

**SRI RAMAKRISHNA MISSION VIDYALAYA
COLLEGE OF ARTS AND SCIENCE,
COIMBATORE -641 020
DEPARTMENT OF PHYSICS**

B.SC. PHYSICS

**Mapping of Course outcomes and programme outcomes and
programme specific outcomes**

**B.Sc. Physics Programme
(2018-2019 onwards)**

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND

SCIENCE COIMBATORE -641 020

B.Sc. PHYSICS

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

The programme educational objectives are set in line with Institutional and Departmental mission statements. The programme educational objectives of Department of Physics are to produce candidates of good basic knowledge in Physics concepts and who later take the role of researchers with following qualities:

PEO1: Consolidates the knowledge acquired at +2 level and improves the ability to solve the problems in physics

PEO2: Students will have an enhanced proficiency in understanding the physical concepts, principles and theories of Physics and applying it in day-to-day life.

PEO3: Develop the ability to apply the knowledge acquired in the classroom and laboratories to specific problems in theoretical and experimental Physics.

PEO4: Analytical thinking and applying skills to develop initiatives and innovative ideas for R&D, industry and social requirements.

PEO5: Develop the learners' personality to suit current industry environment and entrepreneurial skills

PROGRAMME OUTCOMES

PO1: Provide platform to learn Physics, Chemistry and Mathematics theories, concepts and practical skills with appropriate knowledge.

PO2: Assimilate the knowledge on understanding the nature and ability to link the facts to observe and discover scientific laws.

PO3: Create new skills and tools to obtain possible solutions in comprehension of the physical science problems incorporating mathematical modeling and theories.

PO4: Enhancement of critical thinking, problem solving skills, digitally efficient and making effective working professionals to suit for science, technical and research field.

PO5: Making best suitable personalities to serve formation and society with ethical awareness and reasoning ability.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

The graduates able to

- PSO1:** improve the understanding capabilities in fundamental laws, concepts, principles and theories in the different academic field of Physics and its associated fields. Can understand the basics of computer and data science. Accomplish theoretical and laboratory skills
- PSO2:** utilize the procedural knowledge acquired in different areas of study in Physics outlined above in research and development, teaching, government and public services.
- PSO3:** assimilate interest and to improve the competencies of individuals in specialized area relating to the subfields and current developments in Physics.
- PSO4:** apply theoretical and laboratory skills to new/unfamiliar contexts to identify problems and issues relating to Physics. Skill enhancement in analysis and formulation of new theories and concepts.
- PSO5:** develop communication abilities to present their findings and results in technical and popular science forums organized in various universities and other private organizations.

COURSE OUTCOMES (CO)

By the end of the course, the students will be able to

CO1	Procure knowledge on concepts of gravitation and elasticity of materials with physical parameters calculation ability	K
CO2	Measure the values of surface tension and viscosity of liquids at different temperatures.	U
CO3	Understanding of uses and applications of sound energy its measuring techniques, derive the equation of motion for free, damped and forced oscillations.	K
CO4	Apply the knowledge of reverberation-time, absorption coefficient calculations in the construction of good auditorium, acoustics of buildings.	U
CO5	Imparting techniques for generation of ultrasonic waves and handling of CRO	S

K-Knowledge; U-Understand; S-Skill

MAPPING

	PSO1	PSO2	PSO3	PSO4	PSO5		PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	M		S	S	S	L	M
CO2	M	M	M	S	M		M	S	S	S	M
CO3	S	M	S	S	M		S	M	S	S	M
CO4	S	S	M	S	M		S	S	S	S	S
CO5	M	S	M	S	L		S	M	M	S	S

S-Strong; M-Medium; L-Low

COURSE OUTCOMES (CO)

By the end of the course, the students will be able to

CO1	Construct linear circuits and phenomenon of series and parallel resonance circuits.	U
CO2	Predict the motion of charged particles in electric and magnetic fields.	K
CO3	Explain the basics of capacitors, capacitance of capacitors and role of resistance in electrical circuits.	K
CO4	Understand various laws and principles related magnetism and magnetic induction	K
CO5	Classify the magnetic materials and analyze their behaviors using associated theories	S

K-Knowledge; U-Understand; S-Skill

MAPPING

	PSO1	PSO2	PSO3	PSO4	PSO5		PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	M		S	S	M	S	M
CO2	S	M	S	M	L		S	M	S	S	M
CO3	S	M	S	S	M		S	S	M	S	L
CO4	S	M	M	S	M		S	S	M	M	L
CO5	S	S	M	S	M		S	S	M	S	M

S-Strong; M -Medium; L- Low

COURSE OUTCOMES(CO)

By the end of the course, the students will be able to

CO1	Acquaint about basic principles of semiconductor materials and devices.	K
CO2	explore the various parameters of Transistor amplifiers, OP-AMP and Oscillators	K
CO3	Elucidate the concepts of rectifiers and able to design power supplies.	U
CO4	Differentiate analog and digital systems and to work with various number systems involved in digital technology	S
CO5	design and develop digital circuits, essential for calculation and processing,	S

K-Knowledge; U-Understand; S-Skill

MAPPING

	PSO1	PSO2	PSO3	PSO4	PSO5		PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	L	M		S	S	S	M	L
CO2	S	M	M	S	M		S	S	M	S	L
CO3	S	S	M	M	M		S	S	S	S	M
CO4	S	M	S	S	M		S	S	S	M	S
CO5	M	S	S	S	L		S	S	M	S	S

S-Strong; M -Medium; L-Low

Course Title :Heat,ThermodynamicsandStatisticalMechanics

Course Code :18UPH4C04

COURSE OUTCOMES(CO)

By the end of the course, the students will be able to

CO1	Elucidate the behavior of gas laws and the principle of kinetic theory	K
CO2	Assimilate the significance of thermal conduction and radiation	K
CO3	Compare the various methods of production of low temperature and to understand their applications	U
CO4	Apply the principles and laws to determine the entropy of a system	U
CO5	Calculate the efficiency of heat engines distinguish classical statistics and quantum statistics	S

K-Knowledge;U-Understand;S-Skill

MAPPING

	PSO1	PSO2	PSO3	PSO4	PSO5		PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	L		S	S	M	M	M
CO2	S	S	M	S	M		S	S	S	M	M
CO3	M	S	M	S	M		M	S	S	S	M
CO4	S	M	S	S	M		S	S	M	S	S
CO5	M	M	S	S	M		S	M	S	S	M

S-Strong; M -Medium;L-Low

Course Title :Mathematical Physics and Classical Mechanics **Course Code:** 16UPH5C05

COURSE OUTCOMES(CO)

By the end of the course, the students will be able to

CO1	Know about the scalar and vector fields, identities and theorems	K
CO2	Formulate variety of physical systems by means of various coordinate systems with the benefit of vector concepts.	K
CO3	Solve electrical circuit problems using concept of Laplace transformation	S
CO4	Assimilate complex variables and special functions	K
CO5	Setup Lagrange's equation of motion for mechanical, electrical and harmonic systems	U

K-Knowledge; U-Understand; S-Skill

MAPPING

	PSO1	PSO2	PSO3	PSO4	PSO5		PO1	PO2	PO3	PO4	PO5
CO1	M	S	S	M	L		S	S	S	S	M
CO2	S	S	S	M	M		S	S	M	S	M
CO3	S	S	S	S	M		S	S	S	M	M
CO4	M	S	S	M	M		M	S	S	S	L
CO5	M	S	S	S	S		M	S	S	S	M

S-Strong; M -Medium; L-Low

COURSE OUTCOMES(CO)

By the end of the course, the students will be able to

CO1	Enrich the level of understanding on determination of different parameters like focal length, magnification, refractive index of different medium, wavelength, thickness, velocity of light, specific rotation etc.,	K
CO2	Assimilate theories and production of interference, uses of interferometers and to determine refractive indices of optical materials using variety of refractometers methods.	K
CO3	Know about the concept of diffraction, utility of diffractometers and its uses in spectral Analysis.	K
CO4	Analyze Polarization through optical activity of the medium and work with crystal technologies.	U,S
CO5	Apply these ideas on fabricating different optical spare parts for various applications such as setting up of microscope, telescope and camera lenses.	U

K-Knowledge;U-Understand;S-Skill

MAPPING

	PSO1	PSO2	PSO3	PSO4	PSO5		PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	M		S	S	S	M	M
CO2	S	S	S	S	M		S	S	S	S	M
CO3	S	S	S	S	M		S	S	S	S	M
CO4	M	S	M	S	M		S	M	S	S	S
CO5	S	M	M	S	S		S	S	M	S	M

S-Strong; M -Medium;L-Low

COURSE OUTCOMES (CO)

By the end of the course, the students will be able to

CO1	Gain knowledge about structure of atoms, various atomic models and production of atomic spectra.	K
CO2	Clarify the importance of various atomic models and electronic configuration of elements.	K
CO3	Analyze the behavior of an atom under the influence of electric and magnetic field with appropriate experimental setups	S
CO4	Distinguish classical and quantum theory of Raman effect	K
CO5	Apply different spectroscopic techniques to study the spectrograph obtained from spectroscopic devices.,	U

K-Knowledge; U-Understand; S-Skill

MAPPING

	PSO1	PSO2	PSO3	PSO4	PSO5		PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	L		S	S	M	M	M
CO2	M	S	S	S	M		S	S	M	M	M
CO3	M	S	S	M	M		S	S	S	S	M
CO4	M	S	S	M	M		M	S	M	S	M
CO5	M	S	S	S	M		S	S	M	S	S

S-Strong; M-Medium; L-Low

COURSE OUTCOMES(CO)

By the end of the course, the students will be able to

CO1	Understand the architecture of Microprocessor, Microcomputers and their developments.	K
CO2	Handle the instruction format and instruction set in assembly level programming used in second generation microprocessor	K
CO3	Write application-oriented assembly level programming for microcontrollers and microprocessors-based systems like stepper motor controls and traffic control systems etc.,	U
CO4	Develop skills to interface variety of programmable controllers with 8085 processor in research and technology	U
CO5	Acclimatize the techniques involved in interfacing memory and interrupt controller and their utility in the field of computer technology	S

K-Knowledge; U-Understand; S-Skill

MAPPING

	PSO1	PSO2	PSO3	PSO4	PSO5		PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	M		S	S	S	M	M
CO2	S	S	S	M	M		M	S	S	M	M
CO3	S	S	S	M	S		S	M	S	S	S
CO4	M	S	M	S	M		S	M	S	S	L
CO5	M	M	S	S	M		S	M	S	S	S

S-Strong; M -Medium; L-Low

Course Title :Relativity, WaveMechanics andAstrophysics

Course Code : 18UPH 6C09

COURSE OUTCOMES(CO)

By the end of the course, the students will be able to

CO1	Know about postulates and theories of relativity, basics of quantum mechanical concepts such as operators and eigenfunctions. Elucidate details of space physics.	K
CO2	Elaborate experimental evidences of dual nature of matter waves	K
CO3	Handle operators, functions involved in quantum equations associated to subatomic problems	K
CO4	Setting up of quantum equations for subatomic systems and to analyze their behaviors.	S
CO5	Portray the principle associated to stellar evolution, concept of space physics and launching mechanism of satellites and rockets	U

K-Knowledge; U-Understand; S-Skill

MAPPING

	PSO1	PSO2	PSO3	PSO4	PSO5		PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	M		S	S	M	M	L
CO2	S	M	S	S	M		M	S	S	M	M
CO3	S	M	S	M	M		M	S	S	S	M
CO4	M	S	S	S	M		M	S	S	S	M
CO5	S	M	S	M	L		S	S	M	M	M

S-Strong; M -Medium; L-Low

COURSE OUTCOMES(CO)

By the end of the course, the students will be able to

CO1	Procure knowledge on elements of crystallography, structural determination, conductivity laws and theories of solids, properties of dielectric, and superconductors and new materials	K
CO2	Elucidate the concepts of free electron theory and band theory of solids	K
CO3	Use dielectric and smart materials in various fields	U
CO4	Analyze the behavior of superconductors in magnetic levitation	S
CO5	Understand the behaviour of new materials like ceramics, shape memory alloys, biomaterials and metal matrix composites.	K

K-Knowledge; U-Understand; S-Skill

MAPPING

	PSO1	PSO2	PSO3	PSO4	PSO5		PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	M		S	S	S	M	M
CO2	S	S	S	M	M		S	M	S	M	L
CO3	S	S	S	M	M		S	S	S	M	M
CO4	M	S	S	S	M		M	S	M	S	M
CO5	S	S	M	S	L		S	S	M	M	M

S-Strong; M-Medium; L-Low

COURSE OUTCOMES (CO)

By the end of the course, the students will be able to

CO1	Elucidate radioactivity laws, nuclear radiation detectors, nuclear models, properties of nucleus, nuclear hypothesis, types of nuclear reactions and basic theories of elementary particles.	K
CO2	Solve problems related to half-life and mean life period, age of the earth through the radio activity	U
CO3	Distinguish nuclear models and nuclear reactions	S
CO4	Understand the behavior of cosmic rays and elementary particles	K
CO5	Perform overall analyses of nuclear power plants from a man, machine and organizational (human factors) point of view	S

K-Knowledge; U-Understand; S-Skill

MAPPING

	PSO1	PSO2	PSO3	PSO4	PSO5		PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	L		S	S	M	M	M
CO2	M	S	S	M	M		M	S	M	S	M
CO3	M	S	M	S	M		M	S	S	S	S
CO4	S	M	S	M	M		M	S	S	S	M
CO5	M	M	S	S	S		M	S	M	S	S

S-Strong; M-Medium; L-Low

Course Title :Programming in C And Its Physics Applications **Course Code:**18UPH 6C12

COURSE OUTCOMES(CO)

By the end of the course, the students will be able to

CO1	Assimilate the basic structure of C programming, data types, variables and basic functions	K
CO2	Understand the different control, branching structure and write programmes using them	K
CO3	Handle structure variables and unions in programme writing	U
CO4	Declare pointers and handling files in programme writing	U
CO5	Apply the programming skill in physical science, simulation and technology	S

K-Knowledge;U-Understand;S-Skill

MAPPING

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	M	S	M	S	M	S
CO2	S	S	S	S	L	M	S	S	S	M
CO3	M	M	S	S	M	S	M	S	S	S
CO4	M	M	S	S	M	M	S	S	S	M
CO5	M	S	M	S	M	M	M	S	S	S

S-Strong; M -Medium;L-Low

Course Title :Alternate Energy Resource **Course Code:**16UPH6EL1

COURSE OUTCOMES(CO)

By the end of the course, the students will be able to

CO1	Identify types of solar radiation and measuring instruments	K
CO2	Understand the working of biogas plants and windmills	K
CO3	Design and implement solar PV voltaic systems, solar pumping and different solar thermal devices	U
CO4	Analyse and develop energy balance equations	S
CO5	Categorize different energy storage systems and indirect sources of solar energy	S

K-Knowledge; U-Understand; S-Skill

MAPPING

	PSO1	PSO2	PSO3	PSO4	PSO5		PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	M		S	S	M	M	M
CO2	S	S	M	M	S		M	M	S	S	S
CO3	M	M	S	S	S		M	S	S	S	S
CO4	M	M	S	S	S		M	S	S	S	S
CO5	S	S	M	S	M		S	S	M	S	M

S-Strong; M -Medium; L-Low

SCHEME OF EXAMINATION

SEMESTER-I									
S. No.	Course Code	Part	COURSE TITLE	Hrs/wk	Credits	Exam Hrs	MAX MARKS		
							INT	EXT	TOT
1	18UGC1TA1	I	Tamil-I	6	3	3	25	75	100
2	18UGC1EN1	II	English-I	6	3	3	25	75	100
3	18UPH1C01	III	Core -1 Properties of Matter and Sound	5	5	3	25	75	100
4	18UPH1AL1	III	Allied-1 Mathematics-I	6	5	3	25	75	100
5	18UPH2CP1	III	Core Practical-I General Experiments – I [@]	3	--	--	--	--	--
6	18UPH2CP2	III	Core Practical-II Electronics Experiments [@]	2	--	--	--	--	--
7	18UGC1ENS	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	18UGC2TA2	I	Tamil-II	6	3	3	25	75	100
2	18UGC2EN2	II	English-II	6	3	3	25	75	100
3	18UPH2C02	III	Core-2 Electricity and Magnetism	4	5	3	25	75	100
4	18UPH2AL2	III	Allied -2 Mathematics-II	6	5	3	25	75	100
5	18UPH2CP1	III	Core Practical -I General Experiments – I	3	3	3	40	60	100
6	18UPH2CP2	III	Core Practical -II Electronics Experiments	3	2	3	40	60	100
7	18UGC2VAL	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	18UGC3TA3	I	Tamil–III	6	3	3	25	75	100
2	18UGC3EN3	II	English–III	6	3	3	25	75	100
3	18UPH3C03	III	Core -3 Electronics	5	4	3	25	75	100
4	18UPH3AL3	III	Allied-3 Chemistry - I	4	4	3	15	60	75
5	18UPH4CP3	III	Core Practical -III General Experiments-II [®]	3	--	--	--	--	--
6	18UPH4CP4	III	Core Practical –IV Analog and Digital Experiments [®]	2	--	--	--	--	--
7	18UPH4AP1	III	Allied Practical - Chemistry [®]	2	--	--	--	--	--
8	18UPH3NM1	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	18UGC4TA4	I	Tamil – IV	6	3	3	25	75	100
2	18UGC4EN4	II	English - IV	6	3	3	25	75	100
3	18UPH4C04	III	Core –4 Heat, Thermodynamics and Statistical Mechanics	5	5	3	25	75	100
4	18UPH4AL4	III	Allied –4 Chemistry - II	4	4	3	15	60	75
5	18UPH4CP3	III	Core Practical -III General Experiments-II	3	3	3	40	60	100
6	18UPH4CP4	III	Core Practical –IV Analog and Digital Experiments	2	3	3	40	60	100
7	18UPH4AP1	III	Allied Practical - Chemistry	2	2	3	20	30	50
8	18AUG4NM1	IV	Non-Major Elective (NME)-II Solid State Chemistry-II/Basic Tamil-II	2	2	2	--	50	50
9	18UGC4EXT	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	INT	INT
1	18UPH5C05	III	Core - 5 Mathematical Physics and Classical Mechanics	5	5	3	25	75	100
2	18UPH5C06	III	Core - 6 Optics	5	5	3	25	75	100
3	18UPH5C07	III	Core - 7 Atomic Physics and Spectroscopy	5	5	3	25	75	100
4	18UPH5C08	III	Core - 8 Microprocessor and its Physics Applications	5	5	3	25	75	100
5	18UPH5EL1	IV	Elective - I [@] Alternate Energy Resources	2	--	--	--	--	--
6	18UPH6CP6	III	Core Practical - V [@] Advanced Experiments	3	--	--	--	--	--
7	18UPH6CP7	III	Core Practical - VI [@] Microprocessor and C - Programming in Physics	3					
8	18UPH5CP5	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	INT	INT
1	18UPH6C09	III	Core - 9 Relativity, Wave Mechanics and Astrophysics	5	5	3	25	75	100
2	18UPH6C10	III	Core - 10 Solid State Physics	5	5	3	25	75	100
3	18UPH6C11	III	Core - 11 Nuclear Physics	5	5	3	25	75	100
4	18UPH6C12	III	Core - 12 Programming in C and its Physics Applications	5	5	3	25	75	100
5	16UPH6EL2	IV	Elective - I Alternate Energy Resources	2	4	3	25	75	100
6	18UPH6CP6	III	Core Practical - V Advanced Experiments	3	3	3	40	60	100
7	18UPH6CP7	III	Core Practical - VI Microprocessor and C - Programming in Physics	3	3	3	40	60	100
8	18UPH6CPR	III	Project Work	2	4	--	40	60	100
			SUB TOTAL - VI	30	34	-	245	555	800

ALLIED PHYSICS

FOR MATHEMATICS \ CHEMISTRY

SEMESTER – I \ III									
S. No.	Course code	Part	COURSE TITLE	HRS/ WK	CREDIT S	Exam Hours	MAX MARKS		
							INT	EXT	TOT
01	18UMA1A L1\18UCH 3AL3	III	Allied Theory Physics- 1	4	4	3	15	60	75
02	18UMA2A P1 \ 18UCH4A P1	III	Allied Practical: Physics	2	-	-	-	-	-
SEMESTER – II \ IV									
01	18UMA2A L2 \ 18UCH4A L4	III	Allied Theory Physics - II	4	4	3	15	60	75
02	18UMA2A P1\18UCH 4AP1	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	CREDIT S	Exam Hours	MAX MARKS		
							INT	EXT	TOT
01	18UCH3N M1*	IV	INSTRUMENTAL METHODS OF CHEMICAL ANALYSIS - I	2	2	2	--	50	50
SEMESTER – IV									
S. No.	Course code	Part	COURSE TITLE	HRS /WK	CREDIT S	Exam Hours	MAX MARKS		
							INT	EXT	TOT
01	18UPH4N M2 [@]	IV	Energy Auditing	2	2	2	--	50	50

* Non Major elective I offered by Physics Department to Chemistry Department

@ Non Major elective II offered by Physics Department to other Departments

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

For candidates admitted from academic year 2018-19 onwards Under New CBCS

Programme : B. Sc Physics

Subject Code: 18UPH1C01

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
Puplishers 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

References/E-Resources:

1. H. J. Pain, The Physics of Vibrations and Waves, John Wiley, (2005), 6th Edition
2. David Halliday, Robert Resnick and Jearl Walker, Fundamentals of Physics, John Wiley & Sons , New Delhi , 9th Edition , 2010
- 3.. <http://ocw.mit.edu/courses/#physics>
4. <http://hyperphysics.phy-astr.gsu.edu>
5. <https://www.coursera.org>
6. <http://nptel.ac.in/courses/115106090/>

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

For candidates admitted from academic year 2018-19 onwards Under New CBCS

Programme : B. Sc Physics

Subject Code: 18UPH2C02

Course Title : **ELECTRICITY AND MAGNETISM**

Core : 2

Year : I

Semester : II

5 Hours/Week

5 Credits

UNIT-I: CURRENT ELECTRICITY

Electrical measurements: Potential difference – Electric current – Ohm's law – Resistance – Resistances in series and parallel – Kirchhoff's laws - Ammeters and voltmeters. R, C, L, RC, RL and RLC Circuits in AC and DC

UNIT-II: 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 (Basics Only). 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- III: MAGNETIC INDUCTION

Biot-Savart law – Ampere's circuital law – Lorentz force - 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- 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

Reference/E-Resources:

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

4.<http://ocw.mit.edu/courses/#physics>

5.<http://hyperphysics.phy-astr.gsu.edu>

6.<http://nptel.ac.in/courses/108106073>

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

2. Author : D.N. Vasudeva
Book Name: Electricity and
Magnetism

3. Author : Nagarathanam and
Lakshminarayanan
Book Name: Electricity and Magnetism

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

For candidates admitted from academic year 2018-19 onwards Under New CBCS

Programme	: B. Sc Physics	Course Code: 18UPH3C03
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 – Inverting and Non-inverting amplifier – Adder – Subtractor - Integrator – Differentiator - Comparator.

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. B L Theraja, "Basic Electronics", S.Chand and company Ltd, 2001, Edition: 11th - UNIT : I-IV
2. V. Vijayendran, "Introduction to Integrated Electronics Digital and Analog", 2007, Edition: 1st, Reprint 2007.
3. Malvino and Leech, "Digital Principles & Application", McGraw Hill Company, Unit – V

REFERENCE BOOK:

1. V.K. Metha, "Principles of Electronics", S.Chand and company Ltd, 1983, Edition: 3rd.
2. R.S. Sedha, "Applied Electronics", S.Chand and company Ltd, Reprint Year: 2010

References/E-Resources:

3. H. J. Pain, The Physics of Vibrations and Waves, John Wiley, (2005), 6th Edition
4. David Halliday, Robert Resnick and Jearl Walker, Fundamentals of Physics, John Wiley & Sons, New Delhi, 9th Edition, 2010
- 3.. <http://ocw.mit.edu/courses/#physics>
4. <http://hyperphysics.phy-astr.gsu.edu>
5. <https://www.coursera.org>
6. <http://nptel.ac.in/courses/115106090/>

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

For candidates admitted from academic year 2018-19 onwards Under New CBCS

Programme	: B. Sc Physics	Course Code: 18UPH4C04
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 linear 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 engine-Otto Cycle -Clausius clapyron'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. Brijlal and Subramanyam, "Heat and Thermodynamics", S. Chand & Company, 2006, Edition: 16th
2. D.S. Mathur, "Heat and Thermodynamics", S.Chand and Co, 1970, Edition: 3rd.
3. A.B Gupta & H.P. Rai, "Heat and Thermodynamics", New central book, 1995, Edition: 1st

References/E-Resources:

1. David Halliday, Robert Resnick and Jearl Walker, Fundamentals of Physics, John Wiley & Sons , New Delhi , 9th Edition , 2010
2. <http://ocw.mit.edu/courses/#physics>
3. <http://hyperphysics.phy-astr.gsu.edu>
4. <https://www.coursera.org>
5. <http://nptel.ac.in/courses/115106090/>

**SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE
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For candidates admitted from academic year 2016-17 onwards Under New CBCS

Programme : B. Sc Physics Subject Code: 18UPH5C05
Course Title : **MATHEMATICAL PHYSICS AND CLASSICAL MECHANICS**
Core : 5
Year : III Semester : V: 5 Hours/Week 5 Credits

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 – Degree 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. Murugesan

Book Name: Mechanics and Mathematical Physics,

Publication: S.Chand, Edition 2008

**SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE
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For candidates admitted from academic year 2016-17 onwards Under New CBCS

Programme : B. Sc Physics

Subject Code: 18UPH5C06

Course Title : **OPTICS**

Core : 6

Year : III

Semester : V

5 Hours/Week

5 Credits

UNIT – I: OPTICAL INSTRUMENTS

Aberrations: – Lens aberrations – spherical aberrations – reducing spherical aberrations – coma – 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 aperture- 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

3. Author : Murugesan. R

Book Name: Modern physics

Publication: S.Chand & co.,

Year: 2007

Edition: 13th

2. Author : Ananthkrishanan,

Book Name: A text book of light

Publication: S.Viswanathan & co, Chennai

Year: 1966

Edition: 2nd Edition

4. Author : Ajoy K. Ghatak

Book Name: Modern optics

Publication: Tata Mc Graw-Hill Pub. Co.

Ltd. Delhi

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

For candidates admitted from academic year 2014-15 onwards Under New CBCS

Programme : B. Sc Physics

Subject Code: 18UPH5C07

Course Title : **ATOMIC PHYSICS AND SPECTROSCOPY**

Core : 7

Year : III

Semester : V

5 Hours/Week

5 Credits

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

3. Author : Gupta kumar Sharma

Book Name: Elements of Spectroscopy

Publication: Pragati prakashan, Meerut,

Edition : 23, Year : 2011

2. Author : Gurdeep Chatwal and

Sham Anand

Book Name: Spectroscopy

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

For candidates admitted from academic year 2014-15 onwards Under New CBCS

Programme : B. Sc Physics Subject Code: 18UPH5C08

Course Title : **MICROPROCESSOR AND ITS PHYSICS APPLICATIONS**

Core : 8

Year : III Semester: V

5 Hours/Week 5 Credits

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 2014-15 onwards Under New CBCS

Programme	: B. Sc Physics	Subject Code: 18UPH6C09
Course Title	: RELATIVITY, WAVE MECHANICS AND ASTROPHYSICS	
Core	: 9	
Year	: III	Semester : VI
5 Hours/Week		5 Credits

UNIT – I: RELATIVITY

Michelson-Morley Experiment - Galilean Transformation and Newtonian Relativity - Inadequacy of Galilean 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 uncertainty principle and its proof – Illustrations – Diffraction of electrons by a slit – Gamma ray microscope – Applications of uncertainty 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: 1st

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: 18UPH6C10

Course Title : **SOLID STATE PHYSICS**

Core : 10

Year : III

Semester : VI

5 Hours/Week

5 Credits

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 (Entropy, 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 2014-15 onwards Under New CBCS

Programme : B. Sc Physics

Subject Code: 18UPH6C11

Course Title : **NUCLEAR PHYSICS**

Core : 11

Year : III

Semester: VI

5 Hours/Week

5 Credits

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 – Synchrotron – Proton Synchrotron – 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 2014-15 onwards Under New CBCS

Programme : B. Sc Physics

Subject Code: **18UPH6C12**

Course Title : **PROGRAMMING IN C AND ITS PHYSICS APPLICATIONS**

Core : 12

Year : III

Semester : VI

5 Hours/Week

5 Credits

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: 18UPH6EL1
Course Title : **ALTERNATE ENERGY RESOURCES**
Elective : I
Year : III Semester: VI 2 Hours/Week 4 Credits

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 2018-19 onwards Under New CBCS

Programme : B. Sc Physics

Subject Code : 18UPH2CP1

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 Gauge).
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.

Reference Books:

1. C. L. Arora, Practical Physics, S.Chand& Co., 2009.
2. R. K. Shukla and Anchal Srivastava, Practical Physics, New Age International Publishers, 1st edition, 2013.
3. D. Chattopadhyay and R.C. Rakshit, An Advanced Course in Practical Physics, New Central Book Agency, 10th edition, 2011.

E-Resources:

1. <http://ocw.mit.edu/courses/#physics>
2. <http://hyperphysics.phy-astr.gsu.edu>
3. <https://www.coursera.org>
4. <http://nptel.ac.in/courses>

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

For candidates admitted from academic year 2018-19 onwards Under New CBCS

Programme : B. Sc Physics
Course Title : **ELECTRONICS EXPERIMENTS**
Core Practical : II
: I
2 Hours/Week

Subject Code : 18UPH2CP2

Semester : II

Year

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.

Reference Books:

1. L. Arora, Practical Physics, S.Chand& Co., 2009.
2. R. K. Shukla and Anchal Srivastava, Practical Physics, New Age International Publishers, 1st edition, 2013.
3. Chattopadhyay and R.C. Rakshit, An Advanced Course in Practical Physics, New Central Book Agency, 10th edition, 2011.
4. C.C.Ouseph, U.J.Rao and V.Vijayendran, Practical Physics and Electronics, S. Viswanathan Printers and Publishers, 2008.

E-Resources:

1. <http://ocw.mit.edu/courses/#physics>
2. <http://hyperphysics.phy-astr.gsu.edu>
3. <https://www.coursera.org>
4. <http://nptel.ac.in/courses>

**SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE
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For candidates admitted from academic year 2018-19 onwards Under New CBCS

Programme : B. Sc Physics

Subject Code : 18UPH4CP3

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.

References/E-Resources:

1. H. J. Pain, The Physics of Vibrations and Waves, John Wiley, (2005), 6th Edition
2. David Halliday, Robert Resnick and Jearl Walker, Fundamentals of Physics, John Wiley & Sons , New Delhi , 9th Edition , 2010
3. <http://ocw.mit.edu/courses/#physics>
4. <http://hyperphysics.phy-astr.gsu.edu>
5. <https://www.coursera.org>
6. <http://nptel.ac.in/courses/115106090/>

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

For candidates admitted from academic year 2018-19 onwards Under New CBCS

Programme : B. Sc Physics

Course Code : 18UPH4CP4

Course Title : **ANALOG AND DIGITAL EXPERIMENTS**

Core Practical : IV

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.

References/E-Resources:

1. H. J. Pain, The Physics of Vibrations and Waves, John Wiley, (2005), 6th Edition
2. David Halliday, Robert Resnick and Jearl Walker, Fundamentals of Physics, John Wiley & Sons , New Delhi , 9th Edition , 2010
3. <http://ocw.mit.edu/courses/#physics>
4. <http://hyperphysics.phy-astr.gsu.edu>
5. <https://www.coursera.org>
6. <http://nptel.ac.in/courses/115106090/>

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For candidates admitted from academic year 2014-15 onwards Under New CBCS

Programme : B. Sc Physics

Subject Code : 18UPH6CP6

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 2014-15 onwards Under New CBCS

Programme : B. Sc Physics

Subject Code: 18UPH6CP7

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 $^{\circ}\text{C}$ to $^{\circ}\text{F}$ and $^{\circ}\text{F}$ to $^{\circ}\text{C}$
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 2018-19 onwards Under New CBCS

Programme: B. Sc Maths & Chemistry Subject Code: 18UMA1AL1&18UCH3AL3
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 R. Murugasen , Modern Physics , S. Chand & Co.1990 Edition:2nd, Reprint
- 2 Brijlal & Subramaniam, Optics , S. Chand & Co ,1990,Edition:2

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

For candidates admitted from academic year 2018-19 onwards Under New CBCS

Programme : B. Sc Maths & Chemistry Subject Code : 18UMA2AL2&18UCH4AL4

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 laser, Semiconductor laser - Uses of Lasers.

UNIT - III: QUANTUM MECHANICS

Principle 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: Optics

Publication: S. Chand & Co

Year: 1990

Edition:2

2. Author : Brijlal & Subramanian

Book Name: Modern Physics

Publication: S. Chand & Co

Year: 1990

Edition:2

References/E-Resources:

1. H. J. Pain, The Physics of Vibrations and Waves, John Wiley, (2005), 6th Edition
2. David Halliday, Robert Resnick and Jearl Walker,
Fundamentals of Physics,
John Wiley & Sons , New Delhi , 9th Edition , 2010
3. <http://ocw.mit.edu/courses/#physics>
4. <http://hyperphysics.phy-astr.gsu.edu>
5. <https://www.coursera.org>
6. <http://nptel.ac.in/courses/115106090/>

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

For candidates admitted from academic year 2018-19 onwards Under New CBCS

Programme : B. Sc Chemistry

Course Code:18UCH3NM1

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

Year : II

Semester : III

2 Hours/Week

2 Credits

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 Phosphorescence 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

1. Gurdeep Chatwal and Anand, Instrumental Methods and Analysis, Himalaya Publishing House, Mumbai, 1979, Edition: 1.

REFERENCE BOOK

1. B.K.Sharma, Instrumental Methods of Chemical analysis, Goel Publishing House, Meerut, Edition: 3rd.

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

For candidates admitted from academic year 2018-19 onwards Under New CBCS

Programme : B.Sc./BA.,

Course Code: 18UPH4NM2

Course Title : NME - Energy Auditing

Year : II

Semester : IV

2 Hours/Week

2 Credits

UNIT – I: Energy

Energy resources - Different forms of energy - New and renewable energy - Primary and secondary energy - Conventional and non-conventional energy - Energy conservation and its importance - Energy and environmental concerns - Energy scenario and energy crisis.

UNIT – II: Energy Audit & Management

General philosophy - Need of energy audit and management - Definition and objective of energy audit - Types of energy audits - Preliminary & Detailed energy audit methodology Industrial, commercial and residential audit planning - General principles of energy management - Energy management strategy - Energy audit instruments

UNIT – III: Energy conservation

Energy conservation in domestic and industrial sectors

Energy conservation in

- ✓ Thermal system
- ✓ Electrical system
- ✓ Lighting system

TEXT BOOK

1. Albert Thumann and Willaim J. Younge, Hand book of energy audits, The Fairmont Press Inc., 2007, 7th Edition.
2. W.C. Turner, Energy management hand book, The Fairmont Press Inc., 2001, Edition: 4th

REFERENCE BOOK

1. G.D. Rai, Non-conventional energy sources, Khanna Publishers, 2011, Edition: 4th.

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

For candidates admitted from academic year 2014-15 onwards Under New CBCS

Programme : B. Sc Physics

Subject Code: **18UPH6CPR**

Course Title : **Project Work**