FATIMA COLLEGE (AUTONOMOUS)

Re-Accredited with "A" Grade by NAAC (3rd Cycle)
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. PHYSICS

PROGRAMME CODE : UAPH

ACADEMIC YEAR : 2023-2024

VISION OF THE DEPARTMENT

Educating and empowering the youth and to let them excel in all fields of Physics.

MISSION OF THE DEPARTMENT

- To ignite the young minds and impart quality education in basic Physics
- To promote enthusiasm in the study of physics through innovative and dedicated teaching methodologies
- To discover the budding talents in theoretical and experimental physics and ensure their global competency
- To provide a stimulating environment and strengthen basic and application oriented research aptitude among the students.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

A graduate of B.Sc. Physics programme after three years will be

PEO 1	Our graduates will be academic, digital and information literates, creative, inquisitive, innovative and desirous for the "more" in all aspects
PEO 2	They will be efficient individual and team performers, exhibiting progress, flexibility, transparency and accountability in their professional work
PEO 3	The graduates will be effective managers of all sorts of real – life and professional circumstances, making ethical decisions, pursuing excellence within the time framework and demonstrating apt leadership skills
PEO 4	They will engage locally and globally evincing social and environmental stewardship demonstrating civic responsibilities and employing right skills at the right moment.

GRADUATE ATTRIBUTES (GA)

Fatima College empowers her women graduates holistically. A Fatimite achieves all-round empowerment by acquiring Social, Professional and Ethical competencies. A graduate would sustain and nurture the following attributes:

I. SOCIAL COMPETENCE

GA 1	Deep disciplinary expertise with a wide range of academic and digital literacy
GA 2	Hone creativity, passion for innovation and aspire excellence
GA 3	Enthusiasm towards emancipation and empowerment of humanity
GA 4	Potentials of being independent
GA 5	Intellectual competence and inquisitiveness with problem solving abilities befitting the field of research
GA 6	Effectiveness in different forms of communications to be employed in personal and professional environments through varied platforms
GA 7	Communicative competence with civic, professional and cyber dignity and decorum
GA 8	Integrity respecting the diversity and pluralism in societies, cultures and religions
GA 9	All – inclusive skill sets to interpret, analyse and solve social and environmental issues in diverse environments
GA 10	Self awareness that would enable them to recognise their uniqueness through continuous self-assessment in order to face and make changes building on their strengths and improving their weaknesses
GA 11	Finesse to co-operate exhibiting team-spirit while working in groups to achieve goals
GA 12	Dexterity in self-management to control their selves in attaining the kind of life that they dream for
GA 13	Resilience to rise up instantly from their intimidating setbacks
GA 14	Virtuosity to use their personal and intellectual autonomy in being life-long learners
GA 15	Digital learning and research attributes
GA 16	Cyber security competence reflecting compassion, care and concern towards the marginalized
GA 17	Rectitude to use digital technology reflecting civic and social responsibilities in local, national and global scenario

II. PROFESSIONAL COMPETENCE	
GA 18	Optimism, flexibility and diligence that would make them professionally competent
GA 19	Prowess to be successful entrepreuners and become employees of trans-national societies
GA 20	Excellence in Local and Global Job Markets
GA 21	Effectiveness in Time Management
GA 22	Efficiency in taking up Initiatives
GA 23	Eagerness to deliver excellent service
GA 24	Managerial Skills to Identify, Commend and tap Potentials
III. ETHICAL COMPETENCE	
GA 25	Integrity and be disciplined in bringing stability leading a systematic life promoting good human behaviour to build better society
GA 26	Honesty in words and deeds
GA 27	Transparency revealing one's own character as well as self-esteem to lead a genuine and authentic life
GA 28	Social and Environmental Stewardship
GA 29	Readiness to make ethical decisions consistently from the galore of conflicting choices paying heed to their conscience
GA 30	Right life skills at the right moment

PROGRAMME OUTCOMES (PO)

The learners will be able to

PO 1	Apply acquired scientific knowledge to solve complex issues.
PO 2	Attain Analytical skills to solve complex cultural, societal and environmental issues.
PO 3	Employ latest and updated tools and technologies to analyse complex issues.
PO 4	Demonstrate Professional Ethics that foster Community, Nation and Environment Building Initiatives.

PROGRAMME SPECIFIC OUTCOMES (PSO)

On completion of **B.Sc. Physics** programme, the graduates would be able to

PSO 1	Acquire thorough knowledge of the basic concepts of the frontier areas of Physics comprising Mechanics, Properties of matter, Electromagnetism, Electronics, Thermodynamics, Modern Physics, optics, Medical Physics and Opto electronics.
PSO 2	Understand and solve the physics problems in everyday life using the acquired basic knowledge.
PSO 3	Develope skills to perform experiments based on the theoretical understanding
PSO 4	Apply the knowledge acquired to analyse and design models in the versatile realm of physics.
PSO 5	• Equip with the essential foundations for higher education and research in physics.

FATIMA COLLEGE (AUTONOMOUS), MADURAI-18

DEPARTMENT OF PHYSICS

For those who joined in June 2019 onwards

PROGRAMME CODE :UAPH

PART – I – TAMIL / FRENCH / HINDI– 12 CREDITS

PART – I – TAMIL

Offered by The Research Centre of Tamil

S. NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDIT	CIA Mks	ESE Mks	TOT. MKs
1.	I	21TL1C1	Language-Modern Literature	5	3	40	60	100
2.	II	21TL2C2	Language - Bakthi Literature	5	3	40	60	100
3.	III	19TL3C3	Language- Epic Literature	5	3	40	60	100
4.	IV	19TL4C4	Language-Sangam Literature	5	3	40	60	100
			Total	20	12			

PART – I – FRENCH

Offered by The Department of French

S. NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDIT	CIA Mks	ESE Mks	TOT. MKs
1.	I	21RL1C1	PART 1 LANGUAGE FRENCH	5	3	40	60	100
2.	II	21RL2C2	PART 1 LANGUAGE FRENCH	5	3	40	60	100
3.	III	19RL3C3	PART 1 LANGUAGE FRENCH	5	3	40	60	100
4.	IV	19RL4C4	PART 1 LANGUAGE FRENCH	5	3	40	60	100
			Total	20	12			

PART – I – HINDI

Offered by The Department of Hindi

S. NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDIT	CIA Mks	ESE Mks	TOT. MKs
1.	I	21DL1C1	PART 1 LANGUAGE HINDI	5	3	40	60	100
2.	II	21DL2C2	PART 1 LANGUAGE HINDI	5	3	40	60	100
3.	III	19DL3C3	PART 1 LANGUAGE HINDI	5	3	40	60	100
4.	IV	19DL4C4	PART 1 LANGUAGE HINDI	5	3	40	60	100
			Total	20	12			

PART – II -ENGLISH – 12 CREDITS

Offered by The Research Centre of English

S. NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDIT	CIA Mks	ESE Mks	TOT. MKs
1.	I	21EL1LB	BASIC COMMUNICATIVE ENGLISH	5	3	40	60	100
2.		21EL1LI	INTERMEDIATE COMMUNICATIVE ENGLISH	5	3	40	60	100
3.		21EL1LA	ADVANCED COMMUNICATIVE ENGLISH	5	3	40	60	100
4.	II	21EL2LB	ENGLISH COMMUNICATION SKILLS (BASIC)	5	3	40	60	100
5.		21EL2LI	ENGLISH FOR EMPOWERMENT (INTERMEDIATE)	5	3	40	60	100
6.		21EL2LA	ENGLISH FOR CREATIVE WRITING (ADVANCED)	5	3	40	60	100
7.	III	19EL3LN	ENGLISH FOR DIGITAL ERA	5	3	40	60	100
8.	IV	19EL4LN	ENGLISH FOR INTEGRATED DEVELOPMENT	5	3	40	60	100
			Total	**20**	**12**			

PART – III -MAJOR, ALLIED & ELECTIVES – 95 CREDITS

MAJOR CORE COURSES INCLUDING PRACTICALS : 60 CREDITS

S.NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDIT	CIA Mks	ESE Mks	TOT. Mks
1.	I	23P1CC1	Properties of Matter and Sound	6	4	40	60	100
2.		23P1CC2	Physics Practicals-I	3	3	40	60	100
3.		23P1FC	Introductory Physics	2	2	40	60	100
4.	II	23P2CC3	Heat,Thermodynamics and Statistical physics	6	4	40	60	100
5.		23P2CC4	Physics Practicals –II	3	3	40	60	100
6.	III	19P3CC7	Electromagnetism	5	4	40	60	100
7.		19P3CC8	Solid State Physics	4	3	40	60	100
8.		19P3CC9	Major Practicals – III	3	2	40	60	100
9.	IV	19P4CC10	Analog Electronics	5	4	40	60	100
10.		***22***P4CC11	Mathematical Physics	4	3	40	60	100
11.		19P4CC12	Major Practicals – IV	3	2	40	60	100
12.	V	19P5CC13	Digital Electronics and Communication	6	4	40	60	100
13.		19P5CC14	Optics	6	4	40	60	100
14.		19P5CC15	Major Practicals – V (Electronics)	4	2	40	60	100
15.		19P5CC16	Major Practicals – VI (Non Electronics)	4	2	40	60	100
16.	VI	19P6CC17	Thermodynamics &Statistical Mechanics	5	4	40	60	100

S.NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDIT	CIA Mks	ESE Mks	TOT. Mks
17.		19P6CC18	Modern Physics	5	4	40	60	100
18.		19P6CC19	Major Practicals – VII(Electronics)	3	2	40	60	100
19.		19P6CC20	Major Practicals - VIII (Non Elec)	3	2	40	60	100

ALLIEDCOURSES- 20 CREDITS

S.NO	SEM.	COURSECODE	COURSE TITLE	HRS	CREDIT	CIA Mks	ESE Mks	TOT. MKS
1.	I	23P1GEM1	Allied Physics – I	4	4	40	60	100
2. 3.		23P1GE2	Digital Logic Fundamentals	5	4	40	60	100
		23P1GEM2	Allied Physics Practicals-I	2	2	40	60	100
4.	II	23P2GEM3	Allied Physics – II	4	4	40	60	100
5.		23P2GEM4	Allied Physics Practicals-II	2	2	40	60	100
6.	III	21P3ACM1/ 23P1GEG1	Allied Physics – I	3	3	40	60	100
7.		21P3ACM2/ 23P1GEG2	Allied Physics Practicals –I	2	2	40	60	100
8.	IV	21P4ACM3/ 23P2GEG3	Allied Physics –II	3	3	40	60	100
9.		21P4ACM4/ 23P2GEG4	Allied Physics Practicals – II	2	2	40	60	100

ELECTIVES-15 CREDITS

S.No	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDIT	CIA Mks	ESE Mks	TOT. Mks
1.	V	19B5MEP1 (Offered by Computer Science)	Programming With C	5	5	40	60	100
2.		19B5MEP2 (Offered by Computer Science)	Web Development	5	5	40	60	100
3.	VI	19P6ME1 / 19P6ME2	Microprocessor / Medical Physics	5	5	40	60	100
4.		19P6ME3/ 19P6ME4	Optoelectronics / Energy Physics	5	5	40	60	100

PART – IV – 20 CREDITS

- **VALUE EDUCATION**
- **ENVIRONMENTAL AWARENESS**
- **NON MAJOR ELECTIVE**
- **SKILL BASED COURSES**

S. No	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDIT	CIA Mks	ESE Mks	TOT. Mks
1.	I	21G1VE1	Personal Values	1	1	40	60	100
2.		23P1SE1	Non Major Elective – "Physics for Everyday Life"(Offered to other major Students)	2	2	40	60	100
3.		23P2SE3	Physics of Measuring instruments	2	2	40	60	100
4.	II	21G2VE2	Values for Life	1	1	40	60	100

S. No	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDIT	CIA Mks	ESE Mks	TOT. Mks
5.		23P2SE2	Non Major Elective -- "Physics for Everyday Life"(Offered to other major Students)	2	2	40	60	100
5.	III	21G3EE1	Environmental Education	1	1	40	60	100
6.		19P3SB1	Skill based –Bio mechanics	2	2	40	60	100
7.	IV	21G4EE2	Gender Studies	1	1	40	60	100
8.		22P4SB2	Skill based – Solar cell and its applications	2	2	40	60	100
9.	V	19P5SB3	Skill based –Physics of measuring instruments	2	2	40	60	100
10.		19P5SB4	Skill based –Physics of medical instruments	2	2	40	60	100
11.	VI	19P6SB5	Skill based - Physics of Advanced Instrumentation	2	2	40	60	100
12.		19P6SB6	Skill based -Physics of advanced Medical Instruments	2	2	40	60	100

PART – V – 1 CREDIT

OFF-CLASS PROGRAMMES - ALL PART-V

SHIFT - I

S. No	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDIT	TOT. Mks
1.	I - IV	**21A4PED**	Physical Education	30/	1	100

2.		**21A4NSS**	NSS	SEM		
3.		**21A4NCC**	NCC			
4.		**21A4WEC**	Women Empowerment Cell			
5.		**21A4ACUF**	AICUF			

ADD-ON COURSES

COURSE CODE	Courses	Hrs.	Credits	Semester in which the course is offered	CIA Mks	ESE Marks	Total Marks
21UAD1CA	**COMPUTER APPLICATIONS (**offered by The department of PGDCA for Shift I)	40	2	I & II	40	60	100
21UADFCA	**ONLINE SELF LEARNING COURSE-** Foundation Course for Arts	40	3	I	50	-	50
21UADFCS	**ONLINE SELF LEARNING COURSE-** Foundation Course for Science	40	3	II	50	-	50
21UAD3ES & 21UAD4ES	**ETHICAL STUDIES-** Professional Ethics	15	2	III&IV	50 each Semester	-	100

COURSE CODE	Courses	Hrs.	Credits	Semester in which the course is offered	CIA Mks	ESE Marks	Total Marks
21UAD5ES & 21UAD6ES	**ETHICAL STUDIES**	15	2	V&VI	50 each Semester	-	100
21UAD5HR	**HUMAN RIGHTS**	15	2	V	-	-	100
21UAD6RS	**OUTREACH PROGRAMME-** Reach Out to Society through Action **ROSA**	100	3	V & VI	-	-	100
21UAD6PR	**PROJECT**	30	4	VI	40	60	100
21UAD6RC	**READING CULTURE**	10/Semester	1	II-VI	-	-	-
	MOOC COURSES(Department Specific Courses) * Students can opt other than the listed course from UGC-SWAYAM UGC / CEC	-	Minimum 2 Credits	-	-	-	
	TOTAL		20 +				

EXTRA CREDIT COURSE

Course Code	Courses	Hrs.	Credits	Semester in which the course is offered	CIA Mks	ESE Mks	Total Marks
19UGSLP1	**SELF LEARNING COURSE for ADVANCE LEARNERS** **Nanoscience and Nanotechnolgy** **(offered for III UG)**	-	2	V	40	60	100
21UGSLP2	**AMAZING UNIVERSE AND INDIAN SPACE MISSIONS**	-	2	II	40	60	100
21UGIDPB1	**FUNDAMENTALS & PROGRAMMING OF MICROPROCESSOR 8085**	-	2	IV	40	60	100
21UGIDPM1	SPACE SCIENCE	-	2	VI	40	60	100

VALUE ADDED COURSES

19UGVA P1 - Crash Course on 'Digital Photography'
19UGVA CP1 - Certificate Course on 'Mobile Servicing'

I B.Sc. PHYSICS

SEMESTER I

For those who joined in 2023 onwards

PROGRAMME CODE	COURSE CODE	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

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.3	Poiseuille's Method for Coefficient of Viscosity -	4	Chalk & Talk	Black Board
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

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
5.3	-Doppler effect- observer at rest and source in motion- source at rest and observer in motion-	4	Chalk & Talk	Black Board
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 - 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	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 C0s 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

EVALUATION PATTERN

MARKS		
CIA	**ESE**	**Total**
40	**60**	**100**

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	Discussion	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	Discussion	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	1	Lecture	PPT & White Board

	formation–shape, size and lifetime			
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	Discussion	Black Board
3.6	Entropy – change of entropy in reversible and irreversible process.	2	Discussion	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	Discussion	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 - 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	PSOs ADDRESSED

		TAXONOMY)	
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 flowtemperaturephysicsinthebackgroundofgrowthof this technology.	K1, K2	PSO3
CO 4	Articulate the knowledge about electric current resistance,capacitance in terms of potential electric field and electric correlatetheconnectionbetweenelectricfieldandmagneticfieldandanalyzethemmathematicallyverifycircuitsandapplytheconcepts toconstructcircuitsandstudythem.	K1, K2	PSO4
CO 5	Interpret the real life solutions using AND, OR, NOT basiclogicgatesandintendtheirideastouniversalbuildingblocks. InferoperationsusingBooleanalgebraandacquireelementaryideasofICcircuits.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

IB.SCMaths(Regular&SF)

ISEMESTER

Forthosewhojoinedin2023onwards

PROGRAMMECODE	COURSE CODE	COURSETITLE	CATEGORY	HRS/ WEEK	CREDITS
UAPH	23P1GEM2	ALLIEDPHYSICSPRACTICAL S–I	PRACTICALS	2	1

COURSEDESCRIPTION

The course provides hands on training in Physics experiments relevant to the theory learnt in allied core courses.

COURSEOBJECTIVES

Thiscourseenablesthestudentstodevelopbasiclabskills.

LISTOFEXPERIMENTS(Anyeight)

1. Comparisonofcoefficientofviscosityoftwoliquids-Burette method
2. DeterminationofSurfaceTension–DropWeightmethod
3. Specific heat capacity of a liquid-half time correction
4. DeterminationofYoung'sModulus– Non-Uniformbending(Pin and Microscope)
5. Determinationofrigiditymodulus–TorsionPendulum
6. Verification of laws of transverse vibrations using sonometer
7. LowrangeVoltmetercalibrationusingPotentiometer
8. VerificationofAND,OR,NOT,NANDandNORgates
9. Verificationof De Morgan's theorem
10. NANDasuniversalgate

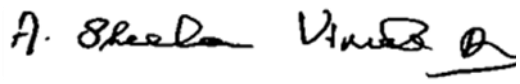
EVALUATIONPATTERN

MARKS		
CIA	ESE	Total
40	60	100

COURSEDESIGNER:

Dr. R. Niranjana Devi
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	Discussion	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 - 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	define the different types of number systems and explain the basic and	K1, K2	PSO1& PSO2

	universal logic circuits		
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	23P1SE1	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
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

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

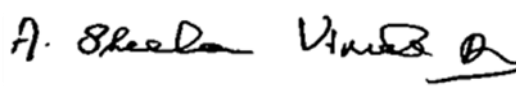
COURSE DESIGNER:

Dr. I.Jeyasheela

Dr. Ancemma Joseph

Dr. J. Selvi

Forwarded By



Dr. A. SheelaVimala Rani

HoD'S Signature & Name

I B.Sc.

SEMESTER –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 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	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 various courses and understand their basis	K1,K2	PSO1& PSO2
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	COURSECODE	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

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

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
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
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	2	Chalk &	Black

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	energy in Black body spectrum		Talk	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
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, 11th Edn., Universal Book Stall, NewDelhi.
5. V.K.Metha(2004), Principles of electronics, 6th Edn. ,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.youutube.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	**i**nterference – 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 grating (no theory) – polarization	3	Chalk & Talk	LCD
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	2	Chalk & Talk	Black Board

	elements			
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	2	Chalk & Talk	Black Board

	disposal, safety of reactors: seismic and floods			
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

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	PSOs ADDRES

		LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	SED
CO 1	Explain the concepts of interference diffraction using principles of superposition of waves and rephrase the concept of polarization based on wave patterns	K1, K2	PSO1& PSO2
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 BscMaths Regular and SF

II Semester

Forthosewhojoinedin2023onwards

PROGRAMMECODE	COURSECODE	COURSETITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	23P2GEM3	ALLIEDPHYSICSPRACTICALS –II	PRACTICALS	2	1

COURSEDESCRIPTION

ThecourseprovideshandsontraininginPhysicsexperimentsrelevanttothetheoryle arntinalliedcourses.

COURSEOBJECTIVES

Thiscourseenablesthestudentstodevelopbasiclabskills.

LISTOFEXPERIMENTS(Anyeight)

1. Refractive index of liquid using liquid prism
2. Characterization of Zener diode
3. Airwedge -Determinationofthicknessof wire
4. Diodecharacteristics–(Forward&Reversebias)
5. Ohm'slawverification
6. Coefficient of viscosity of a liquid-Poiseuille's method
7. Verificationof Booleanexpressions
8. NORasuniversalgate

9.Thermal conductivity of poor conductor using Lee's Disc

10.Young's modulus by non-uniform bending using optic lever, scale and telescope.

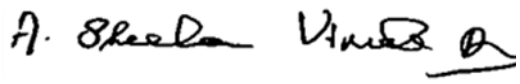
EVALUATIONPATTERN

MARKS		
CIA	**ESE**	**Total**
40	**60**	**100**

COURSEDESIGNER:

Dr. R. Niranjana Devi
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
2.4	polaroid camera	1	Chalk & Talk	Black Board
2.5	colour photography	2	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
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
5.2	Vikram Sarabhai,	1	Chalk &	Black

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	Subrahmanyan Chandrasekhar,		Talk	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 C0s with POs

CO/	PO1	PO2	PO3	PO4

PSO				
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 BscMaths Regular and SF

II Semester

Forthosewhojoinedin2023onwards

PROGRAMMECODE	COURSE CODE	COURSETITLE	CATEGORY	HRS/ WEEK	CREDITS
UAPH	23P2GEM4	ALLIEDPHYSICSPRACTICALS –II	PRACTICALS	2	1

COURSEDESCRIPTION

ThecourseprovideshandsontraininginPhysicsexperimentsrelevanttothetheoryle arntinalliedcourses.

COURSEOBJECTIVES

Thiscourseenablesthestudentstodevelopbasiclabskills.

LISTOFEXPERIMENTS(Anyeight)

1. Refractive index of liquid using liquid prism
2. Characterization of Zener diode
3. Airwedge -Determinationofthicknessof wire
4. Diodecharacteristics–(Forward&Reversebias)
5. Ohm'slawverification
6. Coefficient of viscosity of a liquid-Poiseuille's method
7. Verificationof Booleanexpressions
8. NORasuniversalgate

9.Thermal conductivity of poor conductor using Lee's Disc

10.Young's modulus by non-uniform bending using optic lever, scale and telescope.

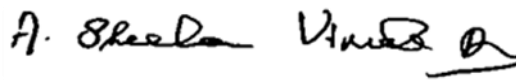
EVALUATIONPATTERN

MARKS		
CIA	**ESE**	**Total**
40	**60**	**100**

COURSEDESIGNER:

Dr. R. Niranjana Devi
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**

I B.Sc.

SEMESTER II

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	23P2SE3	PHYSICS OF MEASURING INSTRUMENTS	THEORY	2	2

For those who joined in 2023 onwards

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 modesof 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 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	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 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. J. Selvi

Forwarded By

Dr. A. SheelaVimala Rani

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	21P3ACM1/ 23P1GEG1	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	3	Lecture	LCD

	AC frequency using sonometer (steel and brass wires)			
1.5	Ultrasound – production – piezoelectric method – application of ultrasonics: medical field – lithotripsy	2	Discussion	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	Discussion	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	Discussion	Black Board
3.6	Entropy – change of entropy in reversible and irreversible process.	2	Discussion	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	Discussion	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 –	3	Real model	Apparatus

	Boolean algebra		in Lab	
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 - 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	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 flowtemperaturephysicsinthebackgroundofgrowthof this technology.	K1, K2	PSO3
CO 4	Articulate the knowledge about electric current resistance,capacitance in terms of potential electric field and electric	K1, K2	PSO4

	correlatetheconnectionbetweenelectricfieldandmagneticfieldandanalyzethemmathematicallyverifycircuitsandapplytheconcepts toconstructcircuitsandstudythem.		
CO 5	Interpret the real life solutions using AND, OR, NOT basiclogicgatesandintendtheirideastouniversalbuildingblocks. InferoperationsusingBooleanalgebraandacquireelementaryideasofICcircuits.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

IB.SCMaths (Regular&SF)
I SEMESTER
For those who joined in 2023 onwards

PROGRAMMECODE	COURSE CODE	COURSETITLE	CATEGORY	HRS/ WEEK	CREDITS
UAPH	21P3ACM2/ 23P1GEG2	ALLIEDPHYSICSPRACTICAL S–I	PRACTICALS	2	1

COURSEDESCRIPTION

The course provides hands on training in Physics experiments relevant to the theory learnt in allied core courses.

COURSEOBJECTIVES

This course enables the students to develop basic lab skills.

LISTOFEXPERIMENTS(Anyeight)

1. Comparison of coefficient of viscosity of two liquids-Burette method
2. Determination of Surface Tension–Drop Weight method
3. Specific heat capacity of a liquid-half time correction
4. Determination of Young's Modulus– Non-Uniform bending(Pin and Microscope)
5. Determination of rigidity modulus–Torsion Pendulum
6. Verification of laws of transverse vibrations using sonometer
7. Low range Voltmeter calibration using Potentiometer
8. Verification of AND,OR,NOT,NAND and NOR gates
9. Verification of De Morgan's theorem

10. NAND as universal gate

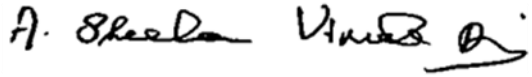
EVALUATIONPATTERN

MARKS		
CIA	**ESE**	**Total**
40	**60**	**100**

COURSEDESIGNER:

Dr. R. Niranjana Devi
Dr. J.Selvi

Forwarded By



Dr. A. SheelaVimala Rani

HoD'S Signature & Name

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	**21P4ACM3/ 23P2GEG3**	**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, 11th Edn., Universal Book Stall, NewDelhi.
5. V.K.Metha(2004), Principles of electronics, 6th Edn. ,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	**i**nterference – 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 grating (no theory) – polarization	3	Chalk & Talk	LCD
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	2	Chalk & Talk	Black Board

	fission and fusion.			
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

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	Explain the concepts of interference diffraction using principles of superposition of waves and rephrase the concept of polarization based on wave patterns	K1, K2	PSO1& PSO2
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**

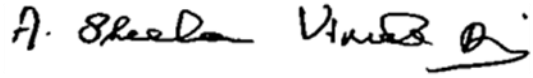
COURSE DESIGNER:

Dr. R. Niranjana Devi

Ms. J. R. Sofia

Dr. J. Selvi

Forwarded By



Dr. A. SheelaVimala Rani

HoD'S Signature & Name

I & II BscMaths and SF

II Semester

For those who joined in 2023 onwards

PROGRAMMECODE	COURSE CODE	COURSETITLE	CATEGORY	HRS/ WEEK	CREDITS
UAPH	21P4ACM4/ 23P2GEG4	ALLIEDPHYSICSPRACTICALS –II	PRACTICALS	2	1

COURSEDESCRIPTION

The course provides hands on training in Physics experiments relevant to the theory learnt in allied courses.

COURSEOBJECTIVES

This course enables the students to develop basic lab skills.

LIST OF EXPERIMENTS(Anyeight)

1. Refractive index of liquid using liquid prism

2. Characterization of Zener diode

3. Airwedge -Determinationofthicknessof wire

4. Diodecharacteristics–(Forward&Reversebias)

5. Ohm'slawverification

6. Coefficient of viscosity of a liquid-Poiseuille's method

7. Verificationof Booleanexpressions

8. NORasuniversalgate

9.Thermal conductivity of poor conductor using Lee's Disc

10.Young's modulus by non-uniform bending using optic lever, scale and telescope.

EVALUATIONPATTERN

MARKS		
CIA	**ESE**	**Total**
40	**60**	**100**

COURSEDESIGNER:

Dr. R. Niranjana Devi
Dr. J.Selvi

Forwarded By

Dr. A. SheelaVimala Rani

HoD'S Signature & Name

EVALUATION PATTERN

MARKS		
CIA	**ESE**	**Total**
40	**60**	**100**

Forwarded By

HoD'S Signature & Name

II B.Sc.

SEMESTER –III

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	19P3CC7	Electromagnetism	Theory	5	4

COURSE DESCRIPTION

This course provides an exposure to electric field, electric potential energy, magnetic field, magnetic field of current, magnetic dipole moment, magnetization and Maxwell's electromagnetic waves

COURSE OBJECTIVES

This course deals with fundamentals of electricity, magnetism and electromagnetic theory based on Maxwell's equations

UNITS

UNIT –I THE ELECTRIC FIELD (12 HRS.)

Coulomb's law - Coulomb's law: Vector form - The electric field - The electric field of point charges-The Electric dipole – Electric field of continuous charge distributions- A Uniform line of charge – A uniform ring or disk of charge – An infinite sheet of charge – A uniform spherical shell of charge – Electric field lines - A dipole in an electric field

UNIT –II GAUSS'S LAW, ELECTRIC POTENTIAL ENERGY AND ELECTRIC POTENTIAL (18 HRS.)

Gauss's law- Gauss's law and Coulomb's law-Applications of Gauss's law – Infinite line of charge – Infinite sheet of charge- A spherical shell of charge

Electric potential –Calculating the potential from the field – Potential due to point charges – Potential due to electric dipole - Electric potential of

continuous charge distributions–A uniform line of charge – A ring of charge – A charged disk - Equipotential surfaces

UNIT –III THE MAGNETIC FIELD, THE MAGNETIC FIELD OF A CURRENT (15 HRS.)

Magnetic interactions and magnetic poles - Magnetic force on a moving charge - Circulating charges –cyclotron - The Hall effect – Magnetic force on a current carrying wire– Torque on a current loop. The magnetic field of a current- A straight wire segment – A circular current loop - Ampere's law- Applications of Ampere's law

UNIT –IV FARADAY'S LAW OF INDUCTION, MAGNETIC PROPERTIES OF MATERIALS (15 HRS.)

Faraday's experiments – Faraday's law of induction – Lenz's law – Motional emf – Eddy currents - Generators and motors.The magnetic dipole –The force on a diole in a nonuniform field- Atomic and nuclear magnetism – Magnetization – Magnetic materials: Paramagnetism – Diamagnetism- Ferromagnetism-Gauss's law for magnetism.

UNIT –V MAXWELL'S EQUATIONS AND ELECTROMAGNETIC WAVES (15 HRS.)

The basic equations of electromagnetism- Induced magnetic field and displacement current- Maxwell's equations- Generating an electromagnetic wave- Traveling waves and Maxwell's equations- Energy transport and Poynting vector.

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

Invention of Leyden jar, Formulation of quantitative laws of electrostatics and magnetostatics,Development of electromagnetic technology

REFERENCES:

1. David Halliday, Robert Resnick & Kenneth S. Krane , *Physics – Volume II*, Fifth edition, (John Wiley and sons, Inc.) (Relevant sections in all Chapters)
2. Tiwari K, *Electricity and Magnetism*, S. Chand & Co.
3. Dayal D. C., *Electricity and Magnetism*, IV edition, Himalaya Publishing House, Bombay.
4. Sehgal, Chopra and Sehgal, *Electricity and Magnetism*, Sultan Chand and Sons, New Delhi

WEB REFERNCES :

1. http://www.gutenberg.org/ebooks/34221
2. https://bookboon.com/en/university-physics-ii-notes-and-exercises-i-ebook

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
Unit-1 The Electric field				
1.1	The electric field	2	Chalk & Talk	Black Board
1.2	The electric field of point charges	1	Lecture	PPT
1.3	The electric dipole	1	Chalk & Talk	Black Board
1.4	Electric field of a continuous charge distribution	1	Chalk & Talk	Black Board
1.5	A Uniform line of charge	1	Chalk & Talk	Black Board
1.6	A uniform ring or disk of charge	2	Lecture	PPT
1.7	An infinite sheet of charge	1	Chalk & Talk	Black Board
1.8	A uniform spherical shell of charge	1	Chalk & Talk	Black Board
1.9	Electric field lines	1	Discussion	Black Board
1.10	A dipole in an electric field	1	Lecture	PPT
Unit 2. Gauss's law, Electric potential energy and Electrical potential				
2.1	Applications of Gauss's law	2	Chalk & Talk	Black Board
2.2	Infinite line of charge	1	Lecture	PPT
2.3	Infinite sheet of charge	1	Chalk & Talk	Black Board
2.4	A spherical shell of charge	1	Chalk & Talk	Black Board

2.5	Calculating the potential from the field	2	Discussion	Black Board
2.6	Potential due to point charges	2	Lecture	PPT
2.7	Potential due to electric dipole	2	Chalk & Talk	Black Board
2.8	Electric potential of continuous charge distributions	2	Lecture	PPT
2.9	A uniform line of charge	1	Chalk & Talk	Black Board
2.10	A ring of charge	1	Lecture	PPT
2.11	A charged disk	1	Chalk & Talk	Black Board
2.12	Equipotential surfaces	2	Chalk & Talk	Black Board
UNIT -3 The Magnetic Field, The magnetic field of a current				
3.1	Magnetic force on a moving charge	1	Chalk & Talk	Black Board
3.2	Circulating charges	1	Lecture	LCD
3.3	Cyclotron	2	Lecture	PPT
3.4	The Hall effect	1	Lecture	LCD
3.5	Magnetic force on a current carrying wire	1	Discussion	Black Board
3.6	Torque on a current loop	2	Discussion	Google classroom
3.7	The magnetic field of a current	2	Chalk & Talk	Black Board
3.8	A straight wire segment	1	Discussion	Black Board
3.9	A circular current loop	1	Chalk &	Black

			Talk	Board
3.10	Ampere's law	1	Lecture	PPT
3.11	Applications of Ampere's law	2	Discussion	Black Board
UNIT -4 Faraday's law of induction, Magnetic properties of materials				
4.1	Motional EMF	1	Lecture	PPT
4.2	Eddy Currents	1	Chalk & Talk	Black Board
4.3	Generators and motors	3	Lecture	PPT
4.4	The magnetic dipole	1	Chalk & Talk	Black Board
4.5	The force on a dipole in a nonuniform field	2	Discussion	Black Board
4.6	Atomic and Nuclear Magnetization	2	Lecture	PPT
4.7	Magnetic materials: Para, Dia, Ferro	3	Lecture	PPT
4.8	Gauss's law for magnetism	2	Discussion	Google classroom
UNIT -5 Maxwell's equations and electromagnetic waves				
5.1	The basic equations of electromagnetism	2	Chalk & Talk	Black Board
5.2	Induced magnetic field and displacement current	3	Lecture	PPT
5.3	Maxwell's equations	3	Chalk & Talk	Black Board
5.4	Generating an em wave	3	Chalk & Talk	Black Board
5.5	Travelling waves and Maxwell's equations	2	Discussion	Black Board
5.6	Energy Transport and Poynting vector	2	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 Scholastic	-	-	-	-	-		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	Derive electric field for a distribution of charges by applying method of calculus	K1,K2	PSO1& PSO2
CO 2	Evaluate electric field for problems involving symmetry by using Gauss's law	K1, K3,	PSO3
CO 3	Estimate the magnetic field of a current using Biot Savarat law and Ampere's law	K1,K2	PSO5
CO 4	Describe the working of generators and motors based on Faraday's law of induction and Lenz law. Also, they will be able to classify magnetic materials based on magnetic dipole moments	K1, K2, K3	PSO1,PSO3

CO 5	Comprehend Maxwell's equations and generation of electromagnetic waves	K1 & K3	PSO2, PSO5

Mapping COs Consistency with PSOs

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

Mapping of C0s with POs

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

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

♦ Weakly Correlated -**1**

COURSE DESIGNER:

Mrs. Alphonsa Fernando

Dr. M. Ragam

Forwarded By

Dr. A. Sheela Vimala Rani

HoD'S Signature & Name

II B.Sc.

SEMESTER –III

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	19P3CC8	Solid State Physics	Theory	4	3

COURSE DESCRIPTION

Aim of this course is to enable the student to understand the concepts in crystal structure and magnetic and dielectric materials which forms the basis for material world.

COURSE OBJECTIVES

Solid State Physics is basic for material fabrications for various electronic applications. This course aims at giving an idea about crystal structure and various properties of solids like magnetic and dielectric behaviours. This course also deals with the super conductors and their applications.

UNIT I: CRYSTAL STRUCTURE [12 HRS.]

Introduction – crystal lattice and translation vectors-unit cells- basis-symmetry operation-point groups-space groups-types of lattices- lattice directions and planes- interplanar spacing-simple crystal structures-structure of diamond-zinc blende structure and sodium chloride structure

UNIT II: LATTICE VIBRATIONS [14 HRS.]

Introduction-vibration of one dimensional monoatomic lattice-vibration of one dimensional diatomic lattice-phonons-momentum of phonons-inelastic scattering of photons by phonons-specific heat-classical theory of lattice heat capacity- Einstien's theory of lattice heat capacity

UNIT III: MAGNETISM IN SOLIDS (10 HRS.)

Magnetic terminology - types of magnetism - diamagnetism, Langevin's

Classical theory – paramagnetism - Langevin's Classical theory ferromagnetism- Concept of Domains an Hysteresis - antiferromagnetism - ferrimagnetism

UNIT IV: DIELECTRIC PROPERTIES OF SOLIDS (12 HRS.)

Polarization and susceptibility- the local field-dielectric constant and polarizability-sources of polarizability-Electronic Polarizability- Ionic Polarizability – Dipolar Polaizability - frequency dependence of total polarizability - ferroelectricity- Piezo electricity

UNIT V: SUPER CONDUCTIVITY (12 HRS.)

Introduction and historical development- electrical resistivity- prefect diamagnetism or meissner effect-super current and penetration depth-critical field and critical temperature-type I and II superconductor- thermo dynamical and optical properties-isotope effect-flux quantization- the Josephson effects and tunneling -additional characteristics - theoretical aspects-high temperature ceramic superconductors-applications.

UNIT VI: DYNAMISM (Evaluation Pattern-CIA only) (2 HRS.)

Applications of crystals in solar cell - Application of super conductor in MRI body scanner.

REFERENCES

2) R.K.Pure and V.K.Babber "Solid State Physics" First Edition 1997, S.Chand.
3) S.O.Pillai "Solid state Physics" Second Edition 2009, New Age International Publishers.
4) Charles Kittel " Introduction to Solid state Physics" First Edition 2018, Wiley Publishers.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -I CRYSTAL STRUCTURE				
1.1	Introduction to crystals	1	Chalk & Talk	Black Board
1.2	crystal lattice and translation vectors	1	Chalk & Talk	Black Board
1.3	unit cells	1	Demonstration	Models
1.4	Basis	1	Lecture	PPT
1.5	Symmetry Operations	1	Chalk & Talk	Black Board
1.6	Point groups& space groups	1	Lecture	Black Board
1.7	Types of lattices,	1	Discussion	Google classroom
1.8	lattice directions and planes	1	Chalk & Talk	Black Board
1.9	Interplanar spacing	1	Chalk & Talk	PPT
1.10	simple crystal structures	1	Lecture	PPT
1.11	Structure of diamond	1	Chalk& Talk	Black Board
1.12	Zinc blende structure and sodium chloride structure	1	Lecture	Black Board
UNIT -II LATTICE VIBRATIONS				
2.1	Introduction	1	Lecture	Black Board

2.2	Vibration of one dimensional monoatomic lattice	1	Chalk & Talk	PPT & Black Board
2.3	Vibration of one dimensional diatomic lattice	1	Discussion	Black Board
2.4	Phonons	1	Discussion	Black Board
2.5	Momentum of phonons-	1	Chalk & Talk	PPT & Black Board
2.6	Inelastic scattering of photons by phonons	1	Lecture	PPT
2.7	Specific heat	1	Lecture	PPT
2.8	Classical theory of lattice heat capacity	2	Lecture	PPT & Black Board
2.9	Einstein's theory of lattice heat capacity	1	Chalk & Talk	Black Board
2.10	Debye's model of lattice heat capacity	2	Chalk & Talk	Black Board
UNIT - III MAGNETISM IN SOLIDS				
3.1	Magnetic terminology	1	Lecture	Black Board
3.2	Types of magnetism	1	Lecture	Black Board
3.3	Diamagnetism	1	Discussion	PPT
	Langevins classical theory and Quantum theory	2	Lecture	Black Board
3.4	Paramagnetism	1	Lecture	Black Board
	Langevins classical theory and Quantum	1	Discussion	PPT& Black

	theory			Board
3.5	Ferromagnetism	1	Lecture	Black Board
	Weiss theory Nature and origin	1	Lecture	PPT
	Concepts of domain and hysteresis	1	Chalk&Talk	PPT
3.6	Antiferromagnetism	1	Lecture	PPT&Black Board
3.7	Ferrimagnetism	1	Lecture	PPT&Black Board
UNIT – IV DIELECTRIC PROPERTIES OF SOLIDS				
4.1	Polarization and Susceptibility	1	Chalk & Talk	Black Board
4.2	the local field	1	Lecture	PPT
4.3	dielectric constant and polarizability	2	Lecture	PPT
4.4	sources of polarizability	1	Chalk & Talk	Black Board
	Electronic polarizability	1	Chalk & Talk	Black Board
	Ionic polarizability	1	Chalk & Talk	Black Board
	Dipolar polarizability	1	Chalk & Talk	Black Board
4.5	frequency dependence of total polarizability	1	Chalk & Talk	Black Board
4.6	Ferroelectricity	2	Lecture	PPT
4.7	Piezo electricity	1	Chalk & Talk	Black Board
UNIT V SUPER CONDUCTIVITY				

5.1	Introduction and historical development	1	Lecture	PPT
5.2	Electrical resistivity	1	Chalk & Talk	Black Board
5.3	Perfect diamagnetism or meissner effect	1	Chalk & Talk	Black Board
5.4	super current and penetration depth	1	Group Discussion	Black Board
5.5	Critical field and critical temperature	1	Discussion	Google class room
5.6	Type I and II superconductor	1	Discussion	Google class room
	Soft and Hard superconductors		Discussion	Google class room
5.7	Thermo dynamical and optical properties-	1	Chalk & Talk	Black Board
5.8	Isotope effect&flux quantization-	1	Chalk & Talk	Black Board
5.9	The Josephson effects and tunneling	1	Lecture	PPT
5.10	Additional characteristics	1	Chalk & Talk	Black Board
5.11	Theoretical aspects (BCS theory)	1	Chalk & Talk	Black Board
5.12	High temperature ceramic superconductors and its applications.	1	Chalk & Talk	PPT
	UNIT VI DYNAMISM			
6.1	Application of crystals in solar cell	1	Discussion	Google Class Room
6.2	Application of super	1	Discussion	Google Class

	conductor in MRI body scanner.			Room

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 Scholastic	-	-	-	-	-		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 -	MARKS

					SCHOLASTIC			
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 parameters of crystal system and explain the basic concepts.	K1,K2	PSO1& PSO2
CO 2	Describe the various magnetic behaviours of solids	K1,K3	PSO3&PSO4
CO 3	Explain the working of dielectric materials.	K3,K3	PSO1, PSO2 &PSO3
CO 4	Understand the basic concepts in super conductivity.	K2,K4	PSO1& PSO2

CO 5	Describe working and various applications of superconductors.	K2,K3	PSO1, PSO2 PSO4 & PSO5

Mapping COs Consistency with PSOs

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

Mapping of C0s with POs

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

Note: ♦ Strongly Correlated – **3** ♦ ModeratelyCorrelated – **2**
♦ WeaklyCorrelated -**1**

COURSE DESIGNER: Dr.M. Ragam

Forwarded By

Dr. A. Sheela Vimala Rani

HoD'S Signature & Name

.Sc.

SEMESTER –III

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	19P3CC9	Major Practicals III	Practical	3	2

COURSE DESCRIPTION

This laboratory course explores the basic principles of electricity and magnetism through experiments

COURSE OBJECTIVES

On completion of this course, the learner will be able to understand electric and magnetic laws using appropriate equipments through experiments

List of Experiments (Any Eight)

1. Series Resonance- LCR circuit
2. De Sauty's Bridge
3. Calibration of ammeter using potentiometer
4. Calibration of low range voltmeter using potentiometer
5. Field along the axis of the coil – Determination of M & H
6. Parallel Resonance – LCR circuit
7. Calibration of high range voltmeter using potentiometer
8. Owen's bridge
9. Comparison of EMF of two cells using spot galvanometer
10. Comparison of capacitances of two capacitors using spot galvanometer

EVALUATION PATTERN

MARKS		
CIA	ESE	Total
40	60	100

Forwarded By

Dr. A. Sheela Vimala Rani

II B.Sc.

SEMESTER –IV

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	19P4CC10	Analog Electronics	Theory	5	4

COURSE DESCRIPTION

The course provides an exposure to transistors, amplifiers, oscillators and operational amplifers

COURSE OBJECTIVES

This course deals with fundamentals and working of electronic devices and its applications

UNITS

UNIT –I SEMICONDUCTOR DIODE (12 HRS.)

PN junction – junction theory–The ideal diode-Static and dynamic resistance of a diode- Use of diodes in rectifiers- Half wave rectifier – Full wave rectifier - Efficiency of rectifiers to convert AC into DC– Shunt capacitor filter – Choke input LC filter – π filter-types of diodes

UNIT –II TRANSISTOR (BJT & FET) (18 HRS.)

Transistor characteristics – Common base (CB) configuration – Common emitter (CE) configuration – Common collector (CC) configuration – comparison between the three configurations – Reason for CE configuration is widely used in amplifier circuits – Basic CE amplifier circuit – DC load line – Amplifier analysis using DC load line - Field Effect Transistor (FET). Structure of a junction field effect transistor – JFET characteristics – JFET parameters

UNIT –III SMALL SIGNAL AMPLIFIERS & MULTISTAGE AMPLIFIERS (15 HRS.)

Single stage transistor amplifier – Equivalent circuit method: Development of Transistor ac equivalent circuit, h-parameter equivalent circuit, amplifier analysis. Need of Multistage Amplifiers – Gain of a multistage amplifier – Coupling of two stages: Resistance- Capacitance coupling-Frequency response curve of an RC coupled amplifier: fall of gain in low frequency range, fall of gain at high frequencies, band width of an amplifier

UNIT –IV FEEDBACK IN AMPLIFIERS & OSCILLATORS (15 HRS.)

Concept of feedback in amplifiers – Types of feedback – Voltage gain of feedback amplifier. Positive feedback amplifiers as an oscillator – LC oscillators: tuned collector oscillator, **tuned base oscillator**, Hartley oscillator, **Colpitts oscillator** – RC oscillators (no derivation): phase shift oscillator, Wein bridge oscillator –Astable multivibrators.(circuit using transistor only)

.UNIT –V OPERATIONAL AMPLIFIER (15 HRS.)

The operational amplifier (OP-AMP) – Basic concepts- Ideal op-amp-Characteristics of an OP-AMP- Operational amplifiers: Basic inverting OP-AMP, Practical inverting OP-AMP, Non inverting OP- AMP ,parameters of OP-AMP -Applications of OP-AMP: **Scale changer, phase shifter, Summing amplifier**, Integrator, Differentiator.

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

Power Electronics-Electronics technology

REFERENCES:

1. Bhargava N N, Kulshreshtha D C, Gupta S.C., *Basic Electronics and linear circuits* Tata McGraw Hill Publishing Company Ltd.

2. Gupta S.L, Kumar V, *Hand Book of Electronics*- -20th edition- Pragati Prakashan Publications.

WEB REFERNCES :

5) http://hyperphysics.phystr.gsu.edu/hbase/magnetic/magcur.html
6) https://www.britannica.com/science/electromagnetism

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**SEMICONDUCTOR DIODE**			
1.1	Half wave rectifier	2	Chalk & Talk	Black Board
1.2	Full wave rectifier	1	Discussion	Google classroom
1.3	Efficiency of rectifiers to convert AC into DC	4	Chalk & Talk	Black Board
1.4	Shunt capacitor filter	1	Lecture	PPT
1.5	Choke input LC filter	1	Chalk & Talk	Black Board
1.6	π filter	1	Chalk & Talk	Black Board
1.7	Types of filters	2	Chalk & Talk	Black Board
UNIT -2	**TRANSISTOR (BJT & FET)**			
2.1	Transistor characteristics	3	Chalk & Talk	Black Board
2.2	Common base configuration	3	Discussion	Google classroom
2.3	Common emitter configuration	2	Chalk & Talk	Black Board
2.4	Common collector configuration	2	Lecture	PPT
2.5	Comparison between three configurations	2	Chalk & Talk	Black Board
2.6	Reason for CE configuration is widely used in amplifier	3	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	circuits			
2.7	Basic CE amplifier circuit	2	Chalk & Talk	Black Board
2.8	DC load line	1	Discussion	Google classroom
2.9	Amplifier analysis using DC load line	1	Chalk & Talk	Black Board
2.10	FET	1	Chalk & Talk	Black Board
2.11	JFET, Characteristics, Parameters	1	Chalk & Talk	Black Board
Unit-3 Small signal amplifers & multistage amplifiers				
3.1	Single stage transistor amplifier	3	Chalk & Talk	Black Board
3.2	Equivalent circuit method	3	Discussion	Google classroom
3.3	h-parameter equivalent circuit	2	Chalk & Talk	Black Board
3.4	Amplifier analysis	2	Lecture	PPT
3.5	RC coupling	2	Chalk & Talk	Black Board
3.6	Frequency response curve of an RC coupled amplifier	3	Chalk & Talk	Black Board
Unit -4 Feeback in amplifiers & oscillators				
4.1	Concept of feedback in amplifiers	1	Chalk & Talk	Black Board
4.2	Types of feedback	2	Discussion	Google classroom
4.3	Voltage gain of feedback amplifier	1	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
4.4	Positive feedback as an oscillator	2	Lecture	PPT
4.5	Tuned collector oscillator	2	Chalk & Talk	Black Board
4.6	Hartley oscillator	2	Chalk & Talk	Black Board
4.7	Phase shift oscillator	1	Lecture	PPT
4.8	Wein bridge oscillator	2	Chalk & Talk	Black Board
4.9	Astable multivibrator	2	Chalk & Talk	Black Board
Unit 5 -Operational Amplifier				
5.1	OP-AMP	1	Chalk & Talk	LCD
5.2	Basic concepts	2	Chalk & Talk	Black Board
5.3	Ideal OPAMP characteristics	2	Lecture	PPT
5.4	Basic inverting OPAMP	1	Lecture	PPT
5.5	Practical inverting OPAMP	1	Chalk & Talk	Black Board
5.6	Non inverting OPAMP	1	Chalk & Talk	Black Board
5.7	Parameters of OPAMP	3	Lecture	PPT
5.8	Applications of OPAMP	2	Chalk & Talk	Black Board
5.9	Applications: Integrator & Differentiator	2	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 Scholastic	-	-	-	-	-		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	Acquire basic knowledge of PN junction diode,different rectifiers and filters	K1,K2	PSO1& PSO2
CO 2	Explain different transistor configuration and various biasing circuits	K1, K3,	PSO3

CO 3	Obtain the knowledge of transistor amplifier and analyse using DC and AC load line	K1,K2	PSO5
CO 4	Elucidate the concept of feedback in amplifiers and design various types of oscillators	K1, K2, K3	PSO3
CO 5	Describe the parameters of OP-AMP and to design OP-AMP circuits	K1 & K3	PSO3,PSO5

Mapping of COs with PSOs

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

Mapping of COs with POs

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

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

♦ Weakly Correlated -**1**

COURSE DESIGNER:
Mrs. Alphonsa Fernando & Dr. M. Ragam

Forwarded By

Dr. A. Sheela Vimala Rani

HoD'S Signature & Name

II B.Sc.

SEMESTER –IV

For those who joined in 2022 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAPH	22P4CC11	Mathematical Physics	Theory	4	3

COURSE DESCRIPTION

The course provides an introduction to fundamentals of Mathematical Physics required in scientific and technological applications. This paper includes modeling, solving and interpretation of scientific problem based on basic principles of Physics.This course has also tremendous applications in solving problems in diverse fields of sciences.

COURSE OBJECTIVES

The main objective of this course is to provide students with an introduction of Mathematics to interpret Physics Phenomena. The course aims to emphasize the need for applying mathematical methods to Physics problems and to realize that Mathematics is a systematic science built on relatively few basic concepts involving unifying principles for the interrelation between theory and experiment.

UNIT –I Linear Algebra: Matrices, Vectors, Determinants (12 HRS.)

Matrix Multiplication: Multiplication of a matrix by a matrix- Differences of Multiplication of Numbers-Special Matrices-Transpose of a Product-Inner Product of vectors-Product in terms of row and column vectors-Matrix multiplication by Linear Transformation-Applications of Matrix multiplication

Determinants: Second order, third order, General Properties -Cramer's Rule

Unit- II Vector Differential Calculus 12 HRS.)

Vector Algebra in 2-space and 3-space-Dot Product-Application of Inner Product-Vector Product-Applications of vector product-Gradient of a scalar field -Divergence of a vector field-Curl of a vector field

UNIT –IIIFourier Analysis (12 HRS.)

Periodic functions: Trigonometric series- Fourier Series: Euler's formulas for the Fourier Coefficients -Orthogonality of trigonometric system-Examples of Fourier Series: Rectangular Wave-Periodic square wave-Half wave rectifier. Even and odd functions: Fourier cosine series, Fourier sine series, Rectangular wave, Saw-tooth wave.

Unit-IV Partial Differential Equations (12 HRS.)

Basic concepts -Modelling: Vibrating string, Wave Equation-Solution by seperating variables-D'Alembert's solution of wave equation-Modelling: Heat flow from a body in a space-Heat Equation -Solution by Fourier series

Unit -V Complex numbers and functions (12 HRS)

Complex numbers - Complex plane-Polar form of complex numbers-Powers and roots- Complex function-Limit, Continuity-Analytic functions - Exponential function-Trigonometric and Hyperbolic functions

REFERENCES:

1. Advanced Engineering Mathematics by Erwin Kreyszig, Tenth Edition, Wiley Plus publications.

2. Introductory Methods of Mathematical Physics, Charlie Harper, Prentice Hall of India PVT Ltd.

3. Mathematical Physics by P K Chattopadhyay, New Age International Publications. **COURSE CONTENTS AND LECTURE:**

Module No.	Topic	No.ofLectures	Teaching Pedagogy	Teaching Aids
UNIT-I	**Linear Algebra: Matrices, Vectors, Determinants**			
1.1	Matrix Multiplication Multiplication of a matrix by a matrix	3	Chalk&Talk	Black Board
1.2	Differences of Multiplication of Numbers	2	Chalk&Talk	PPT

1.3	Special Matrices	2	Demonstration	PPT
1.4	Transpose of a Product	2	Lecture	PPT
1.5	Inner Product of vectors-Product in terms of row and column vectors	2	Lecture	PPT
1.6	Matrix multiplication by Linear Transformation-Applications of Matrix multiplication	2	Lecture	PPT
1.7	Determinants: Second order, third order, General Properties -Cramer's Rule	2	Lecture	PPT
UNIT-II	**Vector Differential Calculus**			
2.1	Vector Algebra in 2-space and 3space	3	Lecture	Black Board
2.2	Dot Product-Application of Inner Product	3	Chalk&Talk	PPT& Black Board
2.3	Vector Product-Applications of vector product	3	Discussion	Black Board
2.4	Gradient of a scalar field	3	Discussion	Black Board
2.5	Divergence of a vector field-Curl of a vector field	3	Chalk&Talk	PPT& Black Board
UNIT-III	**Fourier Analysis**			

3.1	Periodic functions: Trigonometric series	3	Lecture	BlackBoard
3.2	Fourier Series: Euler's formulas for the Fourier Coefficients	3	Lecture	BlackBoard
3.3	Orthogonality of trigonometric system Examples of Fourier Series: Rectangular Wave-Periodic square wave-Half wave rectifier. Even and odd functions: Fourier cosine series, Fourier sine series, Rectangular wave, Saw-tooth wave	2	Discussion	PPT
UNIT-IV Fourier Analysis				
4.1	Basic concepts,Modelling: Vibrating string	3	Lecture	Black Board
4.2	Wave Equation-Solution by seperating variables-	3	Chalk&Talk	PPT& Black Board
4.3	D'Alembert's solution of wave equation	3	Discussion	Black Board
4.4	-Modelling: Heat flow from a body in a space	3	Discussion	Black Board
4.5	-Heat Equation -Solution by Fourier series	3	Chalk&Talk	PPT& Black Board
UNIT-V COMPLEX NUMBERS AND FUNCTIONS				

5.1	Complex numbers -	3	Lecture	Black Board
5.2	Complex plane-Polar form of complex numbers-	3	Chalk&Talk	PPT& Black Board
5.3	Powers and roots- Complex function-Limit, Continuity-	3	Discussion	Black Board
5.4	Analytic functions	3	Discussion	Black Board
5.5	Exponential function- Trigonometric and Hyperbolic functions	3	Chalk&Talk	PPT& Black Board

EVALUATIONPATTERN

Levels	C1	C2	C3	C4	C5	TotalScholastic Marks	NonScholastic Marks C6	CIA Total	% ofAssessment
	T1 10 Mks.	T2 10 Mks.	Quiz 5 Mks.	Assignment 5Mks	OBT/PPT 5Mks	35Mks.	5Mks.	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%
NonScholastic	-	-	-	-	-		5	5	12.5%
Total	10	10	5	5	5	35	5	40	100%

CIA	
Scholastic	35

NonScholastic	**5**
	40

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

UGCIA Components

			Nos		
C1	-	Test(CIA1)	1	-	10Mks
C2	-	Test(CIA2)	1	-	10Mks
C3	-	Assignment	1	-	5Mks
C4	-	Open Book Test/PPT	2*	-	5Mks
C5	-	Quiz	2*	-	5Mk
sC6	-	Attendance			-5Mks

The best out of two will be taken into account

COURSEOUTCOMES

Onthesuccessfulcompletionofthecourse,studentswillbeableto:

NO.	COURSEOUTCOMES	KNOWLEDGELEVEL(ACCORDINGTOREVISED TAXONOMY)	PSOs ADDRESSED
CO 1	Analyze properties and of determinants of matrix to solve problems	K1,K2	PSO1&PSO2
CO 2	Apply vector calculus to solve Physics Phenomena	K1,K3	PSO3&PSO4
CO 3	UtilizeFourier series to represent waves of different shapes	K3,K3	PSO1, PSO2 &PSO3
CO 4	Comprehend idea of modeling physics phenomena	K2,K4	PSO1&PSO2
CO 5	Analyse analytic function and to express trigonometric and hyperbolic functions	K2,K3	PSO1,PSO2PSO4&PSO5

MappingofC0swithPSOs

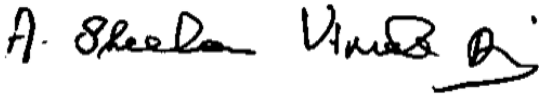
CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	2	1	1
CO2	2	2	3	3	1
CO3	3	3	3	2	1
CO4	3	3	2	2	1
CO5	3	3	1	3	3

MappingofC0swithPOs

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

COURSEDESIGNER:Dr.M.Ragam

ForwardedBy



Dr.A.SheelaVimalaRani

HoD'SSignature&Name

II B.Sc.

SEMESTER –IV

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	19P4CC12	Major Practicals IV	Practicals	3	2

COURSE DESCRIPTION

This laboratory course explores the basic principles of electronics through experiments

COURSE OBJECTIVES

On completion of this course, the learner will be able to understand physical laws using appropriate equipments through experiments

List of Experiments

1. Bridge Rectifier-study of percentage of regulation
2. Transistor characteristics – CE configuration
3. Single Stage RC coupled Amplifier-Study of frequency response curve
4. OP-AMP –Inverting amplifier, Differential amplifier
5. OP-AMP - Adder and Subtractor
6. OP-AMP-Parameters
7. Low pass & High pass filter using RC circuit
8. Zener diode characteristics
9. Hartley Oscillator
10. Colpitt Oscillator

EVALUATION PATTERN

MARKS		
CIA	ESE	Total
40	60	100

COURSE DESIGNER:Dr. M. Ragam

Forwarded By

Dr. A. Sheela Vimala Rani

HoD'S Signature & Name

III B.Sc.

SEMESTER –V

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	19P5CC13	DIGITAL ELECTRONICS AND COMMUNICATION	Theory	6	4

COURSE DESCRIPTION

This course is designed to impart depth knowledge on combinational logic circuits, flip-flops, registers and counters, digital-analog conversion, different modulation techniques of communication systems and satellite communications.

COURSE OBJECTIVES

This course will enhance the vital concepts and improve the analytical, planning and application of acquired knowledge in logic design and simplification, use of registers and counters, simultaneous and continuous conversion of A/D systems, modulations involved in the communication systems.

UNIT I: COMBINATIONAL LOGIC CIRCUITS, FLIP-FLOPS (20 hrs)

Boolean laws and theorem - Sum-of- products method - Truth table to Karnaugh Map - Pairs, Quads and Octets (Self Study) - Karnaugh simplifications, **Don't care conditions(Self Study)** - Product –of- sums method - product-of-sum simplification.

RS flip-flops- Gated flip flops – Edge triggered RS flip flop- Edge triggered D-flip-flops-Edge triggered JK flip-flops-**Flip-flop Timing** **(Self Study)** - Edge triggered D-flip-flops-JK master-slave flip-flop.

UNIT II: SHIFT REGISTERS & COUNTERS (18 hrs)

Types of registers -Serial in- serial out - Serial in-parallel out-Parallel in – serial out – **parallel in- parallel out** **(Self Study)** .

Asynchronous counters – decoding gates - synchronous counters – changing the counter modulus – decade counters.

UNIT III: D/A CONVERSION AND A/D CONVERSION (16hrs)

Variable resistor networks – binary ladders –**D/A converters (Self Study**) – A/D converter- Simultaneous conversion – continuous A/D conversion – A/D techniques.

UNIT IV: MODULATION (18hrs)

Introduction – Modulation- forms of modulation- Amplitude modulation-AM transmitter and receiver (block diagram only) – Side band transmission **Generating the side bands only (filter method)(Self Study)** – Frequency modulation – Direct Frequency modulation – Phase modulation - FM transmitter and receiver (block diagram only).

UNIT V: DIGITAL MODURLATION & SATELLITE COMMUNICATIONS (18 hrs)

Pulse amplitude modulation – Time division multiplexing – Pulse width modulation (brief theory only) – Pulse position modulation (brief theory only).

SATELLITE COMMUNICATIONS: Introduction- The satellite orbits-**satellite position (Self Study) -** the uplink, the down link, the cross link, **assignable satellite frequencies(Self Study)** - Station keeping.

UNIT VI: DYNAMISM (Evaluation Pattern-CIA only) (2 HRS.)

Applications of flip-flops in real life appliances – Modulation in mobile communication.

REFERENCES

1. Digital integrated electronics – H. Taub and D. Schilling (1977- I Edition) McGraw-Hill

2. Electronic Communication system – George Kennedy. (2011 – V Edition) McGraw-Hill

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT I: COMBINATIONAL LOGIC CIRCUITS, FLIP-FLOPS				
1.1	Boolean laws and theorem	2	Chalk & Talk	Black Board
1.2	Sum-of- products method	2	Chalk & Talk	Black Board
1.3	Truth table to Karnaugh Map	2	Chalk & Talk	Black Board
1.4	Karnaugh simplifications	2	Discussion & Exercise	Google classroom
1.5	Product –of- sums method	2	Chalk & Talk	Black Board
1.6	Product-of-sum simplification.	2	Lecture	Black Board
1.7	RS flip-flops	2	Chalk & Talk	Black Board
1.8	Gated flip flops – Edge triggered RS flip flop	2	Chalk & Talk	Black Board
1.9	Edge triggered D-flip-flops-	1	Chalk & Talk	PPT
1.10	Edge triggered JK flip-flops	1	Lecture	PPT
1.11	JK master-slave flip-flop.	2	Chalk& Talk	Black Board

UNIT II: SHIFT REGISTERS & COUNTERS				
2.1	Types of registers	2	Lecture	Black Board
2.2	Serial in- serial out	2	Chalk & Talk	PPT & Black Board
2.3	Serial in-parallel out	2	Chalk & Talk	PPT & Black Board
2.4	Parallel in – serial out	2	Chalk & Talk	PPT & Black Board
2.5	Asynchronous counters	2	Chalk & Talk	PPT & Black Board
2.6	Decoding gates	2	Lecture	PPT
2.7	Synchronous counters	2	Lecture	PPT
2.8	Changing the counter modulus.	2	Lecture	PPT & Black Board
2.9	Decade counters	2	Chalk & Talk	Black Board
UNIT III: D/A CONVERSION AND A/D CONVERSION				
3.1	Variable resistor networks	2	Lecture	Black Board
3.2	binary ladders	2	Lecture	Black Board
3.3	D/A converters	2	Discussion	PPT
3.4	A/D converter	2	Lecture	Black Board
3.6	Simultaneous conversion	2	Lecture	PPT
3.7	continuous A/D conversion	3	Chalk&Talk	PPT

3.8	A/D techniques.	3	Lecture	PPT&Black Board
UNIT IV: MODULATION				
4.1	Introduction – Modulation	1	Lecture	Black Board
4.2	Forms of modulation	1	Chalk & Talk	Black Board
4.3	Amplitude modulation	2	Chalk & Talk	Black Board
4.4	AM transmitter (block diagram only)	2	Lecture	PPT
4.5	AM receiver (block diagram only)	1	Lecture	PPT
4.6	Side band transmission	1	Chalk & Talk	Black Board
4.7	Generating the side bands only (filter method)	1	Discussion	PPT
4.8	Frequency modulation	2	Chalk & Talk	Black Board
4.9	Direct Frequency modulation	2	Lecture	PPT
4.10	Phase modulation	2	Chalk & Talk	Black Board
4.11	FM transmitter and receiver (block diagram only).	3	Chalk & Talk	Black Board
UNIT V: DIGITAL MODURLATION & SATELLITE COMMUNICATIONS				
5.1	Pulse amplitude modulation	2	Lecture	PPT

5.2	Time division multiplexing	2	Chalk & Talk	Black Board
5.3	Pulse width modulation (brief theory only) – Pulse position modulation (brief theory only).	2	Chalk & Talk	Black Board
5.4	Satellite communications: Introduction	2	Lecture	PPT
5.5	The satellite orbits	2	Lecture	PPT
5.6	Satellite position	2	Discussion	Google class room
5.7	The uplink, the down link, the cross link,	2	Lecture	PPT
5.8	Assignable satellite frequencies	2	Discussion	Google class room
5.9	Station keeping.	2	Chalk & Talk	Black Board
	UNIT VI DYNAMISM			
6.1	Applications of flip-flops in real life appliances .	1	Discussion	Google Class Room
6.2	Modulation in mobile communication	1	Discussion	Google Class Room

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1 10 Mks.	T2 10 Mks.	Seminar 5 Mks.	Assignment 5 Mks	OBT/PPT 5 Mks	35 Mks.	5 Mks.	40Mks.	
K2	4	4	-	-	-	8	-	8	20 %
K3	2	2	-	5	-	9	-	9	22.5 %
K4	2	2	-	-	5	9	-	9	22.5 %
K5	2	2	5	-	-	9	-	9	22.5 %
Non Scholastic	-	-	-	-	-		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	Demonstrate the knowledge in Combinational logic circuits and Flip-Flops and apply skills in solving problems and drawing Karnaugh Maps.	K2,K3	PSO1& PSO2
CO 2	Analyse the working of different types of registers and counters.	K1,K3,K4	PSO3&PSO4
CO 3	Explain the concepts involved in D/A Conversion and A/D Conversion, continuous A/D conversion and A/D techniques.	K1,K2	PSO1, PSO2 &PSO3
CO 4	Explicate the different types of analog modulation techniques in	K2,K4	PSO1& PSO2

	communication systems.		
CO 5	Communicate clearly the principles of digital modulation and Satellite communication	K1,K3	PSO1, PSO2 PSO4 & PSO5

Mapping of C0s with PSOs

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

Mapping of C0s with POs

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

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

♦ Weakly Correlated -**1**

COURSE DESIGNER:

Mrs. Arul MozhiPackiaSeeli

Dr. G. Jenita Rani

Forwarded By

Dr. A. Sheela Vimala Rani

HoD'S Signature & Name

SEMESTER –V

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	19P5CC14	OPTICS	Theory	6	4

COURSE DESCRIPTION

This course aims at giving a detailed study of interference, diffraction, polarization and spectroscopy.

COURSE OBJECTIVES

The course enables the students to understand and analyse the interference of light waves. This course explains the diffraction patterns using different types of obstacles and distinguish Fresnel and Fraunhofer diffraction pattern. This course analyses the resolving power of Prism, Grating, Microscope and Telescope and explain the production and detection of polarized light. This course enables the students to understand the concept of Spectroscopy also.

UNIT –I INTERFERENCE OF LIGHT (division of amplitude) (18 HRS)

Change of phase on reflection- Interference by reflected light- Interference by transmitted light- **Colors of thin films**-Non-reflecting films- Interference in a wedged-shaped film- Fringes in white light- **Fringes of equal thickness and fringes of equal inclination** (**self study**)- Newton's rings by reflected light- Newton's rings by transmitted light.

INTERFERENCE OF LIGHT(DIVISION OF WAVEFRONT

Fresnel's biprism- Interference fringes with white light- Displacement of the fringes- Fresnel's double mirror

UNIT –II DIFFRACTION OF LIGHT- FRESNEL CLASS (18 HRS)

Introduction- -Difference between Fresnel and Fraunhofer diffraction- Difference between Interference and Diffracion-Fresnel's assumptions- Fresnel's half period zones for plane waves- Explanation of rectilinear propagation of light-Zone plate - Diffraction at a circular aperture- Diffraction at an opaque disc -Diffraction at a straight edge - **Diffraction at a slit** **(self study)**

UNIT –III FRAUNHOFER DIFFRACTION (18 HRS)

Fraunhofer diffraction at a single slit- Two slits – N parallel equidistant slits- plane diffraction grating- Determination of wavelength of light with a plane transmission grating- Dispersive power of a diffraction grating- Resolving power – Rayleigh's criterion for resolution- Resolving power of telescope, **Resolving power of Microscope (self study)**, Grating, Prism.

UNIT –IV POLARIZATION OF LIGHT (18 HRS)

Polarized andunpolarised light – Production of plane polarised light – Polarization by reflection-Brewster's law- Polarisation by refraction through pile of Plates- Law of Malus- **Uniaxial and biaxialcrystals(self study)** – Double refraction-Polarisation of Double Refraction-Nicol Prism- Superposition of two disturbances-Quarter wave plate-Half wave plate- Production and analysis of polarized light.

UNIT- V SPECTROSCOPY(18 HRS)

Infrared spectroscopy – sources and detector – uses – ultraviolet spectroscopy – sources – quartz spectrograph - applications - Raman Spectroscopy – Quantum theory of Raman effect – applications – Nuclear magnetic resonance –Nuclear quadrupole resonance -– **Electron spin resonance spectroscopies – (Qualitative study)**

UNIT –VI DYNAMISM (Evaluation Pattern-CIA only)

Michelson's interferometer, Cornu's spiral

REFERENCES:

1.Satya Prakash , Optics ,12th edition 2005, Educational & university Publishers.
2) Dr.N.Subrahmanyam, Brijlal, Dr.M.N.Avadhanulu, A text book of optics- 24th Revised Edition 2010, S. Chand & Company limited.
3) AjoyGhatak, OPTICS –4th Edition, Tata Mc Graw Hill Publishing Company Ltd, New Delhi.
4.Optics and Spectroscopy – R.Murugeshan, S. Chand and co., 6th Edition, New Delhi, 2008.
5. Elements of Spectroscopy – S.L. Gupta, V.Kumar and R.C.Sharma Pragati Prakashan, 13th Edition, Meerut, 1997.
6. Molecular structure and spectroscopy – G.Aruldhass, PHI Pvt Ltd, , II Edition, New Delhi, 2007.

Web References

http://igorivanov.tripod.com/physics/optics.html
https://www.asc.ohio-state.edu/schumacher.60/class/780.il/references_book.html
http://www.lightandmatter.com/lm/

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 - INTERFERENCE OF LIGHT (DIVISION OF AMPLITUDE)				
1.1	Change of phase on reflection	1	Chalk & Talk	Black Board
1.2	Interference by reflected light	1	Chalk & Talk	LCD
1.3	Interference by transmitted light	4	Lecture	PPT & White board
1.4	Non-reflecting films- Interference in a wedged-shaped film	1	Lecture	Smart Board
1.5	Fringes in white light	1	Lecture	Black Board
1.6	Fringes of equal thickness and fringes of equal inclination	1	Discussion	PPT & White board
1.7	Newton's rings by reflected light	2	Chalk & Talk	Black Board
1.8	Newton's rings by transmitted light	1	Discussion	Black Board
1.9	Fresnel's biprism	1	Chalk & Talk	Black Board
1.10	Interference fringes with white light- Displacement of the	1	Chalk &	LCD

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	fringes		Talk	
1.11	Fresnel's double mirror	4	Lecture	PPT & White board
UNIT -2 DIFFRACTION OF LIGHT- FRESNEL CLASS				
2.1	Introduction- -Difference between Fresnel and Fraunhofer diffraction	1	Chalk & Talk	Black Board
2.2	Difference between Interference and Diffracion	1	Chalk & Talk	LCD
2.3	Fresnel's assumptions- Fresnel's half period zones for plane waves	4	Lecture	PPT & White board
2.4	Explanation of rectilinear propagation of light	1	Discussion	Black Board
2.5	Zone plate	1	Lecture	Black Board
2.6	Diffraction at a circular aperture	1	Discussion	PPT & White board
2.7	Diffraction at an opaque disc	1	Discussion	Black Board
2.8	Diffraction at a straight edge	1	Lecture	PPT & White board
UNIT -3 FRAUNHOFER DIFFRACTION				
3.1	Fraunhofer diffraction at a	1	Chalk &	Black

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	single slit		Talk	Board
3.2	Two slits - N parallel equidistant slit - plane diffraction grating	1	Chalk & Talk	LCD
3.3	Determination of wavelength of light with a plane transmission grating	4	Lecture	PPT & White board
3.4	Dispersive power of a diffraction grating	1	Lecture	Smart Board
3.5	Resolving power – Rayleigh's criterion for resolution	1	Lecture	Black Board
3.6	Resolving power of telescope	1	Discussion	PPT & White board
3.7	Resolving power of Microscope, Grating.	2	Chalk & Talk	Black Board
3.8	Resolving power of Prism	1	Discussion	Black Board
UNIT -4 POLARIZATION OF LIGHT				
4.1	Polarized andunpolarised light – Production of plane polarised light	1	Chalk & Talk	Black Board
4.2	Polarization by reflection-	1	Chalk & Talk	LCD

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	Brewster's law			
4.3	Polarisation by refraction through pile of Plates- Law of Malus	4	Lecture	PPT & White board
4.4	Uniaxial and biaxial crystals- Double refraction-Polarisation of Double Refraction	1	Lecture	Smart Board
4.5	Nicol Prism	1	Lecture	Black Board
4.6	Superposition of two disturbances-Quarter wave plate	1	Discussion	Black Board
4.7	Half wave plate	1	Lecture	LCD
4.8	Production and analysis of polarized light.	1	Lecture	Black Board
UNIT -5SPECTROSCOPY				
5.1	Infrared spectroscopy- sources and detector	1	Lecture	Smart Board
5.2	Uses- Ultraviolet spectroscopy – sources	1	Lecture	Black Board
5.3	Quartz spectrograph - applications	1	Discussion	PPT & White board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
5.4	Raman Spectroscopy – Quantum theory of Raman effect – applications	2	Chalk & Talk	Black Board
5.5	Nuclear magnetic resonance –Nuclear quadrupole resonance -– **Electron spin resonance spectroscopies-(Qualitative study)** Nuclear magnetic resonance – (Qualitative study)	1	Discussion	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 Scholastic	**-**	**-**	**-**	**-**	-		**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	Gain knowledge on interference of light waves and understand	K1	PSO1& PSO2

	the interference in a wedge shaped film, Newton's rings and describe interference of light due to division of wave front,		
CO 2	Explain Diffraction of light, Diffraction at an opaque disc and the construction and working of zone plate.	K1, K2,	PSO3
CO 3	Insight of the Fraunhofer diffraction at a single slit and double slit, Resolving Power of Prism, Grating, telescope and Microscope.	K1 & K3	PSO5
CO 4	Deduce the concepts of Polarization, Brewster's and Malus law and explain production and analysis of polarized light.	K1, K2, K3	PSO4
CO 5	Insight of the Infrared spectroscopy, ultraviolet spectroscopy,quartz spectrograph, Raman Spectroscopy,Quantum theory of Raman effect, Nuclear magnetic resonance.	K2 & K4	PSO4 &PSO5

Mapping of COs with PSOs

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

Mapping of COs with POs

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

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

♦ Weakly Correlated -**1**

COURSE DESIGNER:

JEYA SHEELA.I

Forwarded By

Dr.A.Sheela Vimala Rani

HOD'S Signature

& Name

III B.Sc.

SEMESTER –V

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAPH	19P5CC15	Major Practicals V ELECTRONICS	Practical	4	2

COURSE DESCRIPTION

This laboratory course explores the basic principles of electronics through experiments

COURSE OBJECTIVES

On completion of this course, the learner will be able to understand physical laws using appropriate equipments through experiments

List of Experiments (Any Eight)

1.Regulated power supply using Zener diode
2.Regulated power supply using IC
3.Gates - using discrete components
4.Gates - using IC's
5.RS & JK Flip Flops using NAND Gates
6.RS & JK Flip Flops using NOR Gates
7.Half adder, Full adder using IC's
8.Half subtractor, Full subtractor using IC's
9.OP-AMP Parameters- Closed loop gain and output impedance
10.OP-AMP Parameters- Offset voltage and input impedance

EVALUATION PATTERN

MARKS		
CIA	ESE	Total
40	60	100

COURSE DESIGNER: Dr. MathaviManisekar

Forwarded By

Dr. A. Sheela Vimala Rani

HoD'S Signature & Name

III B.Sc. SEMESTER–V

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSETITLE	CATEGORY	HRS/ WEEK	CREDITS
UAPH	19P5CC16	Major PracticalsVI NON ELECTRONICS	Practicals	4	2

COURSE DESCRIPTION

The lab course deals with Experiments of optics, thermal and electricity in Physics.

COURSE OBJECTIVES

The course gives an understanding of electrical, thermal and optical measurements like Refractive index of a liquid, Determination of wavelength of Fraunhofer lines using Grating, Determination of λ using Hartmann's Interpolation Formula, and determination of μ by forming Newton's rings, determination of numerical aperture of fiber optic cable.

LIST OF EXPERIMEMTS

1. Newton's rings in air – determination of radius of curvature of lens.
2. Determination of λ -Hartmann's Interpolation Formula.
3. Solar cell Characteristics.
4. He-Ne LASER- Determination of Refractive index of a liquid.
5. **Fraunhofer diffraction of a single slit- Diode Laser**
6. Determination of Resolving power of a grating
7. **Determination of coupling loss using optical fiber.**
8. **Determination of temperature coefficient of resistive coil - Carry faster bridge.**
9. Verification of Malus law- LASER
10. **Determination of the Numerical Aperture of a Fiber optic cable.**

EVALUATION PATTERN

MARKS		
CIA	**ESE**	**Total**
40	**60**	**100**

COURSE DESIGNER:Dr. DhevaShanthaKumari

Forwarded By

Dr. A. Sheela Vimala Rani

HoD'S Signature & Name

III B.Sc.

SEMESTER –VI

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAPH	19P6CC17	THERMODYNAMICS &STATISTICAL MECHANICS	Theory	5	4

COURSE DESCRIPTION

The aim of this course is to deal with thermodynamics, entropy and thermodynamic potentials. This course also deals with statistical thermodynamics and applications of statistics to gases.

COURSE OBJECTIVES

This course enables the student to understand and analyze the zeroth and first law of thermodynamics. This course explains the second law thermodynamics and deduce the Tds eauations. Also deduce the thermodynamic potential, Maxwell relations, Clausius Clapeyron equation to analyse the pressure variation with temperature. This course helps the students to distinguish the three statistics and to calculate thermodynamic probability of the macrostate and also to study the applications of statistics to gases and other systems.

UNITS 6

UNIT –I CONSEQUENCES OF THE FIRST LAW (15 HRS)

Scope of thermodynamics – Thermodynamic systems- State of a system, properties- pressure-Thermal equilibrium and temperature – the Zeroth law-Thermodynamic equilibrium- The first law of thermodynamics- the energy equation T and V independent - T and P independent**- P and V independent (self study)**.

UNIT –II ENTROPY AND THE SECOND LAW OF THERMODYNAMICS (15 HRS)

The second law of thermodynamics - Entropy – Calculations of entropy changes in reversible process - Temperature entropy diagrams-Entropy changes in irreversible processes- The Clausius and Kelvin- Plank statements of the second law.

Combined first and second laws:

Introduction- T and V independent- T and P independent- P and V independent- The T ds equations- **properties of a pure substance(self study)**- Properties of a Vander Waals gas.

UNIT –III THERMODYNAMIC POTENTIALS (15 HRS)

The Helmholtz function and the Gibbs function- Thermodynamic potentials- The Maxwell relations- **Phase transitions (self study)**- The Clausius-Clapeyron equation- The third law of thermodynamics.

UNIT –IV STATISTICAL THERMODYNAMICS (15 HRS)

Introduction- Energy states and energy levels- Macrostates and microstates- Thermodynamic probability- The Bose Einstein statistics- The Fermi-Dirac statistics- The Maxwell-Boltzmann statistics- The Bose- Einstein distribution function- The Fermi Dirac distribution function- **The Maxwell- Boltzmann distribution function(self study).**

UNIT –V APPLICATION OF STATISTICS TO GASES (15 HRS)

The Monoatomic ideal gas- The principle of equipartition of energy- The quantized linear oscillator- Specific heat capacity of a diatomic gas.

Applications of quantum statistics to other systems:

The Einstein theory of the specific heat capacity of a solid- The Debye theory of the specific heat capacity of a solid- **Blackbody radiation** **(self Study)**.

UNIT –VI DYNAMISM (Evaluation Pattern-CIA only) (4 HRS.)

Properties of an ideal gas , Specific heat capacity of a diatomic gas.

REFERENCES:

1. Francis W.Sears & Gerhard L.Salinger,Thermodynamics, kinetic theory and statistical thermodynamics, Narosa Publishing.
2. Agarwal, Eisner Statistical Mechanics, Wiley Eastern Ltd
3 . Reif ,Fundamentals of statistical and thermal physics,McGraw-Hill

Web References

http://igorivanov.tripod.com/physics/stat.html

http://igorivanov.tripod.com/physics/thermo.html

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 - CONSEQUENCES OF THE FIRST LAW				
1.1	Scope of thermodynamics – Thermodynamic systems	1	Chalk & Talk	Black Board
1.2	State of a system, properties-pressure	1	Chalk & Talk	LCD
1.3	Thermal equilibrium and temperature	4	Lecture	PPT & White board
1.4	The Zeroth law	1	Lecture	Smart Board
1.5	Thermodynamic equilibrium	1	Lecture	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
1.6	the energy equation- T and V independent	1	Discussion	PPT & White board
1.7	T and P independent	2	Chalk & Talk	Black Board
1.8	**P and V independent (self study)**.	1	Discussion	Black Board
UNIT -2 ENTROPY AND THE SECOND LAW OF THERMODYNAMICS				
2.1	The second law of thermodynamics	1	Chalk & Talk	Black Board
2.2	Entropy – Calculations of entropy changes in reversible process -	1	Chalk & Talk	LCD
2.3	Temperature entropy diagrams-Entropy changes in irreversible processes	4	Lecture	PPT & White board
2.4	The Clausius and Kelvin-Plank statements of the second law.	1	Lecture	Smart Board
2.5	Combined first and second law- T and V independent	1	Lecture	Black Board
2.6	the energy equation- T and V independent	1	Discussion	PPT & White board
2.7	T and P independent- P and	2	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	V independent- The T ds equations			
2.8	Properties of a Vander Waals gas.	1	Discussion	Black Board
UNIT -3 THERMODYNAMIC POTENTIALS				
3.1	The Helmholtz function and the Gibbs function	1	Chalk & Talk	Black Board
3.2	Thermodynamic potentials	1	Chalk & Talk	LCD
3.3	The Maxwell relations	4	Lecture	PPT & White board
3.4	Phase transitions	1	Discussion	Black Board
3.5	The Clausius-Clapeyron equation	1	Lecture	Black Board
3.6	The third law of thermodynamics.	1	Discussion	PPT & White board
UNIT -4 STATISTICAL THERMODYNAMICS				
4.1	Introduction- Energy states and energy levels	1	Chalk & Talk	Black Board
4.2	Macrostates and microstates- Thermodynamic probability	1	Chalk & Talk	LCD
4.3	The Bose Einstein statistics-	4	Lecture	PPT & White

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
				board
4.4	The Fermi-Dirac statistics	1	Lecture	Smart Board
4.5	The Maxwell-Boltzmann statistics	1	Lecture	Black Board
4.6	The Bose- Einstein distribution function	1	Discussion	PPT & White board
4.7	The Fermi Dirac distribution function	2	Chalk & Talk	Black Board
4.8	The Maxwell- Boltzmann distribution function(self study).	1	Discussion	Black Board
UNIT -5 APPLICATION OF STATISTICS TO GASES				
5.1	The Monoatomic ideal gas	1	Chalk & Talk	Black Board
5.2	The principle of equipartition of energy	1	Chalk & Talk	LCD
5.3	The quantized linear oscillator	4	Lecture	PPT & White board
5.4	The Einstein theory of the specific heat capacity of a solid	1	Lecture	Smart Board
5.5	The Debye theory of the specific heat capacity of a solid	1	Lecture	Black Board
5.6	Blackbody radiation	1	Discussion	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 Scholastic	-	-	-	-	-		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	Analyse the basics of thermodynamic systems and derive the internal energy equation as Pressure, Volume and Temperature as independent	K1	PSO1& PSO2
CO 2	Explain the entropy and the second law of thermodynamics and deduce the Tds equations and discuss the properties of an ideal gas and Vander Waals gas	K1, K2,	PSO3
CO 3	Gain knowledge on thermodynamic potentials, Helmoltz and Gibbs functions and derive Maxwell's relations..	K1 & K3	PSO5

CO 4	Distinguish Bose Einstein, Fermi-Dirac statistics, Maxwell-Boltzmann Statistics and study their distribution functions.	K1, K2, K3	PSO4
CO 5	Demonstrate and explain the application of quantum statistics	K2 & K4	PSO5

Mapping of C0s with PSOs

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

Mapping of C0s with POs

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

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

♦ Weakly Correlated -**1**

COURSE DESIGNER:JEYA

SHEELAForwarded By

Dr.A.Sheela Vimala Rani

HOD'S Signature

& Name

III B.Sc.

SEMESTER –VI

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	19P6CC18	Modern Physics	Theory	5	4

COURSE DESCRIPTION

This course is an informative and comprehensive course on modern physics encompassing the basic quantum mechanical properties of particles, nuclear models and special relativity.

COURSE OBJECTIVES

The objective of this course is to let the students to understand the key concepts of wave properties of particles and get exposed of the behavior of atoms, nuclei and particles through the basis of the Schrodinger equation. Also it introduces the vector atom model and accounts concisely the nuclear models and relativistic concepts.

UNITS

UNIT –I WAVE PROPERTIES OF PARTICLES (15 HRS.)

De Broglie waves – wave function - De Broglie wave velocity – Wave and group velocities - The Davisson – Germer experiment – The uncertainty principle – **Applications of the uncertainty principle (self study)** – The wave particle duality.

UNIT –II THE SCHRODINGER EQUATION (15HRS.)

The wave function – The wave equation – Time dependent form of Schrodinger's Equation – Probability current – Expectation values – Operators – The steady state form of Schrodinger's equation – Eigen values and Eigen functions – The particle in a box – energy quantization – **Momentum wave functions – Momentum quantization (self study)**

UNIT –III THE VECTOR ATOM MODEL (15 HRS.)

Magnetic quantum number – The Normal Zeeman Effect – Angular momentum – Electron spin – The Stern-Gerlach Experiment – Spin – Orbit coupling – **The Exclusion Principle – Hund's rule (self study)–** Total Angular momentum – LS coupling – jj coupling.

UNIT –IV THE NUCLEUS 15 HRS.)

Atomic masses – Nuclear electrons – The Neutron – Stable nuclei – Nuclear sizes – Binding Energy – The deuteron – Ground state of the deuteron – Triplet and singlet states – **Meson theory of nuclear forces (self study**) – The Liquid Drop Model – The Shell Model.

UNIT –V THEORY OF RELATIVITY (15HRS.)

Special theory of Relativity – The Michelson –Morley experiment – The Galilean Transformation – The Lorentz transformation – Lorentz – Fitzerald contraction – The time Dilation – Meson decay – Simultaneity – Space – Time – Velocity addition – The relativity of Mass - The Cerenkov effect – Mass and Energy – Some relativistic formulas – **General Relativity – The Twin Paradox (self study)**.

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

Application of special theory of relativity and General theory of relativity: Global Positioning System (GPS)

REFERENCES:

Arthur Beiser (1968). *Perspectives of Modern Physics.* McGraw Hill.

Unit I: Ch.4: 4.1 - 4.8
Unit II: Ch.7: 7.1 – 7.9
Ch.8: 8.1 – 8.3
Unit III: Ch.9: 9.6 – 9.8
Ch.10: 10.1 – 10.3 , 10.6 – 10.9
Unit IV: Ch.21: 21.1 – 21.6
Ch.22: 22.1 - 22.6
Unit V : Ch.1: 1.1 – 1.8

Ch.2: 2.1 – 2.5, 2.7, 2.8.

Sehgal,N.K. Chopra, K.L and Sehgal,D.L (2004). *Modern Physics.* Sultan Chand and Sons.

Aruldas.G and Rajagopal.P (2005). *Modern Physics.* PHI Ltd

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 WAVE PROPERTIES OF PARTICLES				
1.1	Introduction to the subject - De Broglie waves – wave function	3	Lecture & Chalk & Talk	Black Board
1.2	De Broglie wave velocity – Wave and group velocities	2	Chalk & Talk	Black Board & LCD
1.3	The Davisson – Germer experiment	2	Chalk & Talk , Lecture	PPT & Blackboard
1.4	The uncertainty principle	2	Chalk & Talk	Black Board
1.5	The wave particle duality.	2	Chalk & Talk	Black Board
UNIT -2 THE SCHRODINGER EQUATION				
2.1	The wave function – The wave equation	2	Lecture	Black Board & LCD
2.2	Time dependent form of Schrodinger's Equation	2	Chalk & Talk	Black Board
2.3	Probability current	1	Chalk & Talk	Black Board
2.4	Expectation values	1	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
2.5	Operators – The steady state form of Schrodinger's equation	1	Chalk & Talk	Black Board
2.6	Eigen values and Eigen functions	1	Chalk & Talk	Black Board
2.7	The particle in a box – energy quantization	2	Chalk & Talk	Black Board
UNIT -3 THE VECTOR ATOM MODEL				
3.1	Magnetic quantum number	2	Chalk & Talk	Black Board
3.2	The Normal Zeeman Effect	1	Chalk & Talk	Black Board
3.3	Angular momentum	2	Chalk & Talk	Black Board
3.4	Electron spin	1	Chalk & Talk	Black Board
3.5	The Stern-Gerlach Experiment	1	Chalk & Talk	Black Board & LCD
3.6	Spin – Orbit coupling	1	Chalk & Talk	Black Board
3.7	Total Angular momentum	1	Chalk & Talk	Black Board
3.8	LS coupling	1	Chalk & Talk	Black Board & LCD
3.9	jj coupling	1	Chalk & Talk	Black Board & LCD
UNIT -4 THE NUCLEUS				
4.1	Atomic masses	1	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
4.2	Nuclear electrons	1	Chalk & Talk	Black Board
4.3	The Neutron	1	Chalk & Talk	Black Board
4.4	Stable nuclei	1	Chalk & Talk	Black Board
4.5	Nuclear sizes	1	Chalk & Talk	Black Board
4.6	Binding Energy	1	Chalk & Talk	Black Board
4.7	The deuteron - Ground state of the deuteron	2	Chalk & Talk	Black Board
4.8	Triplet and singlet states	1	Chalk & Talk	Black Board
4.9	The Liquid Drop Model	2	Lecture & Chalk & Talk	Black Board & LCD
4.10	The Shell Model	2	Lecture & Chalk & Talk	Black Board& LCD
UNIT - 5 THE THEORY OF RELATIVITY				
5.1	Special theory of Relativity	2	Chalk & Talk	Black Board
5.2	The Michelson –Morley experiment	2	Chalk & Talk	Black Board
5.3	The Galilean Transformation –	1	Chalk & Talk	Black Board
5.4	The Lorentz transformation –	1	Chalk & Talk	Black Board
5.5	Lorentz – Fitzerald contraction –	1	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
5.6	The time Dilation	1	Chalk & Talk	Black Board
5.7	– Meson decay	1	Chalk & Talk	Black Board
5.8	– Simultaneity – Space – Time – Velocity addition	1	Chalk & Talk	Black Board
5.9	– The relativity of Mass -	1	Chalk & Talk	Black Board
5.10	The Cerenkov effect	1	Chalk & Talk	Black Board
5.11	– Mass and Energy	2	Chalk & Talk	Black Board
5.12	– Some relativistic formulas	1	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 Scholast	**-**	**-**	**-**	**-**	-		**5**	**5**	12.5 %

ic									
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 wave properties of particles	K1	PSO1& PSO2
CO 2	Arrive at Schrodinger wave equations and apply it for accounting the behaviour of atoms, nuclei and particles on the basis of it.	K1, K2,	PSO1, PSO2, PSO5
CO 3	Explain the vector atom model and understand the role of spin in atomic phenomena	K1 & K3	PSO1& PSO4
CO 4	Discuss the properties of atomic nuclei and interpret its behavior through detailed models like liquid drop and shell model	K1, K2, K3 &	PSO1& PSO4
CO 5	Explain the concepts of relativity and explain the intimate relationships between space and time, mass and energy.	K2 & K4	PSO1,PS03

Mapping COs Consistency with PSOs

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

Mapping of COs with POs

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

Note: ♦ Strongly Correlated – **3** ♦ModeratelyCorrelated – **2**
♦ WeaklyCorrelated -**1**

COURSE DESIGNER: Ancemma Joseph

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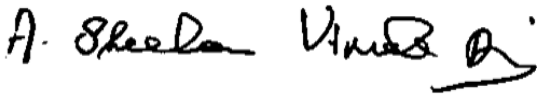

Dr. A. Sheela Vimala Rani

HoD'S Signature & Name

III B.Sc.

SEMESTER –VI

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAPH	19P6CC19	Major Practicals VII ELECTRONICS	Practicals	3	2

COURSE DESCRIPTION

This laboratory course explores the basic principles of electronics through experiments

COURSE OBJECTIVES

On completion of this course, the learner will be able to understand physical laws using appropriate equipments through experiments

List of Experiments (Any Eight)

1.NAND & NOR as universal gates-IC
2.Karnaugh Map- Sum of products
3.Karnaugh Map- product of sums
4.Counters- Mod 3 using JK FF
5.Counters- Mod 5 and Mod 10 using 7490
6.OP-AMP – Integrator and differentiator
7.OP-AMP- Logarithmic Amplifier
8.Shift register- IC 74190
9.Ring Counter using JK FF
10.Verification of Boolean expressions and DeMorgan's theorem

EVALUATION PATTERN

MARKS		
CIA	ESE	Total
40	60	100

COURSE DESIGNER: Dr. Mathavi Manisekar

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III B.Sc.

SEMESTER VI

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAPH	19P6CC20	Major Practicals VIII NON ELECTRONICS	Practicals	3	2

COURSE DESCRIPTION

The lab course deals with Experiments of optics, thermal and electricity in Physics.

COURSE OBJECTIVES

The course gives an understanding of electrical, thermal and optical measurements like Determination of Groove spacing of a CD, Refractive index of the calcite prism, determination of Numerical Aperture of a Fiber optic cable, characteristics of thermistor, Determination of bending loss using optical fiber, Determination of resistance of the coil and malus law verification.

LIST OF EXPERIMENTS

1. Newton's rings in liquid – determination of μ.
2. Study of the Characteristics of a Thermistor
3. Solar Spectrum - Determination of Fraunhofer lines using Grating
4. Biprism and spectrometer - Determination of λ
5. Determination of Groove spacing of a CD – LASER.
6. Determination of Refractive index of a calcite prism.
7. Determination of Thermo emf – Potentiometer.
8. Determination of bending loss using optical fiber
9. Determination of resistance of the coil- Carry faster bridge.
10. Air Wedge – determination of thickness of the wire.

EVALUATION PATTERN

MARKS		
CIA	**ESE**	**Total**
40	**60**	**100**

COURSE DESIGNER:Dr. Dheva Shantha Kumari

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Dr. A. Sheela Vimala Rani

HoD'S Signature & Name

III B.Sc.

SEMESTER –III

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	19P6ME1	Microprocessor	Theory	5	5

COURSE DESCRIPTION

Aim of this course is to enable the student to understand microprocessor architecture and assembly language programming

COURSE OBJECTIVES

UNIT I:Number systems and Microprocessor Architecture

[15 HRS.]

Number inter conversion(decimal, hexa, binary and octal)

The 8085 microprocessor unit-microprocessor communications and bus timings(excluding timings diagram)-demultiplexing the bus AD_7-AD_0-generating control signals- the detailed look at the 8085 MPU and its architecture.

UNIT II: INTRODUCTION TO 8085 ASSEMBLY LANGUAGE PROGRAMMING ***[15 HRS.]***

The 8085 programming model- instruction classification- instruction format- how to write, assemble and execute a simple program- overview of the 8085 instruction set.

UNIT III: INTRODUCTION TO 8085 INSTRUCTIONS [15 HRS.]

Data transfer operations- arithmetic operations- logic operations-branch operations- writing assembly language programs- debugging a program.

UNIT IV: PROGRAMMING TECHNIQUES WITH ADDITIONAL INSTRUCTIONS [15 HRS.]

Looping, counting and indexing- additional data transfer and sixteen bit arithmetic instructions-arithmetic operations related to memory- logic operations: rotate-logic operations: compare-dynamic debugging.

UNIT V COUNTERS AND TIME DELAY [15 HRS.]

Counters and time delay- illustrative program: hexa decimal counters- illustrative programs: Zero to Nine (modulo ten) counter- illustrative programs: Generating pulse waveforms

UNIT VI: DYNAMISM (Evaluation Pattern-CIA only)

Interfacing Microcontrollers with external devices

REFERENCES

Ramesh S.gaonker, Microprocessor architecture, programming and applications with the 8085-III edition
Barry B. Brey, "The Intel Microprocessors 8086/8088, 80186, 80286, 80386 and 80486, Prentice, Hall of India, New Delhi, third edition, 1995
Daniel Tabak, Advanced Microprocessors –
Douglas V. Hall, Microprocessor interfacing, Programming and Hardware, Tata McGraw Hill 2005.
S. Visvanathan and Vijayendran V., Fundamentals of Microprocessor 8086 , 3 rd Edition 2005 -

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -I Number systems and Microprocessor Architecture				
1.1	Number inter conversion(decimal, hexa, binary and octal)	3	Chalk & Talk	Black Board
1.2	Measurements The 8085	5	Chalk & Talk	Black

	microprocessor unit-microprocessor communications and bus timings(excluding timings diagram)			Board
1.3	demultiplexing the bus AD_7-AD_0-	3	Demonstration	PPT
1.4	Generating control signals- the detailed look at the 8085 MPU and its architecture.	4	Lecture	PPT
UNIT -II INTRODUCTION TO 8085 ASSEMBLY LANGUAGE PROGRAMMING				
2.1	The 8085 programming model	3	Lecture	Black Board
2.2	Instruction classification	3	Chalk & Talk	PPT & Black Board
2.3	Instruction format	3	Discussion	Black Board
2.4	How to write, assemble and execute a simple program	3	Discussion	Black Board
2.5	Overview of the 8085 instruction set.	3	Chalk & Talk	PPT & Black Board
UNIT - III INTRODUCTION TO 8085 INSTRUCTIONS				
3.1	Data transfer operations-	3	Lecture	Black Board
3.2	arithmetic operations	3	Lecture	Black Board
3.3	logic operations	2	Discussion	PPT

3.4	branch operations-	2	Lecture	Black Board
3.5	writing assembly language programs	3	Lecture	Black Board
3.6	debugging a program.	2	Lecture	Black Board
UNIT – IV PROGRAMMING TECHNIQUES WITH ADDITIONAL INSTRUCTIONS				
4.1	Looping, counting and indexing	3	Chalk & Talk	Black Board
4.2	- additional data transfer and sixteen bit arithmetic instructions-	3	Lecture	PPT
4.3	arithmetic operations related to memory-	4	Lecture	PPT
4.4	logic operations: rotate- logic operations: compare- dynamic debugging	5	Chalk & Talk	Black Board
UNIT V COUNTERS AND TIME DELAY				
5.1	Counters and time delay-	4	Lecture	PPT
5.2	illustrative program: hexa decimal counters-	4	Chalk & Talk	Black Board
5.3	illustrative programs: Zero to Nine (modulo ten) counter-	3	Chalk & Talk	Black Board
5.4	illustrative programs: Generating pulse waveforms	4	Group Discussion	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 Scholastic	-	-	-	-	-		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	Acquire knowledge of Microprocessor Architecture	K1,K2	PSO1& PSO2
CO 2	Comprehend the instructions in assembly language program	K1,K3	PSO3&PSO4
CO 3	Describe the various operations and debugging	K3,K3	PSO1, PSO2 &PSO3
CO 4	Understand the programming techniches in microcontroller	K2,K4	PSO1& PSO2
CO 5	Explore the role of counters and time delay	K2,K3	PSO1, PSO2 PSO4 & PSO5

Mapping of COs with PSOs

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

Mapping of COs with POs

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

COURSE DESIGNER: Dr. M. Ragam

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Dr. A. Sheela Vimala Rani

HoD'S Signature & Name

III B.Sc.

SEMESTER VI

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	19P6ME2	Medical Physics	Theory	5	5

COURSE DESCRIPTION

This course introduces physics of medical instruments used for diagnosis and therapy

COURSE OBJECTIVES

The course enables the students to understand the physics principles, methods and techniques in practice and research for diagnosis and treatment of human diseases with a specific goal of improving human health and well being

UNIT I:TERMINOLOGY, MODELING AND MEASUREMENT [15 HRS.]

Terminology, Modeling and Measurement - Applications of Electricity and Magnetism in Medicine: Electrical shock, High frequency Electricity in Medicine, Low-frequency Electricity and Magnetism in Medicine

UNIT II: LIGHT IN MEDICINE [15 HRS.]

Measurement of light and its units, Application of visible light in Medicine, Applications of Ultraviolet and Infrared Light in Medicine, Lasers in Medicine.

Physics of Diagnostic X Rays **:**Making an X-ray image, Radiation to patients from x-rays. Producing Live X-ray images-Fluoroscopy

UNIT III:RADIO ISOTOPES IN MEDICINE (NUCLEAR MEDICINE)

(15 HRS.]

Sources of Radioactivity for Nuclear Medicine, Basic Instrumentation and its clinical applications, Nuclear Medicine Imaging Devices, Therapy with

radioactivity, Radiation Doses in Nuclear Medicines

UNIT IV: RADIATION PROTECTION IN MEDICINE (15 HRS.)

Biological effects of Ionizing Radiation, Radiation protection in Diagnostic Radiology, Radiation protection in Radiation therapy, Radiation protection in Nuclear Medicine, Radiation Accidents

UNIT V:COMPUTERS IN MEDICINE&RECENT IMAGING TECHNIQUES (13 HRS.)

History taking, Laboratory Automation, Electrocardiogram Interpretation, Patient Monitoring, Drug-Test interactions, prescribing Drug Dosage, Pulmonary Function Testing, Medical Record systems, Hospitals book keeping, other uses of computers in Medicine.
Computer Aided Tomography, Magnetic Resonance Imaging, Position Emission Tomography, Ultrasonic Imaging.

UNIT VI: DYNAMISM (Evaluation Pattern-CIA only) (2 HRS.)

Adaptive radiation therapy-artificial intelligence

REFERENCES

1. John R.Cameron & James G.Skofronick "Medical Physics", A Wiley-Interscience Publication,John Wiley & Sons

2. Irina Cromwell, Carol Weibell, Lianne Pfeiffer –Biomedical Instrumentation and Measurements –Prentice Hall of India Pvt .Ltd ,New Delhi .

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -I TERMINOLOGY, MODELING AND MEASUREMENT				
1.1	Terminology, modeling	3	Chalk & Talk	Black Board
1.2	Measurements	3	Chalk & Talk	Black Board

1.3	Applications of Electricity and magnetism in medicine	3	Demonstration	PPT
1.4	Electrical shock	3	Lecture	PPT
1.5	High frequency electricity in medicine	3	Chalk & Talk	Black Board
UNIT -II	**LIGHT IN MEDICINE**			
2.1	Measurement of light and its units	2	Lecture	Black Board
2.2	Application of visible light in Medicine	2	Chalk & Talk	PPT & Black Board
2.3	Application of UV light in Medicine	2	Discussion	Black Board
2.4	Application of IR light in Medicine	1	Discussion	Black Board
2.5	Lasers in Medicine	1	Chalk & Talk	PPT & Black Board
2.6	Physics of diagnostic x-rays	2	Lecture	PPT
2.7	Making an x-ray image	1	Lecture	PPT
2.8	Radiation to patients from x-rays	2	Lecture	PPT & Black Board
2.9	Producing Live X-ray images -Flooroscopy	2	Chalk & Talk	Black Board
UNIT - III	**RADIO ISOTOPES IN MEDICINE**			
3.1	Sources of Radioactivity for nuclear medicine	3	Lecture	Black Board
3.2	Basic instrumentation and its clinical application	3	Lecture	Black Board
3.3	Nuclear medicine imaging	3	Discussion	PPT

	devices			
3.4	Therapy with radioactivity	3	Lecture	Black Board
3.5	Radiation Doses in nuclear medicines	3	Lecture	Black Board
UNIT – IV RADIATION PROTECTION IN MEDICINE				
4.1	Biological effects of ionizing radiation	3	Chalk & Talk	Black Board
4.2	Radiation protection in Diagnostic Radiology	3	Lecture	PPT
4.3	Radiation protection in Radiation therapy	3	Lecture	PPT
4.4	Radiation protection in Nuclear Medicine	3	Chalk & Talk	Black Board
4.5	Radiation Accidents	3	Chalk & Talk	Black Board
UNIT V COMPUTERS IN MEDICINE				
5.1	History taking	2	Lecture	PPT
5.2	Laboratory Automation	2	Chalk & Talk	Black Board
5.3	Electrocardiogram Interpretation	2	Chalk & Talk	Black Board
5.4	Patient Monitoring	1	Group Discussion	Black Board
5.5	Drug Test Interactions	1	Discussion	Google class room
5.6	Prescribing Drug Dosage	1	Discussion	Google class room
5.7	Pulmonary Function Testing	2	Discussion	Google class

				room
5.7	Medical Record systems	1	Chalk & Talk	Black Board
5.8	Hospital book keeping	1	Chalk & Talk	Black Board
5.9	Other uses of computers in Medicine	1	Lecture	PPT
	UNIT VI DYNAMISM			
6.1	Adaptive radiation therapy	1	Discussion	Google Class Room
6.2	Artificial Intelligence.	1	Discussion	Google Class Room

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 Scholastic	**-**	**-**	**-**	**-**	-		**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	Acquire knowledge of terminologies, modeling and measurements in medical physics. Also application of low frequency and high frequency electricity in medicine	K1,K2	PSO1& PSO2
CO 2	Comprehend properties of light in medicine and to study various applications of light in medicine	K1,K3	PSO3&PSO4
CO 3	Describe the role of nuclear medicine techniques for diagnosis and therapy	K3,K3	PSO1, PSO2 &PSO3
CO 4	Understand the radiation protection in medicine	K2,K4	PSO1& PSO2
CO 5	Explore the role of computers in diagnosis, testing and therapy	K2,K3	PSO1, PSO2 PSO4 & PSO5

Mapping of C0s with PSOs

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

Mapping of C0s with POs

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

COURSE DESIGNER: Dr. A. Sheela Vimala Rani & Dr. M. Ragam

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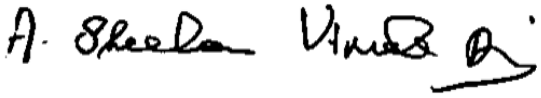

Dr. A. Sheela Vimala Rani

HoD'S Signature & Name

III B.Sc.

SEMESTER –VI

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	19P6ME3	Opto Electronics	Theory	5	5

COURSE DESCRIPTION

Aim of this course is to enable the student to understand the concepts in semiconducting materials and fiber optic systems which forms the basis for communication systems.

COURSE OBJECTIVES

Communication Electronweics is a challenging field. This course aims at giving an idea about fiber optics systems and communication. This course also deals with the semiconductors and stimulated emission in intrinsic semiconductors and photo detectors.

UNIT I: FIBER OPTICS (15HRS.)

Forms of communication Systems- The evolution of fiber optic systems -elements of an optical fiber transmission link -The quantum nature of light- basic optical laws & definitions- optical fiber modes and configurations -fiber types -rays and modes -step index fiber structure - ray optics representations -wave representation.

UNIT II: FIBER OPTICS LOSSES [15 HRS.]

Introduction- Attenuation -Material absorption losses in silica glass fibers: intrinsic absorption, extrinsic absorption -linear scattering losses: Rayleigh scattering, Mie scattering- non-linear scattering losses: stimulated Brillouin scattering, stimulated Raman scattering- Bending losses -core and cladding losses-signal distortion in optical wave guides -information capacity determination -refractive index profiles.

UNIT III: SEMICONDUCTOR LASER (15 HRS.)

Direct band gap semi conductors - Indirect band gap semi conductors- Spontaneous emission: electroluminescense- LEDs emitting different colors - Semiconductor laser: Basic principle of laser action –population inversion – Non-semiconductor laser system -Stimulated emission: Intrinsic semiconductors- Stimulated emission: p-n diode-salient points about LASER action

UNIT IV: PHOTODIODES (15 HRS.)

Photodetectors : photodetector materials - basic principles for optical detection- The p-n junction photo diode-The p-i -n photo diode -diffusion length and life time -Quantum efficiency -Responsivity -The p-i-n avalanche diode- Electron and hole ionization rates, Responsivity of avalanche photodiode.

UNIT V: OPTICAL FIBER SENSORS (15 HRS.)

Introduction- Optical fiber sensors- Phase and polarization fiber sensors- Ring interferometer with multiturn fiber coil- Optical fluid level detector- Optical fiber flow sonsors(Extrinsic)- Optical displacement sensors (Extrinsic)- Optical displacement- moiré fringe modulation sensors- Microbend optical fiber sensors: Introduction- Intrinsic fiber sensors measurement- Current measurement by single – mode optical fiber sensors-Fluoroptic temperature sensors-Photoelastic pressure sensors- Laser Doppler velocimeter using optical fiber.

UNIT VI: DYNAMISM (Evaluation Pattern-CIA only) (3 HRS.)

Application of fibers in telecommunication, Aircrafts and railway- Application of semiconductor in solar cells- Application of Photodiode in smoke detector.

REFERENCES

1. Gerd Keiser.” Optical fiber communications”. Second edition, McGraw-Hill International Edition. Singapore. 1991.

2. John M. Senior. ”Optical fiber Communications- principles and practice”. Second edition-Prentice-Hall of India Private Ltd. New Delhi.1996.

3. C.K. Sarkar &D.C.Sarkar. “Optoelectronics and Fiber optic communication”. I Edition, New Age International (P) Ltd., Publishers, New Delhi.2001.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 FIBER OPTICS				
1.1	Forms of Communication Systems	2	Chalk & Talk	Black Board
1.2	The Evolution of fiber optic systems	2	Chalk & Talk	Black Board
1.3	Elements of an optical fiber transmission link	3	Lecture	PPT & blackboard
1.4	The quantum nature of light	2	Lecture	PPT
1.5	Basic optical laws & definitions	2	Lecture	Black Board
1.6	Optical fiber modes and configuration	2	Discussion	Google classroom
1.7	Fiber types	2	Chalk & Talk	PPT
UNIT -2 FIBER OPTICS LOSSES				
2.1	Introduction& Attenuation	1	Lecture	Black Board
2.2	Material absorption losses in silica glass fibers: intrinsic absorption and extrinsic	2	Chalk & Talk	PPT & Black Board

	absorption			
2.3	linear scattering losses: Rayleigh scattering and Mie scattering-	2	Discussion	Black Board
2.4	Non-linear scattering losses: stimulated Brillouin scattering, stimulated Raman scattering	2	Discussion	Black Board
2.5	Bending losses -core and cladding losses	2	Chalk & Talk	PPT & Black Board
2.6	Signal distortion in optical wave guides	2	Lecture	PPT
2.7	Information capacity determination	2	Lecture	PPT
2.8	Refractive index profiles.	2	Lecture	PPT & Black Board
UNIT -3 SEMICONDUCTOR LASER				
3.1	Direct band gap semi conductors	2	Lecture	Black Board
3.2	Indirect band gap semi conductors-	1	Lecture	Black Board
3.3	Spontaneous emission: electroluminescence	2	Discussion	PPT
3.4	LEDs emitting different colors	1	Lecture	Black Board
3.	Semiconductor laser	1	Discussion	PPT& Black Board
3.6	Basic principle of laser action & population inversion	2	Lecture	Black Board
3.7	Non-semiconductor laser system	2	Lecture	PPT

3.8	Intrinsic semiconductors-Stimulated emission	2	Lecture	PPT&Black Board
3.9	Stimulated emission in p-n diode and salient points about LASER action	2	Chalk & Talk	Black Board
UNIT IV PHOTO DIODES				
4.1	Photo detectors& photodetector materials	2	Chalk & Talk	Black Board
4.2	basic principles for optical detection	1	Lecture	PPT
4.3	The p-n junction photo diode	2	Lecture	PPT
4.4	The p-i -n photo diode	2	Chalk & Talk	Black Board
4.5	Diffusion length and life time	1	Chalk & Talk	Black Board
4.6	Quantum efficiency and Responsivity	2	Chalk & Talk	Black Board
4.7	The p-i-n avalanche diode-	2	Lecture	PPT
4.8	Electron and hole ionization rates	1	Chalk & Talk	Black Board
4.9	Responsivity of avalanche photodiode.	2	Discussion	PPT
UNIT V OPTICAL FIBER SENSORS				
5.1	Introduction to optical fiber sensors.	2	Lecture	PPT
5.2	Phase and polarization fiber sensors	1	Chalk & Talk	Black Board
5.3	Ring interferometer with multiturn fiber coil	1	Chalk & Talk	Black Board
5.4	Optical fluid level detector	1	Group Discussion	Black Board
	Optical fiber flow sonsors(Extrinsic	1	Discussion	Google class room

	Optical displacement sensors (Extrinsic)	1	Discussion	Google class room
5.5	Optical displacement- moiré fringe modulation sensors	1	Discussion	Google class room
5.6	Microbend optical fiber sensors& Intrinsic fiber sensors measurement	1	Chalk & Talk	Black Board
5.7	Current measurement by single mode optical fiber sensors	2	Chalk & Talk	Black Board
5.8	Fluoroptic temperature sensors-Photoelastic pressure sensors	2	Lecture	PPT
5.9	Laser Doppler velocimeter using optical fiber.	2	Chalk & Talk	Black Board
	UNIT VI DYNAMISM			
6.1	Application of fibers in telecommunication, Aircrafts and railway	1	Discussion	Google Class Room
6.2	Application of semiconductor in solar cells	1	Discussion	Google Class Room
6.3	Application of Photodiode in smoke detector	1	Discussion	Google Class Room

Levels	**C1**	**C2**	**C3**	**C4**	**C5**	**Total Scholastic Marks**	**Non Scholastic Marks C6**	**CIA Total**	**% of Assessment**
	T1	**T2**	**Quiz**	**Assignment**	**OBT/PPT**				
	10 Mks.	**10 Mks.**	**5 Mks.**	**5 Mks**	**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 Scholastic	**-**	**-**	**-**	**-**	**-**		**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	Define the different parameters of fiber optics system and explain the basic concepts.	K1&K2	PSO1& PSO2
CO 2	Solve the problems in various losses of fibers.	K2	PSO3&PSO4
CO 3	Understand the working of LED, semiconductor lasers and PN diode.	K2 & K3	PSO1, PSO2 &PSO3
CO 4	Describe working and various parameters of photo detectors.	K2& K3	PSO1& PSO2
CO 5	Understand the working and application of optical fiber sensors	K2 & K4	PSO1, PSO2 PSO4 & PSO5

Mapping of COs with PSOs

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

Mapping of C0s with POs

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

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

♦ Weakly Correlated -**1**

COURSE DESIGNER: Dr.R.Jothi Mani

Forwarded By

Dr. A. Sheela Vimala Rani

HoD'S Signature & Name

III B.Sc.

SEMESTER –VI

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	19P6ME4	ENERGY PHYSICS	Theory	5	5

COURSE DESCRIPTION

This course intends to give a comprehensive description of existing types of conventional energy sources and aims to give a potential notion to resolve the challenges with regard to future supply and demand with the usage of various types of renewable energy sources like solar energy, geothermal energy , wind, biomass, tidal energy.

COURSE OBJECTIVES

The objective of this course is to introduce the basic ideas of conventional energy sources & their primary applications and impart knowledge on physics behind harnessing solar radiation , geothermal energy, magnetohydrodynamics, fuel cell, wind , biomass and ocean tides and waves as renewable energy resources and to let the students identify the remedies/potential solutions to the energy demand and supply based on energy conservation approach.

UNITS

UNIT –I ENERGY RESOURCES (6 HRS.)

Classification of energy resources – Conventional resources – Coal – Petroleum and Natural gas – Thermal power – Hydro Power – Nuclear Power – Nonconventional energy – Solar energy – Bio energy – Ocean energy – Wind energy – Geothermal energy – Magnetohydrodynamics – Animal energy – **Alternative Fuels(self study)**

UNIT –II SOLAR ENERGY (6 HRS.)

Solar Radiation – Physics of the Sun – Solar Position in relation to the earth – Solar Constant -Components- Some important application – Solar drying – Solar distillation – Solar Cooker – Solar energy collector – Solar water heater- Photovoltaic effect - Performance of Solar cell- Storage of solar energy – **water storage** – Solar pond. **(self study)**

UNIT –III GEOTHERMAL ENERGY (6 HRS.)

Geothermal energy - Geothermal resources – Uses of geothermal energy – hydrothermal convective system – Geothermal power plants – Dry field power plant.

Magnetohydrodynamics - power generator – ionising of a gas – method of ionising gas – MHD generator

Fuel cell – fundamentals of electrochemistry – types of fuel cells – hydrogen oxygen cell – bio chemical cell – **regenerative cells(self study)**

UNIT –IV WIND ENERGY (6 HRS.)

Wind energy- Technology – Principle of wind energy conversion – site evaluation – Wind turbines - **Biomass** – introduction – Photosynthesis – Biomass production efficiency – Biomass conversion – **Gasification of Biomass(self study)**

Ocean thermal energy- Technology– energy from **waves and tides** – Tidal barrage design – Modes of operations (Basic ideas, nature, applications, merits and demerits of these.)

UNIT –V ENERGY STORAGE & IMPACTS OF NON-CONVENTIONAL ENERGY - (6 HRS.)

Conservation of energy- Conservation principles in these sectors- Energy audit – Energy conservation – approach and technology- Energy options for the developing countries—Energy Storage- **Instrumentation and control (self study)**

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

Recent industry trends in energy storage and applications

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	Classification of energy resources	1	Lecture & Chalk & Talk	Black Board
1.2	Conventional resources – Coal – Petroleum and Natural gas – Thermal power – Hydro Power – Nuclear Power	1	Chalk & Talk	Black Board & LCD
1.3	Nonconventional energy –	1	Chalk & Talk , Lecture	PPT & Blackboard
1.4	Solar energy	1	Chalk & Talk	Black Board
1.5	Bio energy – Ocean energy –.	1	Chalk & Talk	Black Board
1.6	Wind energy – Geothermal energy	1	Chalk & Talk	Black Board
1.7	Magnetohydrodynamics-	1	Chalk &	Black

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	Animal energy		Talk	Board
UNIT -2	**ATMOSPHERIC PRESSURE AND HUMIDITY**			
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
2.6	Humidity: Hygrometer-Psychrometer	1	Chalk & Talk	Black Board
2.7	Difficulty of accurate humidity measurement	1	Chalk & Talk	Black Board
2.8	Hair tension hygrometer-Electronic hygrometer-Applications.	1	Lecture & Chalk & Talk	LCD & Black Board
UNIT -3	**AIRCRAFT INSTRUMENTATION**			
3.1	Altimeter: Pressure altimeter	1	Lecture & Chalk & Talk	LCD & Black Board
3.2	Radar altimeter-Other modes of transport:	1	Chalk & Talk	Black Board
3.3	Measuring air pressure-Sattelite altimetry-	1	Chalk & Talk	Black Board
3.4	Sextants: Navigational sextant	1	Chalk & Talk	Black Board
3.5	- Aircraft Sextant	1	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.6	-Adjustment and care-Advantages	1	Chalk & Talk	Black Board & LCD
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 anemometer	2	Lecture	LCD
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	1	Chalk &	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	detectors- Thermistors- Ultrasonic termperature transducers- Photoelectric transducers		Talk	
5.6	The photomultiplier tube- - The semiconductor photodiode- The phototransistor	1	Chalk & Talk	Black Board
5.7	Biosensors-Chemical sensors-pH sensing-Optical sensors.	1	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 Scholastic	**-**	**-**	**-**	**-**	-		**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	distinguish the energy resources as conventional and nonconventional and describe each one of its types.	K1	PSO1& PSO2
CO 2	escribe the physics behind harnessing solar radiation as renewable energy resource and its applications	K1, K2,	PSO1& PSO2,PSO3
CO 3	explain the basic concepts of geothermalenergy, magnetohydrodynamics and fuel cell.	K1 & K3	PSO1& PSO2,PSO4
CO 4	describe the energy conversion principles of wind , biomass and ocean tides and waves	K1, K2, K3 &	PSO1& PSO2,PSO4
CO5	suggest energy options for developing countries based on energy conservation approach.	K1, K2, K3	PSO1& PSO2,PSO4

Mapping of COs with PSOs

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

Mapping of C0s with POs

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

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

♦ Weakly Correlated -**1**

COURSE DESIGNER: Dr. Ancemma Joseph

Forwarded By

Dr. A. Sheela Vimala Rani

HoD'S Signature & Name

IIB.Sc.

SEMESTER –III

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	19P3SB1	Biomechanics	THEORY	2	2

COURSE DESCRIPTION

This course aims to introduce the Biomechanical concepts and to provide an idea about the anatomic pulleys and lever systems.

COURSE OBJECTIVES

This course imparts knowledge about mechanics applied to Biological systems.

UNIT-I INTRODUCTION TO BIO MECHANICS (4 HRS.)

Mechanics – Classifications - Meaning of biomechanics - basic concepts - Principle areas of biomechanics

UNIT –II BIOMECHANICAL CONCEPTS (7 HRS.)

Kinematics: Primary variables- Time-Position-Displacement-Velocity-Acceleration. Kinetics- Force related Concepts- Mass and Inertia—Force-Force systems- Center of Mass-center of gravity-Pressure-Moment of Force (torque)- Mass moment of inertia.

UNIT –III NEWTONS LAW OF MOTION [6 hours]

Newton's First law of motion- Newton's second law of motion- Newton's third law of motion- Equilibrium-Work and Power-join mobility and stability.

UNIT-IV LEVER SYSTEM [6 hours]

Resistance force- Effort force. Classes of levers- first, second and third classes-function of levers-moment of force and joint motion- joint reaction forces versus bone on bone forces-joint lubrication

UNIT-V: MUSCLE FORCES [7hours]

Total muscle force vector- Continuing Exploration: Measuring muscle force- anatomic pulleys, action lines and moment arms- changes to moment arm of a force- moment arm and angle of application of force- muscles in third class, second class and first class lever systems – mechanical advantage.

REFERENCES:

1. William C. Whiting, Ronald F. Zernick (Human Kinetics), Biomechanics of Musculoskeletal Injury.
2. Pamela K, Levangie, Cynthia C. Norkin(JP brothers, New Delhi) Joint Structure and Function: A Comprehensive analysis (IV Edition).
3. Ronald.L.Huston, Fundamentals of Biomechanics, 2013, (V Edition).

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 Introduction to Biomechanics				
1.1	Mechanics and their classifications	1	Lecture	PPT
1.2	Meaning of Bio Mechanics	1	Lecture	PPT
1.3	Basic concepts	1	Lecture	PPT
1.4	Principle areas in Biomechanics	1	Lecture	PPT
UNIT -2 Bio Mechanical Concepts				
2.1	Kinematics and primary variables	1	Lecture	PPT
2.2	Time-Position-Displacement-Velocity-Acceleration. Kinetics-	1	Lecture	Black Board
2.3	Kinetics- Force related Concepts- Mass and Inertia	2	Lecture	Smart Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
2.4	Force- Force systems- Center of Mass-center of gravity-	1	Chalk & Talk	LCD
2.5	Pressure-Moment of Force (torque)- Mass moment of inertia.	2	Chalk & Talk	LCD
UNIT -3 NEWTONS LAW OF MOTION				
3.1	Newton's First law of motion	1	Chalk & Talk	Black Board
3.2	Newton's second law of motion	1	Lecture	Smart Board
3.3	Newton's third law of motion	1	Lecture	Black Board
3.4	Equilibrium	1	Discussion	Google classroom
3.5	Work and Power	1	Chalk & Talk	LCD
3.6	join mobility and stability	1	Discussion	Black Board
UNIT – 4 Lever System				
4.1	Resistance and effect force	1	Chalk & Talk	Black Board
4.2	Classes of levers	1	Lecture	Smart Board
4.3	first, second and third classes	1	Lecture	Black Board
4.4	function of levers-moment of force and joint motion	1	Discussion	Google classroom
4.5	joint reaction forces versus bone on bone forces	1	Chalk & Talk	LCD

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
4.6	joint lubrication	1	Discussion	Black Board
UNIT- 5 MUSCLE FORCES				
5.1	Total muscle force vector, Measuring muscle forces	1	Lecture	Black Board
5.2	Anatomic pulley, Action lines and moment arms	1	Chalk & Talk	Black Board
5.3	Changes to moment arm of a force	2	Chalk & Talk	Black Board
5.4	Moment arm and angle of application of force	1	Chalk & Talk	Black Board
5.5	Classes of levers	1	Discussion	Google classroom
5.6	Muscles in third class, second class and first class systems	1	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 Scholastic	**-**	**-**	**-**	**-**	-		**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	Acquire a skill to apply the laws of kinematics to biological systems	K1,K2	PSO1
CO 2	Identify the anatomical pulleys and lever systems	K1, K3,	PSO2
CO 3	Access the types of levers in our body	K1,K2	PSO1
CO 4	Explain how the biological machines inside our body	K2, K3	PSO3
CO 5	Discuss different kinds of activities, equilibrium and stability of the body using Newton's law of physics	K1, K3	PSO1,PSO2

Mapping of C0s with PSOs

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

Mapping of C0s with Pos

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

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

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr.R.Jothi Mani**

Forwarded By

HOD'S Signature

& Name

II B.Sc.

SEMESTER –IV

For those who joined in 2022 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	22P4SB2	Solar Cell and its Applications	Lecture	2	2

COURSE DESCRIPTION

The course provides concept based exposure to solar cell technologies.

COURSE OBJECTIVES

This course deals with the elemental concepts, applications of solar cells and insights in design of PV based appliances.

Unit -1:Solar Cell Technologies (6 HRS)

Introduction – solar cell technologies : Crystalline silicon solar cell- mono silicon solar cell- poly silicon solar cell

Unit –2: Thin film solar cells (6 HRS)

Cadmium telluride solar cells (CdTe)- Copper indium gallium selenide (CIGS) solar cells- polymer solar cells- organic solar cells-Dye sensitised solar cells

Unit -3: Applications of Solar PV (6 HRS)

Solar Domestic Appliances : Solar Water heater, Solar Cooker, Solar Refrigerator, Solar Fans, Solar Mobile Charger

Unit-4: Applications of solar in power plants (6 HRS)

Introduction- Development- Engineering, procurement and construction- economics of power plants-safety issues

Unit -5: PV Solar Design (6 HRS)

Solar Panel Power Calculation – DC load – AC load – Battery Capacity – Design of PV based appliances

Reference Book

1. Photovoltaic solar Energy conversion Technologies, Application and

Environmental impacts, 2020, Shiva Gorjian, Ashish shukla.

2. Hand book of Photovoltaic Science and Engineering - Antonio Luque, Steven Hegedus, Second Edition, 2011.

Web References

1. https://www.havells.com/en/consumer/water-heater/solar.html#:~:text=Solar%20water%20heaters%20use%20natural,and%20is%20also%20environment%20friendly.

2. https://www.leonics.com/support/article2_12j/articles2_12j_en.php

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 Solar Cell Technologies				
1.1	Introduction	2	Lecture	PPT
1.2	solar cell technologies	1	Lecture	PPT
1.3	Crystalline silicon solar cell-	1	Lecture	PPT
1.4	mono silicon solar cell	1	Lecture	PPT
1.5	poly silicon solar cell	1	Lecture	PPT
UNIT -2 Thin film solar cells				
2.1	Cadmium telluride solar cells (CdTe)	1	Lecture	PPT
2.2	Copper indium gallium selenide (CIGS) solar cells	1	Lecture	Black Board
2.3	polymer solar cells	2	Lecture	Smart Board
2.4	organic solar cells	1	Chalk & Talk	LCD
2.5	Dye sensitised solar cells	1	Chalk &	LCD

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
			Talk	
UNIT -3 Applications of Solar PV				
3.1	Solar Domestic Appliances	1	Chalk & Talk	Black Board
3.2	Solar Water heater	1	Lecture	Smart Board
3.3	Solar Cooker	1	Lecture	Black Board
3.4	Solar Refrigerator	1	Discussion	Google classroom
3.5	Solar Fans	1	Chalk & Talk	LCD
3.6	Solar Mobile Charger	1	Discussion	Black Board
UNIT – 4 Applications of solar in power plants				
4.1	Introduction	1	Chalk & Talk	Black Board
4.2	Development	1	Lecture	Smart Board
4.3	Engineering	1	Lecture	Black Board
4.4	procurement and construction	1	Discussion	Google classroom
4.5	economics of power plants-	1	Chalk & Talk	LCD
4.6	safety issues	1	Discussion	Black Board
UNIT- 5 PV Solar Design				
5.1	Solar Panel Power Calculation	1	Lecture	Black

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
				Board
5.2	DC load	1	Chalk & Talk	Black Board
5.3	AC load	2	Chalk & Talk	Black Board
5.4	Battery Capacity	1	Chalk & Talk	Black Board
5.5	Design of PV based appliances	1	Discussion	Google classroom

Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	Session -wise Average 5 Mks.	Better of W1, W2 5 Mks	M1+M2 5+5=10 Mks.	MID-SEM TEST 15 Mks	35 Mks.	5 Mks.	40Mks.	
K1	5	-	-	2 ½	7.5	-	7.5	18.75 %
K2	-	5	4	2 ½	11.5	-	11.5	28.75 %
K3	-	-	3	5	8	-	8	20 %
K4	-	-	3	5	8	-	8	20 %
Non	-	-	-	-		5	5	

Scholastic								12.5 %
Total	**5**	**5**	**10**	**15**	**35**	**5**	**40**	**100 %**

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

- ✓ **All the course outcomes are to be assessed in the various CIA components.**
- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy for I UG are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

- ✓ **The I UG course teachers are requested to start conducting S1, W1, M1, in due intervals of time.**

EVALUATION PATTERN

SCHOLASTIC				**NON - SCHOLASTIC**	**MARKS**		
C1	**C2**	**C3**	**C4**	**C5**	**CIA**	**ESE**	**Total**
5	**10**	**15**	**5**	**5**	**40**	**60**	**100**

C1 – Average of Two Session Wise Tests

C2 – Average of Two Monthly Tests

C3 - Mid Sem Test

C4 – Best of Two Weekly Tests

C5 – Non - Scholastic

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	Acquire a skill on various technologies of solar cell	K1,K2	PSO1
CO 2	Acquire a knowledge on thin film technologies	K1, K3,	PSO2
CO 3	Gain knowledge about the Applications of PV cells	K1,K2	PSO1
CO 4	Explain how to use solar in power plants	K2, K3	PSO3
CO 5	Discuss about PV Solar Design	K1, K3	PSO1,PSO2

Mapping of C0s with PSOs

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

Mapping of C0s with Pos

CO/ PSO	PO1	PO2	PO3	PO4
CO1	3	1	1	1

CO2	**1**	**1**	**3**	**3**
CO3	**3**	**2**	**1**	**2**
CO4	**2**	**1**	**3**	**1**
CO5	**3**	**3**	**1**	**2**

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

♦ Weakly Correlated -**1**

COURSE DESIGNER:

1. **Dr.R.Jothi Mani**

Forwarded By

HOD'S Signature

& Name

III B.Sc.

SEMESTER –V

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	19P5SB3	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-Sattelite altimetry-Sextants: Navigational sextant-**Aircraft Sextant-Adjustment and care-Advantages**

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: Piezoelectric Trasnducers-Temperature transducers-Resistance temperature detectors- Thermistors-Ultrasonic termperature transducers- Photoelectric transducers- The photomultiplier tube- - The semiconductor photodiode- **The phototransistor-Biosensors-Chemical sensors-pH sensing-Optical sensors.**

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

REFERENCES:

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

4. 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				
2.2	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
2.6	Humidity: Hygrometer-Psychrometer	1	Chalk & Talk	Black Board
2.7	Difficulty of accurate humidity measurement	1	Chalk & Talk	Black Board
2.8	Hair tension hygrometer-Electronic hygrometer-Applications.	1	Lecture & Chalk & Talk	LCD & Black Board
UNIT -3 AIRCRAFT INSTRUMENTATION				
3.1	Altimeter: Pressure altimeter	1	Lecture & Chalk & Talk	LCD & Black Board
3.2	Radar altimeter-Other modes of transport:	1	Chalk & Talk	Black Board
3.3	Measuring air pressure-Sattelite altimetry-	1	Chalk & Talk	Black Board
3.4	Sextants: Navigational sextant	1	Chalk & Talk	Black Board
3.5	- Aircraft Sextant	1	Chalk & Talk	Black Board
3.6	-Adjustment and care-Advantages	1	Chalk & Talk	Black Board & LCD
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- The phototransistor	1	Chalk & Talk	Black Board
5.7	Biosensors-Chemical sensors-pH sensing-Optical sensors.	1	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 Scholastic	-	-	-	-	-		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 2	Explain a basic idea of aircraft instrumentation	K1, K2,	PSO4&PSO5
CO 3	list the factors affecting wind speed and gain insight on wind speed	K1 & K3	PSO2&PSO3

	measurement techniques		
CO 4	Discuss the mechanical and electrical measurements comprising of temperature transducers, biosensors, chemical and optical sensors.	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** ♦ModeratelyCorrelated – **2**
♦WeaklyCorrelated -**1**

COURSE DESIGNER: Ancemma Joseph

Forwarded By

Dr. A. Sheela Vimala Rani

HoD'S Signature & Name

IIIB.Sc.

SEMESTER –V

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	19P5SB4	Physics of medical instruments	THEORY	2	2

COURSE DESCRIPTION

This course emphasise the basic concepts and applications of Medical instruments which involves Keratometer, Opthalmoscope , electromyogram, ECG, EEG, Electroretinogram, Cardio vascular Instrumentation- Bio potential of heart, Pacemakers and Angiography

COURSE OBJECTIVES

This course provides the medical foundation required for the diagnostic and therapeutic applications of various medical instruments.

UNITS

UNIT –I The breathing mechanism **(6HRS.)**

The breathing mechanism-Physics of some common lung diseases-Blood pressure and its measurement- Spicomanometer,

UNIT –II Sound in Medicine **(5 HRS.)**

Sound in Medicine**:**Diagram,Principle,construction,working of Stethoscope.

UNIT –III Light in Medicine**:** **(5 HRS.)**

Light in Medicine**:** - Applications of different types of Lasers in Medicine

UNIT –IV Instruments used in Opthomology **(6 HRS.)**

Instruments used in Opthomology, Keratometer, Opthalmoscope

UNIT –V Electricity within the body: **(8HRS.)**

Electrical potentials of Nerves - The electromyogram, ECG, EEG, Electroretinogram, Cardio vascular Instrumentation- Bio potential of heart, Pacemakers, Angiography

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

Diagnostic and therapeutic uses of all medical instruments

REFERENCES:

BOOKS FOR STUDY

1.John R. Cameron, James G. Skofronick- Medical Physics, John Wiley & Sons

2.IrinaCromwell,CarolWeibell,LiannePfeiffer-Biomedical Instrumentation and Measurements-Prentice Hall of India Pvt .Ltd., New Delhi

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 THE BREATHING MECHANISM				
1.1	The breathing mechanism	1	Lecture &Chalk & Talk	Black Board
1.2	Physics of some common lung diseases	1	Chalk & Talk	Black Board &LCD

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
1.3	Blood pressure and its measurement	2	Chalk &Talk ,Lecture	PPT & Blackboard
1.4	Spicomanometer,	2	Chalk & Talk	Black Board
UNIT -2 SOUND IN MEDICINE				
2.1	Diagram, Principle of Stethoscope	2	Chalk & Talk	Black Board
2.2	construction, working of Stethoscope.	3	Chalk & Talk	Black Board
UNIT -3LIGHT IN MEDICINE				
3.1	Applications of different types of Lasers in Medicine	5	Lecture &Chalk & Talk	LCD &Black Board
UNIT -4INSTRUMENTS USED IN OPTHOMOLOGY				
4.1	Diagram, Principle construction, working of Keratometer,	3	Chalk &Talk	Black Board
4.2	Diagram, Principle construction, working of Opthalmoscope	3	Lecture	LCD
UNIT -5ELECTRICITY WITHIN THE BODY				
5.1	Electrical potentials of Nerves	1	Chalk & Talk	Black Board
5.2	The electromyogram	1	Chalk & Talk	Black Board
5.3	ECG	1	Chalk &	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
			Talk	
5.4	EEG	1	Chalk &Talk	Black Board
5.5	Electroretinogram	1	Chalk & Talk	Black Board
5.6	Cardio vascular Instrumentation-	1	Chalk & Talk	Black Board
5.7	Bio potential of heart	1	Chalk & Talk	Black Board
5.8	Pacemakers,	1	Chalk & Talk	Black Board
5.9	Angiography	1	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 Scholastic	-	-	-	-	-		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	Explain the physics of some common lung disease and instrumentation of Sphygmomanometer	K1	PSO1& PSO2
CO 2	Understand the application of sound in medicine and demonstrate the functioning of Stethoscope	K1, K2,	PSO2 & PSO3
CO 3	Study the application of Lasers in the field of medicine.	K1 & K3	PSO1, PSO3 & PSO5
CO 4	Gain knowledge on the construction, working principle of instruments such as Ophthalmoscope &Keratometer	K1, K2, K3 &	PSO1 & PSO3
CO 5	Learn about the applications of the cardio vascular instrumentation and medical instrumentation utilising the principle of electricity within the body	K2 & K4	PSO1 & PSO4

Mapping of C0s with PSOs

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

Mapping of C0s with POs

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

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

♦ Weakly Correlated -**1**

COURSE DESIGNER: Dr. Dheva Shantha Kumari

Forwarded By

Dr. A. Sheela Vimala Rani

HoD's Signature & Name

III B.Sc Physics

SEMESTER VI

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAPH	19P6SB5	PHYSICS OF ADVANCED INSTRUMENTATION	THEORY	2	2

COURSE DESCRIPTION

This course emphasis the basic principles and their measurement techniques of astronomical instruments such as optical telescope, Hubble space telescope, astronomical spectrograph, photoelectric photometry, spectrometry and also electron microscopes such as scanning electron microscopy, transmission electron microscopy and atomic force microscopy and X-ray diffraction measurements.

COURSE OBJECTIVES

This course provides the basic understanding required for the measuring techniques involved in astronomical instruments and also different characterizations of samples involved in material science.

UNITS

UNIT -I BASIC PHYSICS [4HRS]

Planck's theory of blackbody radiation- photoelectric effect – pressure of radiation –Doppler effect – Zeeman effect.

UNIT –II ASTRONOMICAL INSTRUMENTS [5HRS]

Optical telescopes-radio telescopes-Hubble space telescopes- astronomical

spectrographs- Photographic and photoelectric photometry-Spectrophotometry-Detectors and image processing.

UNIT –III ASTRONOMICAL MEASUREMENTS

[6HRS]

Stellar magnitude sequence- absolute magnitude and the distance modulus-Bolometric magnitude –Stellar parallax and units of stellar distances-Harvard spectral classification- Hertzsprung –Russel diagram.

UNIT –IV MATERIAL CHARACTERIZATION

[8HRS]

Scanning electron microscopy – principle and working only-transmission electron microscopy – Atomic force microscopy.

UNIT –V X-RAY DIFFRACTION MEASUREMENTS

[7HRS]

X-ray diffraction method – Powder method – Determination of lattice constants- Photoelectron spectroscopy.

UNIT –VI DYNAMISM (Evaluation Pattern-CIA only)

[2HRS]

Magnetic-field-free-Atomic-Resolution Scanning Tunneling Electron Microscope (MARS) – Protein Crystallography.

REFERENCES:

1. An Introduction to Astrophysics- BaidyanathBasu-Prentice Hall of India, Pvt Ltd.- Chapter 1 - (1.3 to 1.10)
Chapter 3- (3.1 to 3.3) and Chapter 4- 4.4 & 4.8
2. A basic course in crystallography –Jak Tareen and TRN Kutty-University Press – (relevant sections from pages 180-184)
3. Nano:The essentials –understanding Nanoscience and Nanotechnology-T. Pradeep – TMG Hill Publishing Co. Ltd. Newdelhi- (Pages 20- 31) relevant sections only.
4. Elements of Solid State Physics – II edition- J.P.Srivastava page 545

WEB REFERNCES :

1. https://www.nasa.gov/mission_pages/hubble/main/index.html
2. https://en.wikipedia.org/wiki/Hertzsprung%E2%80%93Russell_diagram
3. https://en.wikipedia.org/wiki/Characterization_(materials_science)

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**BASIC PHYSICS**			
1	Planck's theory of blackbody radiation	1	Lecture	Black Board, PPT
2	photoelectric effect & pressure of radiation	1	Chalk & Talk	LCD
3	Doppler effect	1	Lecture	LCD
4	Zeeman effect	1	Discussion	PPT
UNIT -2	**ASTRONOMICAL INSTRUMENTS**			
1	Optical telescopes	1	Lecture	Green Board
2	Radio telescopes	1	Lecture	PPT
3	Hubble space telescopes	1	Lecture	LCD
4	Astronomical spectrographs	1	Lecture	LCD
5	Photographic and photoelectric photometry-Spectrophoto-metry	1	Discussion	PPT
6	Detectors and image processing	1	Lecture	PPT
UNIT -3	**ASTRONOMICAL MEASUREMENTS**			

1	Stellar magnitude sequence	1	Chalk & Talk	Black Board
2	Absolute magnitude and the distance modulus	1	Chalk & Talk	LCD
3	Bolometric magnitude	1	Chalk & Talk	PPT & White board
4	Stellar parallax and units of stellar distances	1	Lecture	LCD
5	Harvard spectral classification	1	Discussion	Black Board
6	Hertzsprung –Russel diagram	1	Lecture	PPT & White board
UNIT -4 MATERIALS CHARACTERZATION				
1	Scanning electron microscopy (principle and working only)	3	Lecture	PPT & white board
2	Transmission electron microscopy	3	Lecture	PPT & white board
3	Atomic force microscopy	2	Lecture	LCD
UNIT -5 DIFFRACTION MEASUREMENTS				
1	X-ray diffraction method	2	Lecture	PPT & white board
2	Powder method	2	Chalk & Talk	LCD
3	Determination of lattice constants	2	Chalk &Talk	PPT & White board

4	Photoelectron spectroscopy	1	Lecture	LCD

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 Scholastic	-	-	-	-	-		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	Discusses the basic physics behind astronomical measurements and material characterization	K1, K2	PSO1& PSO2
CO 2	Explains the principles behind astronomical instruments and their main parts	K1, K2,	PSO2& PSO3
CO 3	Explains the principles behind astronomical measurement techniques	K1 & K3	PSO4

CO 4	Describes the principles and working of electron microscopy	K1, K2, K3,	PSO5
CO 5	Characterizes the structural properties of materials using X ray diffraction measurements.	K2, K3, K4	PSO5

Mapping of COs with PSOs

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

Mapping of COs with POs

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

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

Weakly Correlated -1

COURSE DESIGNER: Dr. R. Niranjana Devi

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III B.Sc.

SEMESTER –VI

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	19P6SB6	PHYSICS OF ADVANCED MEDICAL INSTRUMENTS	THEORY	2	2

COURSE DESCRIPTION

This course emphasise the basic concepts and applications of Medical instruments which involves Radiography, X- Ray, Endoscopy, Computed Tomography , Magnetic Resonance Imaging , Linear Accelerator. Also provides the knowledge on Radiation protection in Diagnostic Radiology and Biomedical Computer Applications.

COURSE OBJECTIVES

This course provides the medical foundation required for the diagnostic and therapeutic applications of various medical instruments.

UNITS

UNIT –I Radiation in Medicine **(6 HRS.)**

Radiation in Medicine: Radiography - X- Ray- Endoscopy

UNIT –II Instruments in Medicine **(6 HRS.)**

Computed Tomography - Magnetic Resonance Imaging ,Linear Accelerator

UNIT –III Sound in Medicine **(7 HRS.)**

Sound in Medicine :medical applications of Ultrasonography

UNIT –IV Nuclear Medicine **(6 HRS.)**

applications of Nuclear Medicine – Radio Therapy with Radioactivity - Radiation protection in Diagnostic Radiology

UNIT –V Computer Applications **(5HRS.)**

Biomedical Computer Applications

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

REFERENCES:

Books for reference:

1) John R. Cameron, James G. Skofronick- Medical Physics, John Wiley&Sons
2) Irina Cromwell, Carol Weibell,Lianne Pfeiffer-Biomedical Instrumentation and Measurements-Prentice Hall of India Pvt .Ltd., New Delhi

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 RADIATION IN MEDICINE				
1.1	Radiography	2	Lecture &Chalk & Talk	Black Board
1.2	X- Ray	2	Chalk & Talk	Black Board &LCD
1.3	Endoscopy	2	Chalk &Talk , Lecture	PPT & Blackboard
UNIT -2 INSTRUMENTS IN MEDICINNE				
2.1	Computed Tomography	2	Chalk &Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
2.2	Magnetic Resonance Imaging	3	Chalk & Talk	Black Board
2.3	Linear Accelerator	1	Chalk & Talk	Black Board
UNIT -3SOUND IN MEDICINE				
3.1	medical applications of Ultrasonography	7	Lecture &Chalk & Talk	LCD &Black Board
UNIT -4NUCLEAR MEDICINE				
4.1	applications of Nuclear Medicine	2	Chalk & Talk	Black Board
4.2	Radio Therapy with Radioactivity	2	Lecture	LCD
4.3	Radiation protection in Diagnostic Radiology	2	Chalk & Talk	LCD
UNIT -5COMPUTER APPLICATIONS				
5.1	Biomedical Computer Applications	5	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 Scholastic	-	-	-	-	-		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

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	Understand the working principle of medical instruments used in X- ray, radiography and endoscopy	K1, K2	PSO1, PSO2 & PSO4
CO 2	Comprehend the Principle and application of Computed Tomography, Magnetic Resonance Imaging, Linear Accelerator in medicine		PSO1, PSO2 & PSO4

CO 3	Gain knowledge on the medical applications of Ultrasonography		PSO2 & PSO3
CO 4	Acquire knowledge on applications of Nuclear Medicine such as Radio Therapy and the key factors of Radiation protection		PSO2 & PSO4
CO 5	Understand the biomedical Computer Applications	K1, K2, K3	PSO4 & PS05

Mapping of C0s with PSOs

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

Mapping of C0s with POs

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

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

♦ Weakly Correlated -**1**

COURSE DESIGNER: Dr. Dheva Shantha Kumari

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Dr. A. Sheela Vimala Rani

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EXTRA CREDIT COURSE

B.Sc.PHYSICS

SEMESTER –V

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAPH	19UGSLP1	Nanoscience and Nanotechnology	Theory	-	2

UNIT I: INVESTIGATING MATERIALS IN THE NANOSCALE [12 HRS.]

Introduction –The Canvas of nano – Nano and nature – Our technologies and the world we live in – Nano- the Beginning. ntroduction – Electron Microscopies – scanning electron microscopy (upto SEM modern advances only)

UNIT II: CARBON NANOTUBES [12 HRS.]

Carbon nanotubes – Introduction – Synthesis and purification - Transport properties – Mechanical properties - Physical properties – Applications

UNIT III: NANOBIOLOGY [12 HRS.]

Introduction –Interaction between Biomolecules and Nanoparticle surfaces – Applications of nano in Biology – Biological Imaging using Semiconductor naocrystals – Immuno Fluorescent Biomarker Imaging _ Immunogold Labeling

UNIT IV: NANOSENSORS [12 HRS.]

Nanosensors – Introduction- What is Sensor? – Nanosensors – What makes them possible? Molecular Nanomachines – Introduction (only)

UNIT V: NANOMEDICINES [12 HRS.]

Introduction – Approach to developing Nanomedicines – Various kinds of

Nanosystems in use –Nanoshells, Nanopores - Tectodendrimers

UNIT VI: DYNAMISM (Evaluation Pattern-CIA only) (2 HRS.)

Nanorobots: Future artificial intelligence devices

REFERENCES

7) Pradeep T "Nano: The Essentials-Understanding Nanoscience and Nanotechnology" Tata Mc Graw Hill Education private Limited, New Delhi

COURSE DESIGNER:

1. Dr. L. Caroline Sugirtham

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SEMESTER – II

For those who joined in 2021 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAPH	21UGSLP2	AMAZING UNIVERSE AND INDIAN SPACE MISSIONS	Theory	-	2

UNIT I

Introduction-Astronomy and Cosmology-Expanding Universe-The Age of the Universe-Composition of the Universe-The Dark Matter-Light year-Astronomical unit-Astronomical Telescopes-Radioastronomy

UNIT II

Clustered objects in the Universe

Planets- Stars – Nebulae- Galaxies - Black Holes - The Dark Cosmos-Hubble's Top Science Accomplishments

UNIT III

The Indian Space Research Organisation

Vikram Sarabhai Space Centre-ISRO Satellite Centre-Liquid Propulsion Systems Centre-ISRO Telemetry, Tracking and Command Network-Sriharikota-India's Spaceport-Mission Control Centre-Launch Dynamics

UNIT IV

ISRO's Rockets

Satellite Launch Vehicle (SLV3)-Augmented Satellite Launch Vehicle (ASLV)-Polar Satellite Launch Vehicle (PSLV)-Geosynchronous Satellite Launch Vehicle (GSLV)-Launch Vehicle Mark 3 (LVM3)-GSLV-Mk3-Reusable Launch Vehicle (RLV)-India's Cryogenic Engine-Missile Technology Control Regime-Commercial Space Services

UNIT V

Satellites and Saris

India's First Satellite: Aryabhata-Earth Observation: Bhaskara and IRS-Communication Satellites-INSAT 1 Series-INSAT 2 Series-Indian Regional Navigation Satellite System-Navigation Satellite-GAGAN: GPS Aided GEO Augmented Navigation-Journey to the Moon-Science from Chandrayaan-1-Chandrayaan2: Journey to the Lunar Surface-From Sriharikota to Mars-Astrosat-Astronomy from Orbit-Return to Mars-Aditya-L1-Venus Orbiter Mission.

Books for study:

1.Jayant Narlikar-A Journey through the Universe-Revised Edition - Published by National Book Trust

2. Oli Usher & Lars Lindberg Christensen-The Universe through the Eyes of Hubble-Springer

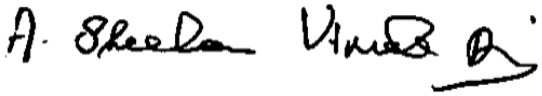
3. Gurbir Singh -The Indian Space Programme-India's incredible journey from the Third Worldtowardsthe First -Astrotalkuk Publications

Books for Reference:

1. BaidyanathBasu, Tanuka Chattopadhyay, Sudhindra Nath Biswas-An introduction to Astro Physics-Second Edition-PHI Learning Private Limited-New Delhi-2010
2. K.S. Krishnaswamy, Astrophysics a modern perspective, New Age International (p) Ltd, New Delhi, 2002.
3. Dr.S. Stephan Rajkumar Inbanathan, Introduction to Astronomy for Beginners, First Edition, Elijah Printing Solutions-Chennai.

Course Designer : Dr. M. V. Leena Chandra

Forwarded By



Dr. A. Sheela Vimala Rani

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SEMESTER – IV

For those who joined in 2021 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAPH	21UGIDPB1	FUNDAMENTALS & PROGRAMMING OF MICROPROCESSOR 8085	Theory	-	2

Unit I: Introduction to Microprocessors

Word Length of a Computer or Microprocessor-Evolution of Microprocessors-Evolution of Digital Computers-Computer Generation-Single Chip Microcomputers-Embedded Microprocessor-Hardware, Software and Firmware-CPU-Buses

Unit II

Microprocessor Architecture

Introduction-Intel 8085-ALU-Timing and control unit-Registers-Pin Configuration-Intel 8085 Instructions-Instruction Cycle-Fetch operation-Execute operation-Instruction and Data flow

Unit III

Instruction set of 8085

Introduction-Instruction and Data formats-Addressing modes-Direct Addressing-Register Addressing - Register Indirect Addressing – Immediate Addressing-Implicit Addressing – Status flags- Symbols and Abbreviations-Intel 8085 instructions- Data transfer group-Arithmetic Group-Logical group-Branch Group-Stack I/O and Machine Control Group

Unit IV:

Assembly language programming

Introduction to programming –Program development using Mnemonics – converting mnemonic code into Assemble code – Entering the code – Editing and Executing the Assemble language programs -Programs to do arithmetic operations – Data transfer operations - Logical operations – Relational operations - Rotation operations –

Unit V:
Programs using looping statements – operations on 16-bit data – Programs using timer control – Seven segment Display control programs

DYNAMISM:
UNIT IV : Simple program development
UNIT V : Designing display control

TEXT BOOKS:
1. Fundamentals of MicroProcessors and Microcomputers by B. Ram, Sixth Revised and Enlarged Edition, Dhanpat Rai Publications Ltd.
2. Microprocessor Architecture, Programming and Applications with 8085 by Ramesh Goankar – Sixth Edition , Penram International Publishing Private Ltd, India

COURSE DESIGNER:
Dr.M. Ragam

Dr. K. Rosemary Euphrasia

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SEMESTER – VI

For those who joined in 2021 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS	CREDITS
UAPH	21UGIDPM1	SPACE SCIENCE	Theory	-	2

UNITI: COSMOLOGY
Big Bang theory-General relativity theory and cosmology-steady state theory.

UNITII: GALAXY
Structure of Milky way galaxy-center of our galaxy-high-energy sources in our galaxy–Planets and Stars

UNITIII: SUN
The sun-basic features of the sun-the photosphere-the chromosphere-the corona –Sun spots

UNITIV:MOON
Moon – Introduction – phases of moon – sidereal and synodic month-lunar day and lunar time–the tides.

UNITV:ECLIPSES
Eclipses–solarandlunar–occurrences–conditionsfortheoccurrences–eclipticlimits – FA maximum and minimum number of eclipses in a year.

UNITVI : **DYNAMISM** : Star Gazing using astronomical telescope

TEXTBOOK:

1. An introduction to astrophysics by BaidhyanathBasu

2.AstronomybyS.Kumaravelu,andSusheelaKumaravelu,

Reprinted,SriVishnuArts,2004.

REFERENCE BOOK:

1.Introductionin Astronomy by Robert .H.Baker 6thEdition.

2.An introduction to Modern Astrophysics by Bradley W. Caroll and Dale A.Ostlie

COURSE DESIGNER:

Dr. Ancemma Joseph&Dr. Sheela Roseline

Forwarded By

Dr. A. Sheela Vimala Rani

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