CAUVERY COLLEGE FOR WOMEN (AUTONOMOUS)

NATIONALLY ACCREDITED (III CYCLE) WITH "A" GRADE BY NAAC

ISO 9001:2015 Certified

TIRUCHIRAPPALLI – 620 018

PG AND RESEARCH DEPARTMENT OF PHYSICS



B.Sc., PHYSICS SYLLABUS

(2023-2024 and Onwards)

CAUVERY COLLEGE FOR WOMEN (AUTONOMOUS) TIRUCHIRAPPALLI-620 018

PG AND RESEARCH DEPARTMENT OF PHYSICS

VISION

To establish a substratum for excellence and creation of knowledge by igniting the essence of learning physics and exploring its area of research with novel ideas.

MISSION

Our mission is two – fold.

- To provide an outstanding and distinctive education to our undergraduate and postgraduate students.
- To expand our research enterprises via centers and institutes to achieve national and international prominence in strategic research areas.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEOs	Statements
PEO1	LEARNING ENVIRONMENT To facilitate value-based holistic and comprehensive learning by integrating innovative learning practices to match the highest quality standards and train the students to be effective leaders in their chosen fields.
PEO2	ACADEMIC EXCELLENCE To provide a conducive environment to unleash their hidden talents and to nurture the spirit of critical thinking and encourage them to achieve their goal.
PEO3	EMPLOYABILITY To equip students with the required skills in order to adapt to the changing global scenario and gain access to versatile career opportunities in multidisciplinary domains.
PEO4	PROFESSIONAL ETHICS AND SOCIAL RESPONSIBILITY To develop a sense of social responsibility by formulating ethics and equity to transform students into committed professionals with a strong attitude towards the development of the nation.
PEO5	GREEN SUSTAINABILITY To understand the impact of professional solutions in societal and environmental contexts and demonstrate the knowledge for an overall sustainable development.

PROGRAMME OUTCOMES FOR B.Sc PHYSICS PROGRAMME

PO NO.	On completion of B.Sc Physics Programme, The students will be able to
	Domain Knowledge:
PO 1	Analyse, design and develop solutions by applying firm fundamental concepts of basic sciences and expertise in discipline.
	Problem solving:
PO 2	Ability to think rationally, analyse and solve problems adequately with practical knowledge to assess the environmental issues.
	Creative thinking and Team Work:
PO 3	Develop prudent decision-making skills and mobility to work in teams to solve multifaceted problems.
	Employability:
PO 4	Self-study acclimatize them to observe effective interactive practices for practical learning enabling them to be a successful science graduate.
	Life Long Learning:
PO 5	Assure consistent improvement in the performance and arouse interest to pursue higher studies in premium institutions.

PROGRAMME SPECIFIC OUTCOMES FOR B.Sc PHYSICS PROGRAMME B.Sc PHYSICS CURRICULUM [2023-2024 and Onwards]

DO NO	Programme Specific Outcomes	POs		
PSO NO.	Students of B.Sc Physics will be able to	Addressed		
PSO1	Intensify the student academic capability, unique qualities and transferable skills which will give them opportunity to evolve as responsible citizens.	PO1, PO2, PO4		
PSO2	Explain the fundamentals laws involved in physics.	PO1, PO5		
PSO3	Understand the theory and consequence of the various physical occurrence.	PO1, PO2, PO3, PO5		
PSO4	Carryout experiments to interpret the laws and concepts of Physics.	PO1, PO2, PO5		
PSO5	Relate the theories learnt and the skills procured to solve enduring problems.	PO1, PO2, PO3, PO5		



Cauvery College for Women (Autonomous) PG & Research Department of Physics

B.Sc., Physics

LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK (CBCS-LOCF) (For the Candidates admitted from the Academic year 2023-2024 and onwards)

er					rs.	8	Exam			
mest	Ħ	Course	Course Course Title Course Code		st. H 'eek	edit	s.	Marks	5	tal
Se	Pa				Ins / w	Cr	Hr	Int	Ext	\mathbf{T}_{0}
		Language Course-I	பொதுத்தமிழ் – I	23ULT1	6	3	3	25	75	100
		(LC)	Hindi ka Samanya	23ULH1						
			Boetry Grammar	23ULS1						
	Ι		and History of	230251						
			Sanskrit Literature							
			Foundation Course:	23ULF1						
			Paper I- French I							
	Π	English Language Course- I(ELC)	General English -I	23UE1	6	3	3	25	75	100
		Core Course – I(CC)	Properties of Matter and Acoustics	23UPH1CC1	5	5	3	25	75	100
Ι		Core Practical - I (CP)	Properties of Matter and Acoustics (P)	23UPH1CC1P	3	3	3	40	60	100
	III	First Allied Course- I	Calculus and Fourier	22UPH1AC1	4	3	3	25	75	100
		First Allied Course- II	Algebra, Analytical	22UPH1AC2	4	3	3	25	75	100
		(AC)	Geometry of 3D &							
			Trigonometry							
		Ability Enhancement	Value Education	23UGVE	2	2	-	100	-	100
	IV	Compulsory Course-I								
		(AECC)	Totol		20	22				700
		Languaga Coursa II		23ULT2	<u> </u>	3	3	25	75	100
	Ι	(LC)	Hindi Literature &	230112 22ULH2	0	5	5	23	15	100
			Grammar –II							
Π			Prose, Grammar and	23ULS2						
			History of Sanskrit							
			Literature							
			Basic French - II	22ULF2	-			25		100
	II	Course- II(ELC)	General English - II	230E2	6	3	3	25	/5	100
		Core Course – II (CC)	Mechanics and Relativity	22UPH2CC2	5	5	3	25	75	100
		Core Practical - II (CP)	Mechanics and Digital Electronics (P)	23UPH2CC2P	3	3	3	40	60	100
	III	Core Course -III (CC)	Introduction to Digital Electronics	23UPH2CC3	2	2	3	25	75	100
		First Allied Course –III	ODE, PDE, Laplace	22UPH2AC3	4	3	3	25	75	100
		(AC)	Transforms and Vector Analysis							
		Ability Enhancement	Environmental Studies	22UGEVS	2	2	-	100	-	100
	IV	Compulsory Course-II (AECC)								
		Ability Enhancement	Innovation and		2	1	-	100	-	100
		Compulsory Course-	Entrepreneurship	22UGIE						
	E-4	III (AECC)			۸		Dat	1	ation	
	EXU	a crean course	SWAIAN Total			2000	rec(Jiimend	auon	800
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er					IS.	S	Exa	am		
nest	rt	Course	Course Title	Course Code	t. H eek	edits	ś	Marks	5	tal
Ser	Pai				Cr	Hr	Int	Ext	Tot	
		Language Course-III	பொதுத்தமிழ் – III	23ULT3	6	3	3	25	75	100
		(LC)	Hindi Literature & Grammar –III	22ULH3						
	Ι		Drama, Grammar and History of Sanskrit Literature	23ULS3						
			Intermediate French-I	22ULF3						
	II	English Language Course- III(ELC)	Learning Grammar Through Literature – I	23UE3	6	3	3	25	75	100
III	III	Core Course– IV (CC)	Thermal Physics and Statistical Mechanics	23UPH3CC4	5	5	3	25	75	100
		Core Practical – III (CP)	Thermal Physics (P)	23UPH3CC3P	3	3	3	40	60	100
		Second Allied Course-I (AC)	Chemistry – I	22UPH3AC4	4	3	3	25	75	100
		Second Allied Course- II (AP)	Chemistry-I (P)	22UPH3AC5P	4	3	3	40	60	100
		Generic Elective Course-	Physics in Everyday Life	22UPH3GEC1	_		_			
	IV	I (GEC)	Basic Tamil – I	22ULC3BT1	2	2	3	25	75	100
			Special Tamil – I	22ULC3ST1						
	Extra Credit Course SWAYAM As p							mendat	ion	
			Total		30	22				700

15 Days INTERNSHIP during Semester Holidays

	Ι	Language Course - IV	பொதுத்தமிழ் – IV	23ULT4	6	3	3	25	75	100
			Hindi Literature & Functional Hindi	22ULH4						
			Alankara, Didactic and	23ULS4						
IV			Modern Literatures and							
1 V			Translation							
			Intermediate French -II	22ULF4						
	II	English Language Course – IV(ELC)	Learning Grammar Through Literature– II	23UE4	6	3	3	25	75	100
	Ш	Core Course – V (CC)	Electricity, Magnetism and Electromagnetism	23UPH4CC5	6	5	3	25	75	100
		Core Practical – IV (CP)	Electricity and Magnetism (P)	23UPH4CC4P	4	4	3	40	60	100
		Second Allied Course- III (AC)	Chemistry – II	22UPH4AC6	4	3	3	25	75	100
		Internship	Internship	22UPH4INT	-	2	-	25	75	100
	IV	Generic Elective	Photography and Videography	22UPH4GEC2	2	2	3	25	7	100
		Course-II(GEC)	Basic Tamil - II	22ULC4BT2					5	
			Special Tamil - II	22ULC4ST2						
		Skill Enhancement	Web Designing (P)	22UPH4SEC1P	2	2	3	40	60	100
		Course – I(SEC)								
	Extra	a Credit Course	SWAYAM		As per UGC Recommendation					
	Total				30	24				800

THEORY						
Attendance	3					
Library	3					
Seminar/Quiz/ Assignment	4					
CIA – I	7.5					
CIA – II	7.5					
Total	25					

PRACTICAL	I
Observation	5
Record	10
Continuous Performance in	10
Practical	
Model Practical	15
Total	40

Semester I	Internal Marks: 25		Exte	rnal Marks: 75
COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
23UPH1CC1	PROPERTIES OF MATTER AND ACOUSTICS	CC-I	5	5

- To build the elastic behavior in terms of three moduli of elasticity and working of torsion pendulum.
- To apply the concept of bending of beams and analyze the expression, quantify, and understand nature of materials.
- To study the concept of surface tension and viscosity of fluids and learn about an analogous solution to many engineering problems
- To analyze simple harmonic motions mathematically and understand the concept of resonance and set up experiment to evaluate frequency of vibration.
- To understand the concepts of acoustics and the significance of building construction. Able to apply ultrasonic knowledge in real life.

Pre-requisites

- Knowledge about the concepts of elasticity and bending moment
- Fundamental knowledge of capillarity, viscosity of various liquids
- Develop the idea of formula, frequency of vibration and factors affecting the architectural acoustics

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the Course, the Student will be able to	Cognitive Level
CO 1	Understand the basic ideas of Physical properties of different states of matter and sound	K1, K2
CO 2	Analyze the characteristics of elasticity, viscosity, surface tension and the requisites of good acoustics	K3
CO 3	Evaluate the ideas of elasticity and excess pressure of surface tension in fluids and analyze the capillarity nature in liquids	K4
CO 4	Apply the concepts of moduli of elasticity, surface tension, viscosity, waves and acoustics	K3, K5
CO 5	Develop the idea of bending of beams, empirical relations between surface tension and temperature, stokes formula, frequency of vibration of strings and factors affecting the architectural acoustics	K4

Mapping of CO with PO and PSO

Cos	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	3	3	3	2	1	3	2	3	2	1
CO 2	3	3	2	3	1	3	2	3	2	2
CO 3	3	3	2	1	1	3	3	2	2	1
CO 4	3	3	3	2	2	3	3	2	3	1
CO 5	3	3	3	2	1	3	3	2	2	1

"1" - Slight (Low) Correlation

"2" – Moderate (Medium) Correlation

"3" – Substantial (High) Correlation

"-" – indicates there is no correlation

UNIT	CONTENT	HOURS	COs	COGNITIVE
				LEVEL
I	Hooke's law-stress-strain diagram- Elastic constants- Poisson 's ratio -relation between elastic constants and Poisson 's ratio -Work done in stretching and twisting a wire-twisting couple on a cylinder-rigidity modulus by static torsion-torsional pendulum (with and without masses)	10	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
Π	BENDING OF BEAMS Cantilever -Expression for bending moment- expression for depression at the loaded end of the cantilever -oscillations of a cantilever-expression for time period-experiment to find Young 's modulus- non-uniform bending-experiment to determine young's modulus by Koenig 's method-uniform bending-expression for elevation-experiment to determine Young's modulus using microscope	13	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
ш	FLUID DYNAMICS: Surface Tension: definition-molecular forces-Excess pressure over curved surface-application to spherical and cylindrical drops and bubbles- determination of surface tension - Jaeger's method-variation of surface tension with temperature Viscosity: Definition- Streamline and turbulent flow– Rate of flow of liquid in a capillary tube -Poiseuille's formula–corrections-terminal velocity and stoke's formula-variation of viscosity with temperature	22	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	WAVES AND OSCILLATIONS Simple Harmonic Motion (SHM)–differential equation of SHM-graphical representation of SHM-Composition of two S.H.M in a straight line and at right angles-Lissajous's figures- Free, Damped, Forced vibrations - Resonance and sharpness of resonance Laws of transverse vibration in strings - Determination of AC frequency using sonometer - Determination of frequency using Melde's string apparatus	10	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
V	ACOUSTICS OF BUILDINGS AND ULTRASONICS: Intensity of sound-Decibel-Loudness of sound- Reverberation- Sabine's reverberation formula- acoustic intensity-factors affecting the acoustics of buildings Ultrasonic waves: -Production of ultrasonic waves–Piezoelectric crystal method– Magnetostriction effect–application of ultrasonic waves	20	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

VISELF STUDY FOR ENRICHMENT: (Not to be included for External Examination) Rigidity modulus of different materials - I- shaped griders and its uses - surface tension of soap bubble - sonic waves and its types – application of acoustics.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
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Text Books

- 1. Murugeshan, R., (2012). *Properties of Matter and Acoustics*. (3rd edition) S.Chand& Co, New Delhi.
- 2. Mathur, D.S., (2010). *Elements of Properties of Matter*. (1st edition) S. Chand & Company, New Delhi.
- 3. Khanna, D.R., & Bedi, R.S., (1969). *Textbook of Sound*. (7th edition) Atmaram and sons, New Delhi.
- 4. Subrahmanyam, N., & BrijLal., (2015). *Textbook of Sound*. (2nd edition) Vikas Publishing House, Chennai.

Reference Books

- 1. Smith, C.J., (1960). General Properties of Matter and Acoustics. Orient Longman Publishers, Hyderabad.
- 2. Gulati, H.R., (1977). *Fundamentals of General Properties of Matter*. (5th edition) R. Chand& Co, New Delhi.
- 3. French, AP., (1973). *Vibration and waves*. (2nd edition), MIT Introductory Physics, Arnold-Heinmann, India.

Web References

- 1. https://www.biolinscientific.com/blog/what-are-surfactants-and-how-do-they-work
- 2. <u>http://hyperphysics.phy-astr.gsu.edu/hbase/permot2.html</u>
- 3. <u>https://www.youtube.com/watch?v=gT8Nth9NWPM</u>
- 4. <u>https://www.youtube.com/watch?v=m4u-SuaSu1s&t=3s</u>
- 5. https://www.biolinscientific.com/blog/what-are-surfactants-and-how-do-they-work
- 6. https://learningtechnologyofficial.com/category/fluid-mechanics-lab/
- 7. http://www.sound-physics.com/
- 8. http://nptel.ac.in/courses/112104026/

Pedagogy

Chalk and Talk, Assignment, Group discussion and quiz

Course Designer

Dr.S.Gowri

Semester I	Internal Marks: 25	External Marks: 75				
COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS		
23UPH1CC1P	PROPERTIES OF MATTER AND ACOUSTICS (P)	CP-I	3	3		

- To help students to enhance their experimental skills.
- To gain hands-on experience with a variety of techniques.
- To learn the basic principles and procedures of laboratory work.

Pre-requisites

• Basic knowledge on usage of scientific apparatus.

Course Outcome and Cognitive Level Mapping

СО	CO Statement	Cognitive
Number	On the successful completion of the Course, the Student will be able to	Level
CO 1	Select the equipment and get the necessary accessories.	K1
CO 2	Demonstrate the use of equipment for various measures.	K2
CO 3	Construct the experiment by arranging and assembling the equipment.	K3
CO 4	Solve the physical quantity using the relevant formula after gathering accurate data through observations. Keep a detailed record of all laboratory activities.	К3
CO 5	Apply experimental approaches to correlate with physics theory to develop practical understanding.	К3

Mapping of CO with PO and PSO

COs	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	1	1	1	2	1	3	2	1	2	1
CO 2	2	3	2	2	2	3	3	1	2	1
CO 3	1	1	2	3	1	3	2	1	3	1
CO 4	2	3	3	3	2	1	3	1	3	2
CO 5	3	2	3	3	3	1	3	2	3	2

"1" – Slight (Low) Correlation

"2" - Moderate (Medium) Correlation

"3" – Substantial (High) Correlation

"-" indicates there is no correlation

LIST OF EXPERIMENTS (Any 8)

- 1. Determination of rigidity modulus without mass using Torsional pendulum.
- 2. Determination of rigidity modulus with masses using Torsional pendulum.
- 3. Determination of Young's modulus by uniform bending load depression graph.
- 4. Determination of Young's modulus by non-uniform bending scale & telescope
- 5. Determination of Young's modulus by cantilever load depression graph.
- 6. Determination of rigidity modulus by static torsion.
- 7. Determination of surface tension & interfacial surface tension by drop weight method.
- 8. Determination of co-efficient of viscosity by Stokes' method terminal velocity.
- 9. Determination of viscosity by Poiseullie's flow method.
- 10. Determination of g using compound pendulum.
- 11. Sonometer determination of frequency of tuning fork.

Text Book

1. Ouseph, C.C., Rao, U.J., Vijayendran, V., (2016). *Practical Physics and Electronics*. S.Viswanathan, Printers & Publishers Pvt Ltd., Chennai.

Reference Book

 Prof.Namboodirippad, M.N., Prof. Daniel, P.A., (1982). B.Sc., Practical Physics. G.B.C. Publications, Cochin.

Web References

- 1. https://vlab.amrita.edu/?sub=1&brch=280&sim=550&cnt=1
- 2. https://vlab.amrita.edu/index.php?sub=1&brch=280&sim=1518&cnt=4
- 3. https://vlab.amrita.edu/?sub=1&brch=280&sim=602&cnt=2
- 4. <u>https://vlab.amrita.edu/?sub=1&brch=280&sim=210&cnt=2</u>

Pedagogy

Demonstration, practical sessions, and viva voce

Course Designer

Dr.N.Manopradha

FIRST ALLIED COURSE-I (AC)

CALCULUS AND FOURIER SERIES

(For B.Sc Physics & Chemistry)

(2022-2023 and Onwards)

Semester I	Internal Marks: 25	External Marks:75				
COURSE CODE	COURSE TITLE	CATEGORY	Hrs / Week	CREDITS		
22UPH1AC1/	CALCULUS AND			2		
22UCH1AC1	FOURIER SERIES	ALLIED	4	3		

Course Objective

- Explore the students with mathematical methods formatted for their major concepts and train them in basic Integrations.
- Analyze mathematical statements and expressions.
- Evaluate the fundamental concepts of Differentiation and Integration.

Course Outcomes

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO1	Explain the concepts of Calculus and Fourier series	K1,K2
CO2	Classify the problem models in the respective area.	К3
CO3	Solve various types of problems in the corresponding stream.	K3
CO4	Identify the properties of solutions in the core area.	К3
CO5	Discover the applications of Calculus and Fourier series.	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	2	2	3	2	2	2	2
CO2	3	2	2	2	2	3	2	2	2	2
CO3	3	2	2	2	2	3	2	2	2	2
CO4	3	2	2	2	2	3	2	2	2	2
C05	3	2	2	2	2	3	2	2	2	2

"1" – Slight (Low) Correlation – "2" – Moderate (Medium) Correlation –

"3" – Substantial (High) Correlation – "-" indicates there is no correlation.

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
Ι	Successive Differentiation: The n^{th} derivative – Standard results – Method of splitting the fractional expressions into partial fractions - Trigonometrical transformation – Formation of equations involving derivatives – Leibnitz formula for the n^{th} derivative of a product(proof not needed) – A complete formal proof by induction (proof not needed) - Curvature- Circle, radius and center of curvature - Cartesian formula for the radius of curvature–Simple problems in all these.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
Π	Evaluation of integrals: Integration of Rational algebraic functions– Rule (a) – Rule (b) Integration of the form $\int \frac{lx+m}{ax^2+bx+c} dx$ – Rule (c)- Integration of Irrational functions : Integration of the form $\int \frac{px+q}{\sqrt{ax^2+bx+c}} dx$ – Integration of the form $\int \frac{dx}{(x+p)\sqrt{ax^2+bx+c}}$ – Integration of the form $\int \frac{dx}{(x+p)\sqrt{ax^2+bx+c}}$ – Integration of the form	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
ш	Reduction Formula: Properties of definite integrals –Reduction formula (when n is a positive integer) for 1] $\int e^{ax}x^n dx$ 2] $\int x^n \cos ax dx$ 3] $\int \sin^n x dx$ 4] $\frac{\pi}{2}$ $\int \sin^n x \cos^m dx$ (without proof) and illustrations.	13	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
IV	Double and Triple Integrals: Definition of the double integral-Evaluation of Double integral(Problems Only)- Change of order and evaluation of the double integral (Problems only).	10	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
v	Fourier Series: Definition of Fourier Series – Finding the Fourier Coefficients for a given periodic function with period 2π - Even and Odd functions –Half range Fourier series.	10	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

	Self-Study for Enrichment : (Not to be included for External examination) Radius of curvature when the curve is in Polar co-			
	ordinates - (i) $\int \frac{dx}{ax^2 + bx + c}$ (ii) $\int \frac{dx}{\sqrt{ax^2 + bx + c}}$ - (1)		CO1, CO2,	K1,
VI	$\int \cos^n x dx \qquad (2) \int_0^{\frac{\pi}{2}} \cos^n dx -\text{Triple Integrals in simple}$	-	CO3, CO4, CO5	K2, K3, K4
	cases(Problems Only)- Development in cosine series -			
	Development in sine series.			

Text Books

- 1. Narayanan, S & Manichavasagam Pillai, T.K. (2015). *Calculus Volume I*. S. Viswanathan Pvt Limited.
- 2. Narayanan, S & Manichavasagam Pillai, T.K. (2015). Calculus Volume II. S. Viswanathan Pvt Limited.
- 3. Narayanan, S & Manichavasagam Pillai, T.K. (2015). Calculus Volume III. S. Viswanathan Pvt
 - Limited.

UNIT–I	Chapter 3:Sections 1.1 to 1.6,2.1,2.2[1]
	Chapter 10:Sections 2.1 to 2.3 [1]
UNIT-II	Chapter 1:Sections 7.1,7.3,7.4,8(CASE II, CASE V), 9 [2]
UNIT-III	Chapter 1:Sections 11,13.1 to 13.5 [2]
UNIT-IV	Chapter 5:Sections 2.1,2.2,4 [2]
UNIT-V	Chapter 6:Sections 1to 4[3]

Reference Books

- Sankarappan, S. Arulmozhi, G. (2006). Vector Calculus, Fourier series and Fourier Transforms. Vijay Nicole Imprints Private Limited.
- 2. Vittal, P.R.(2014). Allied Mathematics. Margham Publications.
- 3. Singaravelu, A.(2003). Differential Calculus and Trigonometry. R Publication.

Web Links

- 1. <u>https://www.youtube.com/watch?v=tBtF3Lr-VLk&t=64s</u>
- 2. <u>https://www.youtube.com/watch?v=Z4oSGuAZrZM</u>
- 3. <u>https://www.youtube.com/watch?v=w6llnAQX_f8</u>
- 4. <u>https://www.youtube.com/watch?v=LMcj8o0ERNE</u>
- 5. <u>https://www.youtube.com/watch?v=_GAwQGCyWy0</u>
- 6. <u>https://www.youtube.com/watch?v=9X3gqehcFII</u>

Pedagogy

Power point presentations, Group Discussions, Seminar, Quiz, Assignment.

Course Designers

- 1. Dr. P. Saranya
- 2. Ms.L.Mahalakshmi
- 3. Ms.P.Geethanjali

FIRST ALLIED COURSE-II (AC) ALGEBRA, ANALYTICAL GEOMETRY OF 3D & TRIGONOMETRY

(For B.Sc Physics & Chemistry)

(2022-2023 and Onwards)

Semester I	Internal Marks: 25	External Marks:75		
COURSE CODE	COURSE TITLE	CATEGORY	Hrs / Week	CREDITS
22UPH1AC2/ 22UCH1AC2	ALGEBRA, ANALYTICAL GEOMETRY OF 3D & TRIGONOMETRY	ALLIED	4	3

Course Objective

- Analyze the mathematical methods formatted for their major concepts.
- Evaluate the problems in Algebra and Trigonometry.
- Explain the basics of Three-Dimensional geometry.

Course Outcomes

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO1	Explain various notions in Algebra, Analytical Geometry of 3D & Trigonometry.	K1,K2
CO2	Identify the problem models.	K3
CO3	Apply the concepts of Algebra, Analytical Geometry of 3D & Trigonometry.	К3
CO4	Solve the given problems in the respective stream.	K3
CO5	Analyze the applications of the core area.	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	2	2	3	2	3	2	2	2	2
CO2	2	2	2	3	2	3	2	2	2	2
CO3	2	2	2	3	2	3	2	2	2	2
CO4	2	2	2	3	2	3	2	2	2	2
C05	2	2	2	3	2	3	2	2	2	2

"1" – Slight (Low) Correlation ¬ "2" – Moderate (Medium) Correlation ¬

"3" – Substantial (High) Correlation \neg "-" indicates there is no correlation.

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	Series Expansion: Application of Binomial Theorem to summation of series – Approximate values – Summation of series by Exponential series - Summation of series by Logarithmic series (Formulae only).	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4.
Π	Matrices: Matrix-Special types of Matrices –Scalar multiplication of a matrix-Equality of matrices-Addition of matrices-Subtraction of matrices- Symmetric matrix- Skew symmetric matrix-Hermitian and Skew Hermitian matrix –Multiplication of matrix – Inverse matrix-Inner product-Solution of simultaneous equations-Rank of a matrix-Elementary transformation of a matrix-A system of <i>m</i> homogeneous linear equations in <i>n</i> unknowns- Linear dependence and independence of vectors-System of non-homogeneous linear equations - Eigen values and Eigenvectors.(Applications only)	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4.
Ш	Three Dimensional Geometry: The Sphere – Definition- The equation of a sphere when the center and radius are given-The equation of a sphere to find its center and radius- The length of the Tangent Plane from a point to the sphere – The Plane Section of a sphere – Equation of a circle on a sphere – Intersection of two spheres in a circle.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4.
IV	Expansion of Trigonometric functions: Expansions of <i>cos n</i> θ and <i>sin n</i> θ - Expansion of tan($A + B + C +$) (omitting examples on formation of equations) –Powers of sines and cosines of θ in terms of functions of multiples of θ – Expansions of cos ⁿ θ when n is a positive integer – Expansions of sin ⁿ θ when n is a positive integer – Expansions of <i>sin</i> θ and <i>cos</i> θ in a	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4.

	series of ascending powers of θ - The expansions of			
	$sin \theta$ and $cos \theta$ to find the limits of certain expressions.			
	Hyperbolic functions:		CO1,	K1
	Hyperbolic functions – Relation between		CO2,	кı, к2
V	hyperbolic functions - Relations between hyperbolic	12	СОЗ,	K2,
	functions and circular functions - Inverse hyperbolic		CO4,	N Э, И 4
	functions.		CO5	Ν4.
	Self-Study for Enrichment :			
VI	(Not to be included for External examination) Series which can be summed up by the Logarithmic series - Simple applications of Matrices- The equation of the tangent plane to the sphere at a point. (Only problems) - Expansion of $\tan\theta$ in terms of powers of θ - Separation of real and imaginary parts of $\tanh(x+iy)$.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4.

Text Books

- 1. Manichavasagam Pillai, T.K. Natarajan, T.& Ganapathy, K.S. (2015). *Algebra, Volume I. S.* Viswanathan Pvt Limited.
- 2. Manichavasagam Pillai, T.K. (2015). Algebra, Volume II. S.Viswanathan Pvt Limited.
- 3. Manichavasagam Pillai, T.K. & Natarajan, T. (2016). *A Text book of Analytical Geometry Part-II 3D*. New Gamma Publishers.
- 4. Manichavasagam Pillai, T.K. & Narayanan, S. (2013). *Trigonometry*. S. Viswanathan Pvt Limited.
- UNIT–I Chapter 3:Sections 10,14[1]

Chapter 4:Sections 3,7,9 [1]

- UNIT-II Chapter 2:Sections 1 to 16 [2]
- UNIT-III Chapter 4:Sections 1-5,6,6.1,7,8 [3]
- UNIT-IV Chapter 3:Sections 1 to 4, 4.1,5,5.1[4]
- UNIT-V Chapter 4:Sections 1,2,2.1 to 2.3[4]

Reference Books

- 1. Arumugam,s.Issac,A. (2017). Analytical Geometry 3D and Vector calculus. New Gamma Publishing house.
- Pandey, H.D. Khan, M.Q. & Gupta, B.N.(2011). A Text Book of Analytical Geometry and Vector Analysis. Wisdom Press.
- 3. Singaravelu, A. (2003). Differential Calculus and Trigonometry. R Publication.

Web Links

- 1. <u>https://www.youtube.com/watch?v=JayFh5EJHcU</u>
- 2. https://www.youtube.com/watch?v=h5urBuE4Xhg
- 3. <u>https://www.youtube.com/watch?v=59z6eBynJuw</u>
- 4. <u>https://www.youtube.com/watch?v=9DyPyJb2N9g</u>
- 5. https://www.youtube.com/watch?v=HOk2XLeFPDk
- 6. <u>https://www.youtube.com/watch?v=G1C1Z5aTZSQ</u>

Pedagogy

Power point presentations, Group Discussions, Seminar, Quiz, Assignment.

Course Designers

- 1. Dr. P. Saranya
- 2. Dr.L.Mahalakshmi
- 3. Ms.P.Geethanjali

Course	Course Name	Category	L	Т	Р	S	Cr edits	Inst	Marl	KS	
Code							curts	Hrs	CIA	External	Total
23UGVE	VALUE EDUCATION	Ability Enhancement Compulsory Course-I (AECC	30	-	-	-	2	2	100	-	100
Year		Ι						1	1		
Semester		Ι									
Prerequisi	tes	Basic Understanding of Values									
Learning	Objectives										
1	To enrich the kn	owledge about ethi	ics ai	nd val	ues.						
2	To instil Moral a	and Social Values a	ind L	oyalt	y and	d to	apprec	ciate th	e right	s of others.	
3	To explain the re	ole of ethics in the	oper	ation	of hu	ıma	in cond	uct			
4	To promote an understanding and framework for students to achieve value based positive and purposeful lives for themselves and their communities.										
5	To build excelle	nt citizens and lead	lers f	for the	cou	ntry	ý				

Course Outcomes and Cognitive Level Mapping

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

CO NUMBER	CO STATEMENT	COGNITIVE LEVEL
CO1	To understand the importance of values and ethical issues at micro, mezzo and macro level of the society and the workplace.	K1, K2
CO2	To apply values and ethics in the daily life.	К3
CO3	To exhibit Ethical Leadership in the workplace and in the society.	K4
CO4	To think logically and reasonably and to handle moral issues with greater clarity	K5
CO5	To Engage in ethical debate and formulate ethical justification.	K6

UNIT	CONTENT	HOURS
Ι	Value education: Meaning, Definition, purpose and significance in the present world. Human Values For Life: Truth, commitment, honesty and integrity,	
	humility, forgiveness, love, empathy, ability to sacrifice, care, unity, inclusiveness, Self esteem, self-confidence, punctuality – Time, task and resource management.	6
II	Ethics: The Essence of Ethics, Determinants and Consequences of Ethics in Human Interaction. Dimensions of Ethics. Ethics in private and public relationships. Role of family, society and educational institutions in inculcating moral and ethical values	6
III	Theory & Approaches in Ethics: Kohlberg's theory, Gilligan's theory, Damon's View of Moral Identity, & Deontology. The Utilitarian Approach, The Rights Approach, The Fairness or Justice Approach, The Common-Good Approach, The Virtue Approach & Ethical Problem Solving Approach.	6
IV	Moral Thinkers & Philosophical Schools of Thought and their contribution: Socrates, Plato, Aristotle, Epicurus, Stoicism. Thomas Aquinas , Contractarianism, Thomas Hobbes, John Locke, Jean-Jacques Rousseau, John Rawls, John Stuart Mill, Emanuel Kant and Hegel, Mother Teresa, Chanakya, Kautilya, Sarojini Naidu, Thiruvalluvar, Rabindranath Tagore, Mahatma Gandhi, Dr. Ambedkar, Bharathiyar and Bharathidasan.	6
V	Values and Ethics in Public administration: ethical concerns and dilemmas in government and private institutions; laws, rules, regulations and conscience as sources of ethical guidance; accountability and ethical governance; ethical issues in international relations and funding; corporate governance. Information sharing and transparency in government, Codes of Ethics, Codes of Conduct, Citizen's Charters, Quality of service delivery, Utilization of public funds, challenges of corruption.	6
VI	Self Study for Enrichment	
	Learners need to list ways of practicing human Values. Group Discussion needs to be conducted on strategies to promote human values at various levels – family, community, society, nation and global.	-

Text Books:

- 1. ETHICS, INTEGRITY & APTITUDE (Prabhat Prakashan). (2021). (n.p.): Prabhat Prakashan.
- 2. Political Parties and Administrative Reforms in India: At the Centre, in the States and in the Local Bodies. (2019). (n.p.): Notion Press.
- 3. Sharma, P. D. (2015). Ethics, Integrity and Aptitude: Foundational Values for Civil Service in India. India: Rawat Publications.
- 4. Vozzola, E. C. (2014). Moral Development: Theory and Applications. United Kingdom: Taylor & Francis.
- 5. Thinkers and Theories in Ethics. (2011). Ukraine: Britannica Educational Pub..

Reference Books:

- 1. Bandiste, D.D.: Humanist Values: A Source Book, B.R. Publishing Corporation, Delhi, 1999
- 2. Ethics in Governance. (2021). (n.p.): K.K. Publications.
- 3. Maheshwari, S. (2002). Administrative Reforms in India. Germany: Macmillan India.
- 4. Bandiste, D.D.: Humanist Values: A Source Book, B.R. Publishing Corporation, Delhi, 1999.
- 5. Saxena, N. C. (2019). What Ails the IAS and Why It Fails to Deliver: An Insider's View. India: SAGE Publications.
- 6. Xavier Alphonse S.J (2008) We Shall Overcome A Textbook on life coping skills ICRDCE Publication, Chennai

Web References

- 1. https://publicintegrity.org
- 2. https://www.ethicssage.com
- 3. https://darpg.gov.in
- 4. https://www.ethics.org
- 5. https://ethicsunwrapped.utexas.edu/glossary/integrity

Pedagogy

Chalk& Talk, Seminar, PPT Presentation, Group Discussion, Blended Method, and Case Study.

ABILITY ENHANCEMENT COMPULSORY COURSE (AECC) I : VALUE EDUCATION (23UGVE)

Assessment Rubrics for 100 Marks

- 1. Designing Posters / video making / preparation of Album 20 marks
- 2. Case study presentation / Narration of stories / Writing stories 20 Marks
- 3. Writing essay based on the individual life experience following human values –personal, family and society level (minimum 10 pages) **20 Marks**

4. VIVA VOCE - 40 Marks

S. No	RUBRICS FOR VIVA VOCE	MARKS
1.	Theoretical Knowledge	20
2.	Values Practiced	10
3.	Attitude & Commitment	10
Total		40

Course Designer Dr.G.Mettilda Buvaneswari

Semester II	Internal Marks: 25		External N	Iarks: 75
COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
22UPH2CC2	MECHANICS AND RELATIVITY	CC-II	5	5

- To find the time of flight and impact velocity of a projectile that lands at a different height from that of launch.
- To explain motion along curved path.
- To illustrate the motion of rigid bodies and outline laws of gravitation.
- To make use of the ideas of frames of reference.

Pre-requisites

- A solid understanding of scalars and vectors.
- Fundamental concepts of physics.
- Basic understanding of Newtonian mechanics.

Course Outcome and Cognitive Level Mapping

СО	CO Statement	Cognitive
Number	On the successful completion of the Course, the Student will be able to	Level
CO 1	Define the effects of a change in the position of any physical object or event.	K1
CO 2	Demonstrate laws and principles in physics.	K2
CO 3	Apply the mathematical tools in understanding physics.	K3
CO 4	Make use of simple concepts of mechanics in daily life.	К3
CO 5	Analyse the principles behind the mechanics of objects travelling at relativistic	K4
	speeds.	

Mapping of CO with PO and PSO

COs	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	2	3	3	3	3	3	3	2	2	3
CO 2	2	3	3	3	3	3	3	2	2	3
CO 3	2	3	3	3	3	3	3	2	3	3
CO 4	2	3	3	2	3	3	2	2	2	3
CO 5	2	3	3	2	3	3	2	2	2	3

"1" – Slight (Low) Correlation

"3" - Substantial (High) Correlation

``2''-Moderate (Medium) Correlation

"-" indicates there is no correlation

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
Ι	PROJECTILE, IMPACT AND FRICTION: Projectile – Path of a projectile is a parabola – Range of horizontal and inclined plane – Impulse of a force – Impulsive force – Impact between two smooth bodies – Laws of impact – Direct and oblique impacts – Impact of a smooth sphere on a smooth horizontal plane – Loss in kinetic energy due to direct and oblique impacts – Friction – Laws of friction – Angle of friction.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
П	MOTION ON A PLANE CURVE: Centripetal and centrifugal forces – Hodograph – Expression for normal acceleration by the hodograph method – Motion of cyclist along a curved path – Motion of a railway carriage round a curved track – Upsetting of a carriage on a curved level track – Motion of a carriage on a banked-up curve – Effect of the Earth's rotation on the value of the acceleration due to gravity – Variation of g with altitude.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
III	DYNAMICS OF RIGID BODIES AND GRAVITATION: Moment of Inertia - Kinetic energy and angular momentum of rotating body - Theorems of perpendicular and parallel axes – Acceleration of a body rolling down an inclined plane without slipping – Oscillations of a small sphere on a large concave smooth surface – Compound pendulum – Centre of suspension and centre of oscillation – Centre of percussion – Minimum period of a compound pendulum – Kater's pendulum. Newton's laws of gravitation – Kepler's laws of planetary motion – Deduction of Newton's law of gravitation – Determination of G – Boy's method.	25	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
IV	FRAMES OF REFERENCE: Frames of reference: Inertial and Non-Inertial – Galilean Transformation: Transformation of position, length, velocity and acceleration – Galilean invariance: Newton's law of motion, law of conservation of momentum and energy – Transformation equation for one frame of reference rotating with its axis with respect to an inertial frame – Coriolis force – Foucault's pendulum.	10	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

V	SPECIAL THEORY OF RELATIVITY: Michelson-Morley experiment - concept of ether - Einstein's special theory of relativity - Lorentz transformation - time dilation - length contraction – proper length and proper time - simultaneity - relativistic mass, momentum, force and acceleration - equivalence of mass and energy ($E = mc^2$).	10	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
VI	SELF STUDY FOR ENRICHMENT: (Not to be included for External Examination) Angular acceleration – Relation between the torque and angular acceleration of a rigid body – Conservation of energy – Conical pendulum - Moment of Inertia of a flywheel – Torsion pendulum.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

Text Books

 Narayanamurthi, M., and Nagarathinam, N., (2008). *Dynamics*. (8thedition) The National Publishing Company, Chennai.

2. Mathur, D.S., and Hemne, P.S., (2015). *Mechanics*. (Revised edition) S. Chand & Company Ltd., New Delhi.

Reference Books

- Narayanamurthi, M., and Nagarathinam, N., (2002). *Statics, Hydrostatics and Hydrodynamics*. (3rd edition) The National Publishing Company, Chennai.
- Murugesan, R., (2016). *Mechanics and Mathematical Physics*. (3rd edition) S. Chand & Company Ltd., New Delhi.
- 3. Brijilal Subramaniam, (1990). *Mechanics and Relativity*. (1st edition), Margham Publications.
- Murugesan, R., and Kiruthiga Sivaprasath, (2016). *Modern Physics*. (18th edition) S. Chand & Company Ltd., New Delhi.

Web References

- 1. https://courses.lumenlearning.com/suny-osuniversityphysics/chapter/4-3-projectile-motion/
- 2. http://www.jbsw.shikshamandal.org/wp-content/uploads/2016/07/2-Gravitation.pdf
- 3. <u>https://vlab.amrita.edu/?sub=1&brch=280&sim=518&cnt=1</u>
- 4. <u>https://www.youtube.com/watch?v=wD7C4V9smG4</u>
- 5. <u>https://www.youtube.com/watch?v=TgH9KXEQ0YU</u>

Pedagogy

Chalk and Talk, Assignment, Group discussion and Quiz

Course Designer

Dr.N.Manopradha

Semester II	Internal Marks: 40	External Marks: 60			
COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS	
23UPH2CC2P	MECHANICS AND DIGITAL	CP-II	3	3	
	ELECTRONICS (P)				

- To give students a foundational understanding of how to measure various physical quantities.
- To use scientific equipment to estimate various physical properties.
- To investigate the basic idea behind digital technology.
- To construct basic logic gates using distinct components.

Pre-requisites

• Basic knowledge on usage of scientific apparatus.

Course Outcome and Cognitive Level Mapping

СО	CO Statement	Cognitive		
Number	On the successful completion of the Course, the Students will	Level		
	be able to			
CO1	Select the equipment and get the necessary accessories.	K1		
CO2	Explain the experiment's fundamental concepts.	K2		
CO3	Make use of fundamental principles and experiment circumstances.	K3		
CO4	Experiment with the laboratory norms.	K3		
CO5	Examine the applications.	K4		

Mapping of CO with PO and PSO

Cos	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	1	1	1	2	1	3	2	1	2	1
CO2	2	3	2	2	2	3	3	1	2	1
CO3	1	1	2	3	1	3	2	1	3	1
CO4	2	3	3	3	2	1	3	1	3	2
CO5	3	2	3	3	3	1	3	2	3	2

"1" - Slight (Low) Correlation

"2" - Moderate (Medium) Correlation

"3" – Substantial (High) Correlation

"-" indicates there is no correlation

LIST OF EXPERIMENTS (Any 8)

- 1. Young's modulus Non-Uniform bending (Pin and Microscope).
- 2. Young's modulus Non Uniform bending (Optic lever).
- 3. Sonometer Determination of unknown frequency.
- 4. Verification of Logic gates.
- 5. Construction of Half and Full adder.
- 6. NAND as UBB.
- 7. NOR as UBB.
- 8. Spectrometer μ of solid prism.
- 9. Concave lens Focal length determination.
- 10. Determination of Poisson's ratio of ductile specimen using strain gauges.
- 11. Verification of Euler- Bernoulli Hypothesis.
- 12. Verification of Flexural Stress Formula.

Text Book

1. Ouseph, C.C., Rao, U.J., Vijayendran, V., (2016). Practical Physics and

Electronics. S.Viswanathan, Printers & Publishers Pvt Ltd., Chennai.

Reference Book

1. Prof.Namboodirippad, M.N., Prof.Daniel, P.A., (1982). *B.Sc., Practical Physics*. G.B.C. Publications, Cochin.

Web References

- 1. <u>https://vlab.amrita.edu/?sub=1&brch=280&sim=210&cnt=2</u>
- 2. <u>https://vlab.amrita.edu/?sub=1&brch=280&sim=1509&cnt=1</u>
- 3. https://de-iitr.vlabs.ac.in/exp/truth-table-gates/simulation.html
- 4. https://amrita.olabs.edu.in/?sub=1&brch=6&sim=244&cnt=4

Pedagogy

Demonstration, practical sessions and viva voce.

Course Designer

Dr.N.Manopradha

Semester II	Internal Marks: 25	External Marks: 75			
COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS	
23UPH2CC3	INTRODUCTION TO DIGITAL ELECTRONICS	CC-III	2	2	

- To learn about different numbers systems and their conversion from one to another.
- To understand the workings of logic gates and equations.
- To acquire Knowledge about Boolean laws to draw Karnaugh maps.
- To know the uses of encoders, decoders, multiplexers and demultiplexers.
- To understand the workings of flip-flops and to analyze sequential circuits.

Pre-requisites

- Basic knowledge of the binary number system.
- Fundamental ideas on logic gates.
- Basic knowledge of the conversion of a number system.

Course Outcome and Cognitive Level Mapping

CO	CO Statement	Cognitive
Number	On the successful completion of the Course, the Students will be	Level
	ableto	
CO 1	Understand the basic knowledge of Number system, Logic	K1
	gates, Combinational circuit, Boolean expression and Flip	
	flops	
CO 2	Interpret the concept of number conversion, logic circuits and thereby	K2
	developequivalent circuits.	
CO 3	Develop the concept of number conversion and combinational logic	K3
	circuits.	
CO 4	Examine different number system, arithmetic and logic functions with	K4
	appropriate selection of inputs and check the possible outputs for	
	arithmetic and logic circuits.	
CO 5	Simplify the arithmetic operation of the number system. Apply the	K5
	Booleanexpressions in the K Map and design the flip flop.	

Mapping of CO with PO and PSO

COs	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	3	3	3	2	2	3	3	2	2	2
CO 2	2	2	2	2	2	3	3	2	3	3
CO 3	2	3	3	2	2	3	3	3	3	3
CO 4	2	2	3	3	3	3	3	3	3	3
CO 5	3	3	3	3	3	3	3	3	3	3

"1" – Slight (Low) Correlation

"2" - Moderate (Medium) Correlation

"3" – Substantial (High) Correlation

"-" – indicates there is no Correlation

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
Ι	NUMBER SYSTEM AND CODE: Binary number system – Binary to decimal conversion – Decimal to binary conversion – Octal numbers –Conversion of octal numbers – Hexadecimal numbers –Conversion of hexadecimal numbers.	6	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
II	ARITHMETIC CIRCUITS: Binary addition – Binary subtraction –Binary multiplication – Binary Division – Half and Full adder – Half and Full subtractor.	6	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4 K5
III	DIGITALLOGICANDLOGICCIRCUITS:Basic gates – NOT, OR, AND – EX-OR gates– Universal logic gates – NOR, NAND –Boolean laws – Simplification of BooleanExpression and Demorgan's theorems.	6	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	APPLICATION OF THEOREM – K-MAP:BOOLEANSum-of-Products- Product of sum – Truth table to Karnaugh map – Pairs, Quads, and Octets – Karnaugh map simplifications – Don't care condition.	6	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
v	FLIP – FLOPS: R-S flip-flops – Clocked R-S flip-flop – Edge-triggered RS flip flop –J-K flip – D flip-flop – T flip flop – Applications of flip- flops.	6	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
VI	SELF STUDY FOR ENRICHMENT: (Not to be included for External Examination) Application of number system Physical Quantity – Counting – Electrical projectcircuit.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

Text Books

- Donald P Leach, Albert Paul Malvino, Goutam Saha, (2011). *Digital Principles and Applications*.(7th edition) Tata McGraw – Hill Publishing Company Limited, New Delhi.
- Jain,R.P, (2009). *Modern Digital Electronics*. (4th edition) Tata McGraw Hill Education PrivateLimited, Noida.
- Vijayendran, V, (2003). *Digital fundamentals*. (1st edition) S. Viswanathan Printers andPublishers Pvt. Ltd, Chennai.
- Virendra Kumar, (2007). *Digital electronics Theory and Experiments*. (2nd edition) New AgeInternational Publishers, Chennai.

Reference Books

- 1. James W. Bignel, (2007). Digital Electronics. (5th edition) Cengage learnings, Uttar Pradesh.
- MandalS.K, (2017). Digital Electronics Principles & Applications. (1st edition) McGraw HillEducation, Karnataka.
- 3. Thomas L. Floyd, (2015). *Digital Fundamentals*. (11th edition) Pearson Education, Bengaluru.
- Kothari, D.P., J.S. Dhillon, (2016). *Digital Circuits and Design*. (1st edition) Pearson Education, Bengaluru.

Web References

- 1. https://circuitglobe.com/rs-flip-flop.html
- 2. http://hyperPhysics.phy-astr.gsu.edu/hbase/Electronic/jkflipflop.html
- 3. https://circuitglobe.com/half-adder-and-full-adder-circuit.html
- 4. https://programmerbay.com/construct-4-to-1-multiplexer-using-logic-gates/
- 5. https://www.electronicshub.org/demultiplexerdemux/
- 6. https://www.elprocus.com/designing-of-2-to-4-line-decoder/
- 7. https://www.electricaltechnology.org/2018/05/bcd-to-7-segment-display-decoder.html

Pedagogy

Chalk and Talk, Assignment, Group discussion and quiz

Course Designer

Dr.S.Priya

ALLIED COURSE - III

(For Physics)

ODE, PDE, LAPLACE TRANSFORMS AND VECTOR ANALYSIS

(2022-2023 Onwards)

Semester II	Internal Marks: 25	ExternalMarks:75		
COURSE CODE	COURSE TITLE	CATEGORY	Hrs /Week	CREDITS
22UPH2AC3	ODE, PDE, LAPLACE	ALLIED	4	3
	TRANSFORMS AND VECTOR			
	ANALYSIS			

Course Objective

- Explain the basics of Ordinary Differential Equations.
- Emphasize in the field of Partial Differential Equations.
- Explore the mathematical methods formatted for major concepts.

CourseOutcomes

Course Outcome and Cognitive Level Mapping

СО	CO Statement	Knowledge
Number		Level
CO1	Explain various notions in ODE, PDE, Laplace transforms &	K1, K2
	Vector Analysis.	
CO2	Classify the problem models in the respective area.	К3
CO3	Identify the properties of solutions in the core area.	К3
CO4	Solve various types of problems in the corresponding stream.	К3
CO5	Analyze the applications of the core area.	K4

Mapping of COwithPO and PSO

Cos	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	2	2	2	3	2	3	3
CO2	3	2	2	2	2	2	3	2	3	3
CO3	3	2	2	2	2	2	3	2	3	3
CO4	3	2	2	2	2	2	3	2	3	3
CO5	3	2	2	2	2	2	3	2	3	3

"1" – Slight (Low) Correlation

"3" – Substantial (High) Correlation

"2" - Moderate (Medium) Correlation

"-" indicates there is no correlation.

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
	Ordinary Differential Equations: Equations of the first order but of higher degree – Type A: Equations solvable for $\frac{dy}{dx}$ - Type B: Equations solvable for y -		CO1, CO2,	K1, K2,
I	 Equations solvable for <i>x</i>-Clairaut's Form (simple cases only). Linear equations with constant coefficients: Definitions – The operator D- Complementary function of a linear equation with constant co-efficients - Particular integral: General method of finding P.I- Special methods for finding P.I. 	12	CO3, CO4, CO5	K3, K4
Π	Partial differential equations: Classification of integrals–Derivation of Partial differential equations: By elimination of constants - By elimination of arbitrary function-Lagrange's method of solving the linear equation-Special methods –Standard forms- I,II,III,IV(Geometrical Meaning is not needed)-(only problems in all the above) – (No proof needed for any formula).	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
Ш	Laplace Transforms: Laplace Transforms – Definition -Sufficient conditions for the existence of Laplace transform-Basic results-Laplace transform of periodic functions-Some general theorems-Evaluation of integrals using Laplace transform.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
IV	Inverse Laplace Transform: The Inverse Transform –Modification of results obtained in finding Laplace transforms to get the inverse transforms of functions- Laplace Transforms to solve ordinary differential equations with constant co-efficients.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
V	 Vector Differentiation: Limit of a vector function-continuity of vector functions- Derivative of a vector function-Some Standard Results- Geometrical significance of vector differentiation-Physical application of derivatives of vectors - partial derivative of a vector function. Gradient, Curl and Divergence: Scalar and Vector point functions – Gradient of a scalar point function-Directional derivative of a scalar point function- Equations of tangent plane and normal line to a level surface. Divergence and curl of a vector point function: Definition- Curl of a vector point function- irrotational vector. 	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
VI	Self -Study for Enrichment:(Not included for End Semester Examination)Equations that do not contain x and y for explicitly-Equations reducible to the standard form - Piecewise continuity- Laplace Transforms to solve ordinary differential equationswith variable co-efficients - Physical interpretation ofdivergence of a vector - Physical interpretation of curl of avector-Vector identity.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

Text Book

- 1. Narayanan. S, Manicavachagam Pillai. T. K. (2016). *Differential Equations and its applications*. S. Viswanathan Pvt Limited.
- 2. Vittal. P. R, Malini. V. (2016). Vector Analysis. Margham Publications.

Chapters and Sections

UNIT-I Chapter 4: Sections 1-3 [1] Chapter 5: Sections 1-4 [1] UNIT-II Chapter 12: Sections 1-5.4 [1] UNIT-III Chapter 9: Sections 1-5 [1] UNIT- IV Chapter 9: Sections 6-8 [1] UNIT- V Chapter 1: Pages (1-24,26-35) [2]

Reference Books

- 1. Narayanan. S, Manicavachagam Pillai. T. K. (2003). *Calculus, Vol. III*. S.Viswanathan Pvt Limited.
- 2. Arumugam Isaac. (2014). *Differential Equations and Applications*. New Gamma Publishing House.
- 3. Sankarappan. S, Arulmozhi. G. (2006). *Vector Calculus, Fourier Series and Fourier Transforms*. Vijay Nicole Imprints Private Limited.

Web References

- 1. <u>https://www.youtube.com/watch?v=OM01KTc0_9w</u>
- 2. https://youtu.be/zlfsh1SyH58
- 3. <u>https://www.youtube.com/watch?v=dCVBZbebl8Y</u>
- 4. https://www.youtube.com/watch?v=Y8GXpS31CGI
- 5. <u>https://www.youtube.com/watch?v=IVJjm5FE4x8</u>
- 6. https://www.youtube.com/watch?v=FXTt6Sa79mI
- 7. https://www.academia.edu/35399426/CHAPTER_1_VECTOR_DIFFERENTIATION

Pedagogy

Power point presentation, Group Discussion, Seminar, Assignment.

Course Designer

1. Dr.L.Mahalakshmi

Semester II		InternalMarks:100		
COURSECODE	COURSETITLE	CATEGORY	HRS/ WEEK	CREDI TS
22UGEVS	ENVIRONMENTAL STUDIES	ABILITY ENHANCEMENTCOMP ULSORYCOURSE	2	2

To train the students to get awareness about total environment and its related problems and to make them to participate in the improvement and protection of the environment.

Course Outcome and Cognitive Level Mapping

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

CO Number	CO Statement	Cognitive Level
CO1	Outline the nature and scope of environmental studies	K2
CO2	Illustrate the various types of natural resources and its importance.	K2
CO3	Classification of various types of ecosystem with its structure and function.	K2
CO4	Develop an understanding of various types of pollution and biodiversity.	К3
CO5	List out the various types of social issues related with environment.	K4

Mapping of CO with PO and PSO

Cos	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	2	2	3	3	2	2	3	2	3
CO2	3	3	2	3	3	3	2	3	3	3
CO3	2	3	3	2	3	3	3	3	3	2
CO4	2	3	3	3	2	3	2	3	3	3
CO5	3	3	2	3	3	3	3	2	3	3

"1"–Slight (Low) Correlation "3"–Substantial (High)Correlation "2" – Moderate (Medium) Correlation "-"indicates there is no correlation

UNIT	CONTENT	HOURS	COS	COGNITIVE
I	Introduction to environmental studies Definition, scope and importance. Need for public awareness	06	CO1, CO2, CO3, CO4	K1, K2, K3, K4
	Natural Resources: Renewable and non- renewable resources:a. Forestresources:useandover- exploitation, deforestation, casestudies. Timber extraction, mining, damsextraction, mining, damsandtheireffectson forestsb. Water resources:Use and over-utilization of surfaceusing faceand ground water, floods, drought, conflicts overwater, damsbe nefitsc. Mineralresources:using mineral resources.d.d. Foodresources:wordfood problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.e. Energyresources:Growingenergy sources, use of alternate energy sources, land degradation, maninduced Landslides, soil erosion 	06	C01, C02, C03, C04	K1, K2, K3, K4
III	Ecosystems Concept,Structure and function of an ecosystem.Producers,consumers and decomposers Energy flow in the ecosystem and Ecological succession. Food chains, food webs and ecological pyramids Introduction,types,characteristic features,structure and function of the following ecosystem:-Forest ecosystem,Grassland ecosystem and Desert ecosystem, Aquatic ecosystems,(ponds,streams,lakes,rivers,oceans, nestuaries)	06	CO1, CO2, CO3, CO4	K1, K2, K3, K4

IV	Bio diversity and Environmental Pollution		CO1,	K1,
	Introduction, types and value of		CO2,	K2,
	biodiversity.India as a mega diversity nation.	06	CO3,	K3,
	Hot-spots of biodiversity.Threatsto		CO4	K4
	biodiversity:habitatloss,poaching of			
	wildlife,man-wildlife conflicts.Endangered and			
	endemic species of India.Conservation of			
	biodiversity:In-situand			
	Ex-situ conservation of			
	biodiversity.Definition,Causes,effects and			
	control measures of : Air Pollution, Water			
	Pollution, Soil Pollution, Noise			
	pollution, Nuclear hazards, Solid waste			
	Management: Causes, effects and control			
	measures of urban and industrial wastes. E-			
	Waste Management:Sources and Types of E-			
	waste.Effect of E-waste on environment and			
	humanbody.Disposal of E-waste,Advantages of			
	Recycling E-waste.Role of an individual			
	inprevention of			
	pollution.Disastermanagement:floods,earthquake			
	, cyclone and landslides.			
V	Social Issues and the Environment	06	CO1,	K1,
	Water conservation, rain water harvesting, water		CO2,	K2,
	shedmanagement. Climate change,global		CO3,	КЗ,
	warming, acid rain,ozone layer depletion, Waste		CO4,	K4,
	land reclamation.		CO5	K5
	Environment Protection Act			
	Wildlife Protection Act. Forest Conservation Act.			
	Population explosion–Family Welfare			
	Programmes Human Rights-Value			
	Education.HIV/ AIDS- Women and Child			
	Welfare. Role of Information Technology in			
	Environment and human health.			

References

- 1. Agarwal,K.C.2001 EnvironmentalBiology,Nidi PublicLtdBikaner.
- 2. BharuchaErach, The Biodiversity of India, Mapin Publishing Pvt Ltd, Ahamedabad 380013,India, E-mail: mapin@icenet.net(R)
- 3. BrunnerR.C.1989, Hazardous Waste Incineration, McGraw HillInc480p
- 4. ClarkR.S.MarinePollution,ClandersonPressOxford(TB)
- 5. Cunningham, W.P.Cooper, T.H.Gorhani E& Hepworth, M.T.2001.
- 6. DeA.K.EnvironmentalChemistry, WileyEasternLtd
- 7. DowntoEarth, Centre for Science and Environment(R)
- Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security.StockholmEnv. InstituteOxford University, Press 473p.
- 9. Hawkins, R.E. Encyclopedia of India Natural History, Bombay Natural History Society, Bombay.
- 10. Heywood, V.H & Watson, R.T. 1995. Global Biodiversity Assessment. Cambridge UniversityPress1140 p.
- 11. Jadhav, H&Bhosale, V.M. 1995. Environmental Protection and Laws Himalaya Pub.

Pedagogy

Chalk and talk, PPT, Discussion, Assignment, Quiz, Seminar

CourseDesigner

Dr.B.Thamilmaraiselvi

Semester III	Internal Marks: 25		Exte	rnal Marks: 75
COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
23UPH3CC4	THERMAL PHYSICS AND STATISTICAL MECHANICS	CC - IV	5	5

- To gain knowledge in heat transfer, entropy, production of low temperature and liquefaction of gases, thermal radiation and statistical thermodynamics.
- To Solve the function of Internal combustion engine and Carnot's engine
- To analyze the behavior of gases under very high pressure.
- To apply probability in statistical thermodynamics.

Pre-requisites

- Strong Foundation of Thermodynamics and its Applications
- Learn the basic principles of elasticity and the elastic nature of materials.
- Understand realistic cycles for internal combustion engines, steam engines, and low-temperature refrigeration systems.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO 1	Learn the basic concepts of thermodynamics, radiation, and statistical mechanics, as well as their significance.	K1
CO 2	Understand the experimental procedures for producing low temperatures, measuring high temperatures, and determining the specific heats of solids, liquids, and gases.	K2
CO 3	Apply the theories related to low temperature, radiation and specific heat of solid, liquid and gas.	К3
CO 4	Examine the energy distribution in the black body spectrum, the system of bosons and fermions, and the temperature change of solids and gases' specific heats.	K4
CO 5	Solve the specific heat capacity of solid, liquid and gas theoretically.	K5

Mapping of CO with PO and PSO

Cos	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	3	3	2	2	2	3	2	2	3	2
CO 2	2	3	3	2	3	3	2	3	3	2
CO 3	2	3	3	2	3	3	2	3	3	2
CO 4	3	3	3	3	3	3	3	3	3	2
CO 5	2	2	3	3	3	2	3	3	3	3

"1" – Slight (Low) Correlation

"2" – Moderate (Medium) Correlation;

"3" - Substantial (High) Correlation

"-" indicates there is no correlation.

UNIT	CONTENT	HOURS	COs	COGNITIVE
				LEVEL
Ι	THERMODYNAMICS	15	CO1,	K1,
	Thermodynamic system - Zeroth law of		CO2,	K2,
	thermodynamics - internal energy- First law of		CO3,	КЗ,
	thermodynamics - reversible and irreversible process -		CO4,	K4,
	Carnot's cycle - Otto and diesel engine - second law of		CO5	K5
	thermodynamics - Entropy - Change in entropy during			
	reversible and irreversible process - T- dS equation-			
	Third law of thermodynamics–Clausius's Claypeyron's			
	latent heat equations.			
II	LOW TEMPERATURE PHYSICS	15	CO1,	K1,
	Joule Thompson effect - Production of low temperature		CO2,	K2,
	- Theory of Porous plug experiment - Liquefaction of		CO3,	K3,
	gases - Linde's air liquefier - Liquefaction of Helium		CO4,	K4,
	and Hydrogen - Adiabatic demagnetization - Practical		CO5	K5
	application of low temperature - Refrigeration machine			
	- Air conditioning machines.			
III	RADIATION	15	CO1,	K1,
	Coefficient of thermal conductivity - Lee's method for		CO2,	K2,
	bad conductors - Convection and its applications -		CO3,	K3,
	Stefan's Boltzmann law - Experimental determination		CO4,	K4,
	of Stefan's constant - Blackbody radiation - Rayleigh		CO5	K5
	Jean's law - Wien's Displacement Law - Planck's law -			
	Solar constant - temperature of the Sun -Angstrom's			
	Pyrheliometer			
IV	SPECIFIC HEAT	15	CO1,	K1,
	Specific heat of solids - Dulong and Petit's law -		CO2,	K2,
	Einstein's theory of specific heat - Debye's theory -		CO3,	K3,
	Specific heat of gases - Mayer's Relation-		CO4,	K4,
	Determination of C _P by Ragnault's method - Newton's		CO5	K5
	law of cooling			
V	STATISTICAL THERMODYNAMICS	15	CO1,	K1,
	Phase space – Statistical equilibrium - Microstates and		CO2,	K2,
	Macrostates – Maxwell-Boltzmann distribution - Ideal		CO3,	K3,
	gas - Fermi-Dirac distribution - Electron gas - Bose-		CO4,	K4,
	Einstein distribution		CO5	K5
VI	SELF-STUDY FOR ENRICHMENT	-	CO1,	K1,
	(Not included for End Semester Examinations)		CO2,	K2,
	Internal combustion engine (ICE) - Electrolux		CO3,	КЗ,
	refrigerator- Bolometer- Variation of specific heat of		CO4,	K4,
	diatomic gases with temperature- Probability theorems		CO5	K5
	in statistical thermodynamics.			

Text Books

- 1. Brijlal Subrahmanyam N, Hemne P S, (2021), *Heat and Thermodynamics and Statistical Physics*, (Revised edition), S.Chand & Co., Pvt. Ltd., New Delhi.
- 2. Sathya Prakash and Agarwal J P, (2019), *Statistical Mechanics*, (7th edition), Kedarnath Ramnath & Co., Meerut.

Reference Books

- 1. Mathur D S, (2008), Heat and Thermodynamics, (5th edition) S. Chand and Co., New Delhi.
- 2. Halliday D, Resnick R and Walker J, (2018), *Fundamentals of Physics*, (11th Edition), John Wiley & Sons, U.S.

Web References

- 1. <u>https://onlinecourses.nptel.ac.in/noc20_ce27/preview</u>
- 2. <u>https://onlinecourses.swayam2.ac.in/nou21_me01/preview</u>
- 3. https://web.stanford.edu/~peastman/statmech/thermodynamics.html

Pedagogy

Chalk and Talk, Seminar, Assignment, Power point Presentation, Group discussion and Quiz

Course Designer

Dr.R.Gayathri

Semester III	Internal Marks: 40		Extern	al Marks: 60
COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
23UPH3CC3P	THERMAL PHYSICS (P)	CP-III	3	3

- To make the students to develop their experimental skills.
- To acquire hands-on experience.
- To enhance the laboratory skills.

Pre-requisites

• Basic knowledge on usage of scientific apparatus.

Course Outcome and Cognitive Level Mapping

СО	CO Statement	Cognitive
Number	On the successful completion of the Course, the Student will be able to	Level
CO 1	Apply the physics principle involved in the various instruments; also relate the principles to new application.	K1
CO 2	Understand the theoretical concepts of transmission of heat with the experimental knowledge	K2
CO 3	Use the theoretical ideas through thermodynamic relations	К3
CO 4	Expand the creative skills that are essential for practical thermodynamics systems	K3
CO 5	Analyze experimental approaches to correlate with physics theory to develop practical understanding.	K4

Mapping of CO with PO and PSO

COs	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	1	1	1	2	1	3	2	1	2	1
CO 2	2	3	2	2	2	3	3	1	2	1
CO 3	1	1	2	3	1	3	2	1	3	1
CO 4	2	3	3	3	2	1	3	1	3	2
CO 5	3	2	3	3	3	1	3	2	3	2

"1" – Slight (Low) Correlation

"3" – Substantial (High) Correlation

"2" – Moderate (Medium) Correlation

"-" indicates there is no Correlation

LIST OF EXPERIMENTS (Any 8)

- 1. Specific heat capacity of a liquid Newton's law of cooling
- 2. Emissive power of a surface Spherical calorimeter
- 3. To determine the Coefficient of Thermal Conductivity of a bad conductor by Lee's disc method
- 4. Joule's Calorimeter Specific heat capacity
- 5. Thermal conductivity of rubber
- 6. Black Body Radiation: Determination of Stefan's Constant
- 7. Specific heat by method of mixtures
- 8. Verification of Stefan-Boltzmann law
- 9. Latent heat of steam/ice
- 10. Verification of Boyle's law
- 11. Mechanical equivalent of heat
- 12. Thermal conductivity of a good conductor Searle's method
- 13. Heat Transfer by Radiation
- 14. Heat transfer by Conduction
- 15.Determination of Planck's constant

Text Book

1. Ouseph, C.C., Rao, U.J., Vijayendran, V., (2016). *Practical Physics* and *Electronics*. S.Viswanathan, Printers & Publishers Pvt Ltd., Chennai.

Reference Book

1. Prof.Namboodirippad, M.N., Prof. Daniel, P.A., (1982). B.Sc., Practical Physics. G.B.C.

Publications, Cochin.

Web References

- 1. https://vlab.amrita.edu/index.php?sub=1&brch=194
- 2. https://vlab.amrita.edu/index.php?sub=1&brch=194&sim=802&cnt=1
- 3. https://vlab.amrita.edu/index.php?sub=1&brch=194&sim=354&cnt=1
- 4. https://vlab.amrita.edu/index.php?sub=1&brch=194&sim=353&cnt=1

Pedagogy

Demonstration, practical sessions, and viva voce

Course Designer

Dr.S.Gowri

Semester III	Internal Marks:	25	Externa	l Marks: 75
COURSE	COURSE TITLE	CATEGORY	Hrs. / Week	CREDITS
CODE				
22UPH3AC4	CHEMISTRY - I	ALLIED	4	3

- To understand the bonding nature in chemical compounds, nuclear reactions and reaction mechanisms in chemistry.
- To know the materials used in industrial chemistry and the separation of chemical compounds.
- To acquire the knowledge of basic principles of thermodynamics, phase equilibria and analytical techniques.

Course Outcomes

Course Outcome and Cognitive Level Mapping

CO	CO Statement	Cognitive
Number	On the successful completion of the course, students will be able to	Level
CO1	Define the terms involved in nuclear, analytical and industrial	K1
	chemistry, organic reaction, thermodynamics and phase equilibria.	
CO2	Understand the magnetic properties, compounds used in industries,	K2
	organic, thermal reactions and principle of analytical techniques.	
CO3	Illustrates the bonding nature, mechanisms, phase diagram,	K3
	instrumentation of analytical techniques.	
CO4	Describe the molecular orbital diagrams, fuel gases, fertilizers,	K4
	hybridization and applications of analytical techniques.	
CO5	Predict bond order, mechanism, phase rule, separation of	K5
	compounds and its uses in industries.	

Mapping of CO with PO and PSO

Cos	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	2	3	3	3	2	3	2	3
CO2	3	3	3	3	3	3	3	3	2	3
CO3	3	3	3	3	3	3	3	3	3	2
CO4	3	3	3	3	3	3	3	2	3	2
CO5	3	3	2	3	3	3	2	3	2	2

"1" – Slight (Low) Correlation

"3" - Substantial (High) Correlation

"2" – Moderate (Medium) Correlation "-" Indicates there is No Correlation.

SYLLABUS

UNIT	CONTENT	HOURS	COs	COGNITIVE
				LEVEL
Ι	Chemical Bonding and Nuclear Chemistry:	12	CO1,	K1, K2, K3,
	Chemical Bonding: Molecular orbital theory -		CO2,	K4, K5
	bonding, antibonding and non-bonding orbitals.		CO3,	
	Molecular orbital diagrams (H ₂ , O ₂ , N ₂ , CO and		CO4,	
	CN) - bond order and magnetic properties.		CO5	
	Nuclear Chemistry: Fundamental particles -			
	isotopes - isobars - isotones and isomers -			
	differences between chemical reactions and			
	nuclear reactions. Nuclear binding energy -			
	mass defect - calculations - nuclear stability -			
	applications of nuclear fission and nuclear			
	fusion. Group displacement law - radioactive			
	series - applications of radioisotopes.			

II	Industrial Chemistry:	12	CO1,	K1, K2, K3,
	Fuels: Natural gas - water gas - semi water gas -		CO2,	K4, K5
	carbureted water gas - producer gas - CNG - LPG		CO3,	
	and oil gas. Silicones: Synthesis - properties -		CO4,	
	uses of silicones. Fertilizers: Urea - ammonium		CO5	
	sulphate - potassium nitrate - NPK			
	fertilizer - superphosphate.			
III	Fundamental Concept in Organic Chemistry:	12	CO1,	K1, K2, K3,
	Hybridization: Orbital overlap - hybridization		CO2,	K4, K5
	and geometry of CH ₄ , C_2H_4 , C_2H_2 and C_6H_6 .		CO3,	
	Electronic effects: Inductive effect - relative		CO4,	
	strength of aliphatic monocarboxylic acid and		CO5	
	aliphatic amines. Hyperconjugation - heat of			
	hydrogenation - bond length - dipole moment and			
	steric effect.			
	Reaction mechanisms: Types of reactions -			
	aromaticity (Huckel's rule) - aromatic			
	electrophilic substitution; nitration -			
	halogenation - Friedel Craft's alkylation-			
	Heterocyclic compounds: Preparation -			
	properties of furan - thiophene - pyrrole and			
	pyridine.			
IV	Thermodynamics and Phase Equilibria:	12	CO1,	K1, K2, K3,
	Thermodynamics: Types of systems processes -		CO2,	K4,
	state and path functions - statements of first law		CO3,	K5
	and second law of thermodynamics - Carnot's		CO4,	
	cycle - efficiency of heat engine. Entropy -		CO5	
	significance - relationship between Gibbs free			
	energy and entropy.			
	Phase Equilibria: Phase rule - terms - reduced			
	phase rule and its application to a simple eutectic			
	system water system - Two-component			
	system - (Pb - Ag).			

V	Analytical Chemistry:	12	CO1,	K1, K2, K3,
	Introduction to qualitative and quantitative		CO2,	K4, K5
	analysis - principles of volumetric analysis.		CO3,	
	separation - purification techniques - extraction,		CO4,	
	distillation - crystallization. Chromatography:		CO5	
	principle and application of column, paper and			
	thin layer chromatography.			
VI	Self-Study for Enrichment:	-	CO1,	K1, K2, K3.
	(Not to be included for External Examination)		CO2,	K4
	Triple superphosphate - Electromeric and		CO3,	
	mesomeric effects - Friedel craft's acylation -		CO4	
	Free energy change and its importance - entropy			
	and Gibbs free energy.			

Text Books

- Puri, B. R., Sharma, L. R., & Kalia, K. K. (2018). Principles of Inorganic Chemistry. 33rd edition. Shoban Lal Nagin Chand & Co., New Delhi.
- Bahl, B. S., & Bahl, A. (2010). Advanced Organic Chemistry. (12th edition), New Delhi, Sultan Chand & Co.
- Puri, B. R., Sharma, L. R., & Pathania, M. S. (2022). Principles of Physical Chemistry. 48th edition. Shoban Lal Nagin Chand & Co, New Delhi.
- 4. Sharma, B. K. (2013). Industrial Chemistry. Goel Publishing House.
- Gopalan, R., Subramanian, P. S., & Rengarajan, K. (2003). Elements of Analytical Chemistry. 2nd edition, Sultan Chand & Sons.

Reference Books

- 1. Madan, R. D. (2000). Modern Inorganic Chemistry. S. Chand and Company. New Delhi.
- Chatwal, G. R., & Anand, S. K. (2005). Instrumental methods of chemical analysis. Himalaya publishing house.
- Morrison, R. T., Boyd, R. N., & Bhattacharjee, S. K. (2011). Organic Chemistry. (7th edition), Pearson India, (2011).

Web References

- 1. <u>https://www.youtube.com/watch?v=QMb-pmf7PKA</u>.
- https://chem.libretexts.org/Bookshelves/Physical_and_Theoretical_Chemistry_Textbo ok_Maps/Supplemental_Modules_(Physical_and_Theoretical_Chemistry)/Physical_P roperties_of_Matter/States_of_Matter/Phase_Transitions/Phase_Diagrams.
- 3. https://byjus.com/biology/fertilizers/.
- 4. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5206469/.
- 5. https://www.vedantu.com/chemistry/hybridization.

Pedagogy

Chalk and talk, PPT, Discussion, Assignment, Demo, Quiz, Seminar.

Course Designer

Dr. S. Devi

Semester III	Internal Marks: 40	External M	arks: 60	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs. / Week	CREDITS
22UPH3AC5P	CHEMISTRY- I (P)	ALLIED	4	3

- > To gain knowledge about the basics of preparation of solutions.
- To impart skills on the quantitative estimation of compounds through volumetric analyses.
- > To develop skills for qualitative analysis of organic compounds.

Course Outcomes

Course Outcome and Cognitive Level Mapping

CO	CO Statements	Cognitive
Number	On the successful completion of the course, students will be able to	Level
CO1	Remember the basic principles involved in quantitative and	K1
	qualitative analyses.	
CO2	Outline the preparation of solutions and basic organic reactions	K2
	involved in organic functional group analyses.	
CO3	Apply tests for the identification of functional groups and titration	K3
	for quantitative analysis.	
CO4	Analyze compounds by qualitative and quantitative methods.	K4
CO5	Predict a suitable way to analysis compounds through qualitative	K5
	and quantitative methods.	

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	2	2	2	3	3	2	3	2
CO2	3	3	2	2	2	3	3	2	3	1
CO3	3	3	2	2	2	3	3	2	2	1
CO4	3	3	3	2	2	3	3	2	2	2
C05	3	3	2	2	2	3	3	2	2	2

"1"- Slight (Low) Correlation

"2"-Moderate (Medium) Correlation

"3"- Substantial (High) Correlation

"-" Indicates there is No Correlation.

SYLLABUS

I. Volumetric Analysis:

- 1. Estimation of HCl using NaOH as a link and standard oxalic acid solution.
- 2. Estimation of NaOH using HCl as a link and standard sodium carbonate.
- 3. Estimation of oxalic acid using NaOH as a link and standard oxalic acid solution.
- 4. Estimation of ferrous sulphate using KMnO₄ as a link and standard Mohr's salt.
- 5. Estimation of KMnO₄ using sodium thiosulphate as a link and standard $K_2Cr_2O_7$ solution.
- 6. Estimation of Mg (II) using EDTA solution as a link and standard MgSO₄ solution.
- 7. Estimation of ferrous ion using $K_2Cr_2O_7$ as a link and standard ferrous ammonium sulphate.

II. Organic Analysis:

- 1. Detection of elements.
- 2. To distinguish aliphatic and aromatic; saturated and unsaturated compounds.
- 3. Detection of functional group monosaccharides, aldehyde, ketone, acid, diamide, aromatic amine.

Text Books

- 1. Venkateswaran, V., Veeraswamy, R., & Kuandaivelu. (1997). Basic Principles of Practical Chemistry. 2nd edition. New Delhi, Sultan Chand & Sons.
- 2. Bassett, J. (1985). Text Book of Quantitative Inorganic Analysis. 4th edition. ELBS Longman.

Reference Book

Vogel, A. I. (2000) Textbook of quantitative inorganic analysis. The English language book society.

Web References

- 1. <u>https://www.youtube.com/watch?v=uOzniLNNxAE</u>.
- 2. https://www.brainkart.com/article/Estimation-of-sodium-hydroxide_38685/.
- 3. <u>https://www2.chem211abs.com/labfiles/UofC_GOB01A_Lab.pdf</u>.
- 4. <u>https://byjus.com/chemistry/volumetric-analysis/</u>.

Pedagogy

Demonstration and Practical Sessions.

Course Designer

Dr. S. Devi

Semester- III	Internal Marks: 25	External Marks: 75				
COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS		
22UPH3GEC1	PHYSICS IN EVERYDAY	GEC-I	2	2		
	LIFE					

- To experience the objects from our daily environment.
- To impart basic knowledge about everyday electrical devices in home with their working principle.
- To focus on their principles of operation and relations to one another.

Pre-Requisites

- Get depth knowledge of physics in day-to-day life.
- Understand the fundamentals of home and office devices.
- Knowledge about the concepts of digital access devices.

Course Outcome and Cognitive Level Mapping

СО	CO Statement					
Number	On the successful completion of the Course, the Student will be able to,	Level				
CO 1	Recall the basics of electricity	K1				
CO 2	Outline the risk factors and precautionary steps to avoid electric shock.	K2				
CO 3	Understand the basics of electrical appliances.	K4				
CO 4	Knowledge on handling home appliances.	K3				
CO 5	Explain the functioning of several home appliances.	K5				

Mapping of CO with PO and PSO

Cos	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	3	2	3	2	3	3	3	2	3	3
CO 2	3	2	2	2	3	3	2	2	3	3
CO 3	2	3	3	2	3	3	3	2	3	3
CO 4	2	2	3	3	3	2	2	2	3	3
CO 5	2	2	3	3	3	3	3	3	3	3

"1" – Slight (Low) Correlation

"2" - Moderate (Medium) Correlation

"3" - Substantial (High) Correlation

"-" indicates there is no correlation.

UNIT	CONTENT	HOURS	COs	COGNITIVE
				LEVEL
Ι	BASICS OF ELECTRICITY	6	CO1,	K1,
	Electricity - Basic principles - Practical unit of		CO2,	K2,
	electricity - International system (S.I) of units -		CO3,	K3,
	Electric shock.		CO4,	K4,
			CO5	K5
II	SAFETY PRECAUTION	6	CO1,	K1,
	Precautions to avoid electric shock – Rescue steps in		CO2,	K2,
	electric Shock – methods of resuscitation - Electric		CO3,	КЗ,
	Line Circuit Breaker (ELCB).		CO4,	K4,
			CO5	K5
III	ELECTRICAL APPLIANCES-I	6	CO1,	K1,
	Heating appliances: Design for heating element –		CO2,	K2,
	Electric iron-Water heater-Room heater.		CO3,	K3,
			CO4,	K4,
			CO5	K5
IV	ELECTRICAL APPLIANCES -II	6	CO1,	K1,
	Cooling appliances: Refrigerator – Air cooler - Air		CO2,	K2,
	Conditioner		CO3,	K3,
	Other electrical appliances: Washing Machine.		CO4,	K4,
			CO5	K5
V	LIQUID CRYSTAL SCREEN TELEVISION	6	CO1,	K1,
	LCD technology - LCD matrix types and operation -		CO2,	K2,
	LCD screens for television - LED TV - Edge LEDs,		CO3,	K3,
	Differences between LED and LCD displays.		CO4,	K4,
			CO5	K5
VI	SELF STUDY FOR ENRICHMENT	-	CO1,	K1,
	(Not to be included for External Examination)		CO2,	K2,
	Smartphones, Smartwatch, Global Positioning		CO3,	K3,
	System, CCTV.		CO4,	K4,
			CO5	K5

Text Books

- 1. Gulati R R, *Colour Television: Principles & Practice*, (2007) New Age International Publisher.
- 2. Anwani M L, Basic Electrical Engineering, (2014), Dhanpat Rai Co. Ltd., Delhi.
- 3. William D. Cooper, *Electrical Instruments and Measurement Techniques*, (1997), Prentice Hall India, New Delhi.

Reference Books

- 1. Bali S P, Consumer Electronics, (2008), Pearson Education, New Delhi.
- 2. Theraja B L and Theraja A K, A Textbook of Electrical Technology, (2014), S. Chand & Co.
- 3. R.R. Gulati, Modern Television Practice, New Age International Publishers, 2007.

Web References

- 1. https://www.esabna.com/euweb/mig_handbook/592mig6_2.htm
- 2. https://www.constellation.com/energy-101/electrical-safety-tips.html
- 3. <u>https://nptel.ac.in/courses/112/105/112105129/</u>

Pedagogy

Chalk and Talk, Seminars, Power Point Presentation, Quiz, Assignment and Group discussion.

Course Designer

Dr. R. Mekala

Semester IV	Internal Marks: 25		Exter	nal Marks: 75
COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
23UPH4CC5	ELECTRICITY, MAGNETISM AND ELECTROMAGNETISM	CC-V	6	5

- To develop knowledge in electrostatics and magnetostatics and apply theories of static andmoving charges.
- To give idea on the fundamentals of electromagnetic conduction and electromagnetic waves.
- To extend the understanding of its applications to instruments involving electric and magneticfields.
- To explore the applications of Electricity and Magnetism.
- To analyze various concepts in electromagnetism with real time applications.

Pre-requisites

- Knowledge about the concepts of electrostatic potential.
- Fundamental knowledge of currents in a network circuits.
- Concept of magnetic materials and its applications.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the Course, the Students will be able to	Cognitive Level
CO 1	Understand the basic laws of electrostatics, magnetostatics and Electromagnetism.	K1, K2
CO 2	Apply the Principles behind the electric and magnetic instruments.	K3
CO 3	Analyze the behavior of circuits containing Inductance, Capacitance and Resistance connected in different combinations.	K4
CO 4	Organize experiments to determine the absolute values of Q factor and power factor of LCR circuits.	K5
CO 5	Interpret the circuit into a mathematical problem using circuit laws and theorems.	K5

Mapping of CO with PO and PSO

Cos	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	3	3	3	3	3	3	2	2	2	2
CO 2	3	3	3	3	3	3	2	2	2	2
CO 3	3	3	3	3	3	3	2	2	2	2
CO 4	3	3	3	3	3	3	3	3	2	2
CO 5	3	3	3	3	3	3	3	3	2	2

"1" – Slight (Low) Correlation

"2" – Moderate (Medium) Correlation

"3" – Substantial (High) Correlation

"-" – indicates there is no correlation

	UNIT	CONTENT	HOURS	Cos	COGNITIVE
_		Floatmatation			LEVEL
	Ι	Coulomb's inverse square law – Gauss theorem and its applications – intensity at a point due to a charged sphere and cylinder – Principle of a capacitor – Capacity of spherical and cylindrical capacitors – Parallel plate capacitor – Effect of a dielectric – Energy stored in a capacitor – Loss of energy due to sharing of charges.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
	Π	Current Electricity Current density – Equation of continuity- Grouping of cells – Theory of Ballistic Galvanometer – Figure of merit – Damping Correction – Kirchhoff's laws – Wheatstone Bridge – Carey Foster's Bridge- Potentiometer Calibration of ammeter and voltmeter- Comparison of resistance	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
	III	Magnetostatics Biot-Savart's law and its applications- straight conductor, Circular coil, Solenoid carrying current – Divergence and curl of magnetic field- Magnetic vector potential – Ampere's circuital law- Types ofmagnetic materials – Properties of dia,para and ferromagnetic materials – Magnetometer method – Cycle of magnetization and Hysteresis- Loss of energy per cycle	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
	IV	Electromagnetic Induction Laws of electromagnetic induction – Self and mutual induction – Self-inductance of a solenoid – Mutual inductance of a pair of solenoids – Coefficient of coupling – Experimental determination of self and mutual inductance (Rayleigh's method) Growth decay of current in circuit containing Land R – Growth and decay of charge in circuit containing C and R – High resistance by leakage – Charging and discharging of capacitor through Land R.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
	V	AC Circuits Alternating EMF – Alternating EMF applied to circuits containing L and R – C and R – Alternating EMF applied to circuits containing L, C and R – Series and Parallel resonance circuits – Sharpness of resonance– Q factor – Power in AC circuits – Power factor – Watt less current	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
	VI	Self Study for Enrichment: (Not to be included for External Examination) Applications of Capacitor – Superposition Theorem- Magnetic Circuit – Earth inductor – Transformer.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

Text Books

- 1. Murugeshan R(2017), *Electricity and Magnetism*(10th edition), S. Chand and Co., New Delhi.
- 2. Brij Lal and N Subrahmanyam(2000), *Electricity and Magnetism*(8th edition), Ratan Prakashan Mandir,Agra.

Reference Books

- 1. Vasudeva D N(2013), *Fundamentals of Magnetism and Electricity*(2nd edition), S. Chand & Co,New Delhi.
- 2. Sehgal N K, Chopra K L and Sehgal D L(2014), *Electricity and Magnetism*(3rd edition), Sultan Chand andSons, New Delhi.
- 3. Tiwari K K(2018), *Electricity and Magnetism*(2nd edition), S. Chand and Company, New Delhi.
- 4. David J. Griffith(2015), Introduction to Electrodynamics(2nd edition), Prentice Hall of India.
- 5. Paul A. Tipler and G. Mosca(2003), *Physics for Scientist and Engineers*, W.H.Freeman, NewYork.

Web References

- 1. https://nptel.ac.in/courses/115106122
- 2. https://www.edx.org/learn/physics/rice-university-electricity-and-magnetism-part-1
- 3. https://www.coursera.org/courses?query=electricity%20and%20magnetism

Pedagogy

Chalk and Talk, Assignment, Group discussion and Quiz

Course Designer

Dr.R.Meenakshi

Semester IV	Internal Marks: 40		Extern	al Marks: 60
COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
23UPH4CC4P	ELECTRICITY AND MAGNETISM (P)	CP – IV	4	4

- To develop practical knowledge of Electricity and Magnetism
- To enhance the experimental skills.
- To gain hands-on experience with a variety of techniques.
- To learn the basic principles and procedures of laboratory work.

Pre-requisites

- Basic knowledge on usage of scientific apparatus.
- Basic Physics principle in Electricity and Magnetism
- Understanding on circuit connection.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the Course, the Students will be able to	Cognitive Level
CO 1	Apply the physics principle involved in the various instruments and also relate the principles to new application.	K1, K2
CO 2	Apply experimental approaches to correlate with physics theory to develop practical understanding.	K2, K3
CO 3	Relate the concept of electricity to a real time applications	K4
CO 4	Demonstrate knowledge and understanding of experiments in Electricity and Magnetism	K5
CO 5	Design and develop circuits which enhance the existing scientific knowledge.	K5

Mapping of CO with PO and PSO

Cos	PSO1	PSO2	PSO3	PSO4	PSO5	PO 1	PO 2	PO 3	PO 4	PO 5
CO1	1	2	1	2	1	3	2	1	2	1
CO2	2	3	2	2	2	2	3	2	2	2
CO3	2	1	2	3	1	3	2	1	3	1
CO4	2	2	3	3	2	2	3	1	2	2
CO5	3	2	3	3	3	1	3	2	3	3

"1" – Slight (Low) Correlation

"3" – Substantial (High) Correlation

"2" – Moderate (Medium) Correlation "-" – indicates there is no correlation

LIST OF EXPERIMENTS (Any 8)

- 1. Post Office Box Temperature coefficient.
- 2. Carey Foster's Bridge Specific Resistance.
- 3. Potentiometer Temperature coefficient of a coil.
- 4. Potentiometer High range voltmeter calibration.
- 5. Series resonance circuit.
- 6. Parallel resonance circuit.
- 7. Ballistic Galvanometer Figure of merit.
- 8. B.G. Absolute capacity of condenser.
- 9. Deflection and Vibration magnetometer- Determination of M and H
- 10. Field along the axis of a coil Determination of M.
- 11. Potentiometer Ammeter calibration.
- 12. Meter Bridge Specific Resistance.

Text Book

1. Ouseph,C.C., Rao,U.J., Vijayendran,V., (2016). *Practical Physics and Electronics*. S.Viswanathan, Printers & Publishers Pvt Ltd., Chennai.

Reference Book

1. Prof.Namboodirippad M.N., Prof.Daniel, P.A., (1982). *B.Sc.*, *PracticalPhysics*. G.B.C. Publications, Cochin.

Web References

- 1. https://vlab.amrita.edu/index.php?sub=1&brch=192
- 2. <u>https://vlab.amrita.edu/index.php?sub=1&brch=192&sim=972&cnt=1</u>
- 3. https://vlab.amrita.edu/index.php?sub=1&brch=192&sim=346&cnt=1

Pedagogy

Demonstration, Practical sessions and Viva-voce.

Course Designer

Dr. B.Anitha

Semester IV	Internal Marks	:: 25	Extern	al Marks: 75
COURSE	COURSE TITLE	RSE TITLE CATEGORY		CREDITS
CODE				
22UPH4AC6	CHEMISTRY - II	EMISTRY - II ALLIED		3

- \blacktriangleright To stimulate the concepts in basic chemistry and apply them in real world problems.
- To understand the preparation and properties of carbohydrates, amino acids and proteins.
- To study the basic concept of polymers, photochemistry, electrochemistry and magnetic properties.

Course Outcomes

Course Outcome and Cognitive Level Mapping

CO	CO Statement	Cognitive						
Number	On the successful completion of the course, students will be able to							
CO1	Recall the fundamental ideas in material science and biomolecules.	K1						
CO2	Understand the characteristics of polymers, biomolecules, alloys, photochemical and electrochemical reactions	K2						
CO3	Identify the types of polymerization, biomolecules, photolytic process, magnetic and nanomaterials	K3						
CO4	Calculate the molecular weight, quantum yield and emf of a cell.	K3						
CO5	Analyze the applications of industrial and bio materials	K4						

Mapping of CO with PO and PSO

Cos	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	2	3	3	3	2	3	2	3
CO2	3	3	3	3	3	3	3	3	2	3
CO3	3	3	3	3	3	3	3	3	3	2
CO4	3	3	3	3	3	3	3	2	3	2
CO5	3	3	2	3	3	3	2	3	2	2

"1" – Slight (Low) Correlation

"2" – Moderate (Medium) Correlation

"3" – Substantial (High) Correlation

"-" Indicates there is No Correlation.

SYLLABUS

UNIT	CONTENT	HOURS	COs	COGNITIVE
				LEVEL
Ι	Carbohydrates, Aminoacids and Proteins:	12	CO1,	K1, K2, K3,
	Carbohydrates - classification - glucose and		CO2,	K4
	fructose - preparation and properties - structure		CO3,	
	of glucose only - Fischer and Haworth cyclic		CO4,	
	structures - amino acids and proteins -		CO5	
	classification based on structure - essential and			
	non - essentials amino acids - preparation -			
	properties – uses - proteins - classification based			
	on physical properties and biological functions -			
	structure of proteins - primary and secondary			
	structure.			
II	Photochemistry:	12	CO1,	K1, K2, K3,
	Introduction - Photosynthesis - comparison between		CO2,	K4
	thermal and photochemical reactions - laws of		CO3,	
	photochemistry - Beer-Lambert law - Grotthus-		CO5	
	Dropper law - Einstein's law of photochemical			
	equivalence - quantum yield - actinometer - kinetics			
	of hydrogen-chlorine reaction - Jablonski diagram -			
	photoprocesses - phosphorescence - fluorescence -			
	photosensitization - quenching - types of			
	luminescence - thermoluminescence - bio-			
ш	Floetrochomistry and Magnetic Properties of	12	CO1	K1 K2 K3
	Matorials:	12	CO1,	К1, К2, К3, КЛ
	Galvanic cells - emf - standard electrode		CO_2	127
	notential reference electrodes		CO4	
	electrochemical series and its applications		CO4,	
	correction types methods of provention		05	
	corrosion - types - methods of prevention –			
	gaivanization - electroplating - cathodic			
	protection - magnetic properties of molecules -			
	types of magnetic behavior- dia - para - ferro -			

	antiferro magnetism - magnetic susceptibility -			
	determination of magnetic moment using Guoy			
	balance - applications of magnetic			
	measurements.			
IV	Material Science:	12	CO1,	K1, K2, K3,
	Ferrous and non-ferrous alloys - aluminium -		CO2,	K4
	copper - titanium - nickel alloys - types and		CO3,	
	composition of glass - cement - ceramics -		CO4,	
	nanomaterials - nanoparticles and bulk materials		CO5	
	- classification - synthesis - properties -			
	applications of carbon nanotube - graphene -			
	quantum dots - energy storage devices -			
	supercapacitors - batteries - solar cell			
V	Polymer Chemistry:	12	CO1,	K1, K2, K3,
	Introduction - functionality - nomenclature -		CO2,	K4
	classification of polymers - differences between		CO3,	
	thermoplastic and thermosetting polymers -		CO5	
	types - mechanism of polymerization - addition,			
	condensation and copolymerization - properties			
	of polymers - transition temperature - tacticity -			
	molecular weight - weight average and number			
	average - polydispersity index - preparation -			
	properties - uses of Nylon 6, 6 - epoxy resin.			
VI	Self-Study for Enrichment:	-	CO1,	K1, K2, K3.
	(Not to be included for External Examination)		CO2,	K4
	Techniques of polymerization - bulk - emulsion		CO3,	
	- solution - suspension - tertiary structure of		CO4	
	proteins - kinetics of hydrogen - bromine			
	reactions - fuel cells - properties of glass.			

Text Books

- Puri, B. R., Sharma, L. R., & Kalia, K. K. (2018). Principles of Inorganic Chemistry. 33rd edition. Shoban Lal Nagin Chand & Co., New Delhi.
- Bahl, B. S., & Bahl, A. (2010). Advanced Organic Chemistry. (12th edition), New Delhi, Sultan Chand & Co.
- Puri, B. R., Sharma, L. R., & Pathania, M. S. (2022). Principles of Physical Chemistry. 48th edition. Shoban Lal Nagin Chand & Co, New Delhi.
- 4. Arumugam, (2007). Materials Science, Anuradha Publications.
- Gopalan, R., & Sundaram, S. (2015). Engineering Chemistry I. 2nd edition, Sultan Chand & Sons.

Reference Books

- 1. Madan, R. D. (2000). Modern Inorganic Chemistry. S. Chand and Company. New Delhi.
- 2. Mohan, S. and Arjunan, V.(2016). Principles of Materials Science. MJP Publishers.
- Morrison, R. T., Boyd, R. N., & Bhattacharjee, S. K. (2011). Organic Chemistry. (7th edition), Pearson India, (2011).

Web References

- 1. https://web.mit.edu/5.33/www/lec/poly.pdf.
- 2. https://byjus.com/biology/biomolecules/.
- 3. <u>http://stpius.ac.in/crm/assets/download/Photochemistry.pdf.</u>
- 4. https://archive.nptel.ac.in/content/storage2/courses/113108051/module1/lecture1.pdf.
- 5. <u>https://www.ccri.edu/chemistry/courses/chem_1100/terezakis/notes/Chapter_19_Lect</u> <u>ure_Notes.pdf.</u>
- 6. <u>https://www.sathyabama.ac.in/sites/default/files/course-material/2020-10/UNIT-1_4.pdf.</u>

Pedagogy

Chalk and talk, PPT, Discussion, Assignment, Demo, Quiz, Seminar.

Course Designer

> Dr. S. Devi

SEMESTER IV	Internal Marks: 25 External Marks: 75						
COURSE CODE	COURSE TITLE	CATEGORY	HRS / WEEK	CREDITS			
22UPH4GEC2	PHOTOGRAPHY AND VIDEOGRAPHY	GEC-II	2	2			

Objectives

- To acquire knowledge with modern cameras.
- To understand the concepts of Digital Photography & Sensitivity.
- To familiarize the concepts of various Lenses.
- To know the fundamentals of the shoot.
- To import the knowledge of getting creative with photography.

Pre-Requisities

- Understand the basic ideas about photography
- Knowledge about basic camera operations
- Skills to use various tools

Course Outcomes and Cognitive Level Mapping

CO No.	CO Statements On the successful completion of the course, the students will be able to	Knowledge Level
CO 1	Knowledge and skills in the use of basic tools, techniques, technologies and able to acquaint with basic camera operations.	K1
CO 2	Understanding of special features and utility purposes of various types of lenses and able to choose an appropriate lens for the job concerned	K2
CO 3	Demonstrate uses of cameras and lighting/digital technologies.	K2
CO 4	Utilize the concept of correct exposure and identify correct and incorrect exposure in photographs.	К3
CO 5	Apply understanding of aesthetics related to shooting and editing.	K3

Mapping with Programme Outcomes

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	3	3	2	2	3	3	3	2	2
CO2	2	3	2	2	2	2	3	2	2	2
CO3	2	2	3	2	3	2	2	3	2	3
CO4	2	2	2	3	3	2	2	2	3	3
CO5	2	2	3	3	3	2	2	3	3	3

"1" – Slight (Low) Correlation " "3" – Substantial (High) Correlation

n 2" – Moderate (Medium) Correlation "-" indicates there is no correlation

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
Ι	Introduction Digital Photography - Advantages and Disadvantages – SLR – Aperture – Shutter Speed – ISO Sensitivity	3	CO1 "CO2 CO3 CO4 CO5	K1 K4 K2 K3 K3
Π	Lenses Specialized Lenses – Telephoto Lens – Wide-Angle Lens – Lens Multiplication Factor - Zoom Lens – Prime Lens – Macro (or Close-Up) Lens – Fish-Eye Lens – Tilt and Shift Lenses	6	CO1 CO2 CO3 CO4 CO5	K1 K2 K4 K3 K3
III	Composition Line - Rule of Odds - Rule of Thirds - The Phi Grid - Negative Space- Repetition - Color - Texture	6	CO1 CO2 CO3 CO4 CO5	K1 K2 K2 K3 K4
IV	Shooting video with DSLR Fundamentals of the shoot – Exposure – Keeping the camera steady – Shooting to edit – Shooting Just Enough Variations – Watching and Learning from the Movies – Varying Focal Length – Mastering Shot Structure – Maintaining continuity between shots	9	CO1 CO2 CO3 CO4 CO5	K1 K4 K2 K3 K3
V	Getting Creative with Shoot Controlling Aperture for Effect – Finding the Best Angle – Using Camera Filters – Tooling withCamera Effects – Using Time-Lapse Photography	6	CO1 CO2 CO3 CO4 CO5	K1 K2 K2 K4 K3
VI	SELF STUDY FOR ENRICHMENT (Not to be included for External Examination) Applications of full frame camera, 50mm lenses, 100mm macro lenses, Tripods, Backlighting, Overhead angle.	-	CO1 CO2 CO3 CO4 CO5	K1 K2 K2 K3 K4

Text Book

- 1. Black, (2013), DSLR Photography for Beginners, Independently Published, 1st Edition.
- 2. John Carucci, (2013), *Digital SLR video & Filmmaking for Dummies*, John Wiley & Sons,Inc.

Reference Book

1. Tom Clark, (2011), *Digital PhotographyComposition for Dummies*, John Wiley & Sons, Inc.

Web References

- 1. www.digital-photography-school.com
- 2. https://www.linkedin.com/in/singhofen/
- 3. https://dev.to/singhofen
- 4. https://codepen.io/csinghofen

Pedagogy:

Chalk and talk, Assignment, power point presentation.

Course Designer

Dr. K. Kannagi

Semester IV	Internal Marks: 40	External Marks: 60							
COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS					
22UPH4SEC1P	WEB DESIGNING (P)	SEC - I	2	2					

- To understand the concepts in web design.
- To design a webpage with font and colour variation.
- To develop a webpage using HTML tags.
- To animate the webpage.
- To apply the HTML tag to create the webpage.

Pre-requisites

- Basics of webpage designing.
- Fundamental ideas on HTML.
- Basics of Flash and Photoshop.

Course Outcome and Cognitive Level Mapping

СО	CO Statement	Cognitive
Number	On the successful completion of the course, students will be able to	Level
CO1	Identify the basic tags used in an HTML document.	K1
CO2	Demonstrate the animating webpages.	K2
CO3	Develop HTML code for the webpage.	К3
CO4	Create formatting and link webpages.	K4
CO5	Make their own web page.	K5

Mapping with Programme Outcomes

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	1	2	2	2	2	3	3	2	2	2
CO2	2	2	2	3	3	3	3	2	2	3
CO3	2	2	2	2	3	3	3	2	3	3
CO4	2	2	2	2	3	3	3	2	3	3
CO5	2	2	3	3	3	3	3	3	3	3

"1" – Slight (Low) Correlation

"3" – Substantial (High) Correlation

"2" – Moderate (Medium) Correlation "-" – indicates there is no correlation

LIST OF EXPERIMENTS (Any 8)

- 1. Web page to demonstrate font variations.
- 2. Web page illustrating text formatting tags.
- 3. Sample code to illustrate three lists in HTML.
- 4. HTML page with seven separate lines in different colors. State color of each line in its text.
- 5. HTML code to form a table.
- 6. Web page for form filling.
- 7. HTML program for personal website.
- 8. HTML code to design your own curriculum vitae.
- 9. Web page to explain concepts using hyperlinks.
- 10. Web page to explain concepts using animated picture, movie and sound.

Text Books

- 1. Weixel et al, (2004). *Multimedia Basics*.(First Edition) Thomson Course Technology, India.
- 2. Xavier C, (2007). *Web Technology and Design*.(First Edition). New Age International, New Delhi.

Reference Books

- 1. Srivastava R N, (2011). *Web Technology*. (First Edition). Global Academic Publishers & Distributors.
- Daniel Gray, (2000). Web Design Fundamentals Hand Book. (First Edition). Sun Rise Printers Shahdara, Delhi.

Web References

- 1. https://www.w3schools.com/html
- 2. https://nptel.ac.in/courses/106/105/106105084/
- 3. <u>HTML Color Names (w3schools.com)</u>
- 4. <u>HTML page with 7 separate lines in different colors. State</u> color of each line in its text <u>RakeshMgs</u>
- 5. How to create a CV using HTML and host in github ? GeeksforGeeks

Pedagogy

Demonstration, Practical sessions and viva-voce.

Course Designer

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