

DEPARTMENT OF PHYSICS

COURSE STRUCTURE & SYLLABI (For the students admitted from year 2023-2024 onwards)

Programme : B.Sc. Physics



JAMAL MOHAMED COLLEGE (AUTONOMOUS)
Accredited with A++ Grade by NAAC (4th Cycle) with CGPA 3.69 out of 4.0
(Affiliated to Bharathidasan University)
TIRUCHIRAPPALLI – 620 020

B.Sc. PHYSICS

Sem	Course Code	Part	Course Category	Course Title	Ins. Hrs/ Week	Credit	Marks		Total
							CIA	ESE	
I	23U1LT1/LA1/LF1/LH1/LU1	I	Language - I		6	3	25	75	100
	23UCN1LE1	II	English - I	English for Communication - I	6	3	25	75	100
	23UPH1CC1	III	Core - I	Properties of Matter and Acoustics	5	5	25	75	100
	23UPH1CC2P		Core - II	Properties of Matter - Practical	3	3	20	80	100
	23UCH1AC1:1		Allied - I	Inorganic, organic and Physical Chemistry - I	5	4	25	75	100
	23UCH1AC2P	Allied - II	Volumetric Estimations - Practical	3	2	20	80	100	
23UCN1AE1	IV	AECC - I	Value Education	2	2	-	100	100	
Total					30	22			700
II	23U2LT2/LA2/LF2/LH2/LU2	I	Language - II		6	3	25	75	100
	23UCN2LE2	II	English - II	English for Communication - II	6	3	25	75	100
	23UPH2CC3	III	Core - III	Mechanics and Relativity	6	6	25	75	100
	23UPH2CC4P		Core - IV	Heat and Optics - Practical	3	3	20	80	100
	23UCH2AC3:1		Allied - III	Inorganic, Organic and Physical Chemistry - II	4	4	25	75	100
	23UCH2AC4P	Allied - IV	Organic Analysis - Practical	3	2	20	80	100	
	23UCN2SS	IV	Soft Skills Development	Soft Skills Development	2	2	-	100	100
	23UCN2CO	V	Community Outreach	JAMCROP	-	@	-	-	@
23U2BT1/ 23U2AT1		Basic Tamil - I/ Advanced Tamil - I	எழுத்தும் இலக்கியமும் அறிமுகம் -I/ தமிழ் இலக்கியமும் வரலாறும் -I	-	-	-	100 [#]	-	
Total					30	23			700
@Only grades will be given									
III	23U3LT3/LA3/LF3/LH3/LU3	I	Language - III		6	3	25	75	100
	23UCN3LE3	II	English - III	English for Communication - III	6	3	25	75	100
	23UPH3CC5	III	Core - V	Heat, Thermodynamics and Statistical Mechanics	4	4	25	75	100
	23UPH3CC6P		Core - VI	Thermal and Electricity - Practical	3	3	20	80	100
	23UMA3AC5:2		Allied - V	Calculus	4	3	25	75	100
	23UMA3AC6:2	Allied - VI	Algebra and Trigonometry	3	3	25	75	100	
	23UPH3GE1	IV	Generic Elective - I		2	2	-	100	100
	23UCN3AE2		AECC - II	Environmental Studies	2	2	-	100	100
Total					30	23			800
IV	23U4LT4/LA4/LF4/LH4/LU4	I	Language - IV		6	3	25	75	100
	23UCN4LE4	II	English - IV	English for Communication - IV	6	3	25	75	100
	23UPH4CC7	III	Core - VII	Optics and Spectroscopy	5	5	25	75	100
	23UPH4CC8P		Core - VIII	Measurement and Calibration - Practical	3	3	20	80	100
	23UMA4AC7:2		Allied - VII	Differential Equations	4	3	25	75	100
	23UMA4AC8:2	Allied - VIII	Vector Calculus and Fourier series	4	3	25	75	100	
	23UPH4GE2	IV	Generic Elective - II		2	2	-	100	100
	23UCN4EL		Experiential Learning	Internship / Industrial Visit	-	2	-	100	100
	23UCN4EA	V	Extension Activities	NSS, NCC, etc.	-	1	-	-	-
23U4BT2/ 23U4AT2		Basic Tamil - II/ Advanced Tamil - II	எழுத்தும் இலக்கியமும் அறிமுகம் -II/ தமிழ் இலக்கியமும் வரலாறும் -II	-	-	-	100 [#]	-	
Total					30	25			800
V	23UPH5CC9P1	III	Core - IX	Advanced Optics Experiments and Python Programming - Practical	3	3	10	40	50
	23UPH5CC9P2			Analog Electronics and Microprocessor - Practical	3	3	10	40	50
	23UPH5CC10			Core - X	Electricity, Magnetism and Electromagnetism	5	5	25	75
	23UPH5CC11	Core - XI	Atomic Physics	5	5	25	75	100	
	23UPH5CC12	Core - XII	Nuclear Physics	5	5	25	75	100	
	23UPH5DE1A/B		Discipline Specific Electives- I		5	4	25	75	100
	23UPH5SE1	IV	Skill Enhancement Course - I	Scientific Programming in Python	2	1	-	100	100
	23UPH5SE2		Skill Enhancement Course - II	Electrical and Electronic Instrumentation	2	1	-	100	100
23UPH5EC1		Extra Credit Course - I*	Online Course	-	*	-	-	-	
Total					30	27			700
VI	23UPH6CC13P1	III	Core - XIII	General Experiments and Python Programming - Practical	3	3	10	40	50
	23UPH6CC13P2			Digital Electronics and Microprocessor - Practical	3	3	10	40	50
	23UPH6CC14			Core - XIV	Wave Mechanics	6	6	25	75
	23UPH6CC15	Core - XV	Laser and Medical Physics	5	5	25	75	100	
	23UPH6PW		Project Work	Project Work	3	2	-	100	100
	23UPH6DE2A/B		Discipline Specific Electives-II		5	4	25	75	100
	23UPH6DE3A/B		Discipline Specific Electives- III		4	4	25	75	100
	23UCN6AE3	IV	AECC - III	Gender Studies	1	1	-	100	100
	23UPH6EC2		Extra Credit Course - II*	Online Course	-	*	-	-	-
23UPHECA		Extra Credit Course for all**	Online Course	-	**	-	-	-	
Total					30	28			700
* Programme Specific Online Course for Advanced Learners									
** Any Online Course for Enhancing Additional Skills									
Grand Total						148			4400

GENERIC ELECTIVE COURSES

Semester	Course Code	Course Title
III	23UPH3GE1	Astronomical Science
IV	23UPH4GE2	Medical Physics

Self-Study Course – Basic and Advanced Tamil

(Applicable to the candidates admitted from the academic year 2023 -2024 onwards)

Semester	Course Code	Course Title
II	23U2BT1	Basic Tamil – I (எழுத்தும் இலக்கியமும் அறிமுகம் - I)
	23U2AT1	Advanced Tamil – I (தமிழ் இலக்கியமும் வரலாறும் - I)
IV	23U4BT2	Basic Tamil – II (எழுத்தும் இலக்கியமும் அறிமுகம் - II)
	23U4AT2	Advanced Tamil – II (தமிழ் இலக்கியமும் வரலாறும் - II)

Mandatory

Basic Tamil Course - I and II are offered for the students who have not studied Tamil Language in their schools and college.

Advanced Tamil Course - I and II are offered for those who have studied Tamil Language in their schools but have opted for other languages under Part - I.

DISCIPLINE SPECIFIC ELECTIVES

Semester	Course Code	Course Title
V	23UPH5DE1A	Semiconductor Devices and Circuits
	23UPH5DE1B	Fundamentals of Nanoscience
VI	23UPH6DE2A	Digital Electronics and Microprocessor
	23UPH6DE2B	Materials Science
	23UPH6DE3A	Non Conventional Energy Physics
	23UPH6DE3B	Astrophysics

ALLIED COURSE STRUCTURE FOR CHEMISTRY & MATHEMATICS

Sem	Course Code	Course Category	Course Title	Ins. Hrs/ Week	Credit	Marks		Total
						CIA	ESE	
I	23UPH1AC1	Allied - I	Fundamentals of Physics	5	4	25	75	100
	23UPH1AC2P	Allied - II	Properties of Matter - Practical	3	2	20	80	100
II	23UPH2AC3	Allied - III	Essentials of Physics	4	4	25	75	100
	23UPH2AC4P	Allied - IV	Optical, Thermal and Electricity - Practical	3	2	20	80	100

ALLIED COURSE STRUCTURE FOR COMPUTER SCIENCE

Sem	Course Code	Course Category	Course Title	Ins. Hrs/ Week	Credit	Marks		Total
						CIA	ESE	
III	23UPH3AC5	Allied - V	Electronic Circuits and Devices	4	4	25	75	100
	23UPH3AC6P	Allied - VI	Electronics - Practical	3	2	20	80	100
IV	23UPH4AC7	Allied - VII	Digital Electronics and Microprocessor	5	4	25	75	100
	23UPH4AC8P	Allied - VIII	Digital and Microprocessor - Practical	3	2	20	80	100

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	23UPH1CC1	Core - I	5	5	25	75	100
Course Title		PROPERTIES OF MATTER AND ACOUSTICS					

SYLLABUS

Unit	Contents	Hours
I	Elasticity: Types of elasticity – Relation between Elastic moduli– Poisson’s ratio – relation between Poisson’s ratio and Elastic moduli – Experimental determination of Poisson’s ratio of rubber - Expression for torque per unit twist -*Bending moment of a beam* – Cantilever –Determination of Young’s Modulus by Cantilever depression	15
II	Viscosity and Surface Tension: Viscosity: Coefficient of viscosity – streamline and turbulent flow - Poiseuille’s equation for the coefficient of viscosity - corrections in the Poiseuille’s equation – Determination of Viscosity of the Liquids: Stokes’s Method – Oswald Viscometer Surface tension: pressure difference across a spherical surface – *excess pressure inside a curved surface* – Jaeger’s experiment to determine the surface tension of a liquid	15
III	Diffusion and Osmosis: Diffusion : Diffusion in liquids – Graham’s laws of diffusion for liquids – Fick’s law of diffusion – *Analogy between liquid diffusion and heat conduction*– Experimental determination of coefficient of diffusion Osmosis: Osmosis and Osmotic pressure – Laws of Osmotic pressure - Experimental determination of osmotic pressure (Berkeley and Hartley method) – –elevation of the boiling point – depression of freezing point	15
IV	Acoustics: Origin of sound - velocity of longitudinal waves in gases – Newton’s formula for velocity of sound in air - effect of temperature - pressure – density of the medium, humidity, wind – velocity of sound in water (experiment) — wave velocity and molecular velocity – *Doppler effect* – Tracking of Artificial Satellites - Applications of Doppler effect	15
V	Acoustics of Buildings & Ultrasonics: Acoustics – Reverberation – Reverberation time - Sabine’s reverberation formula — Factors affecting the acoustics of the buildings- Conditions for good acoustics – Ultrasonics- Properties- *Production of ultrasonic waves*– Piezo electric oscillator – Detection of ultrasonic waves -Applications of ultrasonic waves	15

..... Self Study

Text Book(s):
1. R. Murugesan, Properties of Matter, Fifth Edition, S. Chand & Co Pvt. Ltd., New Delhi. 1994, Reprint 2010. Unit – I: Section 1.1-1.2, 1.7 - 1.8, 1.9, 1.13, 1.14, 1.15, 1.19, 1.20 Unit – II: Section 2.1-2.4, 2.13,3.1,3.2,3.8,3.9,3.11 Unit – III: Section 3.1 – 3.4, 3.6, 3.8 – 3.9, 3.11, 3.12
2. N.Subrahmanyam &Brijlal, Waves and Oscillations , Vikas Publishing House Pvt. Ltd., Second Revised Edition, 1994. Unit – IV: Section 5.1, 5.3-5.10, 5.13, 9.1, 9.5, 9.7 Unit – V: Section 11.14 – 11.16, 11.20 – 11.24, 11.27

Reference Book(s):
1. BrijLal & Subramaniam, Properties of Matter, S.Chand Publications, 4th edition, 2008. 2. MathurD.S, Elements of Properties of Matter, Eleventh edition, Shyam Lal Charitable Trust, New Delhi, 1993.
Web Resource(s):
1. https://www.physicsclassroom.com/class 2. https://www.askiitians.com/revision-notes/physics/ 3. https://www.classcentral.com/course/swayam-fundamentals-of-acoustics-7927

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	understand the elastic properties and bending behaviour of beams	K2
CO2	enhance the knowledge by learning the properties of matter	K3
CO3	stimulate to think the applications of matter with different physical properties	K3
CO4	estimate velocity of sound in different media, analyze viscosity, surface tension, diffusion and osmosis of given liquids	K4
CO5	determine different physical constants of matter, estimate velocity of sound in different media	K5

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	3	3	2	2	3	3	3	2	2	2.5
CO2	3	3	3	2	2	3	2	1	1	2	2.2
CO3	3	3	3	1	3	2	2	2	2	3	2.4
CO4	3	3	2	3	2	3	3	3	1	3	2.6
CO5	2	3	2	2	2	2	3	3	2	2	2.3
Mean Overall Score											2.40
Correlation											MEDIUM

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinators:

Capt. F. S. Muzammil
Dr. A. S. HajaHameed

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	23UPH1CC2P	CORE – II	3	3	20	80	100
Course Title		PROPERTIES OF MATTER – PRACTICAL					

List of Experiments:

1. Determination of the Young's Modulus of a material using non-uniform Bending Method (Pin & Microscope).
2. Determination of Surface Tension by Capillary Rise Method.
3. Determination of the Co-efficient of viscosity of a Liquid by Burette Method
4. Thermal conductivity of a bad conductor using Lee's Disc.
5. Verification of Laws of Transverse Vibrations [I & II laws] in a stretched string using a sonometer.
6. Determination of the Refractive Index of glass using a prism and a spectrometer.
7. Determination of Resistance and Specific Resistance using a Meter Bridge.
8. Comparison of radii by capillary flow method.
9. # **Measurement of Dielectric constant for solids and liquids using LCR Meter #**
10. Determination of the temperature coefficient of resistance of the material using post office box.

- New experiment introduced under DBT Star College scheme

Books for Reference:

1. M.N. Srinivasan, S. Balasubramanian, R. Ranganathan, A text book of Practical Physics, S. Chand & Sons, Reprint 2010.
2. C.C. Ouseph, U.J. Rao & V. Vijayendran, Practical physics and electronics, S. Viswanathan, Pvt, Ltd, First Edition, 2007.

Web Resources:

- www.physicstutorials.org
- www.sciencelearn.org.nz
- <https://vlab.amrita.edu/?sub=1&brch=280&sim=550&cnt=1>
- <https://vlab.amrita.edu/index.php?sub=1&brch=280&sim=1518&cnt=4>
- <http://amrita.olabs.edu.in/?sub=1&brch=5&sim=225&cnt=4>
- <http://www.olabs.edu.in/?sub=1&brch=5&sim=224&cnt=2>

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Recall the basic principles of properties of matter and understand the concepts of bending behaviour beams	K2
CO2	Make practical skills essential for experimentation.	K3
CO3	Apply experimental approaches to correlate with physics theory to develop practical understanding.	K3
CO4	Analyze themselves the concept of heat, optics and acoustics	K4
CO5	Evaluate the ideas required for their higher studies	K5

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	3	3	2	2	2	1	2	2	2	2.2
CO2	2	3	2	3	2	2	2	2	3	2	2.3
CO3	2	2	2	3	3	2	3	3	2	2	2.4
CO4	2	1	2	2	2	2	2	3	2	2	2.0
CO5	2	3	3	2	3	3	2	1	2	2	2.3
Mean Overall Score											2.22
Correlation											Medium

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinator: Dr. A. S. Haja Hameed

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	23UCH1AC1:1	Allied – I	5	4	25	75	100
Course Title		INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY – I					

SYLLABUS		
Unit	Contents	Hours
I	<p>PERIODIC PROPERTIES, MOLECULAR ORBITAL THEORY AND INDUSTRIAL CHEMISTRY</p> <p>1.1. Periodic properties: Ionization potential, electron affinity and electro negativity- Definition, factors affecting and variation in the periodic table.</p> <p>1.2. Molecular Orbital Theory: LCAO, Bonding, anti-bonding orbital and bond order. MO diagrams of H₂, He₂, N₂, O₂ and F₂ molecules.</p> <p>1.3. Industrial Chemistry: Fuel gases composition and preparation of Water gas, Producer gas, LPG, Gobar gas and Natural gas. Fertilizers – NPK and mixed fertilizers. *Soap and detergents – An elementary idea of soap and detergent*.</p>	15
II	<p>SOLUTIONS</p> <p>2.1. Solutions: Definition, Types of solutions - classification based on the solute and solvent, Ideal and non-ideal solutions, Liquid-Liquid type, Primary and secondary standards, preparation of standard solutions.</p> <p>2.2. Concentration of Solutions: Molarity, Molality, Equivalent weight – acid, base and salt, Normality, Mole fraction, percentage (W/V, V/V) and Parts Per Million.</p>	15
III	<p>POLYMERS, HETEROCYCLIC COMPOUNDS AND STEREOISOMERISM</p> <p>3.1. Polymers – Definition, classifications of polymers – Natural and synthetic polymers, Thermoplastic and thermosetting polymer. Addition and condensation polymerization. Preparation, properties and uses of polyethylene, *PVC, Teflon*, polystyrene, nylon 6, 6, and Bakelite.</p> <p>3.2. Heterocyclic compounds – Furan, thiophene and pyridine – Preparation, properties and uses.</p> <p>3.3. Stereoisomerism: Optical isomerism – lactic and tartaric acid, Racemic mixture and resolution, Geometrical isomerism – cis – trans isomerism, maleic and fumaric acid.</p>	15
IV	<p>CHROMATOGRAPHY, PHOTOCHEMISTRY AND PHASE RULE</p> <p>4.1 Chromatography – Definition, classification – principles, Technique and application of TLC.</p> <p>4.2 Photochemistry: Differences between thermal and Photochemical reactions, photochemical laws – Lambert’s law, Beer’s law, Grothus - Draper’s law, Einstein’s law of photo chemical equivalence, *Quantum efficiency*.</p> <p>4.3 Phase Rule: Phase, Component, Degree of freedom, Phase Rule – definition, one component system – Water system.</p>	15
V	<p>CONDUCTANCE, CORROSION, pH AND BUFFER</p> <p>5.1. Conductance: specific and equivalent conductance – Determination, Effect of dilution on conductivities, Ostwald’s dilution law and Kohlrausch’s law, conductometric titrations- Principle, applications (Strong acid vs Strong base and Weak acid and Weak base) and advantages.</p> <p>5.2. Corrosion: Definition, types, wet and dry corrosion and prevention of corrosion.</p> <p>5.3. pH and Buffer: *pH, buffer solution*, Henderson-Hasselbalch equation and its importance (no derivation)-Biological importance of pH and Buffer solutions in living system.</p>	15

..... Self Study

Text Book(s):
1. P. L. Soni, Text book of Inorganic Chemistry, S. Chand & Co., New Delhi, Revised Edition, 2017. 2. P. L. Soni and H.M. Chawla, Text Book of Organic Chemistry, S. Chand & Co., New Delhi, 28 th Edition, 1999. 3. B.R. Puri, L.R. Sharma and M.S. Pathania, Principles of Physical Chemistry, Vishal Publications, Jalandhar, 48 th Edition, 2019.
Reference Book(s):
1. Puri B.R., Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry, Shoban Lal, Nagin Chand & Co. New Delhi, 23 rd , 1993. 2. Bahl and Arun Bahl, Advanced Organic Chemistry, S.Chand & Co., New Delhi, 19 th Edition, 2005 3. R. L. Madan, G.D. Tuli, Simplified Course in Physical Chemistry, S. Chand & Co., New Delhi, 5 th Revised and Enlarged, 2009.
Web Resource(s):
1. https://onlinecourses.nptel.ac.in/noc22_cy03/preview 2. https://www.toppr.com/ 3. https://byjus.com/chemistry/

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Describe the periodic properties, polymers and conductance	K1
CO2	Explain the terms involved in expressing concentrations of solutions	K2
CO3	Apply chromatographic techniques and photochemical laws	K3
CO4	Predict the stereoisomerism of organic compounds	K4
CO5	Measure the pH and buffer solutions	K5

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	3	3	3	3	3	3	3	3	3	3
CO2	2	2	2	2	2	2	2	2	2	2	2
CO3	2	2	2	2	2	2	2	2	2	2	2
CO4	2	2	2	2	2	2	2	2	2	2	2
CO5	2	2	2	2	2	2	2	2	2	2	2
Mean Overall Score											2.2
Correlation											Medium

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinators: Dr. R. Abdul Vahith

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	23UCH1AC2P	Allied – II	3	2	20	80	100
Course Title		VOLUMETRIC ESTIMATIONS - PRACTICAL					

List of Practicals	Hours														
<p>Volumetric Estimation Practicals</p> <ol style="list-style-type: none"> 1. Estimation of Sodium Hydroxide (Na_2CO_3 Vs HCl Vs NaOH) 2. Estimation of Hydrochloric Acid ($\text{H}_2\text{C}_2\text{O}_4$ Vs NaOH Vs HCl) 3. Estimation of Oxalic Acid (FeSO_4 Vs KMnO_4 Vs $\text{H}_2\text{C}_2\text{O}_4$) 4. Estimation of Ferrous Sulphate ($\text{H}_2\text{C}_2\text{O}_4$ Vs KMnO_4 Vs FeSO_4) 5. Estimation of Ferrous Ammonium Sulphate ($\text{H}_2\text{C}_2\text{O}_4$ Vs KMnO_4 Vs $(\text{NH}_4)_2\text{Fe}(\text{SO}_4)_2 \cdot 6\text{H}_2\text{O}$) 6. Estimation of KMnO_4 ($\text{K}_2\text{Cr}_2\text{O}_7$ Vs FAS Vs KMnO_4) 7. Estimation of Zinc by EDTA (MgSO_4 Vs EDTA Vs ZnSO_4) 8. Estimation of Magnesium by EDTA (MgSO_4 Vs EDTA Vs MgSO_4) <p style="text-align: center;"><u>Scheme of valuation</u></p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding-right: 20px;">Record</td> <td>– 10 Marks</td> </tr> <tr> <td>Procedure writing</td> <td>– 10 Marks</td> </tr> <tr> <td>For Estimation</td> <td>– 60 Marks</td> </tr> </table> <p><u>For Estimation Results:</u></p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding-right: 20px;">1-2%</td> <td>- 60 marks</td> </tr> <tr> <td>2-3%</td> <td>- 50 marks</td> </tr> <tr> <td>3-4%</td> <td>- 40 marks</td> </tr> <tr> <td>>4%</td> <td>- 30 marks</td> </tr> </table>	Record	– 10 Marks	Procedure writing	– 10 Marks	For Estimation	– 60 Marks	1-2%	- 60 marks	2-3%	- 50 marks	3-4%	- 40 marks	>4%	- 30 marks	45
Record	– 10 Marks														
Procedure writing	– 10 Marks														
For Estimation	– 60 Marks														
1-2%	- 60 marks														
2-3%	- 50 marks														
3-4%	- 40 marks														
>4%	- 30 marks														

Text Books:
<ol style="list-style-type: none"> 1. Peter McPherson, Volumetric Analysis, Royal Society of Chemistry, 1st Edition 2014. 2. K.B. Baliga et al., College Analytical Chemistry, Himalaya Publishing House, 19th Edition, 2011 3. Venkateswaran V. Veerasamy R. Kulandaivelu A.R, Basic Principles of Practical Chemistry, S. Chand & Co Pvt. Ltd, New Delhi, 2nd Edition 1997.
Reference Books:
<ol style="list-style-type: none"> 1. Handbook Of Inorganic Qualitative Analysis by Maharudra Chakraborty, Scifinity Publication; 1st Edition 2019. 2. Vogel, Text Book of Quantitative Chemical Analysis,, Pearson Education, 6th edition ,2009. 3. Day R A., Underwood A I., Quantitative Analysis, New York: Pearson Emory University. Print. 6th edition, 1991
Web Resources:
<ol style="list-style-type: none"> 1. https://www.studiestoday.com/useful-resources-chemistry-class-12-chemistry-practicals-volumetric-analysis-estimation-oxalic-0 2. https://ncert.nic.in/pdf/publication/sciencelaboratorymanuals/classXI/chemistry/kelm206.pdf

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Recall the principle of volumetric techniques and to classify the methods of preparation of solutions with different concentration.	K1
CO2	Estimate the concentration of a various solution	K2
CO3	Apply the principle of volumetric concept in the estimation	K3
CO4	Analyze the quality of portability of water	K4
CO5	Assess the quantity of chemical substance in a solution	K5

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	3	3	3	2	3	3	1	2	2	2.5
CO2	3	3	3	3	1	3	3	2	2	2	2.5
CO3	3	3	3	2	2	3	3	2	3	1	2.5
CO4	2	1	2	3	3	3	3	3	3	3	2.6
CO5	3	3	2	2	3	3	3	3	3	2	2.7
Mean Overall Score											2.56
Correlation											High

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinator: Dr. S. K. Periyasamy

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	23UCN1AE1	AECC - I	2	2	-	100	100
Course Title		Value Education for Men					

SYLLABUS		
Unit	Contents	Hours
I	VALUES IN LIFE: Purpose and philosophy of life – Need for values –five fold moral culture. Values: truth, loyalty, integrity, humility, trustworthy, considerate, not being greedy, clean habits, punctuality, kindness, gratitude, patience, respect and character building.	6
II	PERSONAL WELLBEING: Social responsibility - taming a healthy mind and body – personal hygiene - Balanced diet – meditation – yoga - positive thinking – introspection - a passion for Nature- Win-win strategy.	6
III	ROLE OF MEN IN FAMILY: As a responsible student – committed employee - loyal husband - dedicated father – fatherhood- sacrificing human – considerate true friend.	6
IV	MAN A SOCIAL BEING: A friendly neighbour - living a life with definite motives – emotions and moral desire- uncompromising will power- puberty-secondary sexual characters- marriage: Purpose – marital life- Harmony with spouse- fidelity towards spouse.	6
V	PROFESSIONAL VALUES: More of a giver than a taker - being compassionate – patriotism - respecting culture - dependence on God – avoiding worry-professional ethics.	6

Hours of Teaching: 5 Hours and Hours of Activity: 25 Hours

Textbook(s):
1. Value Education for health, Happiness and harmony, the world community service centre, Vethathri Publications
2. N. Venkataiah, Value Education, APH Publishing Corporation, New Delhi, 1998
3. K.R. Lakshminarayanan and M. Umamageshwari, Value Education, Nalnilam Publication, Chennai.
Web References:
1. https://www.slideshare.net/humandakayilongranger/values-education-35866000
2. https://www.ananda.org/blog/5-secrets-to-a-harmonious-marriage/
3. https://www.un.org/esa/socdev/family/docs/men-in-families

Activity:

- Assignment on Values (not less than 20 Pages)
- Multiple Choice Questions and Quiz
- Elocution - (Manners and good Habits for 3 to 5 minutes)
- Field Visit
- Debating - Current issues
- Essay writing: Proper use of e-gadgets, Ethics, Cyber ethics, Social media, etc.,
- Case Study / Album Making / Poster Presentation / Documentary- Celebrating National Days, Drug abuse & illicit trafficking, Independence Day, Secularism, Teachers Day, National Youth Awakening Day, Father's Day / Mother's Day and etc.,

EVALUATION COMPONENT: TOTAL: 100 MARKS**Component I:**

Documentary (or) Poster Presentation (or) Elocution - 25 marks

Component II:

Quiz (or) Multiple choice questions Test - 25 marks

Component III:

Album Making (or) Case Study on a topic (or) Field visit - 25 marks

Component IV:

Assignment (or) Essay Writing (or) Debating - 25 marks

Course Coordinator: Dr. M. Purushothaman

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	23UCN1AE1	AECC - I	2	2	-	100	100
Course Title		Value Education for Women					

SYLLABUS		
Unit	Contents	Hours
I	VALUES IN LIFE: Purpose and philosophy of life – Need for values –five fold moral culture - Imbibing values: truth, loyalty, integrity, humility, trustworthy, considerate, not being greedy, clean habits, punctuality, kindness, gratitude, patience, respect and character building.	6
II	FAMILY: Nuclear – cluster – significance - social functions - changing trend - role of women in family - obedient daughter - purposeful youth- dedicated wife - caring mother.	6
III	PUBERTY: Need of knowledge of menstruation- menstrual symptoms – handling – menstrual disorder - maintaining good personal hygiene - motherhood- Stages of pregnancy- post pregnancy care.	6
IV	MARRIAGE: Types of marriage - purpose of marriage- love and infatuation – need for marital preparation - pre and post marital counselling - conflicts in marital life - divorce single parenthood.	6
V	HARMONY WITH SPOUSE: Husband and wife relationship - fidelity towards spouse-relationship among the family members. Tenets of bride for healthy family – kindness, respect, patience, care, love.	6

Hours of Teaching: 5 hours and Hours of Activity: 25 hours

Textbook(s):
1. Value Education for health, Happiness and harmony, the world community service centre, Vethathri Publications 2. N. Venkataiah, Value Education, APH Publishing Corporation, New Delhi, 1998 3. Betty, Carten and Meg Goldric, The Changing family life style - A Framework for Family Therapy, 2 nd Edition, 2000. 4. Marie, Madearentas, Family Life Education, CREST-Centre for research education service training for family promotion, Bangalore, 1999.
Web References:
1. https://www.slideshare.net/humandakakayilongranger/values-education-35866000 2. https://www.ananda.org/blog/5-secrets-to-a-harmonious-marriage/ 3. https://www.nap.edu/read/2225/chapter/14

Activity:

- Assignment on Values (not less than 20 Pages)
- Multiple Choice Questions and Quiz
- Elocution - (Manners and good Habits for 3 to 5 minutes)
- Field Visit
- Debating - Current issues
- Essay writing: Proper use of e-gadgets, Ethics, Cyber ethics, Social media, etc.,
- Case Study / Album Making / Poster Presentation / Documentary- Celebrating National Days, Drug abuse & illicit trafficking, Independence Day, Secularism, Teachers Day, National Youth Awakening Day, Father's Day / Mother's Day and etc.,

EVALUATION COMPONENT: TOTAL: 100 MARKS**Component I:**

Documentary (or) Poster Presentation (or) Elocution - 25 marks

Component II:

Quiz (or) Multiple choice questions Test - 25 marks

Component III:

Album Making (or) Case Study on a topic (or) Field visit - 25 marks

Component IV:

Assignment (or) Essay Writing (or) Debating - 25 marks

Course Coordinator: Dr. M. Purushothaman

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	23UPH2CC3	Core - III	6	6	25	75	100

Course Title	MECHANICS AND RELATIVITY
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SYLLABUS		
Unit	Contents	Hours
I	<p>Impact of Elastic Bodies and Projectile Motion: Impulse and Impact: Impulse of a force –collision –elastic and inelastic collision –Fundamental principle of impact – direct impact of two smooth spheres - loss of kinetic energy due to direct impact –oblique impact of two smooth spheres –loss of kinetic energy due to oblique impact Projectile on Inclined Plane: Range on an inclined plane – range and time of flight down an inclined plane – *maximum range* - two body problem and the reduced mass</p>	18
II	<p>Centre of Gravity, Hydrostatics and Hydrodynamics: Centre of Gravity: Definition – *Distinction between C.G and C.M* - centre of gravity of a solid cone, solid hemisphere, hollow hemisphere Hydrostatics: Pressure and thrust – trust on a plane surface immersed in a liquid at rest – determination of centre of pressure - centre of pressure of a rectangular lamina and triangular lamina immersed vertically in a liquid Hydrodynamics: Equation of continuity – energy of the liquid - Euler’s equation for unidirectional fluid flow –Bernoulli’s theorem – venturimeter – *pitot tube* – wings of an aeroplane</p>	18
III	<p>Moment of Inertia and Friction: Moment of Inertia: Radius of gyration –perpendicular axes theorem –parallel axes theorem –moment of inertia of a thin circular ring, circular disc and solid cylinder – the compound pendulum –period of oscillation – Determination of g Friction: Definitions of static, dynamic, rolling and limiting friction - *laws of friction* – determining coefficient of friction between two surfaces– Equilibrium of a body on a rough inclined plane acted upon by an external force</p>	18
IV	<p>Centre of Mass and Rocket Motion Centre of mass: Definition – position vector of centre of mass – motion of the centre of mass of a system of particles - conservation of linear momentum of a particle – angular momentum - relation between torque and angular momentum - angular momentum of a system of particles – conservation of angular momentum Rocket motion: Principle – theory – velocity of the rocket at any instant – propulsion system –multistage rocket –*shape of the rocket*.</p>	18
V	<p>Relativity: Concepts of space, time and mass –frames of reference –Newtonian principle of relativity –Galilean transformation equations –*Ether hypothesis* – Michelson-Morley experiment –postulates of the Special theory of relativity–Lorentz transformation –length contraction –time dilation – addition of velocities – mass-energy equivalence – Minkowski’s four dimensional space–time continuum – the general theory of relativity</p>	18

..... Self Study

Text Book(s):
<p>1. R Murugesan, Mechanics and Mathematical Physics, S. Chand Publications, Third Edition ,2014 Unit – I Section: 1.1, 1.2, 1.4 -1.7, 2.1 – 2.4 Unit – II Section: 3.1, 3.2, 3.4, 3.5, 4.1, - 4.5, 5.1 – 5.4 Unit IV Section : 13.1, 13.3, 13.4, 13.5, 13.6, 13.7, 13.8 – 13.14 2. R Murugesan, Properties of Matter, S Chand Publications, Revised Edition, 2017 Unit –III Section : 7.1 , 7.2, 7.4, 7.5, 7.6, 6.10 3.R Murugesan, Modern Physics, S.Chand Publications , 18th Edition, 2017 Unit - V: Section 1.1-1.10, 1.16</p>

Reference Book(s):
1. DS Mathur , Elements of Properties of Matter, S Chand Publications, Revised Edition, 2016 2. DS Mathur , Mechanics, S Chand Publications, Revised Edition, 2000 3. Soni Vidwan S , Mechanics and Relativity, PHI Learning Pvt. Ltd., Fourth Edition, 2019
Web Resource(s):
1. Mechanics and Relativity - TU Delft Research Portal , https://research.tudelft.nl > files 2. Special Theory of Relativity – NPTEL https://nptel.ac.in > courses 3. Engineering Mechanics - IIT Guwahati https://www.iitg.ac.in/rkbc/me101/Presentation/L16-18.pdf 4. Fluid Mechanics, IIT Kanpur – NPTEL https://nptel.ac.in/courses/112104118

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	a better understanding of the subjects in higher studies by knowing limitation and applications of mechanics	K2
CO2	enhanced the laboratory skills and problem solving ability in relevant area	K3
CO3	Analyse the mechanical behaviour of a body for applications in technological developments	K4
CO4	assimilate the theoretical knowledge and principle of mechanics which enable the student to become self-reliant on advanced level leanings	K4
CO5	determine forces acting on static and dynamic systems	K5

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	3	3	2	1	2	2	3	2	1	2.1
CO2	2	3	2	3	2	3	2	1	3	1	2.2
CO3	3	3	3	1	1	2	2	1	3	2	2.1
CO4	2	3	2	3	1	2	2	3	3	1	2.2
CO5	2	2	3	2	2	2	2	2	2	3	2.2
Mean Overall Score											2.16
Correlation											Medium

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinators: 1. Dr. A. Mohamed Saleem
2. Mr. A. Umar Malik

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	23UPH2CC4P	CORE – IV	3	3	20	80	100
Course Title		HEAT AND OPTICS - PRACTICAL					

List of Experiments:

1. Determination of the Young's modulus of a material using Non-uniform bending (Scale & Telescope).
2. Static Torsion: Determination of the Rigidity modulus of material.
3. Compound Pendulum: Determination of the Acceleration due to Gravity and Radius of Gyration
4. Comparison of the co-efficient of viscosities of two liquids using the Burette method.
5. Determination of the Specific heat capacity of a liquid using Newton's Law of Cooling.
6. Determination of the specific gravity of a solid and liquid using a sonometer.
7. Air wedge: Determination of the thickness of a material by forming interference fringes.
8. Surface tension and interfacial surface tension by drop weight method.
9. # **Determination of the specific rotatory power of solution using a polarimeter by monochromatic light. #.**
10. Determination of radii of curvature of convex and concave lenses.

- New experiment introduced under DBT Star College scheme

Books for reference:

1. M.N. Srinivasan, S. Balasubramaniyan, R. Ranganathan, A text book of Practical Physics, S.Chand and Sons , Reprint 2010.
2. C.C. Ouseph, U.J. Rao & V. Vijayendran, Practical Physics and Electronics, S. Viswanathan, Pvt,Ltd, First edition, 2007.

Web Resources:

www.physicstutorials.org
www.sciencelearn.org.nz
<http://amrita.olabs.edu.in/?sub=1&brch=5&sim=225&cnt=4>
<http://www.olabs.edu.in/?sub=1&brch=5&sim=224&cnt=2>

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Recall the basic principles of properties of matter and understand the concepts of bending behaviour beams	K2
CO2	Make practical skills essential for experimentation.	K3
CO3	Apply experimental approaches to correlate with physics theory to develop practical understanding.	K3
CO4	Analyze the concepts of heat, optics and acoustics and understood the measurements of some physical quantities through heat and optical experiments	K4
CO5	evaluate the the characteristics of the semiconductor diodes and its practical applications	K5

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	3	3	2	2	2	1	2	2	2	2.2
CO2	2	3	2	3	2	2	2	2	3	1	2.2
CO3	2	2	2	3	3	2	3	3	2	2	2.4
CO4	2	1	2	2	2	2	2	3	2	2	2.0
CO5	2	3	3	2	3	3	2	1	2	2	2.3
Mean Overall Score											2.20
Correlation											Medium

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinator: Dr.C. Hariharan

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	23UCH2AC3:1	Allied - III	4	4	25	75	100

Course Title	Inorganic, Organic and Physical Chemistry – II
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SYLLABUS		
Unit	Contents	Hours
I	<p>COORDINATION CHEMISTRY AND METALLIC BOND</p> <p>1.1. Coordination Chemistry: Introduction to co-ordination compounds, Werner's theory; ligands, co-ordination number, denticity, chelation; IUPAC nomenclature of mononuclear coordination compounds, isomerism; Bonding-Valence bond approach and basic ideas of Crystal field theory, colour and magnetic properties; Importance of coordination compound</p> <p>1.2. Metallic Bond: Properties - Electron gas and Band Theories. Semiconductors – Intrinsic and Extrinsic, n and *p- type*, super conductors.</p>	12
II	<p>ELECTRON DISPLACEMENT EFFECTS, AROMATICITY AND SUBSTITUTION REACTIONS</p> <p>2.1. Electron Displacement Effects- Electronic Displacements: Inductive, electromeric, resonance and mesomeric effects, hyperconjugation and their applications; Dipole moment; Organic acids and bases; their relative strength.</p> <p>2.2. Aromaticity – Criteria's – Huckel's rule - aromaticity of benzene, furan, thiophene, pyrrole and pyridine.</p> <p>2.3. Substitution reactions- mechanism of nitration, halogenation, sulphonation, *Friedel Crafts alkylation and acylation of benzene*.</p>	12
III	<p>CHLORO COMPOUNDS, CHEMOTHERAPY AND NAME REACTIONS</p> <p>3.1. Chloro compounds: Preparation and uses of dichloromethane, chloroform, carbon tetrachloride, freons, DDT and BHC.</p> <p>3.2. Chemotherapy: Sulpha drugs-structure, preparation and uses of sulphapyridine, sulphathiazole and sulphadiazine, Antibiotics –Structure and uses of penicillin-G and *Chloromycetin*.</p> <p>3.3. Name reactions: Benzoin, Perkin, Cannizzaro, Reimer-Tiemann and Kolbe's reactions. (Mechanism not necessary)</p>	12

IV	<p>SOLID STATE AND COLLOIDS</p> <p>4.1 Solid State: Nature of the solid state, law of constancy of interfacial angles, law of rational indices, Miller indices, elementary ideas of symmetry, symmetry elements and symmetry operations, seven crystal systems - X-ray diffraction, Bragg's law. Defects in crystals (stoichiometric and non- stoichiometric).</p> <p>4.2. Colloids: Definition, differences between true solution, colloidal solution and suspension, principle, applications -Electrical properties – Electrophoresis and Electro osmosis (definition and uses only) - protection of colloids – Gold number- *medicinal applications of colloids*.</p> <p>4.3. Emulsion and Gels: definition, types, preparation, properties and applications.</p>	12
V	<p>CHEMICAL KINETICS, CHEMICAL EQUILIBRIUM AND CATALYSIS</p> <p>5.1 Chemical Kinetics: Rate of a chemical reaction, factors affecting the rate of reactions: concentration, temperature, pressure and catalyst; elementary and complex reactions, order and molecularity of reactions, rate law, rate constant and its units. Arrhenius theory.</p> <p>5.2 Chemical Equilibrium: Criteria of homogeneous and heterogeneous equilibria. Decomposition of HI and PCl₅</p> <p>5.3 Catalysis: Catalysis – Importance of catalysis. Types of catalysis - Homogeneous and heterogeneous catalysis, factors affecting catalysis. Definitions of catalytic promoter, *catalytic inhibitor, catalytic poison*. Theory of catalysis - Acid-base catalysis</p>	12

..... Self Study

Text Books:
<p>1. P.L. Soni, Text book of Inorganic Chemistry, S. Chand & Co., New Delhi, 2017, Revised Edition, 2. P.L. Soni and H.M. Chawla, Text Book of Organic Chemistry, S. Chand & Co., New Delhi, 199728th Edition. 3. B.R. Puri, L.R. Sharma and M.S. Pathania, Principles of Physical Chemistry, Vishal Publications, Jalandhar, 2017, 48th Edition.</p>
Reference Book(s):
<p>1. B. R. Puri and L.R. Sharma, Principles of Inorganic Chemistry, Shoban Lal Nagin Chand and Co., New Delhi, 2020, 55th Edition. 2. A .K. Srivastava, Organic Chemistry, New Age International Publishers, New Delhi, 2002, 1st Edition. 3. R.L. Madan, G.D. Tuli, Simplified Course in Physical Chemistry, S. Chand & Co., New Delhi, 2009, 5th Revised and enlarged Edition.</p>
Web Resource(s):
<p>1. https://onlinecourses.nptel.ac.in/noc19_cy19/preview 2. https://www.youtube.com/watch?v=1zima5tIXbY 3. https://nptel.ac.in/courses/104101128</p>

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Understand the bonding nature of inorganic compounds and to classify different types of conductors	K1
CO2	Explain the concept of electron displacement effect and to apply Huckel's rule to identify the aromatic compounds	K2
CO3	Illustrate the preparation and uses of pesticides and some common drugs	K3
CO4	Differentiate types of solids and colloids	K4
CO5	Appraise the rate and molecularity reaction and to explain the application of catalysts	K5

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	3	3	2	2	3	3	2	2	1	2.4
CO2	3	3	3	2	2	3	3	2	1	1	2.3
CO3	3	3	3	2	1	3	2	2	2	1	2.3
CO4	3	3	3	2	2	3	2	2	2	1	2.3
CO5	3	3	3	2	1	3	2	2	2	1	2.2
Mean Overall Score											2.3
Correlation											Medium

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinator: Dr. S. K. Periyasamy

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	23UCH2AC4P	Allied - IV	3	2	20	80	100
Course Title		Organic Analysis - Practical					

List of Practicals	Hours
<p>Qualitative analysis of the following organic compounds:</p> <ol style="list-style-type: none"> Carbohydrate Amide Aldehyde Ketone Monocarboxylic acid Dicarboxylic acid Amine <p style="text-align: center;"><u>Scheme of valuation</u></p> <p>Record – 10 Marks Procedure writing – 10 Marks For Organic Analysis – 60 Marks</p> <p><u>For Organic Analysis Results Marks Distribution:</u></p> <p>(i) Special Elements Present/ Absent – 20 marks (ii) Aromatic/ Aliphatic – 10 marks (iii) Saturated/ Unsaturated – 10 marks (iv) Functional Group Present – 20 marks</p>	45

Text Books:
<ol style="list-style-type: none"> Ganapragasm N S and Ramamurthy G, Organic Chemistry Lab Manual, S. Vishwanathan Printers and Publishers (P) Ltd., Chennai, 2nd Edition, 2007. Venkateswaran V. Veerasamy R. Kulandaivelu A.R, Basic Principles of Practical Chemistry, S. Chand & Co Pvt. Ltd, New Delhi, 2nd Edition, 1997. Furniss B S, et al., Vogel's Textbook of Practical Organic Chemistry, ELBS Longman, London, 7th Edition, 1984.
Reference Books:
<ol style="list-style-type: none"> A. I. Vogel's, Text Book of Practical Organic Chemistry, Prentice Hall, 5th Edition, 1989.
Web Resources:
<ol style="list-style-type: none"> https://jru.edu.in/studentcorner/lab-manual/bpharm/Lab%20Manual%20-%20%20Pharmaceutical%20Organic%20Chemistry.pdf https://ncert.nic.in/pdf/publication/sciencelaboratorymanuals/classXII/chemistry/lelm108.pdf https://faculty.chas.uni.edu/~manfredi/860-121/ORG%20LAB%20MAN%20S08.pdf

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Recall the preliminary tests of organic qualitative analysis.	K1
CO2	Differentiate the aliphatic and aromatic nature of the organic compounds	K2
CO3	Examine the nature of the organic compound	K3
CO4	Separate the functional groups through appropriate chemical reactions	K4
CO5	Summarize their results of the organic analysis in a scientific way.	K5

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	3	3	3	2	3	3	3	2	2	2.7
CO2	3	2	3	3	3	3	3	2	3	1	2.6
CO3	3	2	3	3	2	3	3	3	2	2	2.4
CO4	3	2	1	3	3	3	3	3	3	2	2.6
CO5	3	2	3	1	2	3	3	2	3	1	2.3
Mean Overall Score											2.52
Correlation											High

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinator: Dr. S. Syed Abuthahir

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	23UCN2SS	Soft Skills Development	2	2	-	100	100
Course Title		Soft Skills Development					

SYLLABUS		
Unit	Contents	Hours
I	Communication Skills: Verbal and Non - Verbal communication - The active vocabulary - Conversational Etiquette - KOPPACT syndrome	6
II	Emotional Skills: Emotional Intelligence - The five steps to Emotional Quotient - Self Awareness and Regulation - Empathy - Social Intelligence - stress management - coping with failures	6
III	Functional Skills: Using the tools of communicatory and emotional skills - Resume writing - Preparation of Curriculum Vitae - interview skills - Acing the interview - Group dynamics - Mock interviews and Group discussions	6
IV	Interpersonal Skills: Synergising relationships - SWOT analysis - SOAR analysis - The social skills - Time Management - Decision making - problem solving - prioritising and Implementation	6
V	Personality Skills: Leadership skills - Attributes and Attitudes - Social leader Vs The Boss - critical and creative thinking	6

Hours of Teaching : 5 hours and Hours of Activity: 25 hours

Textbook(s):
<ol style="list-style-type: none"> 1. Social intelligence: The new science of human relationships - Daniel Goleman; 2006. 2. Body Language in the workplace - Allan and Barbara Pease; 2011. 3. Student's Hand Book: Skill Genie - Higher education department, Government of Andhra Pradesh.
Web References:
<ol style="list-style-type: none"> 1. https://nptel.ac.in/courses/109105110

EVALUATION CRITERIA

Work Book (Each unit carries 10 marks)	-	50 Marks
Examination	-	50 Marks

1. Teacher who handles the subject will award 50 marks for work book based on the performance of the student.
2. On the day of examination the examiners (Internal & External) will jointly award the marks for the following categories:
 - Self-Introduction - 20 Marks
 - Resume - 10 Marks
 - Mock Interview - 20 Marks

To assess the self-introduction, Examiners are advised to watch the video presentation submitted by the students. If they failed to submit the video presentation, the Examiners may direct the student to introduce himself orally and a maximum 10 marks only will be awarded.

Mock Interview Marks Distribution

(20-Marks)

Attitude (self interest, confidence etc.) (4 Marks)	Physical appearance including dress code (4 Marks)	Communication Skills (6 Marks)	Answering questions asked from the resume and work book (6 Marks)
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Course Coordinator:
Dr. M. Syed Ali Padusha

Semester	Course Code	Course Category	Hours/Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
III	23UPH3CC5	CORE - V	4	4	25	75	100
Course Title		Heat, Thermodynamics and Statistical Mechanics					

SYLLABUS		
Unit	Contents	Hours
I	Kinetic theory of Gases : Postulates of Kinetic theory of gases-Expression for the pressure of a gas-*Relation between pressure and kinetic energy* -Mean free path- specific heat capacities of gases- Mayer's relation- specific heat capacity of a gas at constant volume by Joly's differential steam calorimeter - Problems.	12
II	Radiation and Transmission of Heat: Conduction process- Coefficient of Thermal conductivity- Measurement of thermal conductivity – Forbes' method – Lee's disc method - Thermal radiation- Planck's quantum postulates-Derivation of Planck's radiation law-Derivation of Stefan's law-*Newton's law from Stefan's law*- Determination of Stefan's constant.	12
III	Specific Heat : Specific heat capacity of liquids-* Dulong and Petit's law*- Variation of specific heat and atomic heat with temperature - Newton's law of cooling-Specific heat capacity of liquids-Barton's correction- Einstein's theory of Specific heat capacity of solids.	12
IV	Thermodynamics : Statements of Zeroth, first, second and third laws of thermodynamics - Isothermal and adiabatic processes -Work done during isothermal and adiabatic changes - Carnot's theorem-Heat engine -Entropy- Principle of increase of entropy – Change of entropy in reversible and irreversible processes- *Change of entropy problems*	12
V	Statistical Mechanics: Definition of phase-space – Micro and Macro states – ensembles –different types of ensembles – classical and quantum Statistics – Maxwell-Boltzmann statistics – expression for distribution function - Bose-Einstein statistics – expression for distribution function – Fermi-Dirac statistics –expression for distribution function – comparison of three statistics	12

..... Self Study

Text Book(s):
1.Heat and Thermodynamics - Brijlal and N. Subramaniam, P.S.Hemne. S. Chand & Co, New Delhi . Revised Edition. 2010 2.Thermal physics -R. Murugesan, Kiruthiga Sivaprasath. S.chand & co. Third Revised edition-2012.
Reference Book(s):
1. Heat and Thermodynamics - J.B. Rajam and C. L. Arora, Second edition.S. Chand & Co, New Delhi. 2.Thermodynamics and Statistical Physics - Sharma and Sarkar, Himalaya publishers, Mumbai. 3. https://www.longdom.org/open-access/thermal-power-generation-by-utilizing-waste-heat-energy-90989.html
Web Resource(s):
1. https://youtu.be/M_5KYncYNyc 2. https://www.youtube.com/watch?v=4M72kQuIGKk&vl=en

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Acquire the basic principles of heat energy, heat conduction and their properties.	K1
CO2	Obtain the capacity of solving problems related to thermal conductivity and entropies	K3
CO3	Imbibe the ability to understand the laws of radiation and its visualization in day to day life	K2
CO4	Explore the ideas of lowering the temperature.	K4
CO5	Be motivated to carryout research in Heat and Thermodynamics related fields.	K5

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	3	3	1	3	2	2	2	3	2	2.3
CO2	2	2	2	3	2	2	3	2	2	2	2.2
CO3	3	2	3	2	2	2	2	3	1	2	2.2
CO4	2	2	2	2	1	2	3	1	3	3	2.1
CO5	3	2	2	2	2	3	2	2	2	2	2.2
Mean Overall Score											2.2
Correlation											Medium

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinators:

Major. F. S. MUZAMMIL

R. Gowthar

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
III	23UPH3CC6P	CORE - VI	3	3	20	80	100
Course Title		THERMAL AND ELECTRICITY – PRACTICAL					

S.No.	List of Experiments
1	Determination of the Young's modulus [Y] of a material using Uniform bending (Single Optic Lever).
2	Determination of the Co-efficient of viscosity [η] of a highly viscous liquid using Stoke's Method.
3	Measurement of the charge of an electron by Millikan's oil drop method.
4	Construction of AND, OR, NOT and EX-OR gates using NAND.
5	Measurement of specific charge of an electron (e/m ratio) by Thomson's method.
6	Figure of merit of a Sensitive Galvanometer.
7	Potentiometer: Calibration of a Low Range Voltmeter.
8	Bridge rectifier with π -section filter and Zener diodes.
9	Determination of magneto resistance of a semiconductors.
10	Construction of clipping and clamping circuits.

Text Book(s):
1. M.N. Srinivasan, S. Balasubramaniyan, R. Ranganathan, A text book of Practical Physics, S. Chand & Sons, Reprint 2010.
Reference Book(s):
1. C.C. Ouseph, U.J. Rao & V. Vijayendran, Practical physics and electronics, S. Viswanathan, Pvt, Ltd, First edition, 2007.
Web Resource(s):
1. www.physicstutorials.org 2. www.sciencelearn.org.nz

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Acquire the basic principles of properties of matter and the underlying concepts of bending behavior of beams.	K1
CO2	Learn the experimental skills.	K2
CO3	Understand the measurements of some physical quantities through electrical and magnetism experiments	K3
CO4	Understand the characteristics of the semiconductor diodes and the practical applications of properties of matter and electronics in their day to day life.	K3
CO5	Apply the basic requirements for their higher studies and learned the circuit construction in the electricity and electronics experiments .	K5

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	1	2	3	2	2	2	3	3	2.3
CO2	3	2	3	2	2	2	2	2	3	2	2.3
CO3	3	2	2	2	2	2	2	2	3	2	2.2
CO4	3	2	3	2	1	2	2	2	3	3	2.3
CO5	3	2	3	3	2	2	2	2	3	2	2.4
Mean Overall Score											2.3
Correlation											Medium

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinators:

Dr. S. Abbas Manthiri

Mrs. M. Ayesha

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
III	23UMA3AC5:2	Allied – V	4	3	25	75	100
Course Title		CALCULUS					

SYLLABUS

Unit	Contents	Hours
I	Higher Derivatives: The nth derivative - Standard results - Trigonometrical transformations - Formation of equations involving derivatives - Leibnitz formula for the nth derivative of a product (Statement only) - Related problems.	12
II	Jacobian – Curvature: Circle, radius and centre of curvature – Cartesian formula for the Radius of Curvature – The Coordinates of the Center of Curvature	12
III	Properties of definite integrals – Integration by parts - Reduction formulae $\int x^n e^{ax}$, $\int \sin^n x$, $\int \cos^n x$, and $\int \sin^m x \cos^n x$ - Related problems.	12
IV	Multiple Integral: Definition of the double integral – Evaluation of the double integral – *Application of multiple integrals*	12
V	Volume of solids of revolution – volumes of solids as double integrals – Volume as a triple integral - *Areas of curved Surface*	12

..... Self Study

Text Book(s):

1. S. Narayanan, R. Hanumantha Rao and T.K. Manicavachagom Pillay, Ancillary Mathematics Volume - I, S. Viswanathan Publishers Pvt. Ltd Revised Edition (2007).
2. S. Narayanan, R. Hanumantha Rao and T.K. Manicavachagom Pillay, Ancillary Mathematics Volume - II, S. Viswanathan Publishers Pvt. Ltd Revised Edition (2007).

UNIT I	Chapter VI	Sections 6.1	T.B.1
UNIT II	Chapter VI	Sections 6.2, 6.4	T.B.1
UNIT III	Chapter 1	Sections 11, 12, 13.1-13.5	T.B.2
UNIT IV	Chapter 3	Sections 2.1, 2.2 & 4.1	T.B.2
UNIT V	Chapter 3	Sections 3, 5.1 – 5.4	T.B.2

Reference Book(s):

1. T.K. Manicavachagom Pillay and Others, Calculus Volume-I, S. Viswanathan Publishers Pvt. Ltd. (2004).
2. T.K. Manicavachagom Pillay and Others, Calculus Volume-II, S. Viswanathan Publishers Pvt. Ltd. (2004).

Web Resource(s):

1. <https://nptel.ac.in/courses/111104092>
2. <https://nptel.ac.in/courses/111105122>

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Recall and illustrate the examples of Multiple Integrals.	K1
CO2	Demonstrate and discuss Jacobian – Curvature with examples.	K2
CO3	Apply domain knowledge for Integration by parts - Reduction formulae	K3
CO4	Examine methods for Higher Derivatives with illustrate the examples.	K4
CO5	Study of Application of multiple integrals with suitable examples.	K5

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	3	1	3	3	1	3	3	3	2	2.5
CO2	3	1	3	1	3	3	2	3	3	1	2.3
CO3	3	3	1	3	3	3	3	3	3	3	2.8
CO4	1	3	3	1	3	3	3	1	3	2	2.3
CO5	3	3	1	3	1	3	1	3	2	3	2.3
Mean Overall Score											2.4
Correlation											Medium

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinators:

1. Dr. P. Muruganatham
2. Mr. T. Rabeeh Ahamed

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
III	23UMA3AC6:2	Allied – VI	3	3	25	75	100
Course Title		ALGEBRA AND TRIGONOMETRY					

SYLLABUS		
Unit	Contents	Hours
I	Theory of equations: *Nature of roots* – Relation between the coefficients and the Roots of an algebraic equation – Transformation of equations – Reciprocal equations.	9
II	Matrices- *Special types of matrices*- Scalar multiplication of a matrix- Equality of matrices, Addition of matrices- Subtraction- Symmetric matrix-Skew symmetric matrix-Hermitian and skew Hermitian matrices- Multiplication of matrices (Problems only).	9
III	Matrices: *Various types of Matrices* - Rank of a Matrix - Eigen values and Eigen Vectors- Verification of Cayley-Hamilton theorem.	9
IV	Trigonometry: Expansions of $\cos n\theta$ and $\sin n\theta$ – Powers of sines and cosines of θ in Terms of functions of multiple of θ .	9
V	Hyperbolic functions – Simple Problems	9

..... Self Study

Text Book(s):				
1. S.Narayanan, R.Hanumantha Rao and T.K. Manicachagom Pillay, P. Kandaswamy, Ancillary Mathematics, Volume I, S. Viswanathan Publishers Pvt. Ltd. Revised Edition (2007).				
2. T.K. Manicavachagom Pillay, T. Natarajan and K.S. Ganapathy, Algebra Volume-II, Ananda Book Depot, Chennai (2019).				
UNIT I	Chapter 2	Sections 2.1– 2.4		TB-1
UNIT II	Chapter 2	Sections 1-7		TB-2
UNIT III	Chapter 3	Sections 3.1, 3.2, 3.4.		TB-1
UNIT IV	Chapter 5	Sections 5.1, 5.2		TB-1
UNIT V	Chapter 5	Section 5.4.		TB-1
Reference Book(s):				
1. A. Abdul Rashid, Allied Mathematics, Vijay Nicole Publishing Company (2008).				
2. S. Arumugam and A. Thangapandi Isaac, Ancillary Mathematics, New Gamma Publishing house (2002).				
Web Resource(s):				
1. https://nptel.ac.in/courses/111107119				
2. https://www.digimat.in/nptel/courses/video/111107119/L01.html				

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Understand of common algebra and how they are used to obtain solutions of matrices then mathematical problems.	K1
CO2	Derive the Trigonometry Expansions of $\cos n\theta$ and $\sin n\theta$ – Powers of sines and cosines.	K2
CO3	Apply algebra and Trigonometry to obtain solutions to mathematical problems.	K3
CO4	Analyse mathematical problems to determine the suitable functions.	K4
CO5	Evaluate various Trigonometry functions and roots of algebraic equation, hyperbolic functions.	K5

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	3	3	2	1	3	3	3	2	3	2.6
CO2	2	3	3	3	1	3	3	3	1	3	2.5
CO3	3	1	3	3	1	3	1	3	3	3	2.4
CO4	3	2	3	2	1	1	2	3	3	3	2.3
CO5	2	3	1	3	1	3	3	3	3	3	2.5
Mean Overall Score											2.46
Correlation											Medium

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinators:

1. Dr. V. Krishnan
2. Mr. T. Rabeeh Ahamed

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
III	23UPH3GE1	GENERIC ELECTIVE - I	2	2	-	100	100
Course Title		ASTRONOMICAL SCIENCE					

SYLLABUS		
Unit	Contents	Hours
I	TELESCOPES: Optical telescopes – magnifying power, brightness, resolving power and f/a ratio – types of reflecting and refracting telescopes – detectors and image processing – radio telescopes – Hubble space telescope.	6
II	SOLAR SYSTEM: Bode's law of planetary distances – meteors, meteorites, comets, asteroids – Kuiper belt – Oort cloud – detection of gravitational waves – recent advances in astrophysics.	6
III	ECLIPSES: types of eclipses – solar eclipse – total and partial solar eclipse – lunar eclipse – total and partial lunar eclipse – transits. THE SUN: physical and orbital data – solar atmosphere – photosphere – chromosphere – solar corona – prominences – sunspots – 11 year solar cycle – solar flares.	6
IV	STELLAR EVOLUTION: H-R diagram – birth & death of low mass, intermediate mass and massive stars – Chandrasekhar limit – white dwarfs – neutron stars – pulsars – black holes – supernovae. GALAXIES: classification of galaxies – galaxy clusters – interactions of galaxies, dark matter and super clusters – evolving universe.	6
V	Position in the Sky: Spherical Polar Coordinates – Celestial Sphere – Altitude and Azimuth – Rotation – Solar and Sidereal Days – Declination and Hour Angle – Time – Right Ascension and Declination – Heliocentric Time – Julian Date – Spherical Trigonometry	6

Text Book(s):
1. Baidyanath Basu, (2001). <u>An introduction to Astrophysics</u> , Second printing, Prentice – Hall of India (P) Ltd, New Delhi
2. K.S. Krishnaswamy, (2002), <u>Astrophysics – a modern perspective</u> , New Age International (P) Ltd, New Delhi.
3. C.R. Kitchin telescopes and techniques, Springer new York Heidelberg Dordrecht London, third edition, 2013
Reference Book(s):
1. Shylaja, B.S. & Madhusudan, H.R., (1999), <u>Eclipse: A Celestial Shadow Play</u> , Orient BlackSwan,
Web Resource(s):
1. https://www.physics.udel.edu/~jlp/classweb2/directory/powerpoint/telescopes.pdf
2. https://phys.libretexts.org/Courses/Grossmont_College/ASTR_110%3A_Astronomy_(Fitzgerald)/08%3A_A_Comet_Asteroids_and_Meteoroids_-_The_Leftovers_of_the_Solar_System
3. https://unacademy.com/content/neet-ug/study-material/physics/astronomical-telescopes/

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Stimulating to think the need of difference types of telescope	K1
CO2	Demonstrate Solar system to understand recent advances in astrophysics	K2
CO3	Constructing telescope and outlines its application	K3
CO4	Analyze stellar evolution and help classify galaxies	K4
CO5	Might sky observation, Develop models, visiting observatories	K5

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	3	3	3	3	3	3	2	2	3	2.8
CO2	3	3	3	2	3	2	2	3	3	3	2.7
CO3	3	3	3	3	3	3	2	2	3	2	2.7
CO4	3	3	3	3	2	3	3	3	2	3	2.9
CO5	3	3	2	3	3	3	3	2	3	3	2.8
Mean Overall Score											2.78
Correlation											High

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinators:

Dr. N. Peer Mohamed Sathik

Dr. P. Revathi

Semester	Course Code	Course Category	Hours / Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
III	23UCN3AE2	AECC - II	2	2	-	100	100
Course Title		Environmental Studies					

Unit	Contents	Hours
I	The multidisciplinary nature of environmental studies Definition, scope, importance, awareness and its consequences on the planet.	6
II	Ecosystems: Definition, structure and function of ecosystem; Energy flow in an ecosystem: food chain, food web and ecological succession. Case studies of the following ecosystems: a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	6
III	Natural Resources: Renewable and Non-renewable Resources: Land Resources and land use change; Land degradation, soil erosion and desertification. Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations. Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state). Heating of earth and circulation of air; air mass formation and precipitation. Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies. renewable energy resources significance of wind, solar, hydal, tidal, waves, ocean thermal energy and geothermal energy.	6
IV	Biodiversity and Conservation: Levels of biological diversity: genetic, species and ecosystem diversity; Biogeography zones of India; Biodiversity patterns biodiversity hot spots. mega-biodiversity nation; Endangered and endemic species of India. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity: <i>In situ</i> and <i>Ex situ</i> conservation of biodiversity. Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.	6
V	Environmental Pollution & Conservation: Environmental pollution: types, causes, effects and controls; Air, water, soil, chemical and noise pollution Waste to wealth - Energy from waste, value added products from waste, fly ash utilization and disposal of garbage, solid waste management in urban and rural areas, Swachh Bharat Abhiyan, recent advances in solid waste management, modern techniques in rain water harvesting and utilization.	6

Text books:

1. Asthana DK and Meera A, Environmental studies, 2nd Edition, Chand and Company Pvt Ltd, New Delhi, India, 2012.
2. Arumugam N and Kumaresan V, Environmental studies, 4th Edition, Saras Publication, Nagercoil, Tamil Nadu, India, 2014.

Activity – I:

1. Assignments – Titles on Environmental awareness to be identified by teachers from the following (scripts not less than 20 pages)
2. Elocution – (Speech on “Environment beauty is the fundamental duty” of citizen of the country for 3 to 5 minutes)
3. Environment issues – TV, Newspaper, Radio and Medias messages – Discussion ∞ Case Studies/Field Visit/Highlighting Day today environmental issues seen or heard
4. Debating/Report Submission – Regarding environment issues in the study period Activity II
5. Environmental awareness through charts, displays, models and video documentation.

Celebrating Nationally Important Environmental DaysNational Science Day – 28th FebruaryWorld wild life Day – 3rd MarchInternational forest Day – 21st MarchWorld Water Day – 22nd MarchWorld Meteorological Day – 23rd MarchWorld Health Day – 7th AprilWorld Heritage Day – 18th AprilEarth / Planet Day – 22nd AprilPlants Day – 26th MayEnvironment Day – 5th June Activity III Discipline specific activities**EVALUATION COMPONENT:**

Component I: (25 Marks) Document (or) Poster presentation or Elocution

Component II: (25 Marks) Album making (or) case study on a topic (or) field visit

Component III: (25 Marks) Essay writing (or) Assignment submission

Component IV: (25 Marks) Quiz (or) multiple choice question test

Course Outcomes**Course Outcomes:** Upon successful completion of this course, the student will be able to:

CO No.	CO Statement	Cognitive Level (K-level)
CO1	To understand the multi-disciplinary nature of environmental studies and its importance	K1
CO2	To obtain knowledge on different types of ecosystem	K2
CO3	To acquire knowledge on Renewable and non-renewable resources, energy conservation	K3
CO4	To understand biodiversity conservation	K4
CO5	To analysis impact of pollution and conversion waste to products	K5

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	02	02	02	02	02	03	03	03	03	03	2.5
CO2	02	03	03	02	03	03	03	03	03	03	2.8
CO3	02	03	03	03	03	03	03	03	03	03	2.9
CO4	02	02	03	03	03	03	03	03	03	03	2.8
CO5	02	03	03	03	03	03	03	02	03	03	2.8
Mean Overall Score											2.7
Correlation											High

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinator: Dr. B. Balaguru

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
IV	23UPH4CC7	Core - VII	5	5	25	75	100
Course Title		OPTICS AND SPECTROSCOPY					

SYLLABUS		
Unit	Contents	Hours
I	<p>Geometrical optics: Lens systems: Principal focus and Focal plane – first and second principal foci – second principal focus- power of lens – focal length of combination of two thin lenses in contact-cardinal points- principal points – focal points – nodal points. Aberrations: Aberrations - Spherical aberration in lenses - Methods of minimizing spherical aberration - Condition for minimum spherical aberration of two thin lenses separated by a distance- Chromatic aberration in lenses * coma and astigmatism* Eyepieces: Ramsden’s eyepieces - Huygen’s eyepieces- Comparison of eyepieces.</p>	15
II	<p>Interference and diffraction: Theory of Interference fringes- Fresnel’s Biprism: Experiment to determine the Wavelength of light- Air wedge- Determination of the diameter of a thin wire- Interferometer- Michelson’s Interferometer- Construction-Working- Measurement of Wavelength of monochromatic light - Fresnel diffraction-Diffraction at circular aperture, straight edge and Narrow slit-Fraunhoffer diffraction-single slit-Double slit</p>	15
III	<p>Polarization: Double refraction-Nicol prism-Polarizer and analyzer-Huygen’s theory of double refraction in uniaxial crystals – Fresnel’s theory of double refraction - Theory of Plane, Circularly and Elliptically polarized light- Quarter wave plate-Half wave plate- Production and detection of plane, circularly and elliptically polarized light - Optical activity-Specific rotation-*Laurent’s half-shade polarimeter*.</p>	15
IV	<p>Fundamental Concepts in Spectroscopy: Properties of Electromagnetic Radiation – Electromagnetic Spectrum – Different types of Molecular Energies – Interaction of Electromagnetic Radiation with Matter – Molecular Absorption of Electromagnetic Radiation – Types of Molecular Spectra – *Characteristics of Spectral lines* – importance of spectroscopy</p>	15
V	<p>Microwave and Raman Spectroscopy: Microwave Spectroscopy: Differences between Infrared and Microwave Spectroscopy – Theory of Microwave Spectroscopy – Linear Molecules – Spherical Top Molecules –Instrumentation for Microwave Spectroscopy – Applications of Microwave Spectroscopy. Raman Spectroscopy: Introduction – Principle – Characteristic properties of Raman lines *Differences between Raman and IR spectra - Mechanism of Raman effect* Instrumentation – Intensity of Raman Peaks – Applications of Raman Spectroscopy.</p>	15
VI	<p>Current Trends (For CIA only) Introduction to Fiber Optic Sensors and their Types</p>	

..... Self Study

Text Book(s):
<ol style="list-style-type: none"> 1. R. Murugesan and Kiruthiga Sivaprasath, Optics and Spectroscopy, S. Chand & Company Ltd, New Delhi , 7th Revised Edition, 2010. 2. Gurdeep R. Chatwal & Sham K. Anand., Spectroscopy (Atomic and Molecular) –Himalaya Publishing House 3. G. Aruldas., Molecular Structure and Spectroscopy, PHI Ltd, Second Edition 2017
Reference Book(s):
<ol style="list-style-type: none"> 1. Ajoy Ghatak, Optics, Tata Mc Graw Hill, New Delhi , 4th Edition, 2009. 2. Subrahmanyam, Brij Lal and M. N. Avadhanulu, A Text Book of Optics, S. Chand, New Delhi, 23rd Edition, 2006 2. 3. Colin N. Banwell and Elaine M. McCash, Fundamentals of Molecular Spectroscopy, Fourth Edition, Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2010.

Web Resource(s):
1. https://nptel.ac.in/courses/104104085/34
2. https://www.elprocus.com/different-types-of-fiber-optic-sensors/

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Understand the various types of aberrations that can occur in the lenses and the limitations that arise in eyepieces because of them.	K2
CO2	Realize the concept of dispersion, the means of calculating dispersive power, know the instruments to observe it and as an illustrative example its real-world application in the explanation of the formation of rainbows	K2
CO3	Comprehend the concepts of interference, the various applications of it.	K3
CO4	Have a clear idea of the concept of diffraction, polarization and its applications in optical instruments.	K3
CO5	Understand the concept of spectroscopy and apply experimental approaches to correlate with physics theory to develop practical understanding	K2

Relationship matrix

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	3	3	1	2	3	3	3	2	2	2.0
CO2	3	3	3	1	2	3	3	2	2	2	2.2
CO3	3	3	3	3	3	3	3	3	3	3	3.0
CO4	3	3	1	3	1	2	2	3	1	3	2.2
CO5	3	3	3	3	3	3	2	2	2	3	2.7
Mean Overall Score											2.42
Correlation											Medium

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinators:

Dr. A.S. Haja Hameed

Mrs. G. Pragadeeswari

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
IV	23UPH4CC8P	CORE – VIII	3	3	20	80	100
Course Title		MEASUREMENT AND CALIBRATION - PRACTICAL					

S.No.	List of Experiments
1	Determination of the Young's modulus [Y] of a material: Cantilever Depression (Scale and Telescope).
2	Determination of Rigidity modulus by static torsion method.
3	Determination of the Co-efficient of viscosity [η] of a highly viscous liquid using Searle's Viscometer.
4	Study the frequency response of the LCR series resonance circuit.
5	Determination of the EMF of Thermocouple – Direct Deflection Method.
6	Calibration of an Ammeter using a Potentiometer.
7	Measurement of wavelength of monochromatic light using Fresnel Biprism.
8	Determination of the Band Gap Energy [Eg] of a thermistor using a Post Office Box.
9	Measurement of wavelength of monochromatic light using Michelson's interferometer.
10	Construction of NOT,AND, OR and EX-OR gates using NOR

Text Book(s):
1. M.N. Srinivasan,S.Balasubramaniyan, R. Ranganathan, A text book of Practical Physics, S.Chand&Sons , Reprint 2010.
Reference Book(s):
1. C.C. Ouseph, U.J. Rao& V. Vijayendran, Practical physics and electronics, S. Viswanathan, Pvt,Ltd, First edition,2007.
Web Resource(s):
1. www.physicstutorials.org 2. www.sciencelearn.org.nz

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Acquire the basic principles of properties of matter and underlying the concepts of bending behaviour beams.	K1
CO2	Learn the experimental skills.	K2
CO3	Familiarise the concept of heat, optics and acoustics. understood the measurements of some physical quantities through heat and optical experiments.	K3
CO4	Learn the measurements and calibration techniques of various instruments.	K3
CO5	Acquire the basic requirements for their higher studies.	K5

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	3	2	3	2	2	2	3	3	2.5
CO2	3	2	3	2	2	2	2	2	3	2	2.3
CO3	3	2	2	2	2	2	2	2	3	2	2.2
CO4	3	2	3	2	3	2	2	2	3	3	2.5
CO5	3	2	3	3	2	2	2	2	3	2	2.4
Mean Overall Score											2.4
Correlation											Medium

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinators:

Dr. A. Abbas Manthiri

M. Shobanambigai

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
IV	23UMA4AC7:2	Allied – VII	4	3	25	75	100
Course Title		DIFFERENTIAL EQUATIONS (For Physics)					

SYLLABUS		
Unit	Contents	Hours
I	Differential Equations of the first order: Definitions – Solution of Differential Equations – Formation of differential equations – Equations of the first order and the first degree – variable separable – Homogenous equations – *Non-homogenous equations of the first degree in x and y* – linear equation.	12
II	Linear Differential Equations with Constant Coefficients: The operator D and D^{-1} – Particular integral – Special methods of finding P.I – Equations reducible to the linear homogeneous equation.	12
III	Partial Differential Equations: Derivation of partial differential equations – Different integrals of partial differential equations – Solution of partial differential equation in some simple cases – *Some standard types of first order equations* – Lagrange's Equations.	12
IV	Laplace Transforms: Definitions – Laplace transform of periodic functions – Some General Theorems and problems.	12
V	The inverse transforms: Results under inverse transforms of functions – Solving ordinary differential equations with constant coefficients using Laplace transforms.	12

..... Self Study

Text Book(s):															
S. Narayanan and T.K. Manicavachagom Pillay, Calculus, Volume – III, S. Viswanathan Publishers Pvt. Ltd., Revised Edition (2019).															
<table style="width: 100%; border: none;"> <tr> <td style="width: 20%;">UNIT I</td> <td style="width: 20%;">Chapter II</td> <td style="width: 60%;">Sections 4, 5, 6.1 – 6.5</td> </tr> <tr> <td>UNIT II</td> <td>Chapter IV</td> <td>Sections 1 – 4</td> </tr> <tr> <td>UNIT III</td> <td>Chapter V</td> <td>Sections 1 – 5</td> </tr> <tr> <td>UNIT IV</td> <td>Chapter IX</td> <td>Sections 1 - 5</td> </tr> <tr> <td>UNIT V</td> <td>Chapter IX</td> <td>Sections 6 - 11</td> </tr> </table>	UNIT I	Chapter II	Sections 4, 5, 6.1 – 6.5	UNIT II	Chapter IV	Sections 1 – 4	UNIT III	Chapter V	Sections 1 – 5	UNIT IV	Chapter IX	Sections 1 - 5	UNIT V	Chapter IX	Sections 6 - 11
UNIT I	Chapter II	Sections 4, 5, 6.1 – 6.5													
UNIT II	Chapter IV	Sections 1 – 4													
UNIT III	Chapter V	Sections 1 – 5													
UNIT IV	Chapter IX	Sections 1 - 5													
UNIT V	Chapter IX	Sections 6 - 11													
Reference Book(s):															
1. S. Arumugam and A. Thangapandi Isaac, Calculus, New Gamma Publishing House (2008).															
2. A. Abdul Rashid, Allied Mathematics, Vijay Nicole Publication Company.															
Web Resource(s):															
1. https://www.classcentral.com/course/swyam-ordinary-and-partial-differential-equations-and-applications-17718															
2. https://nptel.ac.in/noc/courses/noc18/SEM2/noc18-ma10/															
3. https://nptel.ac.in/courses/111/105/111105093/															

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Apply domain knowledge for solving first order linear differential equations.	K1
CO2	Discuss and solve the linear differential equations with constant coefficients with examples.	K2
CO3	Solve the partial differential equations and Lagrange's equations with the examples.	K3
CO4	Investigate Laplace transform of periodic functions and some general theorems with examples.	K4
CO5	Determine results under inverse transforms of functions with examples and solve differential equations with constant co-efficient	K5

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	2	2	2	3	3	3	2	2	2.4
CO2	3	2	1	2	3	3	3	3	3	2	2.5
CO3	3	3	2	2	2	3	3	3	2	2	2.5
CO4	3	3	2	2	2	3	3	3	2	2	2.5
CO5	3	3	3	1	2	3	3	3	2	2	2.5
Mean Overall Score											2.48
Correlation											Medium

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinators:

1. Dr. U. Abuthahir
2. Dr. C. Gurubaran

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
IV	23UMA4AC8:2	Allied – VIII	4	3	25	75	100
Course Title		VECTOR CALCULUS AND FOURIER SERIES (For Physics)					

SYLLABUS		
Unit	Contents	Hours
I	Fourier Series: Even and Odd Functions – Half Range Fourier Series – Development in Cosine series.	12
II	Development in Sine Series – Change of interval – Combination of series.	12
III	Vector Analysis: Level Surfaces – The vector differential operator – Gradient – Direction and Magnitude of gradient – Divergence and curl.	12
IV	Line integral – Theorem under Line integral – Volume integral – Surface integral.	12
V	Gauss Divergence Theorem (Statement only) – Stokes Theorem (Statement only) - Simple problems.	12

Text Book(s):		
S. Narayanan, R. Hanumantha Rao and T.K.Manikavachagompillay, P. Kandasamy, Ancillary Mathematics, Volume – II, S.Viswanathan publishers Pvt. Ltd., Revised Edition (2007).		
UNIT I	Chapter - 2	Sections 1 to 4, 5.1
UNIT II	Chapter - 2	Sections 5.2, 6, 7
UNIT III	Chapter - 8	Sections 15 to 20
UNIT IV	Chapter - 8	Sections 1 to 5
UNIT V	Chapter - 8	Sections 6 and 9
Reference Book(s):		
1. S. Arumugam and A. Thangapandi Isaac, Calculus, New Gamma Publishing House (2008).		
2. A. H. Siddiqi & P.H. Manchanda, A first course in Differential Equations with applications, Macmillan Publishers India Limited, 2006.		
Web Resource(s):		
1. https://nptel.ac.in/courses/111105122		
2. https://nptel.ac.in/courses/111101164		

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Relate and study the Vector differential operator	K1
CO2	Acquire more knowledge on line, volume and surface integral	K2
CO3	Demonstrate and discuss the Half range Fourier series	K3
CO4	Apply domain knowledge for the sine and cosine series in change of interval	K4
CO5	Remember the concept of vector and operators with examples	K5

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	3	2	3	3	2	3	3	2	2	2.4
CO2	3	2	2	3	3	3	2	3	2	2	2.5
CO3	3	3	2	3	3	3	2	3	3	3	2.5
CO4	3	3	1	2	3	3	3	3	1	3	2.5
CO5	1	3	3	2	3	3	2	2	3	3	2.5
Mean Overall Score											2.58
Correlation											High

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinators:

- Dr. H. Sheik Mujibur Rahman
Mr. T. Rabeeh Ahamed

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
IV	23UPH4GE2	GENERIC ELECTIVE – II	2	2	-	100	100
Course Title		MEDICAL PHYSICS					

SYLLABUS		
Unit	Contents	Hours
I	Pressure measurement Eye pressure measurement – Schiötz Tonometer – Goldmann Tonometer – *Comparison between Schiötz and GoldmannTonometers* – Urinary bladder pressure – Direct measurement –Cathetar method.	6
II	Diagnostic Devices X-ray machine – *Comparison between radiography and fluoroscopy* – Angiography-Applications of X-rays Examination –MRI instrumentation.	6
III	Therapeutic Devices Pace maker – *Comparison between external and internal pace maker* – Defibrillators: Internal and external defibrillators –A.C. and D.C. defibrillator.	6
IV	Laser in Medicine Laser – Properties – Principle of Laser action: Spontaneous and Stimulated emission – Population inversion – Applications: LASIK (Laser in-situ keratomileusis) Eye Surgery – Advantages of Laser surgery – Laser based Doppler blood flow meters.	6
V	Ultrasonics in Medicine *Ultrasonics* –Ultrasonic propagation through tissues– B-mode ultrascan– Recording fetal heart movement using Doppler Ultrasonic method– Ultrasonic Imaging System.	6

Text Book(s):
<p>1. Medical Physics, John R. Cameron, University of Wisconsin, Madison & James G. Skofronick, Florida State university, Tallahassee, A wiley-Interscience Publication, John Wiley & sons, Singapore.</p> <p>2. Biomedical Instrumentation, Dr. M. Arumugam, Anuradha Publications PVT, Kumbakonam Second Edition, Reprint-2010,</p>
Reference Book(s):
<p>1. Biomedical Instrumentation and Measurements, Leslie Cromwell, Fred J. Weibell, Erich A. Pfeiffer, Second Edition, Prentice Hall of India, PVT, New Delhi, 2005.</p>
Web Resource(s):
<p>1. Cathetar method: https://www.rch.org.au/rchcpg/hospital_clinical_guideline_index/Intraabdominal_PressureMonitoring/Angiography/ Angiography: https://www.news-medical.net/health/What-is-Angiography.aspx LASIK Eye Surgery: https://www.webmd.com/eye-health/lasik-laser-eye-surgery#1-1 https://www.allaboutvision.com/visionsurgery/lasik_laser.htm</p>

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Identify the symptoms related to the pressure in various parts of the body to be measured by medical indicators.	K1
CO2	Understand the theory and construction of instrument intended for diagnosis and therapy.	K2
CO3	Understand the basic concept of Laser and to apply newer technology to treat the diseases.	K3
CO4	Learn the knowledge of ultrasound to detect the diseases.	K4
CO5	Acquire a scientific awareness on the disease prevention and treatments.	K6

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	1	2	3	2	2	2	3	2	2.2
CO2	3	2	3	2	2	2	2	2	3	2	2.3
CO3	3	3	2	2	2	2	2	2	3	2	2.4
CO4	3	2	3	2	1	2	2	2	2	3	2.2
CO5	3	2	3	3	2	2	2	2	3	2	2.4
Mean Overall Score											2.3
Correlation											Medium

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinators:

Dr. J. Ebenezar

Dr. S. Prabhakaran

Allied Physics for B.Sc. Chemistry

Allied Physics for B.Sc. Mathematics

Allied Physics for B.Sc. Computer Science

Allied Physics for B.Sc. Chemistry and B.Sc. Mathematics

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	23UPH1AC1	Allied – I	5	4	25	75	100

Course Title	FUNDAMENTALS OF PHYSICS
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SYLLABUS		
Unit	Contents	Hours
I	Elasticity: Hooke's law – Young's modulus, Rigidity modulus & Bulk modulus – Expression for bending moment - determination of Young's modulus by non-uniform bending (Pin and Microscope) - surface tension:- definition –determination of surface tension by drop weight method –Viscosity: co-efficient of viscosity –determination of co-efficient of viscosity by burette method (variable pressure head) – *comparison of viscosities*	15
II	Mechanics: Newton's law of gravitation –Kepler's laws of planetary motion–gravitation constant-determination of 'G' by Boy's method- friction- laws of friction – centre of gravity - centre of gravity of solid cone and solid hemisphere – meta center – meta centric height – *determination of the metacentric height of a ship*	15
III	Sound: Simple harmonic motion (SHM) –equation of simple harmonic motion – composition of two SHM's in a straight line – composition of two SHM's at right angles to each other – Lissajou's figures (Basic concept only) –ultrasonic – properties – production by piezo-electric method- *applications of ultrasonics*– reverberation and reverberation time-conditions for a good auditorium	15
IV	Heat: Newton's law of cooling -determination of specific heat capacity of a liquid by cooling – thermal conductivity – co-efficient of thermal conductivity – determination of thermal conductivity of a bad conductor by Lee's disc method – solar constant – * determination of solar constant by Angstrom's Pyrheliometer*-temperature of the sun	15
V	Diffusion and Osmosis: Diffusion: Diffusion of liquids – Graham's laws of diffusion in liquids –*Ficks' law of diffusion* – analogy between liquid diffusion and heat conduction – experimental determination of coefficient of diffusion. Osmosis: osmosis and osmotic pressure – laws of osmotic pressure -experimental determination of osmotic pressure (Berkeley and Hartley method)	15

..... Self Study

Text Book(s): 1. R. Murugesan, Properties of matter, S.Chand& Co, reprint (2022) Unit – I: Sec: 1.1,1.2,1.15.1.21, 3.1, 3.17, 2.1, 2.5, 2.7 Unit – III: 11.1 , 11.2, 12.1,12.2, 12.4, 11.9, 11.10,11.16, 11.17, 11.21 Unit – II: Sec: 6.1-6.3, 22.1-22.3, 20.1- 20.3 2. R. Murugesan, Properties of matter, S.Chand& Co, 4th Edition, 2005 Unit – V: Sec: 2.21, 8.1- 8.28 3. Brijlal&Subramaniam, Heat & thermodynamics, S.Chand Publications, 7th Edition, 2008. Unit – IV: Sec: 4.1- 5.5

Reference Book(s):
1. BrijLal&Subramaniam, Properties of Matter, S.Chand Publications, 4th edition, 2008. 2. MathurD.S, Elements of Properties of Matter ,Eleventh edition, Shyamlal Charitable Trust, New Delhi, 1993.
Web Resource(s):
1. https://www.askiitians.com/physics/mechanics/surface-tension.aspx 2. https://www.esaral.com/oscillations-class-11-simple-harmonic-motion-notes 3. https://www.adda247.com/teaching-jobs-exam/heat-and-temperature/

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	understand the basic principles of certain physical properties of the materials around us	K2
CO2	Applications of different constants associated with different materials	K3
CO3	analyze viscosity, surface tension, diffusion, osmosis, properties of liquid	K4
CO4	analyze the centre of gravity of various objects	K4
CO5	interpret the physical properties of new materials	K5

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	3	3	2	2	3	3	3	2	2	2.5
CO2	3	3	3	2	2	3	2	1	1	2	2.2
CO3	3	1	3	1	3	2	2	2	2	3	2.2
CO4	3	3	2	3	2	3	3	3	1	3	2.6
CO5	1	3	2	2	2	2	3	3	2	2	2.2
Mean Overall Score											2.34
Correlation											MEDIUM

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinator: Dr. C. Hariharan

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	23UPH1AC2P	ALLIED –II	3	2	20	80	100
Course Title		PROPERTIES OF MATTER – PRACTICAL					

List of Experiments:

1. Young's Modulus – Non Uniform bending (Scale & Telescope)
2. Surface tension and interfacial surface tension by drop weight method.
3. Potentiometer – Low range voltmeter calibration
4. Air wedge – Thickness of a thin wire.
5. Comparison of viscosities by capillary flow method.
6. AND, OR and NOT logic gates using discrete components .

Books for reference:
1. M.N. Srinivasan, S. Balasubramanian, R. Ranganathan, A text book of Practical Physics, S.Chand&Sons , reprint 2010.
2. C.C. Ouseph, U.J. Rao & V. Vijayendran, Practical physics and electronics, S. Viswanathan, Pvt,Ltd, First edition, 2007.

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Recall the basic principles of properties of matter and understand the concepts of bending behaviour beams	K2
CO2	Make practical skills essential for experimentation.	K3
CO3	Apply experimental approaches to correlate with physics theory to develop practical understanding.	K3
CO4	Analyze themselves the concept of heat, optics and acoustics	K4
CO5	evaluate the ideas required for their higher studies	K5

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	3	3	2	2	2	1	2	2	2	2.2
CO2	2	3	2	3	2	2	2	2	3	2	2.3
CO3	2	2	2	3	3	2	3	3	2	2	2.4
CO4	2	1	2	2	2	2	2	3	2	2	2.0
CO5	2	3	3	2	3	3	2	1	2	2	2.3
Mean Overall Score											2.22
Correlation											Medium

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinator: Dr. S. Abbas Manthiri

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	23UPH2AC3	ALLIED – III	4	4	25	75	100
Course Title		ESSENTIALS OF PHYSICS					

SYLLABUS		
Unit	Contents	Hours
I	<p>OPTICS</p> <p>Spherical Aberration in a lens – Methods of minimizing Spherical Aberration – Interference– Air-wedge – Thickness of a thin wire (Theory and Experiment) – Newton’s rings – Radius of curvature of the lens-Diffraction-Determination of wavelength of light using grating- *Polarization* –Specific Rotatory Power- Laurent’s Half Shade Polarimeter</p>	12
II	<p>ELECTRICITY</p> <p>Coulomb’s law – Gauss law - Principle of capacitor –Energy stored in a charged capacitor – Loss of energy due to sharing of charges – *Kirchhoff’s laws* – Application of Kirchhoff’s laws to Wheatstone bridge – Carey Foster bridge – Determination of specific resistance – Potentiometer - Calibration of low range voltmeter and ammeter</p>	12
III	<p>ATOMIC AND NUCLEAR PHYSICS</p> <p>Vector atom model – Quantum numbers – Coupling schemes – The Pauli’s Exclusion Principle – Zeeman Effect – Experimental arrangement for normal Zeeman effect – Liquid drop model –Construction and working of an Ionization chamber and Geiger Muller Counter – *Nuclear fission* – Energy released in fission –Nuclear fusion</p>	12
IV	<p>ELECTRONICS</p> <p>Formation of P-N Junction Diode – Forward and Reverse biasing of a Junction diode – V-I Characteristics of a Junction Diode – *Junction diode as bridge rectifier* – Zener diode – V-I Characteristics of a Zener Diode – Construction and Working of a transistor – Characteristics of a transistor in Common Emitter (CE) and Common Base (CB) configurations</p>	12
V	<p>NUMBER SYSTEMS AND LOGIC CIRCUITS</p> <p>Conversion between Decimal, Binary, Octal and Hexadecimal number systems – *The basic logic gates (AND, OR, NOT) using discrete components – NAND and NOR as universal gates – The Exclusive OR gate* – Laws of Boolean algebra – De-Morgan’s theorems – Half Adder– Full Adder</p>	12

..... Self Study

Text Books:
<p>1. R. Murugesan, KiruthigaSivaprasath, Optics and Spectroscopy, S. Chand & Company PVT. Ltd, New Delhi, Reprint, 2016. Unit–I: Section 1.16 – 1.7, 2.1, 2.7-2.9, 3.17, 4.19, 4.20 Unit – VI: Section 5.3 – 5.6</p> <p>2. R. Murugesan, Electricity and Magnetism, S. Chand & Company PVT. Ltd, New Delhi, Tenth Edition, 2017. Unit–II: Section 1.2, 2.2, 4.1, 4.9, 4.11, 6.6 – 6.8 R. Murugesan, KiruthigaSivaprasath, Modern Physics, S. Chand & Company PVT. Ltd, New Delhi, Eighteenth Edition, 2016. Unit –III: Section 4.12 – 4.23, 17.10, 18.3, 18.6, 22.1, 22.6 – 22.6.1 Unit –IV: Section 33.1 – 33.2.1, 33.5.3, 34.1, 35.1 – 35.3 Unit – V: Section 41.1 – 41.15</p> <p>3. N. Subrahmanyam, Brijlal and M.N. Avadhanulu, A Textbook of Optics, S. Chand & Company PVT. Ltd, New Delhi, Twenty Fourth Edition, 2015. Unit – VI: Section 22.8, 22.14 – 22.19</p>
Reference Books :
<p>1. Arthur Beiser, Concepts of Modern Physics, McGraw Hill, Fifth edition, 2002.</p> <p>2. V.K.Mehta, Rohit Mehta, Principles of Electronics, S.Chand Publications, Reprint 2016</p>
Web Resources:
<p>1. https://www.classcentral.com/course/edx-electricity-and-magnetism-part-1-3032</p> <p>2. https://www.electronics-tutorials.ws/</p> <p>3. https://www.nuclear-power.net/nuclear-power/reactor-physics/atomic-nuclear-physics/</p>

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Recall the basic principles and contemporary concepts on various fields on physics like optics, electrostatics, atomic and nuclear physics	K1
CO2	Understand the basic ideas of geometric optics	K2
CO3	Construct digital circuits for simple real world problems	K3
CO4	List the applications of electronics in modern gadgets	K4
CO5	Explain the fundamental concepts of electricity	K5

Relationship Matrix

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	2	1	3	2	2	3	1	2	3	2.1
CO2	2	3	1	2	3	2	3	2	3	2	2.3
CO3	2	3	2	3	1	1	3	2	1	3	2.1
CO4	3	2	3	1	1	3	2	2	2	3	2.2
CO5	3	2	3	3	2	3	2	2	3	1	2.4
Mean Overall Score											2.22
Correlation											MEDIUM

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinators:

Dr. S. Shek Dhavud

Dr.P. Revathi

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	23UPH2AC4P	ALLIED – IV	3	2	20	80	100
Course Title		OPTICAL, THERMAL AND ELECTRICITY - PRACTICAL					

List of Experiments:

1. Young's modulus – Cantilever depression method
2. Potentiometer – Ammeter calibration.
3. Compound Pendulum: Determination of the radius of Gyration
4. Comparison of radii: Capillary flow method.
5. Sonometer – Verification of transverse laws of vibration (I & II Law)
6. Meter bridge resistance.
7. Verification of De Morgan's theorems using ICs.
8. Determination of the resistance of a material using post office box.

Books for Reference:

1. M.N. Srinivasan, S. Balasubramaniyan, R. Ranganathan, A text book of Practical Physics, S.Chand&Sons, reprint 2010.
2. C.C. Ouseph, U.J. Rao & V. Vijayendran, Practical physics and electronics, S. Viswanathan, Pvt,Ltd, First edition, 2007.

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Recall the basic principles of properties of matter and underlying the concepts of bending behaviour beams	K2
CO2	Make practical skills essential for experimentation.	K3
CO3	Apply experimental approaches to correlate with physics theory to develop practical understanding.	K3
CO4	Analyze the concepts of heat and acoustics and understood the measurements of some physical quantities through heat and electricity experiments	K4
CO5	evaluate the circuit construction in the electronics	K5

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	3	3	2	2	2	1	2	2	2	2.2
CO2	2	3	2	3	2	2	2	2	3	2	2.3
CO3	2	2	2	3	3	2	3	3	2	2	2.4
CO4	2	1	2	2	2	2	2	3	2	2	2.0
CO5	2	3	3	2	3	3	2	1	2	2	2.3
Mean Overall Score											2.22
Correlation											Medium

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinator: Mr. S. Mohamed Ibrahim Sulaiman Sait

Allied Physics for B.Sc. Computer Science

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
III	23UPH3AC5	ALLIED-V	4	4	25	75	100

Course Title	ELECTRONIC CIRCUITS AND DEVICES
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SYLLABUS

Unit	Contents	Hours
I	Semiconductor Physics Intrinsic & Extrinsic Semiconductors – n-Type and p-Type semiconductors- Formation of PN Junction Diode -V-I characteristics –*Zener diode* –V-I characteristics – Zener diode voltage regulator -Rectifiers – Half wave & Full wave bridge rectifier	12
II	Transistors Transistor action: npn & pnp–Transistor characteristics CE and CB configuration – α and β relationship-Amplifier – Single Stage RC Coupled Amplifier –Principle of feedback –Types of feedback –Barkhausen criterion – Oscillator – Hartley oscillator.	12
III	Special Devices FET – Construction – n channel and p channel – FET Characteristics – FET parameters – FET amplifier (CS configuration) –Photo diode –Construction- Characteristics - LED – Construction- Characteristics- *LCD*- Construction - Seven segment display.	12
IV	Optical Fiber & Optoelectronic devices Types of fibers- Semiconductor laser source for optical communication-Block diagram of fiber optic communication system -Construction and Characteristics of Optoelectronic devices: Photoconductive Sensors – Photoconductive Cell, Applications, Photodiode, Phototransistor –Solar Cell	12
V	Operational Amplifier: Ideal Op-amp – Parameters – Inverting and Non-Inverting Operational Amplifiers – Adder – Subtractor – Sign changer – Scale changer – Op-amp Differentiator -Op-amp Integrator.	12

Text Book(s):

1. V.K. Mehta & Rohit Metha, Principle of Electronics, PH Printers & Publishers Private Ltd, Reprint 2008.
2. P.K.Palanisamy, Semiconductor Physics And Opto-Electronics , Scitech Publications (India).Pvt.Ltd, 2011
3. S Salivahanan, N Suresh Kumar, Electronic Devices and Circuits, McGraw Hill Education Pvt Limited, Chennai, Fourth Edition, 2019.

Reference Book(s):

1. Murugesan, Kiruththiga SivaPrasath ,Modern Physics,S. Chand & Co Thirteenth Edition, 2016
2. Applied Physics – Dr. M. Arumugam – Anuradha Agencies, 2011
3. D. Roy Choudhury and Shail B. Jain, Linear Integrated Circuits, New Age International Publishers, Fourth Edition, 2015

Web Resource(s):

1. https://swayam.gov.in/nd1_noc19_ee36/preview

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Remembering some basic semiconductor devices, means of identifying them from their coding schemes and finding out their terminals	K1
CO2	understanding a knowledge of the principles and functioning of these semiconductor devices and their individual or standalone characteristic features using mathematical and graphical analysis so that they may be helpful in predicting their behavior and functioning when incorporated in circuitry	K2
CO3	Applying the essential techniques of circuit design employing these devices, the analysis of the circuits so constructed and the means of evaluating their parameters and performance using mathematical and graphical tools	K3
CO4	Analyzing a sound knowledge of the essential theoretical features and concepts such as modulation and demodulation, regulated power supplies, amplification, switching operations so that they may be useful not only for higher studies but also in providing theoretical framework for possible applications beneficial to the society	K4
CO5	Evaluating technical skills to wire the circuits and to trouble shoot them as well as to construct of new circuits for specific tasks thereby helping them to become entrepreneurs	K5

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	3	3	2	2	3	2	3	2	3	2.5
CO2	3	3	2	2	2	3	2	3	2	2	2.4
CO3	3	2	3	2	3	3	2	3	2	3	2.6
CO4	2	3	2	3	2	3	2	3	3	3	2.6
CO5	2	3	2	2	2	2	3	3	3	3	2.5
Mean Overall Score											2.52
Correlation											High

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinators:

Dr. A. Mohamed Saleem
Dr. S. Abbas Manthiri

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
III	23UPH3AC6P	ALLIED-VI	3	2	20	80	100
Course Title		ELECTRONICS – PRACTICAL					

S.No.	List of Experiments
1	Junction diode characteristics
2	Wave shaping Circuits (Positive & Negative Clippers & Clampers)
3	Op-Amp – Adder and Subtractor
4	Basic Logic gates – Discrete Components
5	Zener controlled rectifier
6	Zener diode characteristics
7	Op-Amp – Differentiator and Integrator
8	NAND as universal gates

Text Book(s):
1. M.N. Srinivasan, S. Balasubramanian, R. Ranganathan, A text book of Practical Physics, S. Chand & Sons, Reprint 2010.
Reference Book(s):
1. C.C. Ouseph, U.J. Rao & V. Vijayendran, Practical physics and electronics, S. Viswanathan, Pvt, Ltd, First edition, 2007.
Web Resource(s):
1. www.physicstutorials.org 2. www.sciencelearn.org.nz

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Understand the basic principles of Electricity and Magnetism	K1
CO2	Acquire the experimental skills.	K1
CO3	Understand the characteristics of the semiconductor diodes and operational amplifiers.	K2
CO4	Analyzing the practical applications of Electricity, Magnetism and Electronics in their day to day life.	K4
CO5	Evaluating the basic requirements for their higher studies.	K5

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	1	2	3	2	2	2	3	1	2.1
CO2	3	2	3	2	2	2	2	2	3	2	2.3
CO3	3	2	2	2	2	2	2	2	3	2	2.2
CO4	3	2	3	2	1	2	2	2	3	3	2.3
CO5	3	2	3	3	2	2	2	2	3	2	2.4
Mean Overall Score											2.26
Correlation											Medium

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinators:

Dr. S. Abbas Manthiri

Dr. C. Hariharan

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
IV	23UPH4AC7	ALLIED-VII	5	4	25	75	100
Course Title		DIGITAL ELECTRONICS AND MICROPROCESSOR					

SYLLABUS		
Unit	Contents	Hours
I	Number Systems: Introduction to decimal, binary, octal & hexadecimal number systems – Interconversions –binary arithmetic operations – Addition, Subtraction, Multiplication and Division – 1’s & 2’s complements - signed binary numbers - BCD code - *Gray code – ASCII code*	15
II	Logic gates and Boolean expressions: *Logic gates* –AND, OR, NOT, NAND, NOR, EX-OR, and EX-NOR – Universality of NAND and NOR gates- Sum of Products (SOP) - Product of Sum (POS) Laws of Boolean algebra – simplification of Boolean expressions using Boolean laws - De-Morgan’s theorems-Karnaugh map:Minterms – 2, 3 & 4 variables – Don’t care conditions.	15
III	Arithmetic, Combinational and Sequential circuits: *Half adder and full adder* – half subtractor and full subtractor–multiplexer – demultiplexer- Flip flops – RS, Clocked RS, J-K, J-K master slave and D flip flop	15
IV	Microprocessor Architecture: Intel 8085 architecture – Pin configuration – *Opcode – Operands – Instruction Word size* – Instruction Cycle – Fetch Operation – Execution Operation – Machine Cycle and State – Timing diagram – opcode fetch cycle–memory read – I/O read – memory write –I/O write	15
V	Intel 8085 Assembly language: Addressing modes – Intel 8085 instructions – data transfer, arithmetic, branch, stack, I/O and machine control group – stack – addition, subtraction, multiplication and division of 8-bit numbers – sum of the series of 8-bit numbers – sorting of numbers in ascending and descending order – block data transfer	15

..... Self Study

Text Book(s):
1. V.Vijayendran, S.Viswanathan, Introduction to Integrated electronics(Digital & Analog) PH Printers & Publishers Private Ltd, Reprint 2008. Unit-I : 1.1 – 4.20. Unit-II : 5.1 – 6.23. Unit-III: 7.1 – 8.18, 9.1 – 10.19, 16.1 – 16.13. 2. P.S.Manoharan, Microprocessors & Microcontrollers –P.S.Manoharan, Charulatha Publications, 2011 Unit-IV : 1.68 – 1.82. 3. B.Ram,Fundamentals of Microprocessors and Microcontrollers, B.Ram, Dhanpat Rai Publications,Reprint 2011. Unit-V : 1.6-1.86 ,6.22 – 6.38.
Reference Book(s):
1. V.Vijayendran,Fundamentals of Microprocessor – 8085, S.Viswanathan, Printers & Publishers Private Ltd. 2. P.S.Manoharan, Microprocessors & Microcontrollers –P.S.Manoharan, Charulatha Publications, 2011
Web Resource(s):
1. https://pages.uoregon.edu/rayfrey/DigitalNotes.pdf 2. 2. https://www.tutorialspoint.com/microprocessor/microprocessor_tutorial.pdf 3. http://ce.sharif.edu/courses/86-87/1/ce126/resources/root/8085%20Microprocessor.pdf

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Remember the principles and operations of analog and digital instruments	K1
CO2	understand the digital principles and its applications	K2
CO3	Apply the principle of combinational and Flip-flops	K3
CO4	Analyze about the architecture of Intel 8085 Microprocessor	K4
CO5	Evaluate the assembly language programs of 8085 microprocessor using trainer kit	K5

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	3	3	2	2	3	2	3	2	3	2.5
CO2	3	3	2	2	2	3	2	3	2	2	2.4
CO3	3	2	3	2	3	3	2	3	2	3	2.6
CO4	2	3	2	3	2	3	2	3	2	3	2.5
CO5	2	3	2	2	2	2	3	3	2	2	2.3
Mean Overall Score											2.46
Correlation											Medium

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinators:

Dr. A. Mohamed Saleem

Dr. S. Abbas Manthiri

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
IV	23UPH4AC8P	ALLIED-VIII	3	2	20	80	100
Course Title		DIGITAL AND MICROPROCESSOR – PRACTICAL					

S.No.	List of Experiments
1	Logic Gates AND, OR, NOT, NAND, NOR EX-OR and EX-NOR using ICs
2	Half adder and Full adder using AND,OR and EXOR gates
3	Half subtractor and Full subtractor using AND,OR, NOT and EX-OR gates
4	RS and J-K flip flops
5	8-bit addition, Subtraction, Multiplication and Division
6	Sum of the series of 8-bit numbers
7	Sorting of numbers in ascending and descending order
8	Block data transfer using microprocessor 8085.

Text Book(s):
1. M.N. Srinivasan,S.Balasubramaniyan, R. Ranganathan, A text book of Practical Physics, S.Chand&Sons , Reprint 2010.
Reference Book(s):
1. C.C. Ouseph, U.J. Rao& V. Vijayendran, Practical physics and electronics, S. Viswanathan, Pvt,Ltd, First edition,2007.
Web Resource(s):
1. www.physicstutoruials.org 2. www.sciencelearn.org.nz

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Remember the basic principles of Electricity, Heat and Electronics.	K1
CO2	Understand the experimental skills.	K2
CO3	Understand the characteristics of the semiconductor diodes, transistors and operational amplifiers.	K2
CO4	Analyze the Electricity and Electronics circuit construction.	K4
CO5	Evaluate the basic requirements for their higher studies.	K5

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	1	2	3	2	2	2	3	2	2.2
CO2	3	2	3	2	2	2	2	2	3	2	2.3
CO3	3	3	2	2	2	2	2	2	3	2	2.4
CO4	3	2	3	2	1	2	2	2	2	3	2.2
CO5	3	2	3	3	2	2	2	2	3	2	2.4
Mean Overall Score											2.3
Correlation											Medium

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinators:

Dr. A. Mohamed Saleem

Dr. S. Abbas Manthiri