	White Board

4.2	Lorentz transformation equations – derivation – length contraction – time dilation – twin paradox	3	Chalk & Talk	White Board
4.3	mass-energy equivalence –introduction on gravitational waves,	3	Chalk & Talk	Black Board
4.4	LIGO, ICTS opportunities at International Centre for Theoretical Sciences	3	Chalk & Talk	Black Board
UNIT –V SEMICONDUCTOR PHYSICS				
5.1	p-n junction diode – forward and reverse biasing – characteristic of diode – zener diode	3	Chalk & Talk	Black Board
5.2	characteristic of zener diode – voltage regulator – full wave bridge rectifier	3	Chalk & Talk	Black Board
5.3	rectifier – construction and working – advantages (no mathematical treatment)	2	Chalk & Talk	Black Board
5.4	USB cell phone charger –introduction to e-vehicles and EV charging stations	4	Chalk & Talk	Black Board

	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	%

Levels	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	Asse r
K1	2	2	-	-	-	4	-	4	10
K2	2	2	5	-	-	9	-	9	22.5
K3	3	3	-	-	5	11	-	11	27.5
K4	3	3	-	5	-	11	-	11	27.5
Non Scholas	-	-	-	-	-		5	5	12.5
Total	10	10	5	5	5	35	5	40	100

CIA	
Scholastic	35
Non Scholastic	5
	40

EVALUATION PATTERN

SCHOLASTIC					NON - SCHOLASTI C	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total

10	**10**	**5**	**5**	**5**	**5**	**40**	**60**	**100**

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

The best out of two will be taken into account

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Explain the concepts of interference diffraction using principles of superposition of waves and rephrase the concept of polarization based on wave	K1, K2	PSO1& PSO2

	patterns		
CO 2	Outline the basic foundation of different atom models and various experiments establishing quantum concepts. Relate the importance of interpreting improving theoretical models based on observation. Appreciate interdisciplinary nature of science and in solar energy related applications.	K1, K2, K3	PSO3
CO 3	Summarize the properties of nuclei, nuclear forces structure of atomic nucleus and nuclear models. Solve problems on delay rate half-life and mean-life.Interpret nuclear processes like fission and fusion. Understand the importance of nuclear energy, safety measures carried and get our Govt.agencies like DAE guiding the country in the nuclear field.	K1, K2	PSO3,PSO4
CO 4	To describe the basic concepts of relativity like equivalence principle, inertial frames and Lorentz transformation. Extend their knowledge on concepts of relativity and vice versa. Relate this with current research in this field and get an overview of research projects of National and International importance, like LIGO, ICTS, and opportunities available.	K1, K2	PSO4
CO 5	Summarize the working of semiconductor devices like junction diode, Zener diode, transistors and practical devices we daily use like USB chargers and EV charging stations.	K1, K2, K3	PSO5

Mapping of COs with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	**3**	**3**	**3**	**3**	**3**
CO2	**3**	**3**	**3**	**3**	**3**
CO3	**3**	**3**	**3**	**3**	**3**
CO4	**3**	**3**	**3**	**2**	**3**
CO5	**3**	**3**	**3**	**3**	**3**

Mapping of C0s with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	3	2	3	2
CO2	3	2	3	2
CO3	3	2	3	2
CO4	3	2	3	2
CO5	3	2	3	2

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦ Weakly Correlated -**1**

COURSE DESIGNER:

Dr. R. Niranjana Devi

Ms. J. R. Sofia

Dr. J. Selvi

Forwarded By

Dr. A. SheelaVimala Rani

HoD'S Signature & Name

I B.Sc.

SEMESTER –II

For those who joined in 2023 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS

UAPH	**23P2SE2**	**Physics for Everyday life**	**Theory**	**2**	**2**

COURSE DESCRIPTION

Aim of this course is to enable the student to understand the physics concepts in day today life.

COURSE OBJECTIVES

To know where all physics principles have been put to use in daily life and appreciate the concepts with a better understanding also to know about Indian scientists who have made significant contributions to Physics.

UNIT-I **(5 HRS.)**

MECHANICAL OBJECTS:

Spring scales – bouncing balls –roller coasters – bicycles –rockets and space travel.

UNIT-II **(8 HRS.)**

OPTICAL INSTRUMENTS AND LASER

Vision corrective lenses – polaroid glasses – UV protective glass – polaroid camera – colour photography – holography and laser.

UNIT –III **(7 HRS.)**

PHYSICS OF HOME APPLIANCES:

Bulb – fan – hair drier – television – air conditioners – microwave ovens – vacuum cleaners

UNIT –IV **(4 HRS.)**

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

UNIT –V **(6 HRS.)**

INDIAN PHYSICIST AND THEIR CONTRIBUTIONS:

C.V.Raman, HomiJehangirBhabha, Vikram Sarabhai, Subrahmanyan Chandrasekhar, Venkatraman Ramakrishnan, Dr. APJ Abdul Kalam and their contribution to science and technology.

REFERENCES:

1. The Physics in our Daily Lives, UmmeAmmara, GugucoolPublishing, Hyderabad, 2019.
2. For the love of physics, Walter Lawin, Free Press, New York, 2011.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 MECHANICAL OBJECTS:				
1.1	spring scales,bouncing balls	2	Chalk & Talk	Black Board
1.2	roller coasters, bicycles	2	Chalk & Talk	Black Board
1.3	rockets and space travel.	1	Chalk & Talk	Black Board
UNIT – 2 OPTICAL INSTRUMENTS AND LASER				
2.1	vision corrective lenses	2	Chalk & Talk	Black Board
2.2	polaroid glasses	1	Chalk & Talk	Black Board
2.3	UV protective glass	1	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
2.4	polaroid camera	1	Chalk & Talk	Black Board
2.5	colour photography	2	Chalk & Talk	Black Board
2.6	holography and laser	1	Discussion	Google Class room
UNIT -3 PHYSICS OF HOME APPLIANCES				
3.1	bulb , fan ,hair drier	2	Lecture	PPT
3.2	television	1	Chalk & Talk	Black Board
3.3	air conditioners	1	Lecture	Black Board
3.4	microwave ovens	1	Chalk & Talk	Black Board
3.5	vacuum cleaners	2	Chalk & Talk	Black Board
UNIT – 4 SOLAR ENERGY				
4.1	Solar constant – General applications of solar energy	2	Chalk & Talk	Black Board
4.2	Solar water heaters – Solar Photo	1	Chalk & Talk	Black Board
4.3	voltaic cells – General applications of solar cells.	1	Chalk & Talk	Black Board
UNIT – 5 INDIAN PHYSICIST AND THEIR CONTRIBUTIONS				

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
5.1	C.V.Raman, HomiJehangirBhabha	2	Chalk & Talk	Black Board
5.2	Vikram Sarabhai, Subrahmanyan Chandrasekhar,	1	Chalk & Talk	Black Board
5.3	Venkatraman Ramakrishnan	1	Chalk & Talk	Black Board
5.4	Dr. APJ Abdul Kalam and their contribution to science and technology	2	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	2	2	-	-	-	4	-	4	10 %

K2	**2**	**2**	**5**	**-**	**-**	**9**	-	**9**	22.5 %
K3	**3**	**3**	**-**	**-**	**5**	**11**	-	**11**	27.5 %
K4	**3**	**3**	**-**	**5**	**-**	**11**	-	**11**	27.5 %
Non Scholas	-	**-**	**-**	**-**	-		**5**	**5**	12.5 %
Total	**10**	**10**	**5**	**5**	**5**	**35**	**5**	**40**	**100 %**

CIA	
Scholastic	**35**
Non Scholastic	**5**
	40

EVALUATION PATTERN

SCHOLASTIC					**NON - SCHOLASTIC**	**MARKS**		
C1	**C2**	**C3**	**C4**	**C5**	**C6**	**CIA**	**ESE**	**Total**
10	**10**	**5**	**5**	**5**	**5**	**40**	**60**	**100**

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

The best out of two will be taken into account

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Discuss and illustrate the importance of paying attention to the basic units of physical quantities and the standards accepted for their measurement	K1, K2	PSO1
CO 2	Describe the optical instruments and lasers	K1, K2	PSO1 & PSO3

CO 3	Understand the basic concepts of physics in home appliances	K2	PSO1, PSO2&PSO3
CO 4	Under stand about the solar energy and its concepts	K3	PSO2 &PSO3
CO 5	Comprehend the attributes of Indian physicist and their contributions	K2, K3,K4	PSO3,PSO4 & PSO5

Mapping of COs with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	2	2	2	1
CO2	3	2	3	2	1
CO3	3	3	3	1	1
CO4	1	3	3	1	2
CO5	1	2	3	3	3

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	3	2	1	1
CO2	2	3	1	1
CO3	1	2	3	1
CO4	1	3	2	1
CO5	1	3	3	1

Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦Weakly Correlated -**1**

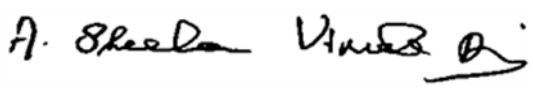
COURSE DESIGNER:

Dr. I.Jeyasheela

Dr. Ancemma Joseph

Dr. J. Selvi

Forwarded By



Dr. A. SheelaVimala Rani

HoD'S Signature & Name

I B.Sc.

SEMESTER II

For those who joined in 2023 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	21P2SE3	PHYSICS OF MEASURING INSTRUMENTS	THEORY	2	2

COURSE DESCRIPTION

This course describes the basic principles of thermodynamical and pressure measurements, aircraft instrumentation.

COURSE OBJECTIVES

This course provides conceptual physics needed for measurement of various thermodynamic quantities like temperature, pressure , density and humidity. Also it introduces wind measurement techniques and mechanical and electrical measurements comprising of temperature transducers, biosensors, chemical and optical sensors.

UNITS

UNIT –I THERMODYNAMICAL MEASUREMENTS (6 HRS.)

Temperature: Average Body Temperature – Low body temperature on health –Basal body temperature thermometer –Swine flu thermometer –Bulb thermometer-Bimetallic strip thermometer-digital thermometer

UNIT –II ATMOSPHERIC PRESSURE AND HUMIDITY(6 HRS.)

Standard atmospheric pressure-Mean sea level pressure-Altitude atmospheric pressure variation-Local atmospheric pressure variation-Atmospheric pressure based on height of water.

Density**:** Change of density with pressure and temperature-Densities of various materials.

Hygrometer-Psychrometer-Difficulty of accurate humidity measurement-Hair tension hygrometer-Electronic hygrometer-Applications.

UNIT –III AIRCRAFT INSTRUMENTATION: (6 HRS.)

Altimeter: Pressure altimeter-Radar altimeter-Other modes of transport:Measuring air pressure-Satelite altimetry

UNIT –IV WIND SPEED MEASUREMENTS (6 HRS.)

Wind speed: Factors affecting wind speed-Design of structures considering Wind Speed.

Anemometers: Velocity anemometers:Windmill anemometer-Laser Doppler anemometer -Sonic anemometerPressure anemometers**:**Plate anemometer-Tube anemometer-Effect of density on measurements:Other practical onsiderations**: Lightning-Precipitation-Low Temperatures.**

UNIT –V FORCE MEASUREMENTS- (6 HRS.)

Force: Force, Torque, Shaft power measurements-Scales and balances, Optical torsion meter, mechanical brakes-Car Brakes.

Transducers: Piezo electric Trasnducers-Temperature transducers-Resistance temperature detectors- Thermistors-Ultrasonic termperature transducers- Photoelectric transducers- The photomultiplier tube- - The semiconductor photodiode

UNIT –VI DYNAMISM (Evaluation Pattern-CIA only) (HRS.)

REFERENCES:

1.Kumar,D.S.() *Mechanical measurements and Control* Metropolitan Book Co., II Edition.

2. Larry Jones, Foster Chin,A. () *Electronic insrtuments and measurements.*

J.Wiley& sons, Inc.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**THERMODYNAMICAL MEASUREMENTS**			
1.1	Average Body Temperature – Low body temperature on health	1	Lecture & Chalk & Talk	Black Board
1.2	Basal body temperature thermometer –	1	Chalk & Talk	Black Board & LCD
1.3	Swine flu thermometer	1	Chalk &Talk , Lecture	PPT & Blackboard
1.4	Bulb thermometer	1	Chalk & Talk	Black Board
1.5	Bimetallic strip thermometer.	1	Chalk & Talk	Black Board
1.6	digital thermometer	1	Chalk & Talk	Black Board
UNIT -2	**ATMOSPHERIC PRESSURE AND HUMIDITY**			
2.1	Standard atmospheric pressure-Mean sea level pressure	1	Chalk & Talk	Black Board
2.2	Altitude atmospheric pressure variation-Local atmospheric pressure variation	1	Chalk & Talk	Black Board
2.3	Atmospheric pressure based on height of water	1	Chalk & Talk	Black Board
2.4	Density**:** Change of density with pressure and temperature - Densities of various materials.	1	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
2.5	Humidity: Hygrometer-Psychrometer, Difficulty of accurate humidity measurement	1	Chalk & Talk	Black Board
2.6	Hair tension hygrometer-Electronic hygrometer-Applications.	1	Lecture & Chalk & Talk	LCD & Black Board
UNIT -3 AIRCRAFT INSTRUMENTATION				
3.1	Altimeter: Pressure altimeter	2	Lecture & Chalk & Talk	LCD & Black Board
3.2	Radar altimeter-Other modes of transport:	2	Chalk & Talk	Black Board
3.3	Measuring air pressure-Sattelite altimetry-	2	Chalk & Talk	Black Board
UNIT -4 WINDSPEED MEASUREMENTS				
4.1	Factors affecting wind speed - Design of structures considering Wind Speed.	1	Chalk & Talk	Black Board
4.2	**:** Velocity anemometers:Windmill anemometer - Laser Doppler anemometer -Sonic	2	Lecture	LCD

	Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
		anemometer			

	4.3	Pressure anemometers:Plate anemometer-Tube anemometer	1	Chalk & Talk	Black Board
	4.4	-Effect of density on measurements:	1	Chalk & Talk	Black Board
	4.5	Lightning-Precipitation-Low Temperatures.	2	Chalk & Talk	Black Board
	UNIT -5 FORCE MEASUREMENTS				
	5.1	Force, Torque, Shaft power measurements	1	Chalk & Talk	Black Board
	5.2	Scales and balances, Optical torsion meter,	1	Chalk & Talk	Black Board
	5.3	mechanical brakes-Car Brakes.	1	Chalk & Talk	Black Board
	5.4	Piezoelectric Trasnducers-Temperature transducers	1	Chalk & Talk	Black Board
	5.5	Resistance temperature detectors- Thermistors-Ultrasonic termperature transducers- Photoelectric transducers	1	Chalk & Talk	Black Board
	5.6	The photomultiplier tube- - The semiconductor photodiode	1	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1	T2	Quiz	Assignment	OBT/PPT				
	10 Mk	10 Mks.	5 Mks.	5 Mks	5 Mks	35 Mks.	5 Mks.	40Mks.	

	s.								
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non Scholas	-	-	-	-	-		5	5	12.5 %
Total	10	10	5	5	5	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

EVALUATION PATTERN

SCHOLASTIC					NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

UG CIA Components

			Nos		
C1	-	Test (CIA 1)	1	-	10 Mks
C2	-	Test (CIA 2)	1	-	10 Mks
C3	-	Assignment	1	-	5 Mks
C4	-	Open Book Test/PPT	2 *	-	5 Mks
C5	-	Quiz	2 *	-	5 Mks
C6	-	Attendance		-	5 Mks

The best out of two will be taken into account

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Describe the qualitative aspects of thermodynamic quantities temperature and its measurement techniques.	K1	PSO1& PSO2
Co2	Describe the qualitative aspects ofpressure , density and humidity and their measurement technique.	K1,K2&K3	PSO2 &PSO3
CO 3	Explain a basic idea of aircraft instrumentation	K1, K2,	PSO4&PSO5

CO 4	list the factors affecting wind speed and gain insight on wind speed	K1 & K3	PSO2&PSO3
CO5	Discuss the mechanical and electrical instruments comprising of temperature and transducers	K1,K2&K3	PSO3, PSO4 &PSO5

Mapping COs Consistency with PSOs

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	2	2	2
CO2	2	3	3	2	3
CO3	1	1	2	3	3
CO4	1	3	3	1	2
CO5	1	2	3	3	3

Mapping of COs with Pos

CO/ PSO	PO1	PO2	PO3	PO4
CO1	3	2	1	1
CO2	2	3	1	1
CO3	1	2	3	1
CO4	1	3	2	1
CO5	1	3	3	1

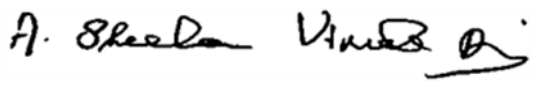
Note: ♦ Strongly Correlated – **3** ♦ Moderately Correlated – **2**

♦Weakly Correlated -**1**

COURSE DESIGNER:

Dr. J. Selvi

Forwarded By



Dr. A. SheelaVimala Rani