FATIMA COLLEGE (AUTONOMOUS)

Re-Accredited with "A" Grade by NAAC (3rd Cycle)
94th Rank in India Ranking 2019 (NIRF) by MHRD
Maryland, Madurai- 625 018, Tamil Nadu, India

NAME OF THE DEPARTMENT : Research Centre of Physics

NAME OF THE PROGRAMME : UG

PROGRAMME CODE :UAPH

ACADEMIC YEAR : 2020-2021

COLLEGE PROFILE

Fatima College (Autonomous), Mary Land, Madurai, is a Post Graduate and Research Institution for Women affiliated to Madurai Kamaraj University. It is a Catholic Minority institution established and run by St. Joseph's Society of Madurai (of the Congregation of the Sisters of St. Joseph of Lyons, France). This institution came into existence through the tireless efforts of the missionary sisters of St. Joseph of Lyons and the zeal and heroic sacrifice of Rev. Sr. Rose Benedicta, the Foundress of the College.

The College was started in St. Joseph's Campus Madurai as a Second Grade College with 63 students in 1953. It was upgraded into a Post Graduate College in 1964; Autonomous in 1990 and a Research Institute in 2004. The College now offers 21 Undergraduate Programmes, 13 Postgraduate Programmes, 2 Professional Programme, 5 M.Phil. Programmes and 6 Departments have become Research Centres. It has strength of 4134 Students, 206 Teaching Staff and 100 Non-Teaching Staff.

The comprehensive assessment by NAAC in 1999 placed Fatima College in Five Star Status of merit. The college strives to sustain excellence, quality and relevance while equipping the students to meet the demands of higher education in India. In 2004 UGC conferred on Fatima College the status of College with Potential for Excellence. In 2006 and 2013 NAAC Re-Accredited the College with 'A' Grade. The College was ranked 94th in the All India NIRF Ranking in 2019 by MHRD.

VISION

WOMEN'S EMPOWERMENT THROUGH EDUCATION

The vision of the college is to empower women by developing human capabilities through quality education based on Christian values, making them responsible citizens who can work for the advancement of the society and promote communal harmony in the multi-religious and multi-cultural reality of India eventually evolving into women of communion.

MISSION

- To enhance quality of life through the development of individuals.
- To enable women to become contributors in the economic, social and political development of India.
- To equip the students with 21st century skill-sets with a focus on problem-solving abilities
- To motivate them to work for social justice
- To give preference to the rural economically backward and first-generation learners
- To enable students to be employed in the technology oriented competitive market

VISION OF THE DEPARTMENT

Educate , Empower and Excel

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)

On completion (after three years) of B.Sc.Physicsprogramme, the graduates would be able to

PO 1	Acquire knowledge on the concepts of general laws of physics governing the universe
PO 2	Relate the principles behind the fundamental theory of Physics including microscopic and macroscopic levels
PO 3	Develop technologies to meet the requirements of the society

PROGRAMME SPECIFIC OUTCOMES (PSO)

On completion (after three years) of B.Sc.Physicsprogramme, 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	19TLC1	Language-Modern Literature	5	3	40	60	100
2.	II	19TLC2	Language - Bakthi Literature	5	3	40	60	100
3.	III	19TLC3	Language- Epic Literature	5	3	40	60	100
4.	IV	19TLC4	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	19RLC1	PART 1 LANGUAGE FRENCH	5	3	40	60	100
2.	II	19RLC2	PART 1 LANGUAGE FRENCH	5	3	40	60	100
3.	III	19RLC3	PART 1 LANGUAGE FRENCH	5	3	40	60	100
4.	IV	19RLC4	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	19DLC1	PART 1 LANGUAGE HINDI	5	3	40	60	100
2.	II	19DLC2	PART 1 LANGUAGE HINDI	5	3	40	60	100
3.	III	19DLC3	PART 1 LANGUAGE HINDI	5	3	40	60	100
4.	IV	19DLC4	PART 1 LANGUAGE HINDI	5	3	40	60	100

S. NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDIT	CIA Mks	ESE Mks	TOT. MKs
			Total	**20**	**12**			

PART – II -ENGLISH – 12 CREDITS

Offered by The Research Centre of English

S. NO	SEM.	COURSECODE	COURSE TITLE	HRS	CREDIT	CIA Mks	ESE Mks	TOT. MKs
1.	**I**	19E1LB1	BASIC COMMUNICATIVE ENGLISH	5	3	40	60	100
2.		19E1LI1	INTERMEDIATE COMMUNICATIVE ENGLISH	5	3	40	60	100
3.		19E1LA1	ADVANCED COMMUNICATIVE ENGLISH	5	3	40	60	100
4.	**II**	19E2LB2	ENGLISH COMMUNICATION SKILLS (BASIC)	5	3	40	60	100
5.		19E2LI2	ENGLISH FOR EMPOWERMENT (INTERMEDIATE)	5	3	40	60	100
6.		19E2LA2	ENGLISH FOR CREATIVE WRITING (ADVANCED)	5	3	40	60	100

S. NO	SEM.	COURSECODE	COURSE TITLE	HRS	CREDIT	CIA Mks	ESE Mks	TOT. MKs
7.	**III**	19ELC3	ENGLISH FOR DIGITAL ERA	5	3	40	60	100
8.	**IV**	19ELC4	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	19P1CC1	Mechanicsand Properties of Matter	5	4	40	60	100
2.		19P1CC2	Thermal Physics	4	3	40	60	100
3.		19P1CC3	Major practicals-I	3	2	40	60	100
4.	II	19P2CC4	Oscillations and Waves	5	4	40	60	100
5.		19P2CC5	Applied Mechanics	4	3	40	60	100
6.		19P2CC6	Major Practicals - II	3	2	40	60	100
7.	III	19P3CC7	Electromagnetism	5	4	40	60	100
8.		19P3CC8	Solid State Physics	4	3	40	60	100
9.		19P3CC9	Major Practicals - III	3	2	40	60	100
10.	IV	19P4CC10	Analog Electronics	5	4	40	60	100

S.NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDIT	CIA Mks	ESE Mks	TOT. Mks
11.		19P4CC11	Materials Science	4	3	40	60	100
12.		19P4CC12	Major Practicals – IV	3	2	40	60	100
13.	V	19P5CC13	Digital Electronicsand Communication	6	4	40	60	100
14.		19P5CC14	Optics	6	4	40	60	100
15.		19P5CC15	Major Practicals – V (Electronics)	4	2	40	60	100
16.		19P5CC16	Major Practicals – VI (Non Electronics)	4	2	40	60	100
17.	VI	19P6CC17	Thermodynamics &Statistical Mechanics	5	4	40	60	100
18.		19P6CC18	ModernPhysics	5	4	40	60	100
19.		19P6CC19	Major Practicals – VII(Electronics)	3	2	40	60	100
20.		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	19P1ACC1	Allied Physics – I	3	3	40	60	100
2.		19P1ACC2	Allied Physics Practicals-I	2	2	40	60	100
3.	II	19P2ACC3	Allied Physics – II	3	3	40	60	100
4.		19P2ACC4	Allied Physics Practicals-II	2	2	40	60	100

S.NO	SEM.	COURSECODE	COURSE TITLE	HRS	CREDIT	CIA Mks	ESE Mks	TOT. MKs
5.	III	19M3ACP1	Allied Physics – I	3	3	40	60	100
6.		19M3ACP2	Allied Physics Practicals–I	2	2	40	60	100
7.	IV	19M4ACP3	Allied Physics –II	3	3	40	60	100
8.		19M4ACP4	Allied Physics Practicals–II	2	2	40	60	100

ELECTIVES-15 CREDITS

S.No	SEM.	COURSECODE	COURSE TITLE	HRS	CREDIT	CIA Mks	ESE Mks	TOT. Mks
1.	V	19P5ME1/ 19P5ME2	Programming with C	5	5	40	60	100
2.	VI	19P6ME1 / 19P6ME2	Microprocessor / Medical Physics	5	5	40	60	100
3.		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.	COURSECODE	COURSE TITLE	HRS	CREDIT	CIA Mks	ESE Mks	TOT. Mks
1.	I	19G1VE	Value Education (Including Meditation in Action Movement)	1	1	40	60	100
2.		19P1NME	Non Major Elective (Offered to other major Students)	2	2	40	60	100
3.	II	19G2VE	Value Education	1	1	40	60	100
4.		19P2NME	Non Major Elective (Offered to other major Students)	2	2	40	60	100
5.	III	19G3EE	Environmental Education	1	1	40	60	100
6.		19P3SB1	Skill based –Bio mechanics	2	2	40	60	100
7.	IV	19G4EE	Environmental Education	1	1	40	60	100
8.		19P4SB2	Skill based – Physics of Stars	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 instruments for Astronomical Measurements and Material Characterisation	2	2	40	60	100

S. No	SEM.	COURSECODE	COURSE TITLE	HRS	CREDIT	CIA Mks	ESE Mks	TOT. Mks
12.		19P6SB6	Skill based -Physics of advanced Medical Instruments	2	2	40	60	100

OFF-CLASS PROGRAMMES

PART – V – 1CREDIT

Shift I

- Physical Education
- NSS
- NCC
- Women Empowerment Cell
- AICUF

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 IIIUG)**	-	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.

SEMESTER I

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	19P1CC1	MECHANICS AND PROPERTIES OF MATTER	Theory	5	4

COURSE DESCRIPTION

The objective of this course is to understand the basic properties of matter and mechanics of fluids

COURSE OBJECTIVES

This course deals with understand in depth the gravitational force, field, potential and energy, study the acceleration due to gravity at various positions,knowledge about the properties of matter and compute the same,the mechanics of fluid motion and its applications

UNITS

UNIT –I GRAVITATION [15 HRS]

Newton's law of gravitation(self-study)- Gravitational field- Gravitational potential energy- Gravitational potential and field due to a spherical shell- gravitational potential and field due to a uniform solid sphere-Gravitational self energy - gravitation self energy of a sphere –gravitation self energy of the Sun.

UNIT –II ACCELERATION DUE TO GRAVITY and SATELLITES [15 HRS]

Acceleration due to gravity(self-study) – simple pendulum- variation of g at the poles and at the equator – variation of g with altitude- variation with depth- variation of g with rotation of Earth- difference between mass and weight- inertial mass and gravitational mass- satellites- stationary satellite- orbital

velocity, period of revolution, escape velocity.

UNIT –III ELASTICITY [15 HRS]

Elasticity – Definitions(self-study) – Glass is more elastic than rubber – Yield Point, Elastic limit, Elastic Fatigue – Poisson's ratio – Work done in deforming a body – Limiting value of Poisson's ratio -Torsion pendulum – Bending of Beams – Bending Moment – Beam supported at its ends and loaded in the middle – I- section Girders – determination of Y by bending.

UNIT –IV SURFACE TENSION [15 HRS]

Surface tension(self-study) – Explanation of surface tension – **Examples of surface tension(**self-study) – Surface energy and 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**(self-study).

UNIT –V FLUIDS DYNAMICS [15 HRS]

Fluid motion- introduction- stream line flow and rate of flow- equation of continuity- energy of a liquid in motion- Bernoulli's Theorem- practical applications- venturimeter- Bunsen burner- atomizer or sprayer- carburetor- wings of an aero plane- blowing of roofs – spinning ball- Viscosity- Poiseuille's method for coefficient of viscosity.

UNIT –VI DYNAMISM (Evaluation Pattern-CIA only) (10 HRS.)

Gravitation of self energy of stars – end stage of stars – Red giant, white dwarf, Neutron stars – Black holes-History of Indian Satellites – applications – Launch vehicle- types of fuel –process of satellite launchBeams and girders in bridges and multistorey buildings - Surfactants – properties and uses – Low pressure formation in oceans – cause of storms.

REFERENCES:

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

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -I GRAVITATION				
1.1	Newton's law of gravitation(self-study)-	4	Chalk & Talk	Black Board
1.2	Gravitational field- Gravitational potential energy- Gravitational potential and field due to a spherical shell	4	Chalk & Talk	Black Board
1.3	gravitational potential and field due to a uniform solid sphere	3	Chalk & Talk	Black Board
1.4	Gravitational self energy – gravitation self energy of a sphere –gravitation self energy of the Sun.	4	Chalk & Talk	Black Board
UNIT -II ACCELERATION DUE TO GRAVITY and SATELLITES				
2.1	Acceleration due to gravity	2	Chalk & Talk	Black Board
2.2	simple pendulum	2	Chalk & Talk	Black Board
2.3	variation of g at the poles and at the equator – variation of g with altitude- variation with depth- variation of g with rotation of Earth- difference between mass and	5	Chalk & Talk	Black Board
2.4	difference between mass and weight- inertial mass and gravitational mass-	1	Chalk & Talk	Black Board
2.5	satellites- stationary satellite- orbital velocity, period of revolution, escape velocity.	5	Chalk & Talk	Black Board

UNIT - III ELASTICITY				
3.1	Elasticity – Definitions – Glass is more elastic than rubber	2	Chalk & Talk	Black Board
3.2	Yield Point, Elastic limit, Elastic Fatigue – Poisson's ratio	2	Chalk & Talk	Black Board
3.3	Work done in deforming a body – Limiting value of Poisson's ratio -Torsion pendulum	2	Chalk & Talk	Black Board
3.4	-Torsion pendulum	2	Chalk & Talk	Black Board
3.5	Bending of Beams – Bending Moment –	3	Chalk & Talk	Black Board
3.6	Beam supported at its ends and loaded in the middle –	3	Chalk & Talk	Black Board
3.7	I- section Girders – determination of Y by bending	1	Chalk & Talk	Black Board
UNIT – IV SURFACE TENSION				
4.1	Explanation of surface tension – Examples of surface tension – Surface energy and surface tension	4	Chalk & Talk	Black Board
4.2	Pressure difference across a spherical surface – Excess of pressure inside a spherical liquid drop – Excess of Pressure inside a soap bubble	3	Chalk & Talk	Black Board
4.3	angle of contact	2	Chalk & Talk	Black Board
4.4	Capillarity –Expression for Surface tension – Determination of Surface tension of water – Examples of Capillarity).	6	Chalk & Talk	Black Board
UNIT V FLUIDS DYNAMICS				
5.1	Fluid motion- introduction- stream line flow and rate of flow-	2	Chalk & Talk	Black Board
5.2	equation of continuity-	2	Chalk & Talk	Black

				Board
5.3	energy of a liquid in motion- Bernoulli's Theorem-	2	Chalk & Talk	Black Board
5.4	Practical applications- venturimeter- Bunsen burner- atomizer or sprayer- carburetor-	3	Chalk & Talk	Black Board
5.5	wings of an aero plane- blowing of roofs – spinning ball-	2	Chalk & Talk	Black Board
5.6	Viscosity- Poiseuille's method for coefficient of viscosity	4	Chalk & Talk	Black Board
	UNIT VI DYNAMISM			
6.1	Gravitation of self energy of stars – end stage of stars – Red giant, white dwarf, Neutron stars – Black holes-	5	Discussion	Google Class Room
6.2	History of Indian Satellites – applications – Launch vehicle- types of fuel – process of satellite launch Beams and girders in bridges and multistorey buildings - Surfactants – properties and uses – Low pressure formation in oceans – cause of storms	5	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**	**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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Explain gravitational force, gravitational field, gravitational potential and gravitational energy.	K1 K2	PSO1& PSO2
CO 2	Analyze the variation of 'g' with latitude, altitude, depth and rotation of earth and Identify the types of satellite orbits and compute the parameters of satellite motion.	K1, K2, K3	PSO2, PSO5
CO 3	Discuss the elastic properties of materials and compute the Young's modulus of a beam.	K1 K2 K3	PSO3,PSO4
CO 4	Describe surface tension and capillarity property of liquids and identify its applications.	K1, K2	PSO3,PSO4
CO 5	Explain the dynamics of fluid motion and its applications and analyse the viscose property of liquids.	K1,K2, K3	PSO1 PSO5

Mapping of C0s with PSOs

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

Mapping of C0s with POs

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

Strongly Correlated – **3,**Moderately Correlated – **2,**WeaklyCorrelated - 1

COURSE DESIGNER:

1. **Dr. L.Caroline Sugirtha m**

Forwarded By

HOD'S Signature & Name

I B.Sc.,PHYSICS

SEMESTER I

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	19P1CC2	THERMAL PHYSICS	Theory	4	3

COURSE DESCRIPTION

The course provides a conceptually based exposure to the fundamental principles and processes of significant topics of thermal physics like Kinetic theory of gases, Transport phenomena in gases and Liquefaction of gases.

COURSE OBJECTIVES

This course deals with the elemental concepts of molecular properties of gases and enhance the experimental, analytical skills of the students on Maxwellian Distribution of speeds in an Ideal gas, transport phenomena and production of very low temperatures.

UNIT –I KINETIC THEORY OF GASES (12HRS.)

Three states of matter-Concept of ideal or perfect Gas-Kinetic model-Expression for the pressure exerted by a gas-Estimation of rms speed of Molecules-**Kinetic energy per unit volume of a Gas**- Derivation of Gas equation- Avogadro's Hypothesis- Graham's Law of Diffusion of Gases-Brownian motion- Langevin's Theory of Brownian Motion- Einstein's Theory of Brownian motion- Degrees of Freedom.

UNIT –II MAXWELLIAN DISTRIBUTION OF SPEEDS IN AN IDEAL GAS: (12 HRS.)

Mean (or) Average speed, Root Mean Square speed and Most Probable Speed-Maxwell's Distribution Law of Velocities-Experimental verification of Maxwellian Distribution of Molecular speeds-Zartman and C.C.Ko experiment.

UNIT –III TRANSPORT PHENOMENA IN GASES: **(12 HRS.)**

Introduction –Molecular Collisions-Mean Free Path- Expression for Mean Free Path-Transport phenomena- Viscosity: Transport of Momentum –Thermal

conductivity: Transport of thermal energy- **Relation between η and k–Effect of temperature on k** –Largest Thermal Conductivity of Hydrogen- Self diffusion: Transport of mass

UNIT –IV PRODUCTION OF VERY LOW TEMPERATURES: (12 HRS.)

Introduction- **Method of freezing mixture**- cooling by evaporation under reduced pressure- Cooling by adiabatic expansion- Joule-Thomson expansion- Adiabatic demagnetization-Superconductivity.

UNIT –V LIQUEFACTION OF GASES: (12 HRS.)

Liquefaction of gases- principle of Regenerative Cooling- Liquefaction of Air (Linde's process)- **Liquefaction of Hydrogen**-Liquefaction of Helium- Helium I and Helium II- Some peculiar properties of Helium II- Helium 'A unique liquid'.

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

Cryogenic Rocket propulsion

REFERENCES:

1. Brijlal , Dr. N.Subramanyam , P.S.Hemne, *HEAT THERMODYNAMICS AND STATISTICAL PHYSICS* , New Delhi-S. Chand & Company Pvt.Ltd.
2. J.K. Sharma and K.K. Sarkar, THERMODYNAMICS *AND STATISTICAL PHYSICS,* Himalaya Publications.
3. Mathur, M.L., and Sharma, R.P., "Gas Turbine, Jet and Rocket Propulsion", Standard Publishers and Distributors, Delhi, 1988

WEB REFERNCES:

1. www.britannica.com/science/kinetic-theory-of-gases
2. astrowww.phys.uvic.ca/~tatum/thermod/thermod15.pdf
3. https://www.isro.gov.in/gslv-d5-gsat-14/indigenous-cryogenic-engine-and-stage

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**KINETIC THEORY OF GASES**			
1.1	Three states of matter-Concept of ideal or perfect Gas- -	2	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
1.2	Kinetic model-Expression for the pressure exerted by a gas	2	Chalk & Talk	LCD
1.3	Estimation of rms speed of Molecules	1	Chalk & Talk	Black Board
1.4	Derivation of Gas equation-Avogadro's Hypothesis-Graham's Law of Diffusion of Gases-	2	Chalk & Talk	Black Board
1.5	Brownian motion- Langevin's Theory of Brownian Motion	2	Chalk & Talk	Black Board
1.6	Einstein's Theory of Brownian motion	2	Chalk & Talk	Black Board
1.7	Degrees of Freedom.	1	Chalk & Talk	Black Board
UNIT -2	**MAXWELLIAN DISTRIBUTION OF SPEEDS IN AN IDEAL GAS**			
2.1	Mean (or) Average speed, and	2	Chalk & Talk	Black Board
2.2	Root Mean Square speed	2	Chalk & Talk	Black Board
2.3	Most Probable Speed	2	Chalk & Talk	Black Board
2.4	Maxwell's Distribution Law of Velocities	4	Chalk & Talk	Black Board
2.5	Experimental verification of Maxwellian Distribution of Molecular speeds-Zartman and C.C.Ko experiment.	2	Chalk & Talk	Black Board
UNIT -3	**TRANSPORT PHENOMENA IN GASES**			

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
3.1	Introduction	1	Chalk & Talk	Black Board
3.2	Molecular Collisions-Mean Free Path- Expression for Mean Free Path	2	Chalk & Talk	Black Board
3.3	Transport phenomena-Viscosity: Transport of Momentum	3	Chalk & Talk	Black Board
3.4	Transport of thermal energy-Largest Thermal Conductivity of Hydrogen	2	Chalk & Talk	Black Board
3.5	Self diffusion: Transport of mass	2	Chalk & Talk	Black Board
UNIT -4 PRODUCTION OF VERY LOW TEMPERATURES				
4.1	Introduction	1	Chalk & Talk	Black Board
4.2	Cooling by evaporation under reduced pressure	2	Chalk & Talk	Black Board
4.3	Cooling by adiabatic expansion	2	Chalk & Talk	Black Board
4.4	Joule-Thomson expansion	2	Chalk & Talk	Black Board
4.5	Adiabatic demagnetization	2	Chalk & Talk	Black Board
4.6	Superconductivity.	1	Chalk & Talk	PPT
UNIT -5 LIQUEFACTION OF GASES				
5.1	Liquefaction of gases	1	Chalk & Talk	Black Board
5.2	principle of Regenerative	2	Chalk &	Black

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	Cooling		Talk	Board
5.3	Liquefaction of Air (Linde's process	2	Chalk & Talk	Black Board
5.4	Liquefaction of Helium	2	Chalk & Talk	Black Board
5.5	Helium I and Helium II- Some peculiar properties of Helium II	3	Chalk & Talk	Black Board
5.6	Helium 'A unique liquid'	2	Chalk & Talk	Black Board
UNIT -6 DYNAMISM				
6.1	Cryogenic Rocket propulsion	2	Chalk & Talk	PPT

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1	T2	Quiz	Assignment	OBT/PPT	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 %

tic									
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 a microscopic approach and seek to account for the macroscopic properties of a gas in terms of properties of its molecules	K1	PSO1& PSO2
CO 2	explain the classical Maxwell's distribution law of velocity and its inference.	K1, K2,	PSO1& PSO2
CO 3	describe molecular collisions and its mean free path , understand the process of thermal conductivity, viscosity and diffusion in gases	K1 & K3	PSO1& PSO2
CO 4	depict the manner in which the energy changes takes place and outline the different methods to produce low temperature	K1, K2, K3 &	PSO1,PSO2, PSO3
CO 5	demonstrate the liquefaction of gases and explain the nature of gases in the neighbourhood of absolute zero temperature.	K2 & K4	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	3	3	2	1	1
CO3	3	3	2	1	1
CO4	3	3	3	1	1
CO5	3	3	2	3	3

Mapping of C0s with POs

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

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

♦ Weakly Correlated -**1**

COURSE DESIGNER:
Dr. M. V. LEENA CHANDRA

Forwarded By

Dr. A. Sheela Vimala Rani

HoD'S Signature & Name

I B.Sc

SEMESTER I

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	19P1CC3	MAJOR PRACTICALS –I	Practical	3	2

COURSE DESCRIPTION

The objective of this course is to develop practical skills to use physics apparatus

COURSE OBJECTIVES

This course offers opportunity to handle the laboratory equipment's and develops lab skills in gain hands-on experience to use microscope and telescope, measure the relevant parameters and calculate the elastic modulus of materials, measure the relevant parameters and calculate the properties of matter, study the formation of longitudinal and transverse vibrations

LIST OF EXPERIMENTS Skill development-100%

1. Determination of Youngs' Modulus of Uniform bending.(scale & telescope)
2. Determination of Youngs' Modulus of Non-Uniform bending (pin & microscope).
3. Determination of 'g' of Compound pendulum
4. Determination of Surface Tension & Interfacial surface tension by Drop Weight Method
5. Melde's String - Determination of the frequency of vibrator
6. Determination of surface tension by 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**

Forwarded By

Ho ’S Signature & Name

I B.Sc

SEMESTER II

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	19P2CC4	OSCILLATIONS AND WAVES -	Theory	5	4

COURSE DESCRIPTION

To understand waves, oscillations and its applications in human ear, musical instruments. To know about Doppler effect, Ultrasonics and various applications of them

COURSE OBJECTIVES

This course deals with simple harmonic motion, Principle of Superposition and their mathematical representation of stationary waves, interference waves and beats, their conditions, Doppler effect in acoustics and apply the same and solving problems, different range of acoustic waves, ultrasonic waves generation and its application.

UNIT I: SIMPLE HARMONIC MOTION [15 HRS]

Introduction- simple harmonic motion- differential equation of SHM- graphical representation of SHM- total energy of vibrating particle- simple pendulum- **simple harmonicoscillations of a loaded spring(**self-study**)**- free vibrations- undamped vibrations- damped vibrations- forced vibrations, resonance and sharpness of resonance, Quality factor.

UNIT II: Progressive waves [15 HRS]

Wave motion- what propagates in wave motion?- characteristics of wave motion of simple harmonic wave- Transverse wave motion- longitudinal wave motion- definitions- relation between frequency and wavelength- Equation of simple harmonic wave- Differential equation of wave motion- particle velocity and wave velocity- energy of a progressive wave.

UNIT III: STATIONARY WAVES, INTERFERENCE AND BEATS [15 HRS]

Stationary waves- properties properties of stationary longitudinal waves- analytical treatment of open end organ pipe or string free at the other end (open end pipe only).

Interference of sound waves- special cases- conditions for interference of

sound waves.Beats- analytical treatment of beats.

UNIT IV: DOPPLER EFFECT [15 HRS]

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

UNIT V: MUSIC AND ULTRASONICS [15 HRS]

Musical Sound and Noise (self-study)– Speech – Human Voice – human Ear – Characteristics of Musical Sound – Intensity of Sound – Bel – **Musical Scale – Limits of Audibility**(self-study)**.** Ultrasonics – Production of Ultrasonic Waves (Piezoelectric oscillator ONLY) – Acoustic grating – **Applications of Ultrasonic Waves**(self-study)

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

Simple Harmonic Motion – examples in day-to-day life – resonance phenomena –examples and its effect- Different musical scales – musical instruments – music generation and notes-frequency tuning systems- Voice spectrographs- Noise cancelling earphones. Advanced ultrasound scanners- Ultrasound in surgery.

REFERENCES:

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Robert Resnick , David Halliday, Kenneth S. Krane *PHYSICS (fifth edition)* , John Wiley and sons, Inc.
2. Paul G. Hewitt , *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 SIMPLE HARMONIC MOTION				
1.1	Introduction- simple harmonic motion- differential equation of SHM-	2	Chalk & Talk	Black Board

1.2	graphical representation of SHM total energy of vibrating particle	3	Chalk & Talk	Black Board
1.3	simple pendulum- simple harmonic oscillations of a loaded spring(	4	Chalk & Talk	Black Board
1.4	free vibrations- undamped vibrations- damped vibrations- forced vibrations, resonance and sharpness of resonance, Quality factor	6	Chalk & Talk	Black Board
UNIT -II Progressive waves				
2.1	Wave motion- what propagates in wave motion?- characteristics of wave motion of simple harmonic wave- Transverse wave motion- longitudinal	5	Chalk & Talk	Black Board
2.2	definitions- relation between frequency and wavelength- Equation of simple harmonic wave	6	Chalk & Talk	Black Board
2.3	Differential equation of wave motion- particle velocity and wave velocity- energy of a progressive wave	5	Chalk & Talk	Black Board
2.4	satellites- stationary satellite- orbital velocity, period of revolution, escape velocity.	5	Chalk & Talk	Black Board
UNIT - III	**STATIONARY WAVES, INTERFERENCE AND BEATS**			
3.1	Stationary waves- properties properties of stationary longitudinal waves- analytical treatment of open end organ pipe or string free	5	Chalk & Talk	Black Board

	at the other end (open end pipe only).			
3.2	Interference of sound waves- special cases- conditions for interference of sound waves.	5	Chalk & Talk	Black Board
3.3	Beats- analytical treatment of beats	5	Chalk & Talk	Black Board
UNIT – IV	**DOPPLER EFFECT**			
4.1	Doppler effect- observer at rest and source in motion- source at rest and observer in motion- both source and observer are in motion	11	Chalk & Talk	Black Board
4.2	effect of wind velocity -	2	Chalk & Talk	Black Board
4.3	tracking of artificial satellites	2	Chalk & Talk	Black Board
UNIT V	**MUSIC AND ULTRASONICS**			
5.1	Musical Sound and Noise (self-study)– Speech – Human Voice – human Ear – Characteristics of Musical Sound – Intensity of Sound – Bel – Musical Scale – Limitsof Audibility(	5	Chalk & Talk	Black Board
5.2	Ultrasonics – Production of Ultrasonic Waves (Piezoelectric oscillator	4	Chalk & Talk	Black Board
5.3	Acoustic grating	2	Chalk & Talk	Black Board
5.4	Applications of Ultrasonic Waves(	4	Chalk & Talk	Black Board
	UNIT VI DYNAMISM			

6.1	Simple Harmonic Motion – examples in day-to-day life – resonance phenomena –examples and its effect- Different musical scales – musical instruments – music generation and notes- frequency tuning systems- Voice spectrographs- Noise cancelling earphones..	5	Discussion	Google Class Room
6.2	Advanced ultrasound scanners- Ultrasound in surgery	5	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	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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Describe simple harmonic motion and explain damped and forced oscillations	K1 K2	PSO1& PSO2
CO 2	Explain the Principle of superposition in sound waves	K1, K2, K3	PSO2, PSO5
CO 3	Apply the same to interference, stationary waves and beats of sound waves	K1 K2 K3	PSO3,PSO4
CO 4	Explain Doppler effect in sound and identify relative motion and solve problems	K1, K2	PSO3,PSO4
CO 5	Discuss ultrasonics and its applications & Outline the physics of voice generation and hearing	K1,K2, K3	PSO1 PSO5

Mapping of C0s with PSOs

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

Mapping of C0s with POs

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

Strongly Correlated – **3,**Moderately Correlated – **2,**Weakly Correlated -1

COURSE DESIGNER:
Dr. L.Caroline Sugirtham

Forwarded By

HOD'S Signature & Name

I B.Sc.,PHYSICS

SEMESTER II

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAPH	19P2CC5	APPLIED MECHANICS	Theory	4	3

COURSE DESCRIPTION

The course enables the students to understand the fundamental and advanced concepts of Central force, Projectile motion, interrelationship between energy and work, linear momentum and angular momentum.

COURSE OBJECTIVES

This course enhance the intellectual, experimental, analytical skills of the students on Kepler's laws of Planetary motion, Projectile motion, collisions, law of conservation of linear momentum and law of conservation of angular momentum.

UNIT –I CENTRAL FORCE (12 HRS.)

Newton's second law of motion- central force – central force motion is confined to a single plane – angular momentum and energy are constants – Law of equal areas - law of orbit- Kepler's third law.

UNIT –II PROJECTILE MOTION (12 HRS.)

Projectile motion- Maximum height- Maximum Range- Special cases- **Horizontal Projection**-Object thrown from Airplane- Fast –Moving Projectiles-Satellites.

UNIT –III WORK AND KINETIC ENERGY (12 HRS.)

Work and Kinetic Energy- Workdone by a constant force-**Translatory motion**-Workdone by a variable force- Kinetic energy and the work-energy theorem.

UNIT –IV LINEAR MOMENTUM (12 HRS.)

Center of mass – Center of mass coordinates -**Motion of centre of mass and linear momentum**- -collisions- Elastic collisions- Inelastic collisions – Coefficient of Restitution-

UNIT –V ANGULAR MOMENTUM (12 HRS.)

Dynamics of rigid body- Rotational Kinetic energy, Moment of inertia and it's physical significance-Angular momentum and angular velocity-Angular acceleration-Angular momentum- torque- **analogy between translatory motion and rotatory motion** – workdone by a torque.

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

Atmospheric angular momentum –Weather forecast

REFERENCES:

1. Brijlal, N.Subrahmanyam and JivanSeshan, *MECHANICS AND ELECTRODYNAMICS,* New Delhi -EURASIA Publishing House (PVT.) LTD..
2. Brijlal and Subrhamanyam (V edition), *PROPERTIES OF MATTER* , New Delhi -Eurasia Publishing Pvt. Ltd.
3. Robert Resnick, David Halliday and S. Krane (Vol I- fifth edition-) ,*PHYSICS*- John Wiley & Sons, Inc.
4. Francis W. Sears, Mark W. Zemansky and Hugh D. Young(Sixth edition), *UNIVERSITY PHYSICS*-New Delhi -Narosa Publishing House.
5. Paul G. Hewitt (tenth edition), *CONCEPTUAL PHYSICS*, Pearson Education, Inc.and Dorling Kindersley Publishing, Inc.

WEB REFERNCES

1. physics.oregonstate.edu/~mcintyre/COURSES/ph426_W12/cfnotes.pdf
2. *https://***ocw.mit.edu***/. /***lecture***-notes/MIT***16_07***F09_Lec15.pdf*
3. https://ocw.mit.edu/. /lecture-notes/MIT16_07F09_Lec16.pdf
4. https://ui.adsabs.harvard.edu/
5. https://royalsocietypublishing.org/doi/10.1098/rsta.1991.0003

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**CENTRAL FORCE**			
1.1	Newton's second law of motion- central force	2	Chalk & Talk	Black Board
1.2	Central force motion is confined to a single plane	2	Chalk & Talk	LCD
1.3	angular momentum and energy are constants	2	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
1.4	Law of equal areas	2	Chalk & Talk	Black Board
1.5	law of orbit	2	Chalk & Talk	Black Board
1.6	Kepler's third law.	2	Chalk & Talk	Black Board
UNIT -2 PROJECTILE MOTION				
2.1	Projectile motion	3	Chalk & Talk	LCD
2.2	Maximum height- Maximum Range	3	Chalk & Talk	Black Board
2.3	Special cases-Object thrown from Airplane	3	Chalk & Talk	Black Board
2.4	Fast –Moving Projectiles-Satellites.	3	Chalk & Talk	PPT
UNIT-3 WORK AND KINETIC ENERGY				
3.1	Work and Kinetic Energy	3	Chalk & Talk	PPT
3.2	Workdone by a constant force	2	Chalk & Talk	Black Board
3.3	Workdone by a variable force	2	Chalk & Talk	Black Board
3.4	Kinetic energy	1	Chalk & Talk	Black Board
3.5	Work-energy theorem.	4	Chalk & Talk	Black Board
UNIT -4 LINEAR MOMENTUM				
4.1	Center of mass	3	Chalk & Talk	Black Board
4.2	Center of mass coordinates	2	Chalk & Talk	Black Board
4.3	Collisions	1	Chalk & Talk	Black Board
4.4	Elastic collisions	2	Chalk & Talk	Black Board
4.5	Inelastic collisions- Coefficient of Restitution	2	Chalk & Talk	Black Board
4.6	Rocket motion.	2	Chalk & Talk	PPT
UNIT –5 ANGULAR MOMENTUM				

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
5.1	Dynamics of rigid body- Rotational Kinetic energy, Moment of inertia and it's physical significance	2	Chalk & Talk	Black Board
5.2	Angular momentum and angular velocity	2	Chalk & Talk	Black Board
5.3	Angular acceleration	2	Chalk & Talk	Black Board
5.4	Angular momentum-Law of conservation of angular momentum	2	Chalk & Talk	Black Board
5.5	Torque	2	Chalk & Talk	Black Board
5.6	Workdone by a torque.	2	Chalk & Talk	Black Board
UNIT –6		**DYNAMISM**		
6.1	Atmospheric angular momentum –Weather forecast	2	Chalk & Talk	PPT

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

tic									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 demonstrate an understanding of central forces and explain Kepler's laws of Planetary motion	K1, K3	PSO1& PSO2
CO 2	Students will be able to compute the path of projectile launched with horizontal and vertical velocity components in the Earth's gravity	K1, K2,K3	PSO1, PSO2&PSO3
CO 3	Students will be able to evaluate the interrelationship between energy and work	K2,K3	PSO1, PSO2&PSO5
CO 4	Students will be able to describe the motion of the center of mass of an object, state the conservation principles involving momentum and explore its applications, analyse collisions between two objects	K1,K2,K3	PSO1,PSO2& PSO3
CO 5	Students will be able to apply law of conservation angular momentum appropriately in rigid body rotations, relate the rotational and translational parameters based on rotational kinematics.	K1,K3& K4	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	3	3	3	1	1
CO3	3	3	2	1	3
CO4	3	3	3	1	1
CO5	3	3	2	3	3

Mapping of C0s with POs

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

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

♦ Weakly Correlated -**1**

COURSE DESIGNER:
Dr. M.V. Leena Chandra

Forwarded By

Dr. A. Sheela Vimala Rani
HoD'S Signature & Name

SEMESTER II

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAPH	19P2CC6	MAJOR PRACTICALS –II	Practical	3	2

COURSE DESCRIPTION

The objective of this course is to develop practical skills to use physics apparatus

COURSE OBJECTIVES

- To gain hands-on experience to use microscope and telescope
- To measure the relevant parameters and calculate the elastic modulus of materials
- To measure the relevant parameters and calculate the properties of matter

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.

EVALUATION PATTERN

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

Forwarded By

HoD' 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	T2	Quiz	Assignment	OBT/PPT	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- 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	T2	Quiz	Assignment	OBT/PPT	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 - : **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	T2	Quiz	Assignment	OBT/PPT	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 C0s 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 C0s 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 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	19P4CC11	Materials science	Theory	4	3

COURSE DESCRIPTION

The course provides concept based exposure to conducting, dielectric, magnetic, superconducting and other emerging new materials

COURSE OBJECTIVES

This course deals with the elemental concepts of properties of various materials

UNITS

UNIT –I CONDUCTING MATERIALS (12 HRS.)

Material Science-Properties of engineering materials.

Atomic interpretation of ohm's law-Relaxation time and electrical conductivity-Derivation of electrical conductivity of a metal-Electrical and thermal conductivity-Thermal conductivity-Wiedemann Franz law-Thermal expansion-Different types of conducting materials:Low resistivity materials, High resistivity materials

UNIT –II DIELECTRIC MATERIALS (12 HRS.)

Fundamental definitions in dielectrics-Determination of dielectric constant of a dielectric material- Applications of insulating and dielectric materials - Properties and different types of insulating materials

UNIT –III MAGNETIC MATERIALS (12 HRS.)

Introduction - Different types of magnetic materials- Soft Magnetic materials-Hard magnetic materials-Energy product of magnetic materials-Ferrite Core memory-Magnetic recording materials-Magnetic storage media materials-Magnetic principle in computer data storage

UNIT –IV SUPERCONDUCTING MATERIALS (12 HRS.)

Introduction - Explanations for the occurrence of superconductivity-General properties of superconductors-Other observations-Types of superconductors-High temperature superconductors-Preparation & Characterisation of high temperature ceramic superconductors-Perovskite superconductivity-Applications of superconductors

UNIT –V NEW MATERIALS (12 HRS.)

Metallic glasses-fiber reinforced plastics- Metal matrix composites – Biomaterials-Ceramics-Cermets-High temperature materials-Thermoelectric materials-Electrets-Nanophase materials-Shape memory alloys-smart materials-conducting polymers.

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

New Materials invented in twentieth century that could change human lives

REFERENCES:

1. Dr. M. Arumugam, M. Sethuraman, *Material Science*, Anuradha publications, Reprint 2010

1. V. Rajendran, *Material science*, TATA Mc GRAW HILL EDUCATION PVT. LTD. Second Reprint 2013

2. William.D. Callister, Jr., *Materials science and Engineering* – an introduction (V edition) 2012

WEB REFERNCES :

1. https://easyengineering.net/materialssciencebooks/
2. https://electronicsforu.com/resources/16-free-ebooks-on-material-science

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1	**CONDUCTING MATERIALS**			
1.1	Properties of engineering materials	2	Chalk & Talk	Black Board
1.2	Atomic interpretation of ohm's law	2	Chalk & Talk	LCD
1.3t	Relaxation time and electrical conductivity of a metal	2	Lecture	PPT
1.4	Electrical and thermal conductivity	1	Lecture	PPT
1.5	Relaxation time, Mean free path	1	Lecture	Black Board
1.6	Wiedemann Franz law	2	Discussion	Google classroom
1.7	Thermal expansion	2	Lecture	Black Board
UNIT -2	**DIELECTRIC MATERIALS**			
2.1	Fundamental definitions in dielectrics	1	Chalk & Talk	Black Board
2.2	Different types of electric polarization	2	Chalk & Talk	LCD
2.3	Frequency and temperature effects on polarization	2	Lecture	PPT
2.4	Dielectric loss	1	Lecture	PPT
2.5	CM relation	2	Lecture	Black Board
2.6	Determination of dielectric constant	2	Discussion	Google classroom
2.7	Insulating materials	2	Lecture	Black

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
				Board
Unit 3 – Magnetic materials				
3.1	Different types of magnetic materials	2	Chalk & Talk	LCD
3.2	Classical theory of diamagnetism	2	Lecture	PPT
3.3	Langevin theory of paramagnetism	2	Lecture	PPT
3.4	Weiss theory	2	Lecture	Black Board
3.5	Molecular theory	2	Discussion	Google classroom
3.6	Heisenberg theory	2	Lecture	Black Board
Unit 4- Superconducting materials				
4.1	Occurrence of superconductivity	2	Chalk & Talk	Black Board
4.2	Properties of superconductors	2	Chalk & Talk	LCD
4.3	Types of superconductors	2	Lecture	PPT
4.4	High temperature superconductors	3	Lecture	PPT
4.5	Applications	3	Lecture	Black Board
Unit 5-New Materials				
5.1	Metallic glass reinforced plastics	1	Lecture	Black Board
5.2	Metal matrix composites	2	Chalk & Talk	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
5.3	Biomaterials	2	Chalk & Talk	LCD
5.4	Ceramics, Cermets	2	Lecture	PPT
5.5	High temperature materials	1	Lecture	PPT
5.6	Thermo electric materials	1	Chalk & Talk	Black Board
5.7	Electrets, Nanophase materials	1	Chalk & Talk	LCD
5.8	Shape memory alloys	1	Lecture	PPT
5.9	Smart materials, conducting polymers	1	Lecture	PPT

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1	T2	Quiz	Assignment	OBT/PPT	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 classical Maxwell's distribution law of velocity and its inference.	K1,K2	PSO1& PSO2
CO 2	Determine electrical conductivity, thermal conductivity of conducting materials	K1, K3,	PSO2 & PSO3
CO 3	Gain the knowledge of properties of various materials	K1,K2	PSO4 & PSO5
CO 4	Explain theory of various magnetic and superconducting materials	K1, K2, K3	PSO1&PSO2
CO 5	Identify new materials that find diverse applications.	K1 & K3	PSO2&PSO5

Mapping COs Consistency with PSOs

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

Mapping of C0s 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. Jeyasheela & Dr. M. Ragam

Forwarded By

Dr. A. Sheela Vimala Rani

HoD'S Signature & 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 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- 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	T2	Seminar	Assignment	OBT/PPT				
						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, Holography, Laser and Maser.

COURSE OBJECTIVES

The course enables the students to understand and analyse the interference of light waves and to study the characteristics of Laser and the applications of Laser. 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.

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.

UNIT –II INTERFERENCE OF LIGHT(DIVISION OF WAVEFRONT(18 HRS)

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

Lasers and Holography

Introduction to Lasers: Absorption, Spontaneous emission and Stimulated emission-Relation between Einstein's A&B coefficients – Characteristics of a Laser beam-Principle of Laser action- Helium Neon Laser –Semi conductor

Lasers- **self study)**
- Laser in Holography.

UNIT –III 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 - **a slit (self study)**

UNIT –IV 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 –V POLARIZATION OF LIGHT (18 HRS)

Polarized and unpolarised 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 –VI DYNAMISM (Evaluation Pattern-CIA only)

Michelson's interferometer, Cornu's spiral

REFERENCES:

1.Satya Prakash , Optics ,12th edition 2005, Educational & university Publishers.

1) Dr.N.Subrahmanyam, Brijlal, Dr.M.N.Avadhanulu, A text book of optics- 24th Revised Edition 2010, S. Chand & Company limited.

2) Ajoy Ghatak, OPTICS –4th Edition, Tata Mc Graw Hill Publishing Company Ltd, New Delhi.

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
UNIT -2 INTERFERENCE OF LIGHT(DIVISION OF				

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
WAVEFRONT)				
2.1	Fresnel's biprism	1	Chalk & Talk	Black Board
2.2	Interference fringes with white light- Displacement of the fringes	1	Chalk & Talk	LCD
2.3	Fresnel's double mirror	4	Lecture	PPT & White board
2.4	Absorption, Spontaneous emission and Stimulated emission	1	Lecture	Smart Board
2.5	Relation between Einstein's A&B coefficients	1	Lecture	Black Board
2.6	Characteristics of a Laser beam-Principle of Laser action	1	Discussion	PPT & White board
2.7	Helium Neon Laser –Semi conductor Lasers	2	Chalk & Talk	Black Board
2.8	Laser in Holography.	1	Discussion	Black Board
UNIT -3 DIFFRACTION OF LIGHT- FRESNEL CLASS				
3.1	Introduction- -Difference between Fresnel and Fraunhofer diffraction	1	Chalk & Talk	Black Board
3.2	Difference between Interference and Diffracion	1	Chalk & Talk	LCD
3.3	Fresnel's assumptions- Fresnel's half period zones for	4	Lecture	PPT & White

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	plane waves			board
3.4	Explanation of rectilinear propagation of light	1	Discussion	Black Board
3.5	Zone plate	1	Lecture	Black Board
3.6	Diffraction at a circular aperture	1	Discussion	PPT & White board
3.7	Diffraction at an opaque disc	1	Discussion	Black Board
3.8	Diffraction at a straight edge	1	Lecture	PPT & White board
UNIT -4 FRAUNHOFER DIFFRACTION				
4.1	Fraunhofer diffraction at a single slit	1	Chalk & Talk	Black Board
4.2	Two slits - N parallel equidistant slit - plane diffraction grating	1	Chalk & Talk	LCD
4.3	Determination of wavelength of light with a plane transmission grating	4	Lecture	PPT & White board
4.4	Dispersive power of a diffraction grating	1	Lecture	Smart Board
4.5	Resolving power – Rayleigh's	1	Lecture	Black

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	criterion for resolution			Board
4.6	Resolving power of telescope	1	Discussion	PPT & White board
4.7	Resolving power of Microscope, Grating.	2	Chalk & Talk	Black Board
4.8	Resolving power of Prism	1	Discussion	Black Board
UNIT -5 POLARIZATION OF LIGHT				
5.1	Polarized and unpolarised light – Production of plane polarised light	1	Chalk & Talk	Black Board
5.2	Polarization by reflection-Brewster's law	1	Chalk & Talk	LCD
5.3	Polarisation by refraction through pile of Plates- Law of Malus	4	Lecture	PPT & White board
5.4	Uniaxial and biaxial crystals-Double refraction-Polarisation of Double Refraction	1	Lecture	Smart Board
5.5	Nicol Prism	1	Lecture	Black Board
5.6		1	Discussion	Black

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	Superposition of two disturbances-Quarter wave plate			Board
5.7	Half wave plate	1	Lecture	LCD
5.8	Production and analysis of polarized light.	1	Lecture	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1	T2	Quiz	Assignment	OBT/PPT	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 the interference in a wedge shaped film, Newton's rings and Michelson's interferometer	K1	PSO1& PSO2
CO 2	describe interference of light due to division of wave front, characteristics and Principle of Laser action, different types of Lasers, Lasers in Medicine and Holography.	K1, K2,	PSO3
CO 3	Explain Diffraction of light, Diffraction at an opaque disc and the construction and working of zone plate.	K1 & K3	PSO5
CO 4	Insight of the Fraunhofer diffraction at a single slit and double slit, Resolving Power of Prism, Grating, telescope and Microscope.	K1, K2, K3	PSO4
CO 5	Deduce the concepts of Polarization, Brewster's and Malus law and explain production and analysis of polarized light.	K2 & K4	PSO4 &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 SHEELAI.

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. d power supply using Zener diode
2. d power supply using IC
3. s - using discrete components
4. s - using IC's
5. & JK Flip Flops using NAND Gates
6. & JK Flip Flops using NOR Gates
7. f adder, Full adder using IC's
8. f subtractor, Full subtractor using IC's
9. -AMP Parameters- Closed loop gain and output impedance
10. 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	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAPH	19P5CC16	Major Practicals VI 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,determination of μ by forming Newtens rings and characteristics of a thermistor.

List of Experiments

Any six experiments

1.He-Ne LASER- Determination of Refractive index of a liquid

2. Verification ofMalus law- LASER

3. Study of the Characteristics of a Thermistor.

4.Solar Spectrum - Determination of ofFraunhofer lines using Grating

5. Air Wedge – determination of thickness of wire

6. Determination of λ -Hartmann's Interpolation Formula

7. Biprism and spectrometer - Determination of λ

8.Newton's rings in liquid – determination of μ.

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	T2	Quiz	Assignment	OBT/PPT	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	T2	Quiz	Assignment	OBT/PPT	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

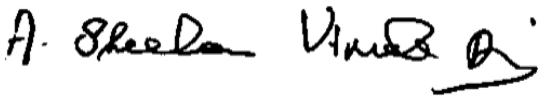
Mapping of C0s with POs

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

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	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. D & NOR as universal gates-IC
2. h Map- Sum of products
3. h Map- product of sums
4. s- Mod 3 using JK FF
5. s- Mod 5 and Mod 10 using 7490
6. -AMP – Integrator and differentiator
7. -AMP- Logarithmic Amplifier
8. t register- IC 74190
9. g Counter using JK FF
10. n of Boolean expressions and DeMorgan's theorem

EVALUATION PATTERN

MARKS		
CIA	ESE	Total
40	60	100

COURSE DESIGNER: Dr. Mathavi Manisekar

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	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 Refractive index of a liquid, Determination of wavelength of Fraunhofer lines using Grating,Determination of λ using Hartmann's Interpolation Formula,determination of μ by forming Newtens rings and characteristics of a thermistor.

List of Experiments

Any six experiments

1.He-Ne LASER- Determination of Refractive index of a liquid

2. Verification ofMalus law- LASER

3. Study of the Characteristics of a Thermistor.

4.Solar Spectrum - Determination of ofFraunhofer lines using Grating

5. Air Wedge – determination of thickness of wire

6. Determination of λ -Hartmann's Interpolation Formula

7. Biprism and spectrometer - Determination of λ

8.Newton's rings in liquid – determination of μ.

EVALUATION PATTERN

MARKS		
CIA	ESE	Total
40	60	100

COURSE DESIGNER:Dr. Dheva Shantha Kumari

Forwarded By

Dr. A Sheela Vimala Rani

HoD's Signature & Name

I B.Sc. Chemistry

SEMESTER I

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAPH	19P1ACC1	ALLIED PHYSICS-I	Theory	3	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, Electricity and Magnetism and Geometrical Optics.

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, Refraction, dispersion of optical devices.

UNITS

UNIT I: WAVES AND OSCILLATIONS [9HRS]

Simple Harmonic motion- Composition of two simple harmonic motions in a straight line-Composition of two simple harmonic motions of equal time periods at right angles-Lissajous's figures- Uses– laws of transverse vibrations of strings – Melde's string – transverse and longitudinal modes.

UNIT –II PROPERTIES OF MATTER [9HRS]

Elasticity –Different Moduli of Elasticity- Poisson's ratio.
Streamline flow and Turbulent flow–Coefficient of Viscosity-Rate of Flow of liquid in a Capillary Tube- Poiseuille's Formula (Method of dimensions) - Poiseuille's Method for determining coefficient of viscosity of liquid- Comparison of viscosities of two liquids.
Surface Tension: Molecular theory of surface tension-pressure difference across a liquid surface-Excess Pressure inside a liquid drop- Excess pressure inside a soap bubble.

UNIT –III THERMAL PHYSICS [9HRS]

Postulates of Kinetic theory of gases– Van der Waals equation of state – Derivation of Critical Constants - Joule Kelvin effect – Joule Thomson porous plug experiment –Laws of thermodynamics- Heat Engine– entropy - changes of entropy in reversible and irreversible processes.

UNIT –IV ELECTRICITY AND MAGNETISM [9HRS]

Capacitor-energy of charged capacitors- between two capacitors- magnetic effect of electric current-Biot Savart's law-Magnetic induction at a point on the axis of a circular coil.

UNIT –V GEOMETRICAL OPTICS [9HRS]

Laws of Refraction – Refractive index by travelling microscope, Refraction through Prism - Dispersion through a prism – Expression for dispersive power of the material of a thin prism – Combination of two prisms to produce dispersion without deviation - Combination of two prisms to produce deviation without dispersion.

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

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

REFERENCES:

1. Allied Physics by R.Murugeshan (2012- I Edition) *Allied Physics,* Ram Nagar, New Delhi: S. Chand & Company Ltd.

WEB REFERNCES :

1.https://study.com/academy/lesson/physical-property-of-matter-definition-examples- quiz.html
2.https://www.physicsforums.com

.https://www.kullabs.com/classes/subjects/units/lessons/notes/note-detail/1761

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 TITLE: WAVES AND OSCILLATIONS				
1.1	Simple Harmonic Motion	1	Chalk & Talk	Black Board
1.2	Composition of two simple	1	Chalk	LCD

	harmonic motions in a straight line		&Talk	
1.3	Composition of two simple harmonic motions of equal time periods at right angles	2	Chalk & Talk	PPT & White board
1.4	Lissajous's figures	1	Lecture	LCD
1.5	Laws of transverse vibrations of strings	1	Discussion	Black Board
1.6	Melde's string	1	Real model in Lab	Apparatus
1.7	Transverse and longitudinal modes	2	Real model in Lab	Apparatus
UNIT -2 TITLE: PROPERTIES OF MATTER				
2.1	Elasticity	1	Lecture	Green Board, Real samples
2.2	Different Moduli of Elasticity, Poisson's ratio	1	Chalk & Talk	Black Board
2.3	Streamline flow and Turbulent flow	1	Discussion	PPT & White Board
2.4	Coefficient of Viscosity-Rate of Flow of liquid in a Capillary Tube Poiseuille's Formula (Method of dimensions)	1	Lecture	PPT & White Board
2.6	Poiseuille's Method for determining coefficient of viscosity of liquid	1	Real Model in Lab	Apparatus
2.6	Comparison of viscosities of two liquids	1	Real Model in Lab	Apparatus
2.7	Surface Tension: Molecular theory of surface tension	1	Lecture	PPT & White Board
2.8	Pressure difference across a liquid surface-Pressure difference across a liquid surface	1	Chalk & Talk	Black Board
2.9	Excess pressure inside a soap bubble and drop	1	Lecture	Smart Board

UNIT -3 TITLE: THERMAL PHYSICS				
3.1	Postulates of Kinetic theory of gases, Van der Waals equation of state	1	Chalk & Talk	Black Board
3.2	Derivation of Critical Constants	1	Chalk & Talk	LCD
3.3	Joule Kelvin effect – Joule Thomson porous plug experiment	2	Chalk & Talk	PPT & White board
3.4	Laws of thermodynamics	1	Lecture	LCD
3.5	Laws of thermodynamics	1	Discussion	Black Board
3.6	Heat Engine	1	Real model in Lab	Apparatus
3.9	Entropy	1	Real model in Lab	Apparatus
3.10	Changes of entropy in reversible and irreversible processes.	1	Chalk & Talk	Black board
UNIT -4 TITLE: ELECTRICITY AND MAGNETISM				
4.1	Capacitor-energy of charged capacitors	1	Lecture	Green Board Charts
4.2	Energy of a stored capacitor	1	Lecture	White Board
4.3	Loss of energy on sharing of charges between two capacitors	2	Chalk & Talk	Black Board
4.4	Magnetic effect of electric current	2	Discussion	Google classroom
4.5	Biot Savart's law	1	Lecture	PPT
4.6	Magnetic induction at a point on the axis of a circular coil.	2	Chalk & Talk	Black Board
UNIT -5 TITLE: GEOMETRICAL OPTICS				
5.1	Laws of Refraction	1	Chalk & Talk	Black Board
5.2	Image formation by	1	Real model	Apparatus

	refraction		in Lab	
5.3	Refractive index by travelling microscope	1	Real model in Lab	Microscope
5.6	Refraction through Prism	1	Real model in Lab	Spectrometer, Prism
5.7	Dispersion through a prism – Expression for dispersive power of the material of a thin prism	1	Real model in Lab	Spectrometer, Prism
5.8	Combination of two prisms to produce dispersion without deviation	2	Chalk & Talk	Black Board
5.9	Combination of two prisms to produce deviation without dispersion	2	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1	T2	Quiz	Assignment	OBT/PPT	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 and discuss about the simple harmonic waves and its oscillations and laws of transverse vibrations of strings.	K1, K2	PSO1& PSO2
CO 2	Classify and describe the properties of matter such as electricity, viscosity and surface tension.	K1, K2, K3	PSO3
CO 3	Summarise the basic concepts of thermal physics and apply the laws of thermodynamics in higher learning concepts such as entropy and its reversible and irreversible process.	K1, K2	PSO3
CO 4	Explain the principles and laws used in electricity and magnetism those are useful in defining the energy of a capacitor and magnetic effect of electric current.	K1, K2	PSO4
CO 5	Demonstrate the properties of geometrical optics and explain the refraction and dispersion through a prism.	K1, K2, K3	PSO5

Mapping of C0s with PSOs

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

Mapping of C0s with POs

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

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

♦ Weakly Correlated -**1**

COURSE DESIGNER:

2. **Dr. Sr. G. Jenita Rani**
3. **Dr. R. Niranjana Devi**
4. **Dr. R. Jothi Mani**

Forwarded By

Dr. A. Sheela Vimala 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	19P1ACB1	DIGITAL PRINCIPLES AND APPLICATIONS	Theory	5	5

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 [15HRS]

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 [15HRS]

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 [15HRS]

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 [15HRS]

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

(Switched tail Counter only)

UNIT –V Counters [15HRS]

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- Simultaneous

Conversion, Counter Method.

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	1	Chalk & Talk	Black Board
1.2	Octal numbers	1	Chalk & Talk	LCD
1.3	hexadecimal numbers	2	Lecture	PPT & White board
1.4	ASCII code	1	Lecture	LCD
1.5	Excess-3 code	1	Chalk & Talk	LCD
1.6	Gray Code	1	Chalk & Talk	LCD
1.7	Inverters – OR Gates – AND Gates	3	Discussion	Black Board
1.8	NOR Gates	1	Lecture	PPT & White

				board
1.9	NAND gates	2	Chalk & Talk	LCD
1.10	Exclusive OR Gates.	2	Chalk & Talk	LCD
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	4	Chalk & Talk	Black Board
2.5	Don't care conditions	2	Chalk & Talk	Black Board
2.6	product-of-Sums method	3	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	2	Chalk & Talk	PPT & White board
3.4	Binary subtraction	1	Chalk & Talk	PPT & White board
3.5	Unsigned Binary numbers	1	Chalk & Talk	PPT & White board
3.6	Sign-Magnitude Numbers	1	Chalk & Talk	PPT & White board
3.7	2's Complement representation	2	Chalk & Talk	Black board
3.8	2's Complement Arithmetic	1	Chalk & Talk	Black board
3.9	Arithmetic Building Blocks	1	Chalk &	PPT &

			Talk	White board
3.10	The Adder	1	Chalk & Talk	PPT & White board
3.11	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 D Flip-Flop	2	Discussion	Google classroom
4.5	Edge Triggered JK flip flop	1	Lecture	PPT
4.6	JK Master Slave Flip Flop	2	Chalk & Talk	Black Board
4.7	Serial In-Serial Out	2	Chalk & Talk	Black Board
4.8	Serial In-Parallel out	1	Chalk & Talk	Black Board
4.9	Parallel In-Serial Out	1	Chalk & Talk	Black Board
4.10	Parallel In- Parallel Out	1	Lecture	PPT
4.11	Application of shift registers(Switched tail Counter only)	1	Lecture	PPT
UNIT -5	**TITLE: COUNTERS**			
5.1	Asynchronous Counters	1	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	2	Chalk & Talk	Black Board
5.8	A/D converter- Simultaneous Conversion	2	Chalk & Talk	Black Board
5.9	Counter Method	2	Lecture	PPT

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1	T2	Quiz	Assignment	OBT/PPT	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 types of number systems and explain the basic and universal logic circuits	K1, K2	PSO1& PSO2
CO 2	simplify the logic expressions using Boolean laws and Kmap	K1, K2	PSO2 & PSO3
CO 3	describe the principles behind the data processing and arithmetic circuits	K1, K2	PSO2 & PSO3

CO 4	explain the working of basic flipflops and design master slave flipflops	K2, K3	PSO3 & PSO4
CO 5	understand the working of shift registers and counters Students will be able to describe D/A and A/D conversion techniques	K2, K3	PSO4 & PSO5

Mapping of C0s with PSOs

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

Mapping of C0s with POs

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

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

♦ Weakly Correlated -**1**

COURSE DESIGNER:

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

Forwarded By

A. Sheela Vimala Rani

Dr. A. Sheela Vimala Rani

HoD'S Signature & Name

I B.Sc.Chemistry/ II B.SC Maths (Regular & SF)I/
III SEMESTER
For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAPH	19P1ACC2	ALLIED PHYSICS PRACTICALS –I	PRACTICALS	2	2

COURSE DESCRIPTION

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

COURSE OBJECTIVE/S

This course enables the students to develop basic lab skills.

LIST OF EXPERIMENTS (Any eight)

1. Comparison of coefficient of viscosity of two liquids
2. Determination of coefficient of viscosity
3. Determination of Surface Tension – Capillary rise method
4. Determination of Surface Tension – Drop Weight method
5. Determination of Latent heat of fusion of Ice
6. Determination of Young's Modulus - Uniform bending (optic lever)
7. Determination of specific heat capacity of a liquid-Newton's law of cooling
8. Determination of focal length of biconvex lens (UV& Distant object Methods).
9. Determination of refractive index of liquid
10. Determination of rigidity modulus – Torsion Pendulum

EVALUATION PATTERN

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

COURSE DESIGNER:
Dr. R. Jothi Mani

Forwarded By

D . A. Sheela Vimala Rani

H D'S Signature & Name

I B.Sc. Chemistry

SEMESTER II

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	19P2ACC3	ALLIED PHYSICS -II	THEORY	3	3

COURSE DESCRIPTION

The course provides a conceptually based exposure to the fundamental principal and processes of significant topics of physics like geometrical Optics, Atomic Physics, Nuclear Physics and Electronics

COURSE OBJECTIVES

This course will improve the elemental concepts and enhance the intellectual, experimental, analytical skills of the students on Atomic Physics, Nuclear Physics, Electronics and Physical optics.

UNITS

UNIT I: PHYSICAL OPTICS (9 HRS.)

Velocity of light-Michelson's method-Interference in thin films-Production of colours in thin films-Air wedge-Diffraction- Polarisation- Polarisation by reflection-Double refraction –Nicol Prism.

UNIT II: ATOMIC PHYSICS (9 HRS.)

Introduction – Rutherford's experiments on scattering of alpha particles- Bohr atom model – Bohr formula – calculation of total energy – Bohr's Interpretation of Hydrogen spectrum – Spectral series of hydrogen atom .

UNIT III: NUCLEAR PHYSICS (9 HRS.)

Models of Nuclear Structure -The Liquid Drop Model-Mass defect-Binding energy- Nuclear fission-chain reaction - atom bomb-energy released in fission - Nuclear reactor-Nuclear Fusion.

UNIT IV: BASIC ELECTRONICS (9 HRS.)

Formation of p-n Junction Diode-Forward and Reverse Biasing of a Junction Diode-V-I Characteristics of a Junction Diode-The Zener Diode-I study the characteristics of Zener diode-Junction Transistor-v transistor - common emitter characteristics of a transistor.

UNIT V: DIGITAL ELECTRONICS [9 HRS]

Decimal Number system- Binary Number system-conversion of Binary number into decimal number-conversion of decimal number into binary number- Octal Number system-Hexadecimal number system – Boolean Algebra-Boolean addition and multiplication-Logic Expressions-commutative laws-associative laws-distributive law-Rules for Boolean algebra-De Morgan's Theorem

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

Role of Michelson interferometer in Atmospheric and space applications - Working of pocket calculators, and cd players

REFERENCES

2. R.Murugesan "Allied Physics" Second Edition 2012, Ram Nagar, New Delhi: S. Chand & Company Ltd.
3. R. Murugeshan&KiruthigaSivaprasath "Modern Physics" 2007,S.Chand & Company Ltd., 2007.

WEB REFERENCES (OPTIONAL)

1. https://www.khanacademy.org/science/physics/quantum-physics/atoms-and-electrons/v/atomic-energy-levels
2. https://www.nature.com/subjects/nuclear-physics
3. https://www.dictionary.com/browse/physical-optics

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -I PHYSICAL OPTICS				
1.1	Velocity of light- Michelson Method	1	Chalk & Talk	Black Board
1.2	Interference in thin films	1	Chalk & Talk	Black Board
1.3	Production of colours in thin films	1	Chalk & Talk	Black Board
1.4	Air wedge	1	Demonstration	Specimen
1.5	Diffraction	1	Chalk & Talk	Black Board
1.6	Polarisation	1	Lecture	Black Board
1.7	Polarisation by reflection	1	Discussion	Google classroom
1.8	Double refraction	1	Chalk & Talk	Black Board
1.9	Nicol Prism	1	Chalk & Talk	PPT
UNIT -II ATOMIC PHYSICS				
2.1	Introduction	1	Lecture	Black Board
2.2	Rutherford's experiments on scattering of alpha particles	2	Chalk & Talk	Black Board
2.3	Bohr atom model	1	Chalk & Talk	Black Board
2.4	Bohr formula	1	Chalk & Talk	Black Board
2.5	calculation of total energy	1	Chalk & Talk	Black Board
2.6	Bohr's Interpretation of Hydrogen spectrum	1	Chalk & Talk	Black Board

2.7	Spectral series of hydrogen atom.	2	Lecture	PPT& Black Board
UNIT - III NUCLEAR PHYSICS				
3.1	Models of Nuclear Structure	1	Lecture	Black Board
3.2	The Liquid Drop Model	1	Lecture	PPT &Black Board
3.3	Mass defect	1	Chalk & Talk	Black Board
3.4	Binding energy	1	Lecture	PPT& Black Board
3.5	Nuclear fission	1	Lecture	PPT
3.6	chain reaction	1	Lecture	PPT
3.7	Atom bomb & Energy released in fission	1	Chalk &Talk	Black Board
3.8	Nuclear reactor	1	Discussion	Google class room
3.9	Nuclear Fusion	1	Lecture	Black Board
UNIT – IV BASIC ELECTRONICS				
4.1	Formation of p-n Junction Diode	1	Chalk & Talk	Black Board
4.2	Forward and Reverse Biasing of a Junction Diode	1	Lecture	PPT
4.3	V-I Characteristics of a	2	Lecture	PPT

	Junction Diode			
4.4	The Zener Diode-Experiment to study the characteristics of Zener diode	2	Chalk & Talk	Black Board
4.5	Junction Transistor	1	Chalk & Talk	Black Board
4.6	Working of n-p-n transistor	1	Discussion	Google Class room
4.7	Common emitter characteristics of a transistor.	1	Chalk & Talk	Black Board
UNIT V DIGITAL ELECTRONICS				
5.1	Decimal Number system& Binary Number system	1	Chalk & Talk	Black Board
5.2	conversion of Binary number into decimal number	1	Chalk & Talk	Black Board
5.3	conversion of decimal number into binary number	1	Chalk & Talk	Black Board
5.4	Octal Number system& Hexadecimal number system	1	Group Discussion	Black Board
5.5	Boolean Algebra-Boolean addition and multiplication	1	Discussion	Google class room
5.6	Logic Expressions	1	Chalk & Talk	Black Board
5.7	commutative laws & associative laws	1	Chalk & Talk	Black Board

5.8	Distributive law	1	Chalk & Talk	Black Board
5.9	Rules for Boolean algebra-De Morgan's Theorem	1	Chalk & Talk	Black Board
UNIT VI DYNAMISM				
6.1	Role of Michelson interferometer in Atmospheric and space applications	1	Discussion	Google Class Room
6.2	Working of pocket calculators, and cdplayers	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	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	Categorize and clarify the different optical phenomena of interference, diffraction, polarization.	K1,K2	PSO1& PSO2
CO 2	Explain the atom model and calculate the total energy of an atom and account for the spectral series of hydrogen atom.	K1,K3,K4	PSO3&PSO4
CO 3	Elucidate the models of nuclear structure and to learn the principle behind atom bomb, nuclear reactors.	K3,K3	PSO1, PSO2 &PSO3
CO 4	Summarize the working principle of p-n junction diode in forward and reverse biasing, it's V-I characteristics, the Zenor Diode, n-p-n transistor in common emitter characteristics.	K2,K3,K4	PSO1& PSO2
CO 5	Classify the number system and demonstrate the skill in conversion of Number systems, Boolean algebra and its associated laws.	K2,K3	PSO1, PSO2 PSO3 & PSO4

Mapping of C0s with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
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

COURSE DESIGNER:

Dr. Sr. G. Jenita Rani

Dr. R. Niranjana Devi

Dr. R. Jothi Mani

Forwarded By

Dr. A. Sheela Vimala Rani

HoD'S Signature & Name

B.SC CHEMISTRY

II SEMESTER

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAPH	19P2ACC4	ALLIED PHYSICS PRACTICALS –II	PRACTICALS	2	2

COURSE DESCRIPTION

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

COURSE OBJECTIVE/S

This course enables the students to develop basic lab skills.

LIST OF EXPERIMENTS (Any eight)

1. Low range Voltmeter calibration using Potentiometer
2. Air wedge - Determination of thickness of insulation
3. Diode characteristics – (Forward & Reverse bias)
4. Ohm's law verification
5. Bridge rectifier
6. Verification of AND, OR, NOT, NAND and NOR gates
7. Verification of Boolean expressions
8. NAND as universal gate
9. NOR as universal gate
10. De Morgan's theorems

1. EVALUATION PATTERN

MARKS		
CIA	ESE	Total
40	60	100

COURSE DESIGNER:

Dr. Sr. G. Jenita Ra i

Dr. R. Niranjana De i

Dr. R. Jothi Mani

Forwarded By

Dr. A. Sheela Vimala Rani

HoD'S Signature & Name

II B.Sc Mathematics (Reg) & (SF)

SEMESTER – III

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAPH	19M3ACP1/ 19G3ACP1	ALLIED PHYSICS-I	THEORY	3	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, Electricity and Magnetism and Geometrical Optics.

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, Refraction, dispersion of optical devices.

UNIT I: WAVES AND OSCILLATIONS [9HRS]

Simple Harmonic motion- Composition of two simple harmonic motions in a straight line-Composition of two simple harmonic motions of equal time periods at right angles-Lissajous's figures- Uses– laws of transverse vibrations of strings – Melde's string – transverse and longitudinal modes.

UNIT –II PROPERTIES OF MATTER [9HRS]

Elasticity –Different Moduli of Elasticity- Poisson's ratio.

Streamline flow and Turbulent flow–Coefficient of Viscosity-Rate of Flow of liquid in a Capillary Tube- Poiseuille's Formula (Method of dimensions) - Poiseuille's Method for determining coefficient of viscosity of liquid- Comparison of viscosities of two liquids.

Surface Tension: Molecular theory of surface tension-pressure difference across a liquid surface-Excess Pressure inside a liquid drop- Excess pressure inside a soap bubble.

UNIT –III THERMAL PHYSICS [9HRS]

Postulates of Kinetic theory of gases– Van der Waals equation of state – Derivation of Critical Constants - Joule Kelvin effect – Joule Thomson porous plug experiment –Laws of thermodynamics- Heat Engine– entropy - changes of entropy in reversible and irreversible processes.

UNIT –IV ELECTRICITY AND MAGNETISM [9HRS]

Capacitor-energy of charged capacitors-Loss of energy on sharing of charges between two capacitors- magnetic effect of electric current-Biot Savart's law-Magnetic induction at a point on the axis of a circular coil.

UNIT –V GEOMETRICAL OPTICS [9HRS]

Laws of Refraction – Refractive index by travelling microscope, Refraction through Prism - Dispersion through a prism – Expression for dispersive power of the material of a thin prism – Combination of two prisms to produce dispersion without deviation - Combination of two prisms to produce deviation without dispersion.

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

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

REFERENCES:

2. Allied Physics by R.Murugeshan (2012- I Edition) *Allied Physics,* Ram Nagar, New Delhi: S. Chand & Company Ltd.

WEB REFERNCES :

1.https://study.com/academy/lesson/physical-property-of-matter-definition-examples- quiz.html
2.https://www.physicsforums.com

.https://www.kullabs.com/classes/subjects/units/lessons/notes/note-detail/1761

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 TITLE: WAVES AND OSCILLATIONS				
1.1	Simple Harmonic Motion	1	Chalk & Talk	Black Board
1.2	Composition of two simple	1	Chalk &	LCD

	harmonic motions in a straight line		Talk	
1.3	Composition of two simple harmonic motions of equal time periods at right angles	2	Chalk & Talk	PPT & White board
1.4	Lissajous's figures	1	Lecture	LCD
1.5	Laws of transverse vibrations of strings	1	Discussion	Black Board
1.6	Melde's string	1	Real model in Lab	Apparatus
1.7	Transverse and longitudinal modes	2	Real model in Lab	Apparatus
UNIT -2 TITLE: PROPERTIES OF MATTER				
2.1	Elasticity	1	Lecture	Green Board, Real samples
2.2	Different Moduli of Elasticity, Poisson's ratio	1	Chalk & Talk	Black Board
2.3	Streamline flow and Turbulent flow	1	Discussion	PPT & White Board
2.4	Coefficient of Viscosity-Rate of Flow of liquid in a Capillary Tube Poiseuille's Formula (Method of dimensions)	1	Lecture	PPT & White Board
2.6	Poiseuille's Method for determining coefficient of viscosity of liquid	1	Real Model in Lab	Apparatus
2.6	Comparison of viscosities of two liquids	1	Real Model in Lab	Apparatus
2.7	Surface Tension: Molecular theory of surface tension	1	Lecture	PPT & White Board
2.8	Pressure difference across a liquid surface-Pressure difference across a liquid surface	1	Chalk & Talk	Black Board
2.9	Excess pressure inside a soap bubble and drop	1	Lecture	Smart Board

UNIT -3 TITLE: THERMAL PHYSICS				
3.1	Postulates of Kinetic theory of gases, Van der Waals equation of state	1	Chalk &Talk	Black Board
3.2	Derivation of Critical Constants	1	Chalk & Talk	LCD
3.3	Joule Kelvin effect – Joule Thomson porous plug experiment	2	Chalk & Talk	PPT & White board
3.4	Laws of thermodynamics	1	Lecture	LCD
3.5	Laws of thermodynamics	1	Discussion	Black Board
3.6	Heat Engine	1	Real model in Lab	Apparatus
3.9	Entropy	1	Real model in Lab	Apparatus
3.10	Changes of entropy in reversible and irreversible processes.	1	Chalk & Talk	Black board
UNIT -4 TITLE: ELECTRICITY AND MAGNETISM				
4.1	Capacitor-energy of charged capacitors	1	Lecture	Green Board Charts
4.2	Energy of a stored capacitor	1	Lecture	White Board
4.3	Loss of energy on sharing of charges between two capacitors	2	Chalk & Talk	Black Board
4.4	Magnetic effect of electric current	2	Discussion	Google classroom
4.5	Biot Savart's law	1	Lecture	PPT
4.6	Magnetic induction at a point on the axis of a circular coil.	2	Chalk & Talk	Black Board
UNIT -5 TITLE: GEOMETRICAL OPTICS				
5.1	Laws of Refraction	1	Chalk & Talk	Black Board
5.2	Image formation by	1	Real model	Apparatus

	refraction		in Lab	
5.3	Refractive index by travelling microscope	1	Real model in Lab	Microscope
5.6	Refraction through Prism	1	Real model in Lab	Spectrometer, Prism
5.7	Dispersion through a prism – Expression for dispersive power of the material of a thin prism	1	Real model in Lab	Spectrometer, Prism
5.8	Combination of two prisms to produce dispersion without deviation	2	Chalk & Talk	Black Board
5.9	Combination of two prisms to produce deviation without dispersion	2	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1	T2	Quiz	Assignment	OBT/PPT	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 and discuss about the simple harmonic waves and its oscillations and laws of transverse vibrations of strings.	K1, K2	PSO1& PSO2
CO 2	Classify and describe the properties of matter such as electricity, viscosity and surface tension.	K1, K2, K3	PSO3
CO 3	Summarise the basic concepts of thermal physics and apply the laws of thermodynamics in higher learning concepts such as entropy and its reversible and irreversible process.	K1, K2	PSO3
CO 4	Explain the principles and laws used in electricity and magnetism those are useful in defining the energy of a capacitor and magnetic effect of electric current.	K1, K2	PSO4
CO 5	Demonstrate the properties of geometrical optics and explain the refraction and dispersion through a prism.	K1, K2, K3	PSO5

Mapping of C0s with PSOs

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

Mapping of C0s with POs

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

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

♦ Weakly Correlated -**1**

COURSE DESIGNER:

Dr. Sr. G. Jenita Rani

Dr. R. Niranjana Devi

Dr. R. Jothi Mani

Forwarded By

Dr. A. Sheela Vimala Rani

HoD'S Signature & Name

II B.Sc Mathematics (Reg) & (SF)

SEMESTER - IV

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
UAPH	19M3ACP2/ 19G3ACP2	ALLIED PHYSICS PRACTICALS -I	PRACTICALS	2	2

COURSE DESCRIPTION

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

COURSE OBJECTIVES

This course enables the students to develop basic lab skills.

LIST OF EXPERIMENTS

1. Comparison of coefficient of viscosity of two liquids
2. Determination of coefficient of viscosity
3. Determination of Surface Tension – Capillary rise method
4. Determination of Surface Tension – Drop Weight method
5. Determination of Latent heat of fusion of Ice
6. Determination of Young's Modulus - Uniform bending (optic lever)
7. Determination of specific heat capacity of a liquid-Newton's law of cooling
8. Determination of focal length of biconvex lens (UV& Distant object Methods).
9. Determination of refractive index of liquid
10. Determination of rigidity modulus – Torsion Pendulum

EVALUATION PATTERN

MARKS		
CIA	ESE	Total
40	60	100

COURSE DESIGNER:

Dr. Sr. G. Jenita Ra i

Dr. R. Niranjana De i

Dr. R. Jothi Mani

Forwarded By

D . A. Sheela Vimala Rani

H D'S Signature & Name

II B.Sc Mathematics (Reg) & (SF)

SEMESTER – IV

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	19M4ACP3/ 19G4ACP3	Allied Physics-II	THEORY	3	3

COURSE DESCRIPTION

The course provides a conceptually based exposure to the fundamental principal and processes of significant topics of physics like geometrical Optics, Atomic Physics, Nuclear Physics and Electronics

COURSE OBJECTIVES

This course will improve the elemental concepts and enhance the intellectual, experimental, analytical skills of the students on Atomic Physics, Nuclear Physics, Electronics and Physical optics.

UNITS

UNIT I: PHYSICAL OPTICS (9 HRS.)

Velocity of light-Michelson's method-Interference in thin films-Production of colours in thin films-Air wedge-Diffraction- Polarisation- Polarisation by reflection-

UNIT II: ATOMIC PHYSICS (9 HRS.)

Introduction – Rutherford's experiments on scattering of alpha particles- Bohr atom model – Bohr formula – calculation of total energy – Bohr's Interpretation of Hydrogen spectrum – Spectral series of hydrogen atom .

UNIT III: NUCLEAR PHYSICS (9 HRS.)

Models of Nuclear Structure -The Liquid Drop Model-Mass defect-Binding energy- Nuclear fission-chain reaction - atom bomb-energy released in fission

- Nuclear reactor-Nuclear Fusion.

UNIT IV: BASIC ELECTRONICS (9 HRS.)

Formation of p-n Junction Diode-Forward and Reverse Biasing of a Junction Diode-V-I Characteristics of a Junction Diode-The Zener Diode-I study the characteristics of Zener diode-Junction Transistor-v transistor - common emitter characteristics of a transistor.

UNIT V: DIGITAL ELECTRONICS [9 HRS]

Decimal Number system- Binary Number system-conversion of Binary number into decimal number-conversion of decimal number into binary number- Octal Number system-Hexadecimal number system – Boolean Algebra-Boolean addition and multiplication-Logic Expressions-commutative laws-associative laws-distributive law -De Morgan's Theorem

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

Role of Michelson interferometer in Atmospheric and space applications - Working of pocket calculators, and cd players

REFERENCES

1. R.Murugesan "Allied Physics" Second Edition 2012, Ram Nagar, New Delhi: S. Chand & Company Ltd.
2. R. Murugeshan & Kiruthiga Sivaprasath "Modern Physics" 2007,S.Chand & Company Ltd., 2007.

WEB REFERENCES (OPTIONAL)

4. https://www.khanacademy.org/science/physics/quantum-physics/atoms-and-electrons/v/atomic-energy-levels
5. https://www.nature.com/subjects/nuclear-physics
6. https://www.dictionary.com/browse/physical-optics

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -I PHYSICAL OPTICS				
1.1	Velocity of light- Michelson Method	1	Chalk & Talk	Black Board
1.2	Interference in thin films	1	Chalk & Talk	Black Board
1.3	Production of colours in thin films	1	Chalk & Talk	Black Board
1.4	Air wedge	1	Demonstration	Specimen
1.5	Diffraction	1	Chalk & Talk	Black Board
1.6	Polarisation	1	Lecture	Black Board
1.7	Polarisation by reflection	1	Discussion	Google classroom
1.8	Double refraction	1	Chalk & Talk	Black Board
1.9	Nicol Prism	1	Chalk & Talk	PPT
UNIT -II ATOMIC PHYSICS				
2.1	Introduction	1	Lecture	Black Board
2.2	Rutherford's experiments on scattering of alpha particles	2	Chalk & Talk	Black Board
2.3	Bohr atom model	1	Chalk & Talk	Black Board
2.4	Bohr formula	1	Chalk & Talk	Black Board
2.5	calculation of total energy	1	Chalk & Talk	Black Board
2.6	Bohr's Interpretation of Hydrogen spectrum	1	Chalk & Talk	Black Board

2.7	Spectral series of hydrogen atom.	2	Lecture	PPT& Black Board
UNIT - III NUCLEAR PHYSICS				
3.1	Models of Nuclear Structure	1	Lecture	Black Board
3.2	The Liquid Drop Model	1	Lecture	PPT &Black Board
3.3	Mass defect	1	Chalk & Talk	Black Board
3.4	Binding energy	1	Lecture	PPT& Black Board
3.5	Nuclear fission	1	Lecture	PPT
3.6	chain reaction	1	Lecture	PPT
3.7	Atom bomb & Energy released in fission	1	Chalk &Talk	Black Board
3.8	Nuclear reactor	1	Discussion	Google class room
3.9	Nuclear Fusion	1	Lecture	Black Board
UNIT – IV BASIC ELECTRONICS				
4.1	Formation of p-n Junction Diode	1	Chalk & Talk	Black Board
4.2	Forward and Reverse Biasing of a Junction Diode	1	Lecture	PPT
4.3	V-I Characteristics of a	2	Lecture	PPT

	Junction Diode			
4.4	The Zener Diode-Experiment to study the characteristics of Zener diode	2	Chalk & Talk	Black Board
4.5	Junction Transistor	1	Chalk & Talk	Black Board
4.6	Working of n-p-n transistor	1	Discussion	Google Class room
4.7	Common emitter characteristics of a transistor.	1	Chalk & Talk	Black Board
UNIT V DIGITAL ELECTRONICS				
5.1	Decimal Number system& Binary Number system	1	Chalk & Talk	Black Board
5.2	conversion of Binary number into decimal number	1	Chalk & Talk	Black Board
5.3	conversion of decimal number into binary number	1	Chalk & Talk	Black Board
5.4	Octal Number system& Hexadecimal number system	1	Group Discussion	Black Board
5.5	Boolean Algebra-Boolean addition and multiplication	1	Discussion	Google class room
5.6	Logic Expressions	1	Chalk & Talk	Black Board
5.7	commutative laws & associative laws	1	Chalk & Talk	Black Board

5.8	Distributive law	1	Chalk & Talk	Black Board
5.9	Rules for Boolean algebra-De Morgan's Theorem	1	Chalk & Talk	Black Board
UNIT VI DYNAMISM				
6.1	Role of Michelson interferometer in Atmospheric and space applications	1	Discussion	Google Class Room
6.2	Working of pocket calculators, and cdplayers	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	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	PSOs ADDRESSED

		TAXONOMY)	
CO 1	Categorize and clarify the different optical phenomena of interference, diffraction, polarization.	K1,K2	PSO1& PSO2
CO 2	Explain the atom model and calculate the total energy of an atom and account for the spectral series of hydrogen atom.	K1,K3,K4	PSO3&PSO4
CO 3	Elucidate the models of nuclear structure and to learn the principle behind atom bomb, nuclear reactors.	K3,K3	PSO1, PSO2 &PSO3
CO 4	Summarize the working principle of p-n junction diode in forward and reverse biasing, it's V-I characteristics, the Zenor Diode, n-p-n transistor in common emitter characteristics.	K2,K3,K4	PSO1& PSO2
CO 5	Classify the number system and demonstrate the skill in conversion of Number systems, Boolean algebra and its associated laws.	K2,K3	PSO1, PSO2 PSO3 & PSO4

Mapping of C0s with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
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:

Dr. Sr. G. Jenita Rani

Dr. R. Niranjana Devi

Dr. R. Jothi Mani

Forwarded By

Dr. A. Sheela Vimala Rani

HoD'S Signature & Name

II B.SC Mathematics(Reg)&(Sf)

IV SEMESTER

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	19M4ACP4/ 19G4ACP4	ALLIED PHYSICS PRACTICALS -II	PRACTICALS	2	2

COURSE DESCRIPTION

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

COURSE OBJECTIVE

This course enables the students to develop basic lab skills.

LIST OF EXPERIMENTS (Any eight)

1. Low range Voltmeter calibration using Potentiometer
2. Air wedge - Determination of thickness of insulation
3. Diode characteristics – (Forward & Reverse bias)
4. Ohm's law verification
5. Bridge rectifier
6. Verification of AND, OR, NOT, NAND and NOR gates
7. Verification of Boolean expressions
8. NAND as universal gate
9. NOR as universal gate
10. De Morgan's theorems

EVALUATION PATTERN

MARKS		
CIA	ESE	Total
40	60	100

COURSE DESIGNER:

Dr. Sr. G. Jenita Ra i

Dr. R. Niranjana De i

Dr. R. Jothi Mani

Forwarded By

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	T2	Quiz	Assignment	OBT/PPT	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 C0s with PSOs

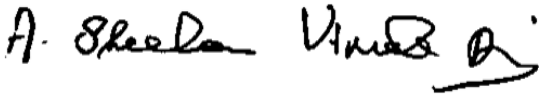
CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	2	1	1
CO2	2	2	3	3	1
CO3	3	3	3	2	1
CO4	3	3	2	2	1
CO5	3	3	1	3	3

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. M. Ragam

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	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 (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.

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 boo k 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	**T2**	**Quiz**	**Assignment**	**OBT/PPT**	**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

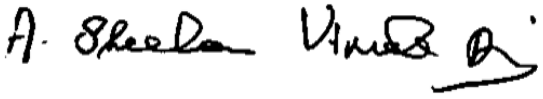
CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	2	1	1
CO2	2	2	3	3	1
CO3	3	3	3	2	1
CO4	3	3	2	2	1
CO5	3	3	1	3	2

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

(URSE DESIGNER: Dr. A. Sheela Vimala Rani & Dr. M. Ragam

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	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	35 Mks.	5 Mks.	40Mks.	
		10	5						

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 C0s 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	T2	Quiz	Assignment	OBT/PPT	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	scribe 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 C0s 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' Signature & Name

I B.Sc.

SEMESTER I

For those who joined in 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	19P1NME	Physics in 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

This course imparts basic ideas of physical quantities, standards and units. It further deals with mechanics and properties of matter comprising the concepts of Newton's law of motion, impulse, work, power and energy, moment of a force etc., Also this course throws light on the fundamental knowledge on concepts of heat, waves, sound, electricity, magnetism and explore their nature.

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

MECHANICS

Physical quantities , standards and units : Unit of length, unit of mass and unit of time, Motion, Force, Newton's law of motion

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

PROPERTIES OF MATTER

Impulse, work, power and energy, moment of a force, Centre of gravity, Machines, Artificial satellites Density and relative density, Pressure, upthrust, Hydrometer, Matter and its properties, Motion of fluids- Bernoulli's theorem

UNIT –III **(7 HRS.)**

HEAT: Internal energy, thermal expansion, transmission of heat, Quantity of heat, Change of state, relative humidity, Air conditioning, Pressure cooker

WAVE MOTION: Electromagnetic radiation, radio and television transmission, Radar, Microwave oven

UNIT –IV **(4 HRS.)**

SOUND: Sound characteristics, The speed of sound, Reflection of sound and Echo, Doppler effect, sonic boom

UNIT –V **(6 HRS.)**

STATIC ELECTRICITY: Electricity of Friction, insulators, Conductors, Super conductors and semiconductors
CURRENT ELECTRICITY: Effects of electric current, Power generations and transmission, Domesitic Electric installation, Electric light
MAGENTISM: Earth's magnetism

REFERENCES:

1. Dr.Tara Chand(2007), GENERAL STUDIES MANUAL, TMH

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1				
1.1	Unit of length, unit of mass and unit of time	2	Chalk & Talk	Black Board
1.2	Motion, Force,	1	Chalk & Talk	Black Board
1.3	Newton's law of motion	2	Chalk & Talk	Black Board
UNIT – 2				
2.1	impulse, work, power and energy	2	Chalk & Talk	Black Board
2.2	moment of a force, Centre of gravity	1	Chalk & Talk	Black Board
2.3	Centre of gravity, Machines	1	Chalk & Talk	Black Board
2.4	Artificial satellites, Density and relative density	1	Chalk & Talk	Black Board
2.5	Pressure, upthrust, Hydrometer	2	Chalk & Talk	Black Board
2.6	Motion of fluids- Bernoulli's	1	Discussion	Google

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
	theorem			Class room
UNIT -3				
3.1	Internal energy, thermal expansion	1	Lecture	PPT
3.2	transmission of heat, Quantity of heat,	1	Chalk & Talk	Black Board
3.3	Change of state, relative humidity, Air conditioning, Pressure cooker	2	Lecture	Black Board
3.4	Electromagnetic radiation, radio and television transmission	1	Chalk & Talk	Black Board
3.5	Radar, Microwave oven	2	Chalk & Talk	Black Board
UNIT – 4				
4.1	Sound characteristics, The speed of sound	2	Chalk & Talk	Black Board
4.2	Reflection of sound and Echo, Doppler effect, sonic boom	2	Chalk & Talk	Black Board
UNIT – 5				
5.1	Earth's magnetism	2	Chalk & Talk	Black Board
5.2	Electricity of Friction, insulators, Conductors	1	Chalk & Talk	Black Board
5.3	Super conductors and semiconductors	1	Chalk & Talk	Black Board
5.4	Effects of electric current, Power generations and transmission,	1	Chalk & Talk	Black Board
5.5	Domestic Electric installation, Electric light	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	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	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 motion in terms of particle's position, velocity and acceleration and analyse the cause of motion	K1,K2	PSO1 & PSO3
CO 3	Understand the concepts of heat and electromagnetic radiation waves,	K2	PSO1, PSO2&PSO3

	sound, electricity, magnetism and explore their nature.		
CO4	Explain the characteristics of Sound	K3	PSO2 &PSO3
CO5	Comprehend the attributes of electricity and magnetism	K2 , K3 & K4	PSO3,PSO4 & PSO5

Mapping COs Consistency with PSOs

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

Mapping of C0s with POs

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

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

COURSE DESIGNER:

1. **Ms. I.Jeyasheela**
2. **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	T2 10	Quiz 5	Assignment	OBT/PPT	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 2019 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	19P4SB2	Physics of Stars	Theory	2	2

COURSE DESCRIPTION

This course briefly explains the life cycle of a star. It throws light on various nuclear reactions taking place in a star. It also explains about the mysterious objects of the Universe.

COURSE OBJECTIVES

This course impart knowledge about physics of stars and other mysterious objects of Universe

UNITS

UNIT-I THE STARS IN THE SKY (5 HRS.)

Life cycle of the stars – The black body model of a star – Morgan – Keenan spectral classification of stars

UNIT –II LUMINOSITY RELATION (5 HRS.)

Hertzsprung – Russel diagram –Mass Luminosity relationship of a star in the main sequence – The size limits of a star.

UNIT –III THE LIFE OF STARS IN THE MAIN SEQUENCE (8 HRS)

The stellar structures – The stellar models – The energy transport mechanism inside a star – The main sequence and life span of the stars – Nuclear reactions inside a main sequence star– The Proton – proton chain reaction – The Carbon – Nitrogen – Oxygen cycle.

UNIT-IV : MYSTERIOUS OBJECTS OF THE UNIVERSE (6 HRS)

Brilliant Phenomena and Mysterious Objects of the Universe - Supernova – Type I supernova – Type II supernova.

UNIT-V: COMPACT OBJECTS OF THE SKY (6HRS)

Compact Objects of the sky - White dwarfs - Neutron stars- Pulsars - Black holes - Quasars- Evidences of dark matter - Gravitational lensing.

REFERENCES:

1. Astronomy and AstroPhysics- Asit Baran Bhattacharya, ShubhenduJoardar& Rina Bhattacharya
2. Astrophysics for Physicists by Arnab Rai Choudhuri, Cambridge Universit y Press

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 THE STARS IN THE SKY				
1.1	Life cycle of the stars	2	Lecture	PPT
1.2	The black body model of a star	1	Lecture	PPT
1.3	Morgan	1	Lecture	PPT
1.4	Keenan spectral classification of stars	1	Lecture	PPT
UNIT -2 LUMINOSITY RELATION				
2.1	Hertzsprung	1	Lecture	PPT
2.2	Russel diagram	1	Lecture	Black Board
2.3	Mass Luminosity relationship of a star in the main sequence	2	Lecture	Smart Board
2.4	The size limits of a star	1	Chalk & Talk	LCD

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -3 THE LIFE OF STARS IN THE MAIN SEQUENCE				
3.1	The stellar structures	1	Chalk & Talk	Black Board
3.2	The stellar models	1	Lecture	Smart Board
3.3	The energy transport mechanism inside a star	1	Lecture	Black Board
3.4	The main sequence and life span of the stars	1	Discussion	Google classroom
3.5	Nuclear reactions inside a main sequence star	1	Chalk & Talk	LCD
3.6	The Proton – proton chain reaction	1	Discussion	Black Board
3.7	The Carbon – Nitrogen	1	Chalk & Talk	PPT
3.8	Oxygen cycle.	1	Chalk & Talk	Black board
UNIT – 4 MYSTERIOUS OBJECTS OF THE UNIVERSE				
4.1	Brilliant Phenomena and Mysterious Objects of the Universe	2	Chalk & Talk	Black Board
4.2	Supernova	2	Lecture	Smart Board
4.3	Type I supernova	1	Lecture	Black Board
4.4	Type II supernova	1	Discussion	Google classroom
UNIT- 5 COMPACT OBJECTS OF THE SKY				
5.1	Compact Objects of the sky	1	Lecture	Black Board

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
5.2	White dwarfs	1	Chalk & Talk	Black Board
5.3	Neutron stars, Pulsars	1	Chalk & Talk	Black Board
5.4	Black holes, Quasars	1	Chalk & Talk	Black Board
5.5	Evidences of dark matter	1	Discussion	Google classroom
5.6	Gravitational lensing	1	Chalk & Talk	Black Board

Levels	C1	C2	C3	C4	C5	Total Scholastic Marks	Non Scholastic Marks C6	CIA Total	% of Assessment
	T1	T2	Quiz	Assignment	OBT/PPT	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	On completion of the course, the student will be able to explain the life cycle of stars	K1, K2	PSO1
CO 2	Students will be able to discuss the spectral classification of stars	K1, K3	PSO2
CO 3	Students will be able to outline the nuclear reactions taking place in stars	K1,K2	PSO1
CO 4	Students will be able to distinguish between various mysterious objects of the universe like supernova, white dwarfs, pulsars, red giants, black holes etc	K1,K2,K3	PSO3
CO 5	Students will be able to explain classification of galaxies, red and blue shift of spectral lines	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:

Dr.M.Ragam

Forwarded By

Dr. A Sheela Vimala Rani

HoD' 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:

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	T2	Quiz	Assignment	OBT/PPT	35 Mks.	5 Mks.	40Mks.	
	s.								
K1	2	2	-	-	-	4	-	4	10 %
K2	2	2	5	-	-	9	-	9	22.5 %
K3	3	3	-	-	5	11	-	11	27.5 %
K4	3	3	-	5	-	11	-	11	27.5 %
Non 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 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** ♦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	T2	Quiz	Assignment	OBT/PPT	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 INSTRUMENTS FOR ASTRONAMICAL MEASUREMENTS AND MATERIALS CHARACTERIZATION	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-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	T2	Quiz	Assignment	OBT/PPT	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

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	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	T2	Quiz	Assignment	OBT/PPT	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

Forwarded By

Dr. A. Sheela Vimala Rani

HoD's Signature & Name

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:

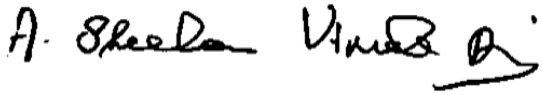
1. Jayant Narlikar-A Journey through the Universe-Revised Edition - Published by National Book Trust
2. Oli Usher & Lars Lindberg Christensen-The Universe through the Eyes of Hubble-Springer
3. Gurbir Singh -The Indian Space Programme-India's incredible journey from the Third Worldtowardsthe First -Astrotalkuk 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

HoD'S Signature & Name

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

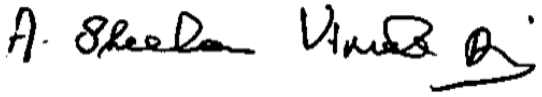
DYNAMISM:
UNIT IV : Simple program development
UNIT V : Designing display control

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

Forwarded By



Dr. A. Sheela Vimala Rani
HoD'S Signature & Name

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

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

HoD'S Signature & Name