SRI RAMAKRISHNA MISSION VIDYALAYA
COLLEGE OF ARTS AND SCIENCE

(AUTONOMOUS)

COIMBATORE - 641 020

DEPARTMENT OF PHYSICS

Under Choice Based Credit System (CBCS) 2017 - 18Onwards

B.Sc., PHYSICS
SYLLABUS
2017-2018

SRI RAMAKRISHNA MISSION VIDYALAYA
COLLEGE OF ARTSAND SCIENCE (AUTONOMOUS)
COIMBATORE – 641 020.

B.Sc PHYSICS

Under Choice Based Credit System (CBCS) 2017-18 Onwards

SCHEME OF EXAMINATION

SEMESTER-I									
S. No.	Course Code	Part	COURSE TITLE	Hrs/ wk	Credits	Exam Hrs	MAX MARKS		
							INT	EXT	TOT
1	15UGC1TA1	I	Tamil–I	6	3	3	25	75	100
2	16UGC1EN1	II	English–I	6	3	3	25	75	100
3	13UPH1C01	III	Core -1 Properties of Matter and Sound	5	5	3	25	75	100
4	13UPH1AL1	III	Allied-1 Mathematics-I	6	5	3	25	75	100
5	13UPH2CP1	III	Core Practical–I General Experiments – I@	3	--	--	--	--	--
6	17UPH2CP2	III	Core Practical–II Electronics Experiments@	2	--	--	--	--	--
7	15UGC1ENS	IV	Environmental Studies	2	2	2	--	75	75
			SUB TOTAL - I	30	18	--	--	--	475

SEMESTER-II									
S. No.	Course Code	Part	COURSE TITLE	Hrs/ wk	Credits	Exam Hrs	MAX MARKS		
							INT	EXT	TOT
1	16UGC2TA2	I	Tamil–II	6	3	3	25	75	100
2	16UGC2EN2	II	English–II	6	3	3	25	75	100
3	17UPH2C02	III	Core-2 Electricity and Magnetism	4	5	3	25	75	100
4	13UPH2AL2	III	Allied –2 Mathematics-II	6	5	3	25	75	100
5	14UPH2CP1	III	Core Practical –I General Experiments – I	3	3	3	40	60	100
6	17UPH2CP2	III	Core Practical –II Electronics Experiments	3	2	3	40	60	100
7	16UGC2VAL	IV	Value Education	2	2	2	--	75	75
			SUB TOTAL - II	30	23	--	--	--	675

SEMESTER-III									
S. No	**Course Code**	**Part**	**COURSE TITLE**	**Hrs/ wk**	**Credits**	**Exam Hrs**	**MAX MARKS**		
							INT	**EXT**	**TOT**
1	**16UGC3TA3**	I	**Tamil–III**	6	3	3	25	75	100
2	**16UGC3EN3**	II	**English–III**	6	3	3	25	75	100
3	**17UPH3C03**	III	**Core -3 Electronics**	5	4	3	25	75	100
4	**13UPH3AL3**	III	**Allied–3 Chemistry - I**	4	4	3	15	60	75
5	**13UPH4CP3**	III	**Core Practical -III** **General Experiments-II@**	3	--	--	--	--	--
6	**15UPH4CP4**	III	**Core Practical –IV** **Analog and Digital Experiments@**	2	--	--	--	--	--
7	**13UPH4AP1**	III	**Allied Practical - Chemistry@**	2	--	--	--	--	--
8	**13UPH3NM1**	IV	**Non-Major Elective (NME)-I** **Solid State Chemistry-I/Basic Tamil-I**	2	2	2	--	50	50
			SUB TOTAL - III	30	16	--	--	--	425
SEMESTER-IV									
S. No.	**Course Code**	**Part**	**COURSE TITLE**	**Hrs/ wk**	**Credits**	**Exam Hrs**	**MAX MARKS**		
							INT	**EXT**	**TOT**
1	**16UGC4TA4**	I	**Tamil – IV**	6	3	3	25	75	100
2	**16UGC4EN3**	II	**English - IV**	6	3	3	25	75	100
3	**13UPH4C04**	III	**Core –4 Heat, Thermodynamics and Statistical Mechanics**	5	5	3	25	75	100
4	**13UPH4AL4**	III	**Allied –4 Chemistry - II**	4	4	3	15	60	75
5	**13UPH4CP3**	III	**Core Practical -III** **General Experiments-II**	3	3	3	40	60	100
6	**15UPH4CP4**	III	**Core Practical –IV** **Analog and Digital Experiments**	2	3	3	40	60	100
7	**13UPH4AP1**	III	**Allied Practical - Chemistry**	2	2	3	20	30	50
8	**13AUG4NM1**	IV	**Non-Major Elective (NME)-II** **Solid State Chemistry-II/Basic Tamil-II**	2	2	2	--	50	50
9	**13UGC4EXT**	V	**Extension Activities -NCC/NSS/SP**	--	1	--	25	25	50
			SUB TOTAL - IV	30	26	--	--	--	725

SEMESTER-V									
S. No.	Course Code	Part	Course Title	Hrs/ wk	Credits	Exam Hrs	Max marks		
							Int	Ext	Tot
1	**16UPH5C05**	III	**Core - 5 Mathematical Physics and Classical Mechanics**	5	5	3	25	75	100
2	**16UPH5C06**	III	**Core - 6 Optics**	5	5	3	25	75	100
3	**14UPH5C07**	III	**Core - 7 Atomic Physics and Spectroscopy**	5	5	3	25	75	100
4	**14UPH5C08**	III	**Core - 8 Microprocessor and its Physics Applications**	5	5	3	25	75	100
5	**14UPH6EL1**	III	**Elective - I@ Alternate Energy Resources**	2	--	--	--	--	--
6	**14UPH6CP5**	III	**Core Practical - V@ Advanced Experiments**	3	--	--	--	--	--
7	**14UPH6CP6**	III	**Core Practical - VI@ Microprocessor and C - Programming in Physics**	3					
8	**14UPH5CP5**	III	**Models based on Concepts of Physics**	2*	3	--	40	60	100
			SUB TOTAL - V	30	23	--	140	360	500

SEMESTER-VI									
S. No.	Course Code	Part	Course Title	Hrs/ wk	Credits	Exam Hrs	Max marks		
							Int	Ext	Tot
1	**14UPH6C09**	III	**Core - 9 Relativity, Wave Mechanics and Astrophysics**	5	5	3	25	75	100
2	**16UPH6C10**	III	**Core - 10 Solid State Physics**	5	5	3	25	75	100
3	**14UPH6C11**	III	**Core - 11 Nuclear Physics**	5	5	3	25	75	100
4	**14UPH6C12**	III	**Core - 12 Programming in C and its Physics Applications**	5	4	3	25	75	100
5	**16UPH6EL1**	IV	**Elective - I Alternate Energy Resources**	2	4	3	25	75	100
6	**14UPH6CP6**	III	**Core Practical – V Advanced Experiments**	3	3	3	40	60	100
7	**14UPH6CP7**	III	**Core Practical - VI Microprocessor and C - Programming in Physics**	3	3	3	40	60	100
8	**14UPH6CPR**	III	**Project Work**	2*	5	--	40	60	100
			SUB TOTAL - VI	30	34	-	245	555	800

NME- Non Major elective I&II offered by Chemistry and Tamil Departments

@ - conducted respective even semester

*** - Students undertake the Model preparation and Project work even after college hours**

ALLIED PHYSICS

FOR MATHEMATICS / CHEMISTRY:

SEMESTER – I/ III									
S. No.	**Course code**	**Part**	**COURSE TITLE**	**HRS/ WK**	**CREDITS**	**Exam Hours**	**MAX MARKS**		
							INT	**EXT**	**TOT**
01	**13UMA1AL1/13UCH3AL3**	**III**	**Allied Theory Physics- 1**	**4**	**4**	**3**	**15**	**60**	**75**
02	**13UMA2AP1/13UCH4AP1**	**III**	**Allied Practical: Physics**	**2**	**-**	**-**	**-**	**-**	**-**

SEMESTER – II/ IV									
01	**13UMA2AL2/13UCH4AL4**	**III**	**Allied Theory Physics - II**	**4**	**4**	**3**	**15**	**60**	**75**
02	**13UMA2AP1/13UCH4AP1**	**III**	**Allied Practical: Physics**	**2**	**2**	**3**	**20**	**30**	**50**

NON-MAJOR ELECTIVE (NME*)

FOR CHEMISTRY

SEMESTER – III									
S. No.	**Course code**	**Part**	**COURSE TITLE**	**HRS /WK**	**CREDITS**	**Exam Hours**	**MAX MARKS**		
							INT	**EXT**	**TOT**
01	13UCH3NM1	**IV**	**INSTRUMENTAL METHODS OF CHEMICAL ANALYSIS - I**	**2**	**2**	**2**	**--**	**50**	**50**

SEMESTER – IV									
S. No.	**Course code**	**Part**	**COURSE TITLE**	**HRS /WK**	**CREDITS**	**Exam Hours**	**MAX MARKS**		
							INT	**EXT**	**TOT**
01	13UCH4NM2	**IV**	**INSTRUMENTAL METHODS OF CHEMICAL ANALYSIS - II**	**2**	**2**	**2**	**--**	**50**	**50**

***** - Non Major elective I &II offered by Physics Department to Chemistry Department

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE -641 020
For candidates admitted from academic year 2013-14 onwards Under New CBCS

Programme : B. Sc Physics Subject Code: 13UPH1C01
Course Title : **PROPERTIES OF MATTER AND SOUND**
Core : 1
Year : I Semester : I
5 Hours/Week 5 Credits

UNIT – I: GRAVITATION
Newton's law of gravitation from Kepler's laws – Determination of 'G' by Boy's method – Poynting's method - Variation of 'g' with altitude, depth and latitude – Gravitational potential and field – solid, hollow spheres and Spherical shell.

UNIT – II: ELASTICITY
Relation between module of elasticity and Poisson's ratio – Work done in stretching and twisting – Twisting couple of a cylinder – Rigidity modulus – Static torsion and Torsional oscillations – uniform and non-uniform bending - Bending moment - 'q' by Koenig's method – Cantilever oscillations.

UNIT – III: SURFACE TENSION AND VISCOSITY
Molecular theory – Relation between curvature, pressure and surface tension – Applications to cylindrical, spherical drops and bubbles – Surface tension by Quincke's method, Jacgor's method and Ripple method – Variation of surface tension with temperature.
Poiseuille's formula – Viscosity by capillary flow method – Motion through highly viscous liquids-Stoke's formula - Viscosity of gases – Rankine's method.

UNIT-IV: SOUND WAVES AND MEASUREMENTS
Laws of transverse vibration of strings -Velocity of transverse waves along a stretched string – Melde's experiment –Closed end organ pipe –Open end organ pipe.
Classification of sound – Intensity of sound –Measurement of intensity of sound - Doppler effect – Microphones and loud speakers –Wave front at super sonic speed.

UNIT-V: ACOUSTICS
Reverberation –Sabine's formula –Determination of absorption coefficient –Factors affecting the acoustics of building and their remedies –Ultrasonic waves – protection and applications – Acoustic grating –Wave velocity and group velocity – Frequency measurements – Study of waves using CRO - CRO Applications – Lissajou's figures.

TEXT BOOK:

1. Author : Brijlal and Subramaniam,
Book Name: Properties of Matter
Publication: Educational & university Pub, Agra.
Year: 1995
Edition: 1st
UNIT-I-III

2. Author : Brijlal and Subramaniam,
Book Name: A Text Book of Sound
Publication: Vikas Publishing House Pvt.Ltd.
Year: 1978
Edition:2nd
UNIT- IV&V

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE -641 020
For candidates admitted from academic year 2013-14 onwards Under New CBCS

Programme : B. Sc Physics Subject Code: 13UPH2C02
Course Title : **ELECTRICITY AND MAGNETISM**
Core : 2
Year : I Semester : II
5 Hours/Week 5 Credits

UNIT-I: ELECTROSTATICS

Gauss's theorem and its applications- Coulomb's law – Mechanical force experienced by unit area of a charged sphere – Electrified soap bubble – Electrical images.

Capacitors: Capacity of a conductor- Energy of a charged conductor- Sharing of energy between two capacitors - Principle of a capacitor- capacity of a spherical and cylindrical capacitors- Capacitors in series and in parallel.

UNIT-II: CURRENT ELECTRICITY

Electrical measurements: Potential difference – Electric current – Ohm's law – Resistance – Resistances in series and parallel – Ammeters and voltmeters – Kirchhoff's laws.

Electromagnetic Induction: Faraday's laws – Lenz's law - Fleming's right hand thumb rule – Self inductance – Self inductance of a long solenoid – Determination of self inductance by Rayleigh's method – Mutual inductance – mutual inductance between two solenoids – Determination of mutual inductance.

UNIT- III: THERMO ELECTRICITY

Seebeck effect – laws of thermo emf- Peltier effect – Peltier coefficient – determination of Peltier co-efficient of a junction (Caswell's method) – Thomson effect – Starling method -Thomson co-efficient – Thermo electric power – Application of thermodynamics to Thermocouple – Thermoelectric diagrams and their uses.

UNIT- IV: MAGNETISM

Magnetic potential – potential and intensity at a point due to a bar magnet- magnetic intensity at any point due to bar magnet - magnetic potential at a point due to a magnetized sphere – magnetic shell – potential at a point due to a magnetic shell – permeability – susceptibility – Relation between μ and χ - Gauss theorem in magnetism - applications.

UNIT –V: MAGNETIC PROPERTIES OF MATERIAL

Magnetic induction – Magnetization M – Properties of dia, para and ferro magnetic materials –Anti ferro magnetism and ferri magnetism - Electron theory of magnetism – Langevin's theory of para magnetism - Weiss's theory of ferro magnetism – determination of draw M-H curve (horizontal model) – Energy loss due to hysteresis.

TEXT BOOK:

1. Author : Brijlal and Subramaniam
Book Name: Electricity and Magnetism
Publication: Ratan Prakashan Educational & University Publishers,
Year: 1992,Edition: 19th

2. Author : R. Murugesan
Book Name: Electricity and Magnetism
Publication: Sultan Chand & Sons,
Year: 1998
Edition:2

REFERENCE BOOK

1. Author : Sehgal, Chopra and Sehgal
Book Name: Electricity and Magnetism
Publication: Sultan Chand & Sons, Delhi,
Year: 1980,Edition:3rd

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For candidates admitted from academic year 2013-14 onwards Under New CBCS

Programme : B. Sc Physics Subject Code: 17UPH3C03
Course Title : **ELECTRONICS**
Core : 3
Year : II Semester : III
5 Hours/Week 5 Credits

UNIT – I : SEMICONDUCTOR FUNDAMENTALS

Energy band in solids – types of semiconductor – majority and minority carriers – Mobile charge carriers and immobile ions – drift current in intrinsic semiconductor – PN junction – Depletion layer – barrier voltage – Effect of temperature – forward biased and reverse biased pn junction – Zener breakdown – Avalanche breakdown – H parameters in CE and CB configuration.

UNIT-II: AMPLIFIERS

Single stage Transistor amplifiers – CB,CE and CC – comparison of amplifier configuration – Amplifier classification based on the biasing condition – Class B push-pull amplifier – Complementary Symmetry push-pull class B amplifier – Distortion in amplifiers – RC and Transformer coupled two stage amplifiers – Direct-couple amplifier using complementary and symmetry of two transistors – Darlington pair

UNIT-III: SINUSOIDAL AND NON SINUSOIDAL OSCILLATORS

Comparison between an amplifier and oscillator – Damped and undamped Oscillations – Tuned base oscillator – Tuned collector oscillator - Hartley and Colpitt's oscillator Phase shift oscillator and Crystal controlled oscillator – Astable and Bistable multivibrator.

UNIT – IV: POWER SUPPLY AND OPERATIONAL AMPLIFIER

Rectifiers – Half wave - full wave rectifiers – voltage regulation using Zener diode and transistor- Characteristics of ideal and practical operational amplifiers – Sign changer- Scale changer – AC inverting amplifier – Adder – Subtractor - Integrator – Phase shifter- Differentiator.

UNIT-V: DIGITAL FUNDAMENTAL AND DEVICES

Basic logic gates – Demorgan's theorem – NAND and NOR as a universal gates – Half adder – Full adder - Half subtractor – Full subtractor – 4 Bit binary adder – RS flip flop- J-K flip flop – Digital to Analog Converter (R-2R ladder D/A converter) – Analog to Digital converter (Counter type A/D converter).

TEXT BOOK:

1.Author :B L Theraja
Book Name: Basic Electronics
Publication: S.Chand and company Ltd
Year: 2001, Edition: 11th
UNIT : I-V

REFERENCE BOOK:

1. Author : V .K. Metha
Book Name: Principles of Electronics
Publication: S.Chand and company Ltd
Year: 1983
Edition: 3rd

2. Author : R.S. Sedha
Book Name: Applied Electronics
Publication: S.Chand and company Ltd
Reprint Year: 2010

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For candidates admitted from academic year 2013-14 onwards Under New CBCS

Programme : B. Sc Physics Subject Code: 13UPH4C04

Course Title : **HEAT, THERMODYNAMICS AND STATISTICAL MECHANICS**
Core : 4
Year : II Semester : IV
5 Hours/Week 5 Credits

UNIT –I: THERMOMETRY AND EXPANSION
Concept of heat and temperature- Centigrade and Fahrenheit Scales-Types of thermometer-Platinum resistance thermometer-Expansion of solids- Coefficient of liner expansion -Coefficient of superficial expansion-relation between α and β-Expansion of liquids -Relation between Co-efficient of apparent and real expansion.

UNIT – II: TRANSMISSION OF HEAT
Coefficient of thermal conductivity- Forbe's method -Lee's method for bad conductors - Radial flow of heat -Widemann Franz's law -Stefan's law and verification -Newton's law of cooling - Wein's law Rayleigh jeans law and Planck's law -Solar constant -Surface temperature of sun - Angstrom's Pyroheliometer.

UNIT – III: LOW TEMPERATURE PHYSICS
Porous plug experiment and its results - Joule Kelvin effect -Temperature of inversion - Liquefaction of air, Liquefaction of hydrogen, Liquefaction of helium -Adiabatic demagnetization – Electrolux Refrigerator.

UNIT – IV: THERMODYNAMICS
First law of Thermodynamics - Determination of γ -Clement and Desormer's method -Second law of thermodynamics – Carnot engineOtto Cycle -Clausius clapcyron's latent heat equation and its applications -Entropy -Third law of thermodynamics -Entropy of a perfect gas -Entropy diagram - Zero point energy -Maxwell's Thermo dynamical relations

UNIT – V: STATISTICAL MECHANICS
Statistical equilibrium -Probability theorems in statistical thermodynamics- Maxwell Boltzmann distribution in terms of temperature -Ideal gas- Quantum statistics -Phase space - Bose Einstein statistics -Distribution law -Photon gas - Fermi Dirac statistics -Distribution law -Electron gas - Comparison of three statistics.

TEXT BOOK:

1. Author : Brijlal and Subramanyam
Book Name: Heat and Thermodynamics
Publication: S. Chand & Company
Year: Reprint 2006
Edition: 16th Edition

BOOK	UNIT	CHAPTER
1	I	1 & 2
1	II	8
1	III	5 & 7
1	IV	6
1	V	9

REFERENCE BOOK:

1. Author : D.S. Mathur
Book Name: Heat and Thermodynamics
Publication: S.Chand and Co
Year: 1970
Edition: 3rd

2. Author : A.B Gupta & H.P. Rai
Book Name: Heat and Thermodynamics
Publication: New central book
Year: 1995
Edition: 1st

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For candidates admitted from academic year 2016-17 onwards Under New CBCS

Programme : B. Sc Physics Subject Code: 16UPH5C05
Course Title : **MATHEMATICAL PHYSICS AND CLASSICAL MECHANICS**
Core : 5
Year : III Semester : V: 5 Hours/Week 5 Credits

Objectives:
To understand the basics of vector calculus, matrices and complex variables. With these background, students are made to gain the knowledge of concept of classical mechanics and its applications.

UNIT – I: VECTOR CALCULUS
Gradient of a scalar field – line, surface and volume integral – Divergence of a vector function – examples – Curl of a vector function – Important vector identities – Gauss divergence theorem – Stoke's theorem – Green's theorem – examples.

UNIT – II: COORDINATE SYSTEMS
Curvilinear coordinates – transformation of coordinates – orthogonal curvilinear coordinates – unit vectors in curvilinear systems – cylindrical coordinates – spherical polar coordinates – curl, divergence and gradient in curvilinear, cylindrical and spherical polar coordinates.

UNIT – III: MATRICES
Special types of matrices -Properties of unitary and orthogonal matrices -Eigen values and Eigen functions- Cayley - Hamilton theorem- Diagonalisation of matrix -Solution of quadratic equations by matrix method.

UNIT – IV: COMPLEX VARIABLES AND SPECIAL FUNCTIONS
Complex analysis- Analytic functions – Cauchy - Riemann equations- Cauchy's Integral theorem -Integral formula-Residues -Residue theorem (Definite integrals of trigonometry functions of $\cos\theta$ and $\sin\theta$).
Special Functions : Definition – Beta function – Gamma function – Evaluation of Beta function – Evaluation of Gamma function – Relation between Beta and Gamma functions.

UNIT – V: LAGRANGE'S FORMULATION
Conservation theorem – linear and angular momentum - energy – Degress of freedom – constraints – Generalized co-ordinates – transformation equations – Generalized displacement, velocity, acceleration, momentum and force – Principle of virtual work – D' Alembert's principle – Lagrange's equation of motion – linear Harmonic Oscillator, Simple Pendulum and Compound Pendulum.

TEXT BOOK

1. Author : Satya Prakash
Book Name: Mathematical Physics with Classical Mechanics
Publication: Sultan Chand & sons
Year: Reprint 2007
Edition: Reprint 2007 (UNIT:I – V)

REFERENCE BOOK

1. Author : B.D.Gupta
Book Name: Mathematical Physics
Publication: Vikas Publishing house Year: Reprint, 1997
Edition: Reprint, 1997
2. Author: R. Murugeshan
Book Name: Mechanics and Mathematical Physics,
Publication: S.Chand, Edition 2008

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Programme : B. Sc Physics Subject Code: 16UPH5C06
Course Title : **OPTICS**
Core : 6
Year : III Semester : V
5 Hours/Week 5
Credits

Objectives:

The key objective of this paper is that the students acquainted with fundamental concepts and laws of reflection, refraction , diffraction and interference with the help of mirrors ,lenses ,prisms they get an elaborate and clear knowledge about laser and fibre optics.

UNIT – I: OPTICAL INSTRUMENTS

Aberrations: – Lens aberrations – spherical aberrations – reducing spherical aberrations – comma – astigmatism – distortion – chromatic aberration – achromatic lens- telephoto lens- microscope – simple microscope-compound microscope- Telescope: angular magnification of telescope- Refracting Astronomical - Reflecting Astronomical - Reflecting telescopes - Eye pieces: Huygens and Ramsden – comparison – Velocity of light: Michelson's rotating mirror method - Houston's method.

UNIT – II: INTERFERENCE

Young's experiment-Coherent sources – phase difference and path difference- theory of interference fringes- Fresnel's Biprism – Lloyd's single mirror- Billet's split lens- Interference in thin films- interference due to reflected light- Colours of Thin Film - Newton's rings - Determination of the wavelength of the sodium light - Refractive index of a liquid - Newton's rings with white Light – Haidinger's fringes- Michelson Interferometer – visibility of fringes- applications- determination of the refractive index of gases – Jamin's Refractometer – Mach-Zehnder refractometer - Rayleigh's Refractometer - Fabry Perot Interferometer.

UNIT – III: DIFFRACTION

Fresnel assumptions - Rectilinear propagation of light - Zone plate -action of zone plate for an incident spherical wave front –difference between a zone plate and a convex lens- Fresnel and Fraunhofer Diffraction –diffraction at a circular aperature- diffraction at an opaque circular disc Fresnel Diffraction at a Straight edge- intensity at a point inside the geometrical shadow (straight edge) - Fresnel Diffraction at a narrow slit and Narrow wire- Fraunhofer Diffraction at a Single slit and Double slit - Plane Transmission grating - Dispersive power of grating.

UNIT – IV: POLARISATION

Polarization of transverse waves –plane of polarization- Brewster's law- polarization by refraction -Double refraction - Nicol prism – Nicol prism as an analyser- Huygen's theory for uniaxial crystals - Quarter wave plate and half wave plate - Production and Detection of Plane, Circularly and Elliptically Polarized light - Babinet's compensator – Dichroism- Optical activity - Fresnel's Explanation of optical rotation – Experimental verification - Specific rotation: Laurent's half shade polarimeter.

UNIT – V: LASERS AND FIBRE OPTICS

Lasers: Induced absorption - spontaneous emission and stimulated emission – The ruby laser – semiconductor laser.

Fibre Optics : Introduction – optical fibre – optical fibre system – optical fibre cable – total internal reflection – propagation of light through and optical fibre - critical angle of propagation – acceptance angle – numerical aperture – skip distance and number of total internal reflections – classification of optical fibres – The three types of fibres - single mode step index fibre – multimode step index fibre – graded index fibre –fibre optic communication system – merits of optical fibres.

TEXT BOOK :

1. Author: N. Subramaniam and Brijlal
Book Name: A Textbook of Optics
Publication: S.Chand & Co Ltd, New Delhi
Year: 2010
Edition: 24

REFERENCE BOOK:

1. Author: Subir Kumar Sarkar
Book Name: Optical Fibers and Fiber Optic Communication Systems
Publication: S.Chand & Co
Year: 2001

2.Author : Ananthakrishanan,
Book Name: A text book of light
Publication: S.Viswanathan & co, Chennai
Year: 1966
Edition: 2nd Edition

3. Author : Murugesan. R
Book Name: Modern physics
Publication: S.Chand & co.,
Year: 2007
Edition: 13th

4. Author : Ajoy K. Ghatak
Book Name: Modern optics
Publication: Tata Mc Graw-Hill Pub. Co. Ltd. Delhi

Programme : B. Sc Physics Subject Code: 14UPH5C07

Course Title : **ATOMIC PHYSICS AND SPECTROSCOPY**
Core : 7
Year : III Semester : V
5 Hours/Week 5 Credits

Objectives:

Students know the structure of the atom, laws of optical spectra, characteristics of rays and spectroscopic techniques.

UNIT-I: STRUCTURE OF THE ATOM

Introduction- Rutherford experiments on α particle scattering- Experimental verification- Bohr atom model – Critical potentials - atomic excitation – Experimental determination of critical potentials - Franck and Hertz method – Davis and Goucher's method - Mass spectrograph: Aston's mass spectrograph – Dempster's mass spectrograph.

UNIT- II: ATOM MODEL

Sommerfeld's relativistic atom model – The Vector atom model – Quantum numbers associated with the vector atom model – Coupling schemes – L-S coupling –J J coupling – The Pauli's exclusion principle – magnetic dipole moment – The stern and Gerlach Experiment – Spin orbit coupling.

UNIT- III: OPTICAL SPECTRA

Zeeman effect – Larmor's theorem – Paschen back effect – Stark effect – Production of X-rays – Bragg's law – Bragg's X-ray spectrometer – X- ray spectra – Characteristics of X-ray spectra – Mosley's law – Compton effect – Photo electric effect – Experimental investigation – Einstein's Photo electric equation – Photo voltaic cell.

UNIT- IV: MOLECULAR SPECTRA AND RAMAN EFFECT

Molecular spectra: Introduction – Origin of molecular spectra – Nature of molecular spectra – Rotation of linear system – Non rigid rotator -Theory of the origin of pure rotational spectrum of a molecule – Electronic spectra of molecule.

Raman effect: Experimental study of Raman effect – Quantum theory of Raman effect – applications- Laser Raman spectroscopy - Classical theory of Raman effect - vibrational Raman spectra of diatomic molecules.

UNIT-V: SPECTROSCOPIC TECHNIQUES

The energy of a diatomic molecule – vibrating diatomic molecule as a harmonic oscillator - spectroscopic techniques – constant deviation spectrograph – recording the spectrum – UV spectroscopy – Quartz spectrograph for near UV region - Infra red spectroscopy – absorption spectroscopy – Double beam IR spectrometer –Raman spectroscopy – Raman spectrometer.

TEXT BOOK:

1.Author : Murugesan. R
Book Name: Modern physics
Publication: S.Chand & co.,
Year: 2007
Edition: 13th

REFERENCE BOOK:

1. Author : J.B. Rajam
Book Name: Atomic Physics
Publication: S.Chand and Co

2. Author : Gurdeep Chatwal and Sham Anand
Book Name: Spectroscopy

3. Author : Gupta kumar Sharma
Book Name: Elements of Spectroscopy
Publication: Pragati prakashan, Meerut,
Edition : 23, Year : 2011

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE -641 020
For candidates admitted from academic year 2013-14 onwards Under New CBCS

Programme : B. Sc Physics Subject Code: 14UPH5C08
Course Title : **MICROPROCESSOR AND ITS PHYSICS APPLICATIONS**
Core : 8
Year : III Semester: V
5 Hours/Week 5 Credits

Objectives:

Enable the students to know about Microprocessor, Microcomputers historical background and their developments. To familiarize the instruction format and instruction set used in second generation microprocessor and to develop the programming skill and their usage in day to day life.

UNIT – I: INTRODUCTION TO INTEL 8085 MICROPROCESSOR AND MEMORY

Evolution of Microprocessor-First, second, third and fourth generation microprocessors-Microprocessor based systems - Micro, Mini and Large computers - Advantages and disadvantages of microprocessor based system - General description of Intel 8085 - Pin configuration - 8085 Signal description summary - Block diagram of Intel 8085 - Intel 8085 architecture - Introduction to memory – Semiconductor memory - ROM, PROM, EPROM, static RAM, DRAM and NOVRAM

UNIT – II: INSTRUCTION SETS AND BASIC PROGRAMMING

Instruction format of 8085 – Basics of Addressing modes-Instruction set –Data transfer Instructions - Arithmetic instructions – ADD reg; ADI d8; ADD M; ACI d8; ADC reg; ADC M; SUB reg; SUI d8; SUB M; SBB reg; SBI d8; SBB M; DAA; DAD rp; INR reg; INR M; DCR reg; DCR M; INX rp and DCX rp with examples.

Logical instructions – ANA reg; ANI d8; ANA M; ORA reg; ORA M; ORI d8; XRA reg; XRI d8; XRA M; CMP reg; CPI d8; CMP M; CMA; STC; CMC; RLC; RRC;RAR and RAL with examples.

Branching and Machine control instructions- JMP addr16; J<condition> addr 16; CALL addr 16; C <condition> addr 16; RET; R <condition> ; RSt n; PCHL; DI; EI; SIM; RIM HLT and NOP with detailed descriptions - Assembler – Assembler Directive - Flow Charts – Assembly language program development tools – Program development algorithms

UNIT- III: ASSEMBLY LANGUAGE PROGRAMMING

Programme to transfer data between memory and accumulator – 1's and 2's complement of 8 bit data - Programme to add two 8 bit data –Subtract two 8 bit data – Subtract two BCD data – Binary to Gray – Gray to Binary conversion.

Programme to add two 16 bit data –Subtract two 16 bit data – Add two BCD data – add an array of datas - Programme to sort an array of data in Ascending and Descending order-Programme to multiply two numbers of 8 bit data - Programme to find the square root of a given binary number – Programme to search a smallest in the given array of data.

UNIT- IV: MEMORY INTERFACING AND INTERRUPTS

Interfacing SRAM and EPROM – Memory capacity – Choice of memory IC's and address allocation – Interfacing I/O devices and peripheral IC's — I/O device mapping (simple descriptions) - Needs for interrupts – Types of interrupts —Polling of interrupts – Data transfer schemes – Synchronous data transfer scheme – Asynchronous data transfer scheme – Interrupt driven data transfer scheme - 8259 Programmable interrupt controller – 8255 peripheral interface-8257 DMA controller.

UNIT- V: APPLICATIONS OF MICROPROCESSOR

Temperature control system– Motor speed control system – Stepper motor control system – Traffic control system – Keyboard control system.

TEXT BOOK:

1.Author : A.Nagoorkani
Book Name: Microprocessor and its applications
Publication: RBA Publication, Chennai.
Year: 1999,
Edition: 1st

REFERENCE BOOK:

1.Author : A.P Mathur,
Book Name Introduction to Microprocessor
Publication: Tata Mc-GrawHill
Year: 2001
Edition: 3rd

2.Author : Ramesh Gaonkaer
Book Name: . Microprocessor and its Application
Publication: ,Penram Publication, Mumbai
Year: 1999

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE -641 020
For candidates admitted from academic year 2013-14 onwards Under New CBCS

Programme : B. Sc Physics Subject Code: 14UPH6C09
Course Title : **RELATIVITY, WAVE MECHANICS AND ASTROPHYSICS**
Core : 9
Year : III Semester : VI
5 Hours/Week 5 Credits

Objectives:

The chief aim of this paper is to introduce the concept of relativity and wave mechanics with quantum mechanical formulation and the operator relations and the method of solving simple problems are included, a brief introduction about astro physics is also included.

UNIT – I: RELATIVITY

Michelson-Morley Experiment - Gallilean Transformation and Newtonian Relativity - Inadequacy of Gallilean Transformation - Fundamental Postulates of Special Theory of Relativity - Lorentz Transformation Equations - Length Contraction and Time Dilation – Law of Addition of Velocity- Variation of Mass with Velocity -Equivalence of Mass and Energy.

UNIT – II: ORIGIN OF WAVE MECHANICS

De Broglie hypothesis – Concept of Phase Velocity – Concept of Group Velocity – Relation between group velocity and wave velocity – Experiments of Davisson and Germer and G.P. Thomson – Wave packet – Heisenberg uncertainity principle and its proof – Illustrations – Diffraction of electrons by a slit – Gamma ray microscope – Applications of uncertainity principle – Non-existence of electrons in the nucleus – Radius of Bohr's first orbit of hydrogen atom and energy of ground state.

UNIT – III: FORMULATION OF WAVE MECHANICS

Wave function for a free particle – Schrodinger's one dimensional wave equation – Time dependent and independent parts- Physical interpretation of wave function – Operators in quantum mechanics – Eigen functions – Eigen value – Eigen value equations – Postulates of quantum mechanics – Orthogonality of Eigen functions – Probability current density – Ehrenfest's theorem.

UNIT – IV: OPERATORS

Significance of various quantum numbers – n, l, m_l – Electron probability density – Commutation relations – Position and momentum, H and P, between the components of L, L^2 with L_x, L_y and L_z – Ladder operators L_+ and L_- - Particle in a box – Potential step – The barrier penetration problem – Linear harmonic oscillator.

UNIT –V: ASTRO PHYSICS

Solar system-Astronomical Instruments-Refracting telescope-Reflecting telescope-Radio telescope measurement of distance-Size-Rotation – Mass of the sun-Surface temperature – Atmosphere -Planets- Asteroids – Comets -Meteorites-Sun - Star- Physical Properties of Stars-Masses of stars-Stellar Evolution-Milky Way Galaxy – Expanding Universe- Big-bang theory.

TEXT BOOK

1. Author: Murugesan. R
Book Name: Modern physics
Publication: S.Chand & co.,
Year: 2007
Edition: 13th

2.Author : Swati Saluja, Sathya Prakash
Book Name: Quantum mechanics
Publication:kedar Nath , Ram Nath and co
Year: 2005
Edition: Ist

3.Author : Brijlal Subramaniam
Book Name: Properties of matter
Publication: S.Chand & co.,
Year: 1991
Edition: 6th

REFERENCE BOOK:

1.Author : G. Arul dass
Book Name: Quantum mechanics
Publication: Prentice-hall of India, Pvt
Year: 2004
Edition: 3rd Printing

2.Author : Guptha kumar sharma
Book Name: Quantum mechanics
Publication: Jai prakash ovath and co
Year: 2005
Edition:25th

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE -641 020
For candidates admitted from academic year 2016-17 onwards Under New CBCS

Programme : B. Sc Physics Subject Code: 16UPH6C10
Course Title : **SOLID STATE PHYSICS**
Core : 10
Year : III Semester : VI
5 Hours/Week 5 Credits

Objectives:

The necessity of this paper is to provide an in-depth foundation in solid state physics especially in crystallography, x-ray diffraction phonons, magnetic and dielectric property of the solids.

UNIT – I: CRYSTAL STRUCTURE

Elements of Crystal Structure - X ray Diffraction - Bragg's Law - Miller Indices - Simple Crystal Structures - Calculation of number of atoms per unit cell – Atomic radius – co-ordination number – Packing factor for SC,BCC,FCC and HCP structures – Rotating crystal method - Powder Photograph method – determination of unit cell dimensions. Crystal imperfections**:** Point defects – line defects –Surface defects – Volume defects.

UNIT – II: ELECTRON THEORY OF SOLIDS

Electrical conduction classification of conducting materials – Drude Lorentz theory – Expression for electrical conductivity – Thermal conductivity – Expression for thermal conductivity – Wiedemann – Franz law – electrical resistivity versus temperature- schottky effect- photoelectric effect – photoelectric emission-free electron gas in three dimensions-periodic boundary conditions- The Fermi Energy failure of the free electron model.

UNIT – III: DIELECTRIC MATERIALS

Dielectric polarization -Dielectric constant and displacement vector - Different types of dielectric polarization – Frequency and temperature effects on polarization – Dielectric loss – Dielectric break down – local fields – Clausius Mossotti relation.- Piezoelectric effect-properties of ferroelectrics.

UNIT – IV: SUPERCONDUCTORS

Super conductivity phenomena – Effect of magnetic field - Properties of Superconductors – Type I and Type II Superconductors -Meissner effect – High Tc Superconductors - SQUIDS. Isotope effect -Thermodynamic effects (Entrophy, Specific heat, Thermal conductivity) – Application of superconductors (Electric generators, Electric power transmission line, Magnetic levitation

UNIT – V: TYPES OF BONDING AND NEW MATERIALS

Types of bonding- Ionic bond- characteristics of ionic bond- Covalent bond – characteristics of covalent bond – Metallic bond – characteristics of metallic bond- Vander waals bonding - New materials: Metallic glasses - Fiber Reinforced Plastics (FRP) and Fiber Reinforced Metals (FRM) – Surface Acoustic Wave materials- applications (Delay lines and memories, frequency filter, surface acoustic wave resonator) - Metal matrix composites – Biomaterials – Ceramics – Shape memory alloys – SMART materials – conducting polymers.

TEXT BOOK:

1.Author : S. L. Gupta & V. Kumar,
Book Name:Solid state Physics
Publication: K.Nath & Co,Meerut
Year:1984
Edition: 4th

2. Author : Dr. M. Arumugam
Book Name: Material Science
Publication: Anuradha Agencies
Edition: Revised 3, UNIT –V

REFERENCE BOOK:

1 Author : S.O. Pillai
Book Name: Solid State Physics

Publication: New Age International Publishers
Year:2002
Edition: Revised 6th UNIT – I to IV
2. Author: Saxena Gupta Saxena
Book Name : Solid State Physics
Publication : Pragathi
Year : 2010
Edition : 14

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE -641 020
For candidates admitted from academic year 2013-14 onwards Under New CBCS

Programme : B. Sc Physics Subject Code: 14UPH6C11
Course Title : **NUCLEAR PHYSICS**
Core : 11
Year : III Semester: VI
5 Hours/Week 5 Credits

Objectives:

To enable the students to know the elements of nuclear structure and radioactivity and to know the different nuclear models to know the elementary particles and their interactions.

UNIT – I: RADIO ACTIVITY

Radio activity - Fundamental laws of Radio activity - Laws of Radioactive disintegration - Half life - Mean life - Laws of Successive disintegration – Radioactive dating – The age of earth – radioactive series – Alpha emission – properties of alpha particles – alpha spectrum – Geiger Nuttal law – Beta decay – Properties of Beta decay – Gamma ray spectrum – Determination of the wavelength of gamma rays.

UNIT – II: NUCLEAR ACCELERATORS AND DETECTORS

Linear accelerator (LINAC) – Betatron – Synchroton – Proton Synchroton – Ionization chamber – GM counter – Wilson's cloud chamber – Bubble chamber – Spark chamber - Scintillation counter – Cerenkov counter

UNIT- III: NUCLEAR PROPERTIES AND MODELS

Classification of nuclei - General properties of nucleus – Binding energy – Nuclear stability - Theories of nuclear composition – Nuclear forces - Proton-electron hypothesis – Proton-neutron hypothesis – Models of nuclear structure – The Liquid drop model – The Shell model – The Collective model.

UNIT – IV: NUCLEAR REACTIONS

The Discovery of artificial transmutation – The Q-value equation for a Nuclear reaction – Types of nuclear reactions – Energy balance in nuclear reactions and the Q-value – Threshold energy of an endoergic reaction – Nuclear fission – critical mass – chain reaction – Nuclear fusion – source of stellar energy - Transuranic elements.

UNIT- V: COSMIC RAYS AND ELEMENTARY PARTICLES

Discovery of cosmic rays – latitude effect – Azimuth effect – Altitude effect – Primary and Secondary cosmic rays – cosmic ray showers – Discovery of positron – the mesons – Van allen belts.

Elementary Particles: Classification – Particles and anti particles – the fundamental interactions.

TEXT BOOK:

1.Author : Murugesan. R
Book Name: Modern physics
Publication: S.Chand & co.,
Year: 2007
Edition: 13th

REFERENCE BOOK:

1.Author : Pandiya and Yadav ,
Book Name: Elements of Nuclear Physics
Publication: Kedar Nath , Ram Nath, Meerut
Year: 1997
Edition:7th
2. Author : D. C. Tayal,
Book Name: Nuclear Physics
Publication: Himalaya Publishing ,
Year: 2003
Edition: 9th

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE -641 020
For candidates admitted from academic year 2013-14 onwards Under New CBCS

Programme : B. Sc Physics Subject Code: 14UPH6C12
Course Title : **PROGRAMMING IN C AND ITS PHYSICS APPLICATIONS**
Core : 12
Year : III Semester : VI
5 Hours/Week 5 Credits

Objectives:

Know about the techniques and applications of C Programming and to solve the Physics problems.

UNIT – I: C LANGUAGE FUNDAMENTALS

History of C language - Basic Structure of C Programming - Character set - Constants - Variables - Data Types - Operators and Expression - Escape Sequence Characters -Library Functions - Input and Output statements: scanf - printf - getchar - putchar - gets – puts.

UNIT – II: CONTROL STRUCTURES

Arrays Variables – Assigning Data for Array - One, Two and Multi dimensional Array - Conditional control statement: if, else, nested if, switch case - Looping statement: while, do while, for, nested for- break - continue and Unconditional control statement: go..to statement.

UNIT – III: FUNCTIONS, STRUCTURE AND UNIONS

Function declaration – argument – Call the function – Return statement - Type of functions - Recursive functions - Passing Array to functions - Automatic, Static, Register and External storage - Defining a structure – Declaring structure variables – Accessing structure members – Structure initialization – Structure within structures – Structures and functions – Unions – Size of structures.

UNIT – IV: POINTERS AND FILES

Understanding pointers – Accessing the address of a variable – Declaring pointer variables – Initialization of pointer variables – Accessing a variable through its pointer – Pointer expressions

Defining and opening a file – Closing a file - Input/output operation in files – Error handling during I/O operations – Command line arguments.

UNIT - V: PHYSICS APPLICATION PROGRAMMS

Quadratic equations - Matrix multiplication - Conversion of temperature from C to F and F to C - Determination of G by Boy's Method - Young's Modulus - Uniform bending - Spectrometer - Refractive index & Dispersive power of prism - Newton's Rings - Radius of curvature - Determination of Velocity of light - Foucault's Rotating Mirror Method - Estimation of Average Global Solar Radiation

BOOK FOR STUDY:

1. A textbook on C by E. Karthikeyan
   Publication: Prince–Hall of India Pvt Ltd, New Delhi
   Year: 2008.1st edition

BOOKS FOR REFERENCE:

1. Programming in ANSI C by E. Balagurusamy
   3rd edition Tata Mc Graw Hill Publishing Company Limited, 2004
2. Let us C by Yeshavant Kanitkar
   4th edition, BPB publications, 2002

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE -641 020
For candidates admitted from academic year 2016-17 onwards Under New CBCS

Programme : B. Sc Physics Subject Code: 16UPH6EL1
Course Title : **ALTERNATE ENERGY RESOURCES**
Elective : I
Year : III Semester: VI 2 Hours/Week 4 Credits

Objectives:

Impart the knowledge of energy crisis, conventional and non-conventional energy sources.

UNIT – I: INTRODUCTION

Introduction – Consumption pattern – Oil shock – Types based on usage –Usage pattern of primary energy sources – Necessity of harnessing alternate energy resources – Energy chain –Energy and its major classifications.

UNIT – II: ENERGY CRISIS

Salient features and drawbacks of energy sources in practice- Alternate energy sources and their significances- Energy and its influence on environment -Heating values of various fuels – Energy status – Global context –Indian context.

UNIT – III: THERMAL CONVERSION

Principles of Solar thermal conversion - Solar collectors - Solar water heater- Solar passive space heating and cooling systems - Solar industrial heating systems - Solar cookers – Solar furnaces- Solar green house - Solar desalination - Solar pumping – Satellite solar power stations.

UNIT – IV: BIOMASS ENERGY

Introduction - Photosynthesis - Bio-gas generation - Digesters and their design - Some materials for biogas and biomass - Advantages and disadvantages of biological conversion of solar energy applications of biogas.

UNIT – V: FUEL CELL AND PHOTOVOLTAICS

Introduction to fuel cell – Potential applications – Classifications – Phosphoric acid fuel cell (PAFC) – Alkane fuel cell (AFC) – Fuel cell power plot- Magneto hydro dynamic (MHD) power conversion – Principle MZHD generator – Advantages – Limitations.

Photovoltaics : Introduction to photovoltaics – Photovoltaic effect – Photovoltaic cell – Photovoltaic system for power generation – Applications of photovoltaic system.

TEXT BOOK:1

1. B.H. KHAN – Non-conventional Energy Resources, Tata Mc Graw-Hill Publishing Company Ltd, 2006.
2. G.D. RAI – Solar Energy Utilization, Khanna Publishers, 1995.
3. S.P. SUKHATME - solar energy – Principles of thermal collection and storage- 2 nd edition./ Tata Mc-Hill –coy 2006

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE -641 020
For candidates admitted from academic year 2013-14 onwards Under New CBCS

Programme : B. Sc Physics Subject Code : 14UPH2CP1
Course Title : **GENERAL EXPERIMENTS- I**
Core Practical : I
Year : I Semester : II
3 Hours/Week 3 Credits

Any Fifteen of the Following Experiments:

1. Error Analysis I (Vernier Caliper, Physical Balance, Screw Gauage).
2. Error Analysis II (Spectro meter, Travelling Microscope).
3. Young's Modulus-Non uniform bending (Pin & Microscope method).
4. Young's Modulus - Cantilever depression(Pin & Microscope method).
5. Rigidity modulus – Torsional Pendulum.
6. Compound Pendulum – Determination of 'g'.
7. Surface tension – Capillary rise.
8. Metre bridge – Resistance and specific resistance.
9. Sonometer – Frequency of tuning fork.
10. Surface tension – Method of drops.
11. Newton's law of cooling.
12. Determination of 'M'–Tan C position.
13. Potentiometer – low range voltmeter calibration.
14. Spectrometer – Refractive Index – Prism.
15. Spectrometer – Grating (Normal incidence method).
16. Potentiometer - low range ammeter calibration.
17. Comparison of viscosity's – Poisuille's flow method.
18. Liquid lens – Refractive index of liquid.

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE -641 020
For candidates admitted from academic year 2017-18 onwards Under New CBCS

Programme : B. Sc Physics Subject Code : 17UPH2CP2
Course Title : **ELECTRONICS EXPERIMENTS**
Core Practical : II
Year : I Semester : II
2 Hours/Week 2 Credits

Any Fifteen of the Following Experiments

1. Junction diode characteristics.
2. Zener diode characteristics.
3. Construction of Half and Full wave rectifier.
4. Construction of 5V regulated power supply using IC.
5. Bridge Rectifier.
6. 12 – 0 – (-12) Dual IC regulated power supply
7. Zener Regulated Power supply.
8. Study of CRO- Lissajous figures.
9. Verification of truth tables of AND, OR and NOT gates.
10. Verification of truth tables of NAND, NOR and EX-OR gates.
11. NAND as universal gate.
12. NOR as universal gate.
13. Voltage Doubler.
14. Construction of Half adder and half subtractor.
15. Verify ohms law.
16. Transistor characteristics – CE mode.
17. Construction of Astable Multivibrator.
18. Single stage RC-coupled amplifier.

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE -641 020
For candidates admitted from academic year 2013-14 onwards Under New CBCS

Programme : B. Sc Physics Subject Code : 13UPH4CP3
Course Title : **GENERAL EXPERIMENTS- II**
Core Practical : III
Year : II Semester : IV
3 Hours/Week 3 Credits

Any fifteen of the following experiments:

1. Young's modulus - uniform bending (Optic lever Method).
2. Young's modulus – Cantilever Oscillations.
3. Rigidity Modulus – Static torsion (Scale and telescope).
4. Metre bridge - TCR.
5. Melde's string method – Determination of frequency.
6. Thermal conductivity – Lee's disc method.
7. Spectrometer-dispersive power of the prism.
8. Determination of Band gap energy of a Thermister.
9. Spectrometer – Hollow prism.
10. Spectrometer i-d curve.
11. Newton's ring – Radius of curvature
12. Field along the axis of the coil – Determination of B_H.
13. Spectrometer – Small angled prism.
14. Young's modulus - Koenig's Method.
15. Sonometer – A.C frequency.
16. Polarimeter – Specific rotation.
17. Joules calorimeter – Specific heat capacity of liquid.
18. Air Wedge – Thickness of the Wire.

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE -641 020
For candidates admitted from academic year 2015-16 onwards Under New CBCS

Programme : B. Sc Physics Subject Code : 15UPH4CP4
Core Practical : IV : **ANALOG AND DIGITAL EXPERIMENTS**
Year : II Semester: IV
2 Hours/Week 2 Credits

Any fifteen of the following experiments:

1. OP-AMP – Adder and Subtractor.

2. OP-AMP – Inverting and non-inverting amplifier.

3. Parameters of OP-AMP.

4. OP-AMP – Integrator and Differentiator.

5. Low pass filter - OP-AMP.

6. High pass filter - OP-AMP.

7. Band pass filter - OP-AMP.

8. Unity Gain follower- OP-AMP.

9. Parallel resonant circuit.

10. Series resonant circuit.

11. Astable multivibrator -555 Timer.

12. Two Input OR and AND gates using diode and transistor.

13. Construction of Full adder.

14. Construction of Full subtractor.

15. 4-bit Binary adder.

16. RS Flip Flop.

17. Verification of De Morgan‘s theorem.

18. Analog to Digital converter.

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE -641 020
For candidates admitted from academic year 2013-14 onwards Under New CBCS

Programme : B. Sc Physics Subject Code : 14UPH6CP6
Course Title : **ADVANCED EXPERIMENTS**
Core Practical : V
Year : III Semester: VI
3 Hours/Week 3 Credits

Any fifteen of the following experiments:

1. Spectrometer – i -i' curve
2. Spectrometer – Cauchy's constant
3. Spectrometer - Hartmann's formula
4. Spectrometer - Solar spectrum
5. Newton's Rings - Refractive Index of Liquid
6. Ballistic Galvanometer – Figure of merit
7. Potentiometer – High range voltmeter
8. Self inductance of coil – Anderson's bridge
9. Hartley oscillator
10. Colpitt's oscillator
11. FET characteristics
12. UJT Characteristics
13. Band gap energy of the semiconductor
14. Young's modulus - uniform bending (Optic lever)
15. Young's modulus – non-uniform bending (Optic lever)
16. Laser Diffraction – Determination of wave length of the diode laser
17. Resolving power of a lens using He-Ne laser
18. Verification of Malus law using diode laser

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE -641 020
For candidates admitted from academic year 2013-14 onwards Under New CBCS

Programme : B. Sc Physics Subject Code: 14UPH6CP7

Course Title : **MICROPROCESSOR AND C - PROGRAMMING IN PHYSICS**
Core Practical : VI
Year : III Semester: VI
3 Hours/Week 3 Credits

Any Fifteen of the following experiments:

MICROPROCESSOR PROGRAMMING

1. Program to transfer data between memories
2. Program to find the 1's and 2's complement of 8 - bit data
3. Program to perform 8 – Bit Addition and Subtraction
4. Program to perform 8 –Bit Ascending order
5. Program to perform 8 –Bit Descending order
6. Program to perform 8 –Bit Multiplication
7. Program to perform 16 Bit Addition
8. Program to convert Binary to Gray and Gray to Binary
9. Program to find the smallest and largest in a data Array

C - PROGRAMMING

10. Determine the Square root of the Quadratic equations
11. Matrix multiplication of a given 2 x 2 matrices
12. Conversion of temperature from ^{0}C to ^{0}F and ^{0}F to ^{0}C
13. Determination of 'G' by Boy's Method
14. Young's Modulus - Uniform bending
15. Spectrometer - Refractive index & Dispersive power of prism
16. Newton's Rings - Radius of curvature
17. Determination of Velocity of light - Foucault's Rotating Mirror Method
18. Estimation of Average Global Solar Radiation

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE -641 020
For candidates admitted from academic year 2013-14 onwards Under New CBCS

Programme : B. Sc Maths & Chemistry Subject Code: 13UMA1AL1&13UCH3AL3
Course Title : **I - B. Sc Maths, Semester - I & II - B.Sc Chemistry, Semester – III**
ALLIED THEORY PHYSICS – I
Allied : 1
Year : I&II Semester : I&III
4 Hours/Week 4/5 Credits

UNIT – I: GRAVITATION
Determination of 'G' by Boy's method – Potential and field due to a solid sphere – Variation of 'g' due to altitude and depth.
ELASTICITY
Bending moment – Determination of 'Y' by non uniform bending – Torsional oscillations – use of Torsional Pendulum to determine 'n' and 'I'

UNIT – II: OPTICS
Newton's rings – Determination of refractive index of a liquid – Plane diffraction grating – Determination of wavelength – Dispersive power of a grating – Polarization – Production and analysis of elliptically and circularly polarized light.

UNIT – III: THERMODYNAMICS
Joule Thomson effect – Adiabatic demagnetization – Liquefaction of Helium – Meissner effect – Properties of Liquid Helium I and II – Super conductivity.
Measurement of Radiation from SUN – Pyroheliometer.

UNIT – IV: MAGNETISM AND ELECTRICITY
Field along the axis of along solenoid – tangent Galvanometer – Moving coil galvanometer.
Self induction – Mutual induction – Alternating current – LR and LCR series, circuits – Impedance and Resonance.

UNIT – V: RELATIVITY
Michelson Morley experiment – Postulates of Special Theory of Relativity – Lorentz transformation – Time dilation and length contraction – Addition of Velocities – Mass Energy relation.

TEXT BOOK:1

1.Author : R. Murugasen
Book Name: Modern Physics
Publication: S. Chand & Co
Year:1990
Edition:2nd Reprint

2.Author : Brijlal & Subramaniam
Book Name: Optics
Publication: S. Chand & Co
Year:1990
Edition:2

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE -641 020
For candidates admitted from academic year 2013-14 onwards Under New CBCS

Programme : B. Sc Maths & Chemistry Subject Code: 13UMA2AL2&13UCH4AL4
Course Title : **I - B. Sc Maths, Semester - II & II - B.Sc Chemistry, Semester – IV**
ALLIED THEORY PHYSICS – II
Allied : 2
Year : I&II Semester : II&IV
4 Hours/Week 4/5 Credits

UNIT – I: QUANTUM OPTICS
Einstein's photo electric equation – Photo Voltaic Cell – Photomultiplier – Production and properties of X rays – X ray spectrum –Mosley's law – Compton effect – Derivation of formula for 'd'.

UNIT – II: LASER PHYSICS
Population Inversion – Methods of producing population inversion – Ruby Laser – Helium-Neon Laser – CO_2 laser, Semiconductor laser - Uses of Lasers.

UNIT – III: QUANTUM MECHANICS
Principal Uncertainty – wave function - Probability Density – Schrodinger's one dimensional equation – Eigen function and Eigen values – Particle in a box – One dimensional Potential well

UNIT – IV: SEMICONDUCTOR PHYSICS
PN Junction– Zener Diode – VI Characteristics – Action of a transistor – Transistor characteristics (Common Base and Common Emitter) – Transistor as an Amplifier – Switching action of a Transistor.

UNIT – V: INTEGRATED ELECTRONICS
Operational Amplifier – Block diagram – Operation Amplifier as an Adder and Subtractor - Integrator and Differentiator. OR, AND & NOT gates – Demorgan's theorems – NAND gate as a universal gate.

TEXT BOOK:

1.Author : R. Murugasan
Book Name: Modern Physics
Publication: S. Chand & Co
Year: 1990
Edition:2nd

2. Author : Brijlal & Subramanian
Book Name: Optics
Publication: S. Chand & Co
Year: 1990
Edition:2nd

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE -641 020
For candidates admitted from academic year 2013-14 onwards Under New CBCS

Programme : B. Sc Maths & Chemistry Subject Code: 13UMA2AP1/13UCH4AP1
Course Title : **I - B. Sc Maths, Semester – 1 & 2 and II - B. Sc Chemistry, Semester – 3 & 4 ALLIED PHYSICS PRACTICAL**
Allied Practical: I
Year :I& II Semester : II & IV
2 Hours/Week 2 Credits

Any Fifteen of the following experiments:

1. Compound pendulum.
2. Young's Modulus – Non uniform bending.
3. Young's modulus – Uniform bending.
4. Spectrometer – Solid prism.
5. Spectrometer – Grating.
6. Potentiometer – Low range ammeter calibration.
7. Potentiometer – Voltmeter calibration.
8. Rigidity modulus - Torsional pendulum.
9. Rigidity modulus – Static torsion.
10. Meter bridge.
11. Deflection magnetometer – Field along the axis of the coil.
12. Newton's rings.
13. Deflection magnetometer – Tan C position.
14. Zener diode – Characteristics.
15. Transistor characteristics – CE mode
16. Verification of truth tables AND, OR and NOT gates.
17. NAND as universal gate.
18. OP- AMP – adder and subtractor.

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE -641 020
For candidates admitted from academic year 2015-16 onwards Under New CBCS

Programme : B. Sc Chemistry Subject Code: 13UCH3NM1
Course Title : **NME-INSTRUMENTAL METHODS OF CHEMICAL ANALYSIS-I**
NME : I
Year : II Semester : III
2 Hours/Week
2 Credits

Objectives:

The objective of this paper is to make the students know about the instrumentation and characteristic properties of IR, UV and Raman spectroscopy.

UNIT – I

Ultraviolet and Visible Spectrophotometry: Radiation sources – Monochromators – Detectors – Double beam spectrophotometer.

Infrared Spectrophotometer: The range of IR radiation – Instrumentation - Radiation sources –Monochromators – Single beam and Double beam Spectrophotometer.

UNIT - II

Raman Spectroscopy: Characteristics and properties of Raman lines – Difference between Raman spectra & IR spectra – Instrumentation – Source of light – Filters – Sample holders – Spectrograph.

UNIT – III

Fluorescence and Phosphoresence Spectrophotometry: Fluorescence and Phosphorescence – Theory – Singlet and Triplet states – Instrumentation - Single beam and Double beam Fluorimeters - Spectrofluorimeters – Instruments for Phosphorimetric analysis – Comparison of Fluorimetry and Phosphorimetry.

TEXT BOOK

Author : Gurdeep Chatwal and Anand
Book Name: Instrumental Methods and Analysis
Publication: Himalaya Publishing House, Mumbai
Year: 1979
Edition: 1st
UNIT:I-III

REFERENCE BOOK

Author : B.K.Sharma
Book Name: Instrumental Methods of Chemical analysis
Publication: Goel Publishing House, Meerut
Year:
Edition: 3rd

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE -641 020

For candidates admitted from academic year 2015-16 onwards Under New CBCS

Programme : B. Sc Chemistry Subject Code: 13UCH4NM2

Course Title : **NME-INSTRUMENTAL METHODS OF CHEMICAL ANALYSIS-II**

NME : II

Year : II Semester : IV

2 Hours/Week 2 Credits

Objectives:

The objective of this paper is to make the students know about the instrumentation and characteristic properties of NMR, Mass spectroscopy and Atomic absorption spectrometer.

UNIT - I

Atomic Absorption Spectrometry: Instrumentation – Radiation source – Production of the atomic vapour - Monochromators – Detectors – Amplifier - single beam and double beam AAS.

UNIT – II

X-ray Methods: Instrumentation – Production of X-rays – Collimator – Monochromators - Counter methods – Rotating crystal method – Powder crystal method.

UNIT - III

Nuclear Magnetic Resonance: Instrumentation – Sample holder – Magnet – Sweep generator – RF generator - RF receiver – Limitations

Mass Spectrometry: Components of mass spectrometers – Inlet system – Ionization chamber - Double focusing mass spectrometers.

TEXT BOOK

Author : Gurdeep Chatwal and Anand
Book Name: Instrumental Methods and Analysis
Publication: Himalaya Publishing House, Mumbai
Year: 1979
Edition: 1st
UNIT:I-III

REFERENCE BOOK

Author : B.K.Sharma
Book Name: Instrumental Methods of Chemical analysis
Publication: Goel Publishing House, Meerut
Year:
Edition: 3rd

Programme : B. Sc Physics Subject Code: **14UPH6CPR**

Course Title : **Project Work**

Objectives

To manifest the students to understand the importance of experimental analysis, problem solving through a scientific approach related to the environment and society and to educate and train the students to write scientific papers.

Description:

Each faculty member will be served as a guide for a group consisting of 3-5 students. A specific problem will be assigned to the students, or they will be asked to choose a problem/area of interest. The research work can be carried out at the college or any other organization approved by the guide and HOD. The internal and external examiners panel, including HOD, will conduct viva-voce. The group of students will explain their project through PPT before the panel members. Internal and external evaluation will be based on the student's performance.

Methodology

Each project should contain the following details:

- Introduction on the topic
- Experimental details
- Result and Discussion - Enclosure of figures and tables
- Conclusion
- Reference