R. T. E. Society's

Arts Science and Commerce Degree College, Ranebennur-581115

A.Y. - 2019-20

DEPARTMENT OF PHYSICS

PO, PSO & CO

Program Outcome (PO)
Program Specific Outcome (PSO)
Course Outcome (CO)

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

PHY 1.1: Mechanics and properties of matter

Syllabus	Mechanics and properties of matter
Curriculum plan	To revise basic concepts of Mechanics and properties of matter such as Inertial frames, derivation of Galilean transformation equations. Newton's Laws under Galilean Transformations, Definition of Linear Momentum, Law of conservation of linear momentum for a system of particles, Centre of mass of a system of particles, Definition of angular momentum and its relation to angular velocity, Definition of Torque and its relation to angular velocity, Relation between angular momentum and Torque, Definition of SHM, Expressions for displacement, velocity and acceleration. Definition of M.I. and radius of gyration, Perpendicular and Parallel axis theorems. Compound Pendulum, Experimental determination of "g" using Bar Pendulum, Bifilar Suspension with Parallel threads. Stress, Strain, Elastic limit, Hook's law, Modulii of elasticity for isotropic materials, Relation between elastic constants. Determination of surface tension by capillary rise method and Jeager's method with relevant theory. Streamline and turbulent motion, Newton's law of viscous flow, Stoke's law of Viscosity, determination of co-efficient of viscosity of liquid
Strategy	Chalk and Talk, Student Seminar
Tools/techniques used	Black board
Program outcome (PO)	Creating comprehensive scientific knowledge to understand, explain and to solve advanced scientific problems related to energy sources. Effectively communicate the knowledge of physics to community. It guides to Mechanics and properties of matter.
Program Specific Outcome (PSO)	Students will be able to discuss the wide range of physical phenomena with underlying principles with respect to solid state physics and nuclear physics with able to solve problems
Course outcome (CO)	Understanding of basic concepts of derivation of Galilean transformation equations. Newton's Laws under Galilean Transformations, Expressions for displacement, velocity and acceleration. Definition of M.I. and radius of gyration, Perpendicular and Parallel axis theorems. Compound Pendulum, Experimental determination of "g" using Bar Pendulum, Bifilar Suspension with Parallel threads. Streamline and turbulent motion, Newton's law of viscous flow, Stoke's law of Viscosity, determination of co-efficient of viscosity of

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

	liquid

Attainments

Program outcome attainment(POA)	Classroom discussion , solving numerical problems
Program specific outcome attainment (PSOA)	Group discussion, peer learning
Course outcome attainment (COA)	Internal & external assessments, assignments and viva

I semester- practical

PHY 1.2: Physics Lab-1

Syllabus	PHY 1.2: Physics Lab-1
Curriculum plan	To develop experimental skills about Bar Pendulum L vs. T and L'Vs. LT graphs. M.I. of the Fly-Wheel, Verification of Parallel axes theorem of Moment of Inertia using Bar Pendulum. Verification of Perpendicular axes theorem of Moment of inertia using Tortional Pendulum. Bifilar Suspension. Young's Modulus of the material of a wire using Searls' Apparatus. Y-by Uniform bending- Load depression Graph. Co-efficient of viscosity ofliquid by Stoke's method. Surface Tension by Jeager's Method/Quincke's method.
Strategy	Lab demonstration , group learning
Tools/techniques used	Lab equipments

Outcomes

Program outcome(PO)	Using methodology and knowledge of physics to design innovative experiments analyze and interpret the data. Applying modern experimental tools of physics to predict and model problems in physics.
Program Specific Outcome (PSO)	Able to solve physics related problems and demonstrate the physics phenomenon through experiments.
Course Outcome (CO)	Acquiring the skills in doing the experiments in Bar Pendulum L vs. T and L'Vs. LT graphs. M.I. of the Fly-Wheel, Verification of Parallel axes theorem of Moment of Inertia using Bar Pendulum. Verification of Perpendicular axes theorem of Moment of inertia using Tortional Pendulum. Bifilar Suspension. Young's Modulus of the material of a wire using Searls' Apparatus. Y-by Uniform bending- Load depression Graph. Co-efficient of viscosity ofliquid by Stoke's method. Surface Tension by Jeager's Method/Quincke's method.

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

Attainments

Program Outcome Attainment (POA)	Performing experiments in the lab
Program Specific Outcome Attainment (PSOA)	Lab demonstration and peer learning
Course Outcome Attainment (COA)	Internal and external assessments, viva

II Semester -2019-20

PHY 2.1: Kinetic theory of gasses, Thermodynamics, Radiation, Energy Sources and Sound

Syllabus	Kinetic theory of gasses, Thermodynamics, Radiation, Energy Sources and Sound
Curriculum plan	To revise basic concepts of Kinetic theory of gasses, Thermodynamics, Radiation, Energy Sources and Sound such as Maxwell's law of distribution of velocities & its experimental verification. derivation of Bose-Einstein & Femi-Dirac distribution. Heat engines: Otto engine, Otto cycle, expression for efficiency, Diesel engine, Diesel cycle, express ion for efficiency& Carnot's theorem. Measurement of low temperature, exhaust pump & its characteristics, exhaust pressure. Stefan's law & its derivation using radiation pressure. Wein's displacement law with derivation, Rayleigh-Jeans's law , Planck's law of radiation & its derivation. Ferry's total radiation pyrometer. conventional and non-conventional energy sources, Renewable energy sources; advantages and prospects. Analytical treatment of forced vibrations. Theory of Helmoltz resonator, condition for amplitude of resonance, phase of forced vibration, effect of damping on phase of forced vibration.
Strategy	Chalk and Talk, Student Seminar
Tools/techniques used	Black board
Program outcome (PO)	Creating comprehensive scientific knowledge to understand, explain and to solve advanced scientific problems related to energy sources. Effectively communicate the knowledge of physics to community. It guides to resonant vibrations.
Program Specific Outcome (PSO)	Students will be able to discuss the wide range of physical phenomena with underlying principles with respect to solid state physics and nuclear physics with able to solve problems.

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

R.T.E.S. Degree College Commerce Science

ಪ್ರಾಚಾರ್ಯರು
ರಾ.ತಾ.ಶಿ.ಸಂಸ್ಥೆಯ ಕಲಾ, ವಿಜ್ಞಾನ ಹಾಗೂ ವಾಣಿಜ್ಯ
ಪದವಿ ಮಹಾವಿದ್ಯಾಲಯ, ರಾಣೇಬೆನ್ನೂರ

urse outcome (CO)	Understanding of basic concepts of Kinetic theory of gasses, Thermodynamics, Radiation, Energy Sources and Sound.

Attainments

Program outcome attainment(POA)	Classroom discussion , solving numerical problems
Program specific outcome attainment (PSOA)	Group discussion, peer learning
Course outcome attainment (COA)	Internal & external assessments, assignments and viva

II semester-practical

PHY 2.2: Physics Lab -II

Syllabus	PHY 2.2: Physics Lab -II
Curriculum plan	To develop experimental skill by Volume Resonator, Frequency of AC using Sonometer, Velocity of sound through wire using sonometer, Use of CRO -study of Lissajous figures, Lee's method of determination of thermal conductivity of rubber, Specific heat by cooling, Verification of Stefan's Law. Determination of Stefan's constant.
Strategy	Lab demonstration, group learning
Tools/techniques used	Lab equipments

Outcomes

Program outcome(PO)	Using methodology and knowledge of physics to design innovative experiments analyze and interpret the data. Applying modern experimental tools of physics to predict and model problems in physics.
Program Specific Outcome (PSO)	Able to solve physics related problems and demonstrate the physics phenomenon through experiments.
Course Outcome (CO)	To develop experimental skill by Volume Resonator, Frequency of AC using Sonometer, Velocity of sound through wire using sonometer, Use of CRO -study of Lissajous figures, Lee's method of determination of thermal conductivity of rubber, Specific heat by cooling, Verification of Stefan's Law. Determination of Stefan's constant.

Attainments

Program Outcome Attainment (POA)	Performing experiments in the lab
Program Specific Outcome Attainment (PSOA)	Lab demonstration and peer learning
Course Outcome Attainment (COA)	Internal and external assessments, viva

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

SEMESTER-2019-20

PHY 3.1:Geometrical Optics and Electricity

Syllabus	Geometrical Optics and Electricity
Curriculum plan	To revise concept of Geometrical Optics and Electricity. Explain detail the Fermat's principle, derivation of laws of reflection &Snell's, Derivation of Abbe's sign convention, Lagrange's law & Helmholtz relation Cardinal points, Aberrations, Ramsden & Huygen's eye piece. Electric polarization, Gauss law in dielectrics and electric displacement. Boundary conditions at a surface separating two dielectric media(with derivation).Derivation Of relation between electric displacement D), electric field 'E & polarization P°. D &P in terms of E. Atomic polarisability, electric susceptibility, relation between dielectric constant & electric suscebtibility, Mention of expression for force between two charges in a dielectric medium separated by a large distance. Expression for mechanical stress on surface of charged conductor. Derivation of Clausius-Mosotti equations & its limitations. Statement of Biot-Savart' law and its applications. Theory of growth & decay of current through RL circuit. Measurement of high resistance by leakage method. LCR parallel circuit- Expression for admittance & condition for resonance .Comparison between series &parallel resonant circuits. Theory of BG. Charge and current sensitivity and their relationship, correction tor damping.
Strategy	Chalk and Talk, Student Seminar
Tools/techniques used	Black board
Program outcome (PO)	Creating comprehensive scientific knowledge to understand, explain and to solve advanced scientific problems related to energy sources. Effectively communicate the knowledge of physics to community. It guides Electrostatics and Electricity
Program Specific Outcome (PSO)	Students will be able to discuss the wide range of physical phenomena with underlying principles with respect to Dielectrics, Transient currents, Alternating current, AC bridges and Filters, Network theorems, Power Supplies, Electrical instruments, measurements and Electromagnetic induction and Thermoelectricity.
Course outcome (CO)	**Attainments**

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

R.T.E.S. Degree College

ogram outcome attainment(POA)	Classroom discussion , solving numerical problems
Program specific outcome attainment (PSOA)	Group discussion, peer learning
Course outcome attainment (COA)	Internal & external assessments, assignments and viva

PHY 3.2:Physics Lab -III

Syllabus	Practical III
Curriculum plan	Calibration of spectrometer, Dispersive curve and dispersive power, Goniometer, Turn table, Detemination of magnetic field along the axis of a coil, Helmholtz galvanometer, Determination of high resistance by leakage method, Measurement of capacity by method of mixtures & R-C time constant
Strategy	Lab demonstration, group learning
Tools/techniques used	Lab equipments

Outcomes

Program outcome(PO)	Using methodology and knowledge of physics to design innovative experiments analyze and interpret the data. Applying modern experimental tools of physics to predict and model problems in physics.
Program Specific Outcome (PSO)	Able to solve physics related problems and demonstrate the physics phenomenon through experiments.
Course Outcome (CO)	Acquiring the skills i1

Attainments

Program Outcome Attainment (POA)	Performing experiments in the lab
Program Specific Outcome Attainment (PSOA)	Lab demonstration and peer learning
Course Outcome Attainment (COA)	Internal and external assessments, viva

IV Semester

PHY 4.1 : Physical Optics, Thermoelectricity and Electromagnetic theory

Syllabus	Physical Optics, Thermoelectricity and Electromagnetic theory
Curriculum plan	To revise basic concepts and then discuss the topics of Fresnel's wavelength of biprism. Detemination of monochromatic light & thickness of a thin film using biprism. Interference due to division of transmission at

HOD OF PHYSICS
R.T.E.S. Degree College

	an amplitude. Michelson interferometer. Fresnel theory of half period zones considering plane waves, rectilinear propagation of light. Zone plate, construction. Diffraction at a at a single slit & double slit, Plane transmission grating & its theory. Production of circularly & elliptically polarized light. Optical activity, Fresnel's theory of rotator polarization. Seebeck effect & its explanation. Thermoelectric series. Laws of thermoelectric effect. Peltier effect, Thomson coefficient. Gauss', Stoke's and Green's theorems. derivation of Maxwell's equations in differential.
Strategy	Chalk and Talk, Student Seminar
Tools/techniques used	Black board
Program outcome (PO)	Creating comprehensive scientific knowledge to understand, explain and to solve advanced scientific problems related to energy sources. Effectively communicate the knowledge of physics to community. It guides to production of thermo emf.
Program Specific Outcome (PSO)	Students will be able to discuss the wide range of physical phenomena with underlying principles with respect to solid state physics and nuclear physics with able to solve problems.
Course outcome (CO)	Understanding of basic concepts of Fresnel's wavelength of biprism. Determination of monochromatic light & thickness of a thin film using biprism. Michelson interferometer. Fresnel theory of half period zones considering plane waves, rectilinear propagation of light. Zone plate, construction. Diffraction at a at a single slit & double slit, Plane transmission grating & its theory. Production of circularly & elliptically polarized light. Optical activity, Fresnel's theory of rotator polarization. Seebeck effect & its explanation. Thermoelectric series. Laws of thermoelectric effect. Derivation of Maxwell's equations in differential.

Attainments

Program outcome attainment(POA)	Classroom discussion , solving numerical problems
Program specific outcome attainment (PSOA)	Group discussion, peer learning
Course outcome attainment (COA)	Internal & external assessments, assignments and viva

IV semester practical

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

HOD OF PHYSICS
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PHY 4.2: Physics Lab -IV

Syllabus	PHY 4.2: Physics Lab -IV
Curriculum plan	To develop experimental skill by Newton's rings, R.P. of a prism, R.P of telescope , RP.of grating, Polarimeter, Series Parallel Resonance, Determination of dielectric constant of liquid, Measurement of emf of a thermocouple at various temperatures
Strategy	Lab demonstration, group learning
Tools/techniques used	Lab equipments

Outcomes

Program outcome(PO)	Using methodology and knowledge of physics to design innovative experiments analyze and interpret the data. Applying modern experimental tools of physics to predict and model problems in physics.
Program Specific Outcome (PSO)	Able to solve physics related problems and demonstrate the physics phenomenon through experiments.
Course Outcome (CO)	To develop experimental skill by determination radius of curvature of plano conex lens by Newton's rings, R.P. of a prism, R.P of telescope , RP.of grating, Polarimeter, Series Parallel Resonance, Determination of dielectric constant of liquid, Measurement of emf of a thermocouple at various temperatures

Attainments

Program Outcome Attainment (POA)	Performing experiments in the lab
Program Specific Outcome Attainment (PSOA)	Lab demonstration and peer learning
Course Outcome Attainment (COA)	Internal and external assessments, viva

V Semester , paper –I 2019-20

PHY5.1 :Classical mechanics, Quantum mechanics and Atomic Physics

Syllabus	Classical mechanics, Quantum mechanics and Atomic Physics
Curriculum plan	Constraints- types, Holonomic, Nonholonomic, examples. Degrees of freedom, Generalized co-ordinates D 'Alemberts', Principle, Lagrange's equation, Introduction to Quantum theory, Compton scattering, expression for Compton shift. de Broglie hypothesis, Davison and Germer's

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

	experiment. Uncertainty principle. Schrodinger's Linear Harmonic oscillator, Statistics of identical particles. Maxwell-Boltzmann; Bose-Einstein and Fermi-Dirac. Degenerate Fermi gas. Vector-model of Atom, Spin orbit interaction, Coupling schemes LS and L-S, The Pauli exclusion principle. Stern-Gerlach experiment, Larmor effect, precession, Normal and Anomalous Zeeman Experimental method to study Zeeman effect.
Strategy	Chalk and Talk, Student Seminar
Tools/techniques used	Black board
Program outcome (PO)	Creating comprehensive scientific knowledge to understand, explain and to solve advanced scientific problems related to energy sources. Effectively communicate the knowledge of physics to community. It guides to Classical mechanics, Quantum mechanics and Atomic Physics
Program Specific Outcome (PSO)	Students will be able to discuss the wide range of physical phenomena with underlying principles with respect to classical mechanics, quantum mechanics, atomic spectra, magnetic field effect on light. Able to solve problems
Course outcome (CO)	Understanding of basic concepts of classical and quantum mechanics such as Constraints-types, Holonomic, Nonholonomic, examples. Degrees of freedom, Generalized co-ordinates D 'Alemberts', Principle, Lagrange's equation, Compton scattering, expression for Compton shift. de Broglie hypothesis, Davison and Germer's experiment. Uncertainty principle. Maxwell-Boltzmann; Bose-Einstein and Fermi-Dirac. Degenerate Fermi gas. Vector-model of Atom, Spin orbit interaction. Stern-Gerlach experiment, Larmor effect, precession, Normal and Anomalous Zeeman Experimental method to study Zeeman effect

Attainments

Program outcome attainment(POA)	Classroom discussion, solving numerical problems
Program specific outcome attainment (PSOA)	Group discussion, peer learning
Course outcome attainment (COA)	Internal & external assessments, assignments and viva

V semester , Paper-II

PHY 5.2: Molecular Spectra, Lasers, Relativity and Electronics

Syllabus	Molecular Spectra, Lasers, Relativity and Electronics
Curriculum plan	Different types motions in a molecule - electronic, vibration, rotation. molecular energy

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

	distribution in the electromagnetic spectrum, Einstein's theory of spontaneous emission, stimulated emission and stimulation .Gas lasers(He-Ne), The Rayleigh's Scattering, the Raman Scattering. Quantum theory, Raman effect and Raman spectrum. Micheison-Morley experiment, The Lorentz transformation –Relativity of length and time. Thevenin and Norton's Theorems. Power Supplies with filters (C,L, LC and T-section), Žener diode characteristics, its voltage regulation, Transistors of DC h-parameters . Transistor as an oscillator, Hartley and Phase shift . FET- Types,
Strategy	Chalk and Talk, Student Seminar
Tools/techniques used	Black board
Program outcome (PO)	Creating comprehensive scientific knowledge to understand, explain and to solve advanced scientific problems related to energy sources. Effectively communicate the knowledge of physics to community. It guides to Classical mechanics, Quantum mechanics and Atomic Physics
Program Specific Outcome (PSO)	Students will be able to discuss the wide range of physical phenomena with underlying principles with respect to molecular spectra, Raman effect, laser and electronics with able to solve problems
Course outcome (CO)	Understanding of basic concepts of classical and quantum mechanics such as molecular energy distribution in the electromagnetic spectrum, Einstein's theory of spontaneous emission, stimulated emission and stimulation. Raman effect and Raman spectrum. Micheison-Morley experiment, The Lorentz transformation –Relativity of length and time. Thevenin and Norton's Theorems. Power Supplies with filters (C,L, LC and T-section), Žener diode characteristics, its voltage regulation, Transistors of DC h-parameters . Transistor as an oscillator, Hartley and Phase shift. FET-Types,

Attainments

Program outcome attainment(POA)	Classroom discussion, solving numerical problems
Program specific outcome attainment (PSOA)	Group discussion, peer learning
Course outcome attainment (COA)	Internal & external assessments, assignments and viva

PHYSICS- Paper-I, 5.3 : Physics Lab-V

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

R.T.E.S. Degree College Science, Commerce

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Syllabus	**Practical –I**
Curriculum plan	To develop experimental skills. Thevenin and Norton's theorems using ladder circuits, Low pass filter, Characteristics of Zener diode, Voltage regulator using Zener diode .Battery charger. Battery eliminator, CE-amplifier. Hybrid parameters
Strategy	Lab demonstrations , group learning
Tools/techniques used	Lab equipments

Outcomes

Program outcome(PO)	Using methodology and knowledge of physics to design innovative experiments, analyze and interpret the data. Applying modern experimental tools of physics to predict and model problems in physics.
Program Specific Outcome (PSO)	Able to solve physics related problems and demonstrate the physics phenomenon through experiments.
Course Outcome (CO)	Acquiring the skills in doing the experiments in molecular spectra and electronics such as Thevenin and Norton's theorems using ladder circuits, Low pass filter, Characteristics of Zener diode, Voltage regulator using Zener diode .Battery charger. Battery eliminator, CE-amplifier.Hybrid parameters

Attainments

Program Outcome Attainment (POA)	Performing experiments in the lab
Program Specific Outcome Attainment (PSOA)	Lab demonstration and peer learning
Course Outcome Attainment (COA)	Internal and external assessments, viva

Paper-II practical's , V Semester

PHY5.4:Physics Lab-V

Syllabus	**Practical –II**
Curriculum plan	To develop experimental skills. Planck's constant using Photocell, Thevenin and Norton's theorems using Whetstone's network. High pass filter. Construction of multi range voltmeter. Full wave bridge rectifier. Hartely Oscillator. FET Amplifier. Photo conductive cell (L.DR),
Strategy	Lab demonstrations , group learning
Tools/techniques used	Lab equipments

Outcomes

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

R.T.E.S. Degree College

Program outcome(PO)	Using methodology and knowledge of physics to design innovative experiments analyze and interpret the data. Applying modern experimental tools of physics to predict and model problems in physics.
Program Specific Outcome (PSO)	Able to solve physics related problems and demonstrate the physics phenomenon through experiments.
Course Outcome (CO)	Acquiring the skills in doing the experiments in molecular spectra and electronics such as Planck's constant using Photocell, Thevenin and Norton's theorems using Whetstone's network. High pass filter. Construction of multi range voltmeter. Full wave bridge rectifier. Hartely Oscillator. FET Amplifier. Photo conductive cell (L.DR),

Attainments

Program Outcome Attainment (POA)	Performing experiments in the lab
Program Specific Outcome Attainment (PSOA)	Lab demonstration and peer learning
Course Outcome Attainment (COA)	Internal and external assessments, viva

VI semester, Paper-I

PHY 6.1: Solid state physics, Nuclear physics and nano science

Syllabus	Solid state physics, Nuclear physics and nano science
Curriculum plan	Lattice, lattice translational vectors, basis of crystal structure. Bravais lattices, crystal indices, expression for inter-planar spacing, crystal structure of NaCI and CSl. X-ray spectrum. Bragg's X-ray spectrometer. Specific heat of solids, Weidman-Franz law, Semiconductors Expression for electrical conductivity in case of intrinsic Semiconductors, experimental determination of energy gap, Hal effect. Langevin's theory of diamagnetism and Para magnetism, Ferromagnetism, Domain and hysteresis. Meissner effect, isotope effect and applications. Nano materials; synthesis, characterization, properties and applications Theory of alpha-decay, Geiger-Nuttal law. Fermi theory of Beta-ray spectrum. Liquid-drop model- explanation of semi-emperical formula, Magic numbers. Properties of nuclear forces, Meson Theory of nuclear forces. Detectors and Accelerators
Strategy	Chalk and Talk, Student Seminar
Tools/techniques used	Black board
Program outcome (PO)	Creating comprehensive scientific knowledge to

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

	understand, explain and to solve advanced scientific problems related to energy sources. Effectively communicate the knowledge of physics to community. It guides to Classical mechanics, Quantum mechanics and Atomic Physics
Program Specific Outcome (PSO)	Students will be able to discuss the wide range of physical phenomena with underlying principles with respect to solid state physics and nuclear physics with able to solve problems
Course outcome (CO)	Understanding of basic concepts of solid state physics and nuclear physics such as Lattice, lattice translational vectors, basis of crystal structure. X-ray spectrum. Bragg's X-ray spectrometer. Weidman-Franz law, Semiconductors Expression for electrical conductivity in case of intrinsic Semiconductors, Ferromagnetism, Domain and hysteresis. Meissner effect, isotope effect and applications.Fermi theory of Beta-ray spectrum. Liquid-drop model- explanation of semi-emperical formula, Magic numbers. Properties of nuclear forces, Meson Theory of nuclear forces. Detectors and Accelerators

Attainments

Program outcome attainment(POA)	Classroom discussion , solving numerical problems
Program specific outcome attainment (PSOA)	Group discussion, peer learning
Course outcome attainment (COA)	Internal & external assessments, assignments and viva

VI semester, Paper-II

PHY 6.2: Astrophysics, Computational physics, Electronics and communication.

Syllabus	Astrophysics, Computational physics, Electronics and communication
Curriculum plan	To revise basic concepts of Astrophysics, Computational physics, Electronics and communication such as luminosities of stars, apparent and absolute magnitudes, stellar spectra, H-R diagram, binary stars, stellar masses, stellar temperatures, equations of stellar structure, Different types of telescopes and their characteristics. C-Programming. types of ICs, operation of astable multivibrator using 555, Op-amp, Boolen algebra, truth tables, basic theorems, Basic and Universal gates. DTL gates; OR, AN ,NOT, NAND and

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

	XOR gates. modulation and Demodulation , FM spectrum,
Strategy	Chalk and Talk, Student Seminar
Tools/techniques used	Black board
Program outcome (PO)	Creating comprehensive scientific knowledge to understand, explain and to solve advanced scientific problems related to energy sources. Effectively communicate the knowledge of physics to community. It guides to Classical mechanics, Quantum mechanics and Atomic Physics.
Program Specific Outcome (PSO)	Students will be able to discuss the wide range of physical phenomena with underlying principles with respect to solid state physics and nuclear physics with able to solve problems
Course outcome (CO)	Understanding of basic concepts of astro physics, electronics and communication such as luminosities of stars, apparent and absolute magnitudes, stellar spectra, H-R diagram, binary stars, stellar masses, stellar temperatures, equations of stellar structure, Different types of telescopes and their characteristics. C-Programming. types of ICs, operation of astable multi vibrator using 555, Op-amp, Boolen algebra, truth tables, basic theorems, Basic and Universal gates. DTL gates; OR, AN ,NOT, NAND and XOR gates. modulation and Demodulation

Attainments

Program outcome attainment(POA)	Classroom discussion , solving numerical problems
Program specific outcome attainment (PSOA)	Group discussion, peer learning
Course outcome attainment (COA)	Internal & external assessments, assignments and viva

VI semester- practical -I

PHY 6.3 : Physics Lab-VI

Syllabus	PHY 6.3 : Physics Lab-VI
Curriculum plan	To develop experimental skill by Hall effect, Determination of resistivity of a semiconductor by four probe method. Characteristics of GM counter. GM tube (dead time). Voltage Multipliers using diodes and capacitors. V-I Characteristics of three LED's (emitting different colors). Study of DTL gates. Solar cell characteristics (a) Open circuit voltage (b)Short circuit current,

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

R.T.E.S. Degree College Commerce

tegy	Lab demonstration , group learning
ols/techniques used	Lab equipments

Outcomes

Program outcome(PO)	Using methodology and knowledge of physics to design innovative experiments analyze and interpret the data. Applying modern experimental tools of physics to predict and model problems in physics.
Program Specific Outcome (PSO)	Able to solve physics related problems and demonstrate the physics phenomenon through experiments.
Course Outcome (CO)	Acquiring the skills in doing the experiments in Hall effect, Determination of resistivity of a semiconductor by four probe method.Characteristics of GM counter. GM tube (dead time). Voltage Multipliers using diodes and capacitors. V-I Characteristics of three LED's (emitting different colors). Study of DTL gates. Solar cell characteristics (a) Open circuit voltage (b)Short circuit current,

Attainments

Program Outcome Attainment (POA)	Performing experiments in the lab
Program Specific Outcome Attainment (PSOA)	Lab demonstration and peer learning
Course Outcome Attainment (COA)	Internal and external assessments, viva

VI semester, practical -II

PHY 6.4 : Physics Lab-VI

Syllabus	**PHY 6.4 : Physics Lab-VI**
Curriculum plan	To develop experimental skills about thermister ,Verification of inverse square law using GM tube, Attenuation of B-radiation, Spectral sensitivity of photovoltaic cell, H.R. diagram: Physical Properties of stars, Use of IC 7400 D'Morgan's theorems & verification of Boolean expressions).Executing C Programs for period of a simple pendulum and range & height of a projectile.
Strategy	Lab demonstration, group learning
Tools/techniques used	Lab equipments

Outcomes

Program outcome(PO)	Using methodology and knowledge of physics to design innovative experiments

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

	analyze and interpret the data. Applying modern experimental tools of physics to predict and model problems in physics.
Program Specific Outcome (PSO)	Able to solve physics related problems and demonstrate the physics phenomenon through experiments.
Course Outcome (CO)	Acquiring the skills in doing the experiments in thermister ,Verification of inverse square law using GM tube, Attenuation of B- radiation, Spectral sensitivity of photovoltaic cell, H.R. diagram: Physical Properties of stars, Use of IC 7400 (D'Morgan's theorems & verification of Boolean expressions).Executing C Programs for period of a simple pendulum and range & height of a projectile.

Attainments

Program Outcome Attainment (POA)	Performing experiments in the lab
Program Specific Outcome Attainment (PSOA)	Lab demonstration and peer learning
Course Outcome Attainment (COA)	Internal and external assessments, viva

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

R.T.E.S Arts, Science & Commerce College

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Arts Science and Commerce Degree College, Ranebennur-581115

A.Y. - 2020-21

DEPARTMENT OF PHYSICS

PO, PSO & CO

Program Outcome (PO)
Program Specific Outcome (PSO)
Course Outcome (CO)

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

R.T.E.S Arts, Science & Commerce College

Department of Physics

2020-21

Semester - I

Optional Subject: PHYSICS(DSC-PHYT:101)

Mechanics and properties of Matter

Syllabus	Mechanics and Properties of Matter; Frames of Reference and Special Theory of Relativity: Collisions and Rotational Dynamics: Gravitation and Elasticity: Surface Tension & Viscosity:
Curriculum plan	To revise concept of Inertial frames, Galilean transformation equations (derivation), Invariance of Newton's Laws under Galilean Transformations, concept of the Coriolis force, Centre of mass of a system of particles, Position coordinates of the Centre of Mass, Motion of center of mass, collision between two particles which stick together and do not stick together , Angular momentum and its relation to angular velocity, Torque and its relation to angular velocity, Relation between angular momentum and Torque, Law of conservation of angular momentum, Work done by a Torque, D'Alembert's Principle, Derivation of Lagrange's equation of motion , Qualitative discussion on Hamiltonian formulation. The Michelson-Morley experiment, Significance of negative result. Postulates of special theory of relativity. The Lorentz transformation equations, Newton's Law of Gravitation. Basic idea of global positioning system(GPS). Bending of Beams , Expression for bending moment,Theory of light cantilever Torsion expression for the couple per unit twist.Introduction to CRO, Basic diagram of CRT:
Strategy	Chalk and Talk, Student Seminar
Tools/techniques used	Black board, PPT
Program outcome (PO)	1. culminate in depth knowledge of almost all basic branches of physics such as mechanics, properties of matter, relativity, electricity and magnetism, wave motion,

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	optics, thermal physics, electronics, classical mechanics, quantum mechanics, spectroscopy, nuclear physics, condensed matter physics and also advanced areas like Nanoscience, energy science, astrophysics, instrumentation. 2. communicate effectively physics concepts with examples related to day to day life. Acquire ability of recognizing and distinguishing various aspects of physics found in real life. 3. learn, perform and design experiments in the laboratory to demonstrate the concepts principles, laws of physics, theories learnt in the class rooms. 4. acquire ability of critical thinking and logical reasoning in physics problems and their solutions. Develop ability to analyze physics problem including simple to thought provoking problems and apply the acquired knowledge to solve. 5. appreciate the importance of physics subjects and its application for pursuing interdisciplinary and multidisciplinary higher education and research in these areas. 6. understand the vast scope of physics as theoretical and experimental science with application in finding solution of problems in nature spanning from smallest dimension 10^{-15} m to highest dimension 10^{26} m in space, covering energy ranges from 10^{-10} eV to 10^{25} eV. 7. think independently and develop algorithm and program using programming techniques for solving real world physics problems. 8. develop ability of working independently and to make in-depth study of various notions of physics. 9. develop ability to apply the knowledge and skill acquired through experiments of physics in laboratories to solve real life problems. 10. Pursue advanced studies and research in varied areas of physical science.
Program Specific Outcome (PSO)	Students will be able to discuss the wide range of physical phenomena with underlying principles with respect to mechanics, thermal physics, relativity, collisions, gravitational effect, surface tension and viscosity. Able to solve problems to mechanics and fluid mechanics.
Course outcome (CO)	1. Analyze data, (graphical and analytical), through estimation of errors and their sources in experimental determination of physical quantities. Also able to fit experimental data to straight line graph and calculate standard

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	deviation, standard error and probable error. 2. Distinguish inertial, non-inertial and rotational frames of reference. Also able understand and distinguish real, fictitious and Coriolis force and its importance in real life. 3. Distinguish Galilean, Lorentz transformation and their applications .Understand special theory of relativity by studying variation of length, mass and time with relativistic velocity. 4. Analyze collision problems through laboratory and center of mass frame of reference, also able to relate these two frames. 5. Understand concept of moment of inertia of regular/irregular bodies and its variation with axes through distribution of mass. 6. Find Young's modulus, rigidity modulus and their importance in understanding materials and applications. 7. Understand concept of surface tension and viscosity of liquids and their experimental determination. 8. Understand importance of surface tension and viscosity of liquids/fluids in real life situation (everyday life).

Attainments

Program outcome attainment(POA)	Classroom discussion, solving numerical problems
Program specific outcome attainment (PSOA)	Group discussion, peer learning
Course outcome attainment (COA)	Internal & external assessments, assignments and viva

I Semester physics (PHYDSCCP-1.1) Practical's

Syllabus	Practical- I
Curriculum plan	Improving the experimental skill by Moment of Inertia of the Fly-Wheel. Bar pendulum/Kater's Pendulum. Verification of Parallel axes theorem of Moment of Inertia using. Bar Pendulum. Y- by bending using Cantilever. Modulus of Rigidity of a wire using disc/ Maxwell's needle. To find Youngs modulus, modulus of rigidity and poisson's ratio for the material of a wire by Searle's method. Use of CRO – Measurement of AC and DC voltage. Measurement of frequency of sine and square waves.
Strategy	Lab demonstrations, group learning
Tools/techniques used	Lab equipments

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Outcomes

Program outcome(PO)	Using methodology and knowledge of physics to design innovative experiments analyze and interpret the data. Applying modern experimental tools of physics to predict and model problems in physics.
Program Specific Outcome (PSO)	Able to solve physics related problems and demonstrate the physics phenomenon through experiments.
Course Outcome (CO)	Acquiring the skills in doing the experiments in mechanics and in fluid mechanics. Moment of Inertia of the Fly-Wheel. Bar pendulum/Kater's Pendulum. Verification of Parallel axes theorem of Moment of Inertia using. Bar Pendulum. Y-by bending using Cantilever. Modulus of Rigidity of a wire using disc/ Maxwell's needle. To find Youngs modulus, modulus of rigidity and poisson's ratio

Attainments

Program Outcome Attainment (POA)	Performing experiments in the lab
Program Specific Outcome Attainment (PSOA)	Lab demonstration and peer learning
Course Outcome Attainment (COA)	Internal and external assessments, viva

II Semester Physics

PHYDSCCT 2.1: ELECTRICITY and MAGNETISM

Syllabus	ELECTRICITY and MAGNETISM
Curriculum plan	To review Theory of Dielectrics and Electric Instruments, Measurements such as Polar and nonpolar molecules. Gauss law in a dielectric medium. Relation between D, E and P. Mechanism of polarization. Boundary condition at a dielectric surface. Langevin-Debye theory of polarization in polar dielectrics. moving coil galvanometer to be ballistic & dead beat. Measurement of capacitance of a capacitor. Resonance Circuits, D. C. & AC Bridges: Wheatstone Bridge , Kelvin's double bridge, Maxwell's bridge and Anderson's bridge. Magnetostatics and

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	Thermoelectricity: Tangent law, Helmholtz galvanometer. Ampere's circuital , Seebeck effect, Variation of thermo emf with temperature, neutral temperature & temperature of inversion. Thermoelectric series. Peltier effect, Thomson effect. Thermoelectric generators (TEG), Peltier-cooling, Thermoelectric cooler (TEC). Qualitative discussion on different types of Thermocouples (J-type, K-type and RTD type). Electromagnetic Induction and Electromagnetic Theory: Determination of self-inductance (L) by Rayleigh's method and mutual inductance by direct method, with necessary theory.
Strategy	Chalk and Talk, Student Seminar
Tools/techniques used	Black board
Program outcome (PO)	1. culminate in depth knowledge of almost all basic branches of physics such as mechanics, properties of matter, relativity, electricity and magnetism, wave motion, optics, thermal physics, electronics, classical mechanics, quantum mechanics, spectroscopy, nuclear physics, condensed matter physics and also advanced areas like Nanoscience, energy science, astrophysics, instrumentation. 2. communicate effectively physics concepts with examples related to day to day life. Acquire ability of recognizing and distinguishing various aspects of physics found in real life. 3. learn, perform and design experiments in the laboratory to demonstrate the concepts principles, laws of physics, theories learnt in the class rooms. 4. acquire ability of critical thinking and logical reasoning in physics problems and their solutions. Develop ability to analyze physics problem including simple to thought provoking problems and apply the acquired knowledge to solve. 5. appreciate the importance of physics subjects and its application for pursuing interdisciplinary and multidisciplinary higher education and research in these areas. 6. understand the vast scope of physics as theoretical and experimental science with application in finding solution of problems in nature spanning from smallest dimension 10^{-15} m to highest dimension 10^{26} m in space, covering energy ranges from 10^{-10} eV to 10^{25} eV. 7. think independently and develop algorithm and program using programming techniques for solving real world physics problems. 8. develop ability of working independently and to make in-depth study of various notions of

HOD OF PHYSICS
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	physics. 9. develop ability to apply the knowledge and skill acquired through experiments of physics in laboratories to solve real life problems. 10. Pursue advanced studies and research in varied areas of physical science.
Program Specific Outcome (PSO)	Students will be able to discuss the wide range of physical phenomena with underlying principles with respect to Theory of Dielectrics and Electric Instruments, Measurements: Resonance Circuits, D.C. & AC Bridges: Magnetostatics and Thermoelectricity: Electromagnetic Induction and Electromagnetic Theory:
Course outcome (CO)	At the end of the course the student should be able to: 1. understand and distinguish application of Gauss law in vacuum and dielectric medium. 2. determine dielectric constant of solid/liquid materials by experiments in laboratory. 3. apply the resonant circuits in the field of communication and signal oscillator building 2. apply concepts of AC and DC bridges to determine values of resistance, capacitance of capacitor and self- inductance of coil. 3. understand how to produce magnetic field from electric current. Understand magnetic field produced by current in toroid and solenoid. 4. distinguish Seeback and Peltier effect and their applications to real life. Also able to distinguish different type of thermocouples as temperature sensors. 5. explain Maxwell's equations to articulate the relationship between varying electric and magnetic field. Also able to explain electromagnetic waves and their characteristics.

Attainments

Program outcome attainment(POA)	Classroom discussion , solving numerical problems
Program specific outcome attainment (PSOA)	Group discussion, peer learning
Course outcome attainment (COA)	Internal & external assessments, assignments and viva

B.Sc Semester- II Practicals

Course Title: PHYDSCCP 2.1: Electricity and Magnetism

Syllabus	Practical's - Electricity and Magnetism
Curriculum Plan	To develop experimental skills. Determination of dielectric constant of a

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RANEBENNUR-581 115

	liquid, constants of B.G. Helmholtz galvanometer, magnetic field along the axis of a coil , capacity by absolute method, using B.G., high resistance by leakage method , coefficient of self-inductance (L) by Rayleigh's method/ Anderson's bridge method. Low resistance measurement using Kelvin's double bridge method, thermo-emf and verification of laws of thermoelectricity using / ordinary , Study of Seeback / Peltier Effect (Thermoelectric Cooler-TEC).
Strategy	Lab demonstrations , group learning
Tools/techniques used	Lab equipments

Outcomes

Program outcome(PO)	Using methodology and knowledge of physics to design innovative experiments analyze and interpret the data. Applying modern experimental tools of physics to predict and model problems in physics.
Program Specific Outcome (PSO)	Able to solve physics related problems and demonstrate the physics phenomenon through experiments.
Course Outcome (CO)	Acquiring the skills in doing the experiments in Determination of dielectric constant of a liquid, constants of B.G. Helmholtz galvanometer, magnetic field along the axis of a coil , capacity by absolute method, using B.G., high resistance by leakage method , coefficient of self-inductance (L) by Rayleigh's method/ Anderson's bridge method. Low resistance measurement using Kelvin's double bridge method, thermo-emf and verification of laws of thermoelectricity using / ordinary , Study of Seeback/Peltier Effect (Thermoelectric Cooler-TEC).

Attainments

Program Outcome Attainment (POA)	Performing experiments in the lab
Program Specific Outcome Attainment (PSOA)	Lab demonstration and peer learning
Course Outcome Attainment (COA)	Internal and external assessments, viva

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II Semester 2020-21

PHY 3.1:Geometrical Optics and Electricity

Syllabus	Geometrical Optics and Electricity
Curriculum plan	To revise concept of Geometrical Optics and Electricity. Explain detail the Fermat's principle, derivation of laws of reflection &Snell's, Derivation of Abbe's sign convention, Lagrange's law & Helmholtz relation Cardinal points, Aberrations, Ramsden & Huygen's eye piece Electric polarization, Gauss law in dielectrics and electric displacement. dBoundary conditions at a surface separating trivation of he two dielectric media(with derivation).Derivation ofrelation between electric displacement D), electric field 'E & polarization P°. D &P in terms of E. Atomic polarisability, electric susceptibility, relation between dielectric constant & electric suscebtibility, Mention of expression for force between two charges in a dielectric medium separated by a large distance. Expression for mechanical stress on surface of charged conductor. Derivation of Clausius-Mosotti equations & its limitations. Statement of Biot-Savart' law and its applications. Theory of growth & decay of current through RL circuit. Measurement of high resistance by leakage method. LCR parallel circuit- Expression for admittance & condition for resonance .Comparison between series &parallel resonant circuits. Theory of BG. Charge and current sensitivity and their relationship, correction tor damping.
Strategy	Chalk and Talk, Student Seminar
Tools/techniques used	Black board
Program outcome (PO)	Creating comprehensive scientific knowledge to understand, explain and to solve advanced scientific problems related to energy sources. Effectively communicate the knowledge of physics to community. It guides Electrostatics and Electricity
Program Specific Outcome (PSO)	Students will be able to discuss the wide range of physical phenomena with underlying principles with respect to Dielectrics, Transient currents, Alternating current, AC bridges and Filters, Network theorems, Power Supplies, Electrical instruments, measurements and Electromagnetic induction and Thermoelectricity.

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ourse outcome (CO)	

Attainments

Program outcome attainment(POA)	Classroom discussion , solving numerical problems
Program specific outcome attainment (PSOA)	Group discussion, peer learning
Course outcome attainment (COA)	Internal & external assessments, assignments and viva

PHY 3.2:Physics Lab -III

Syllabus	Practical III
Curriculum plan	Calibration of spectrometer, Dispersive curve and dispersive power, Goniometer, Turn table, Detemination of magnetic field along the axis of a coil, Helmholtz galvanometer, Determination of high resistance by leakage method, Measurement of capacity by method of mixtures & R-C time constant
Strategy	Lab demonstration, group learning
Tools/techniques used	Lab equipments

Outcomes

Program outcome(PO)	Using methodology and knowledge of physics to design innovative experiments analyze and interpret the data. Applying modern experimental tools of physics to predict and model problems in physics.
Program Specific Outcome (PSO)	Able to solve physics related problems and demonstrate the physics phenomenon through experiments.
Course Outcome (CO)	Acquiring the skills in doing the experiments in Calibration of spectrometer, Dispersive curve and dispersive power, Goniometer, Turn table, Determination of magnetic field along the axis of a coil, Helmholtz galvanometer, Determination of high resistance by leakage method, Measurement of capacity by method of mixtures & R-C time constant

Attainments

Program Outcome Attainment (POA)	Performing experiments in the lab
Program Specific Outcome Attainment (PSOA)	Lab demonstration and peer learning
Course Outcome Attainment (COA)	Internal and external assessments, viva

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IV Semester 2020-21

PHY 4.1 : Physical Optics, Thermoelectricity and Electromagnetic theory

Syllabus	Physical Optics, Thermoelectricity and Electromagnetic theory
Curriculum plan	Interference due to division of wave front: Fresnel's wavelength of biprism. Thin films conditions for maxima & minima case of reflected light, Mention of conditions for maxima & minima in case of transimitted by thin films. Qualitative discussion of with mention of wedge shaped film,Theory of Newton's rings ,Michelson interferometer. Fresnel theory of half period zones considering plane waves, rectilinear propagation of light. Zone plate, construction Diffraction at a at a single slit & double slit .Plane transmission grating, dispersive power of grating. Resolving power of prism &grating. Malus law, Huygen's theory of double diffraction. Positive & negative crystals. quarter wave plate, half wave plate. Fresnel's theory of rotatory polarization. Seebeck effect. .Thermoelectric series. Laws of thermoelectric effect. Peltier effect- Thomson coefficient - Gauss', Stoke's and Green's theorems. derivation of Maxwell's equations in differential forms
Strategy	Chalk and Talk, Student Seminar
Tools/techniques used	Black board
Program outcome (PO)	Creating comprehensive scientific knowledge to understand, explain and to solve advanced scientific problems related to energy sources. Effectively communicate the knowledge of physics to community. It knowledge's the Electromagnetic theory and Optics.
Program Specific Outcome (PSO)	Students will be able to discuss the wide range of physical phenomena with underlying principles with respect to Interference due to division of wave front, Interference due to division of amplitude, Fresnel's diffraction and Fraunhoffer diffraction, polarization, thermoelectricity and electromagnetic theory.
Course outcome (CO)	Understanding of basic concepts of Interference due to division of wave front: Fresnel's wavelength of biprism. mention of wedge shaped film, Theory of Newton's rings ,Michelson interferometer. Fresnel theory of

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	half period zones considering plane waves, rectilinear propagation of light. Zone plate, Resolving power of prism &grating. quarter wave plate, half wave plate. Fresnel's theory of rotatory polarization. Seebeck effect. .Thermoelectric series. Laws of thermoelectric effect. Peltier effect- Thomson coefficient

Attainments

Program outcome attainment(POA)	Classroom discussion , solving numerical problems
Program specific outcome attainment (PSOA)	Group discussion, peer learning
Course outcome attainment (COA)	Internal & external assessments, assignments and viva

PHY 4.2: Physics Lab -IV

Syllabus	Practical -VI
Curriculum plan	To develop experimental skills about Newton's rings, R.P. of a prism, R.P of telescope, RP of grating, Polarimeter, Series Parallel Resonance of LCR Circuit, Capacity by De Sauty's method (AC), Detemination of L &C by equal voltage method, Determination of dielectric constant of liquid
Strategy	Lab demonstration, group learning
Tools/techniques used	Lab equipments

Outcomes

Program outcome(PO)	Using methodology and knowledge of physics to design innovative experiments analyze and interpret the data. Applying modern experimental tools of physics to predict and model problems in physics.
Program Specific Outcome (PSO)	Able to solve physics related problems and demonstrate the physics phenomenon through experiments.
Course Outcome (CO)	Acquiring the skills in doing the experiments in Newton's rings, R.P. of a prism, R.P of telescope, RP of grating, Polari meter, Series Parallel Resonance of LCR Circuit, Capacity by DeSauty's method (AC), Determination of L &C by equal voltage method, Determination of dielectric constant of liquid

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Attainments

Program Outcome Attainment (POA)	Performing experiments in the lab
Program Specific Outcome Attainment (PSOA)	Lab demonstration and peer learning
Course Outcome Attainment (COA)	Internal and external assessments, viva

V Semester , paper –I 2020-21

PHY5.1 :Classical mechanics, Quantum mechanics and Atomic Physics

Syllabus	Classical mechanics, Quantum mechanics and Atomic Physics
Curriculum plan	Constraints- types, Holonomic, Nonholonomic, examples. Degrees of freedom, Generalized co-ordinates D 'Alemberts', Principle, Lagrange's equation, Introduction to Quantum theory, Compton scattering, expression for Compton shift. de Broglie hypothesis, Davison and Germer's experiment. Uncertainty principle. Schrodinger's Linear Harmonic oscillator, Statistics of identical particles. Maxwell-Boltzmann; Bose-Einstein and Fermi-Dirac. Degenerate Fermi gas. Vector-model of Atom, Spin orbit interaction, Coupling schemes LS and L-S, The Pauli exclusion principle. Stern-Gerlach experiment, Larmor effect, precession, Normal and Anomalous Zeeman Experimental method to study Zeeman effect.
Strategy	Chalk and Talk, Student Seminar
Tools/techniques used	Black board
Program outcome (PO)	Creating comprehensive scientific knowledge to understand, explain and to solve advanced scientific problems related to energy sources. Effectively communicate the knowledge of physics to community. It guides to Classical mechanics, Quantum mechanics and Atomic Physics
Program Specific Outcome (PSO)	Students will be able to discuss the wide range of physical phenomena with underlying principles with respect to classical mechanics, quantum mechanics, atomic spectra, magnetic field effect on light. Able to solve problems
Course outcome (CO)	Understanding of basic concepts of classical and quantum mechanics such as Constraints-types, Holonomic, Nonholonomic, examples. Degrees of freedom, Generalized co-ordinates D 'Alemberts', Principle, Lagrange's equation, Compton scattering, expression for Compton shift. de Broglie hypothesis, Davison and Germer's experiment. Uncertainty principle. Maxwell-Boltzmann; Bose-Einstein and Fermi-

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	Dirac. Degenerate Fermi gas. Vector-model of Atom, Spin orbit interaction. Stern-Gerlach experiment, Larmor effect, precession, Normal and Anomalous Zeeman Experimental method to study Zeeman effect

Attainments

Program outcome attainment(POA)	Classroom discussion, solving numerical problems
Program specific outcome attainment (PSOA)	Group discussion, peer learning
Course outcome attainment (COA)	Internal & external assessments, assignments and viva

V semester , Paper-II

PHY 5.2: Molecular Spectra, Lasers, Relativity and Electronics

Syllabus	Molecular Spectra, Lasers, Relativity and Electronics
Curriculum plan	Different types motions in a molecule - electronic, vibration, rotation. molecular energy distribution in the electromagnetic spectrum, Einstein's theory of spontaneous emission, stimulated emission and stimulation .Gas lasers(He-Ne), The Rayleigh's Scattering, the Raman Scattering. Quantum theory, Raman effect and Raman spectrum. Micheison-Morley experiment, The Lorentz transformation –Relativity of length and time. Thevenin and Norton's Theorems. Power Supplies with filters (C,L, LC and T-section), Ẑener diode characteristics, its voltage regulation, Transistors of DC h-parameters . Transistor as an oscillator, Hartley and Phase shift . FET- Types,
Strategy	Chalk and Talk, Student Seminar
Tools/techniques used	Black board
Program outcome (PO)	Creating comprehensive scientific knowledge to understand, explain and to solve advanced scientific problems related to energy sources. Effectively communicate the knowledge of physics to community. It guides to Classical mechanics, Quantum mechanics and Atomic Physics
Program Specific Outcome (PSO)	Students will be able to discuss the wide range of physical phenomena with underlying principles with respect to molecular spectra, Raman effect, laser and electronics with able to solve problems
Course outcome (CO)	Understanding of basic concepts of classical and quantum mechanics such as molecular energy distribution in the electromagnetic

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	spectrum, Einstein's theory of spontaneous emission, stimulated emission and stimulation. Raman effect and Raman spectrum. Micheison-Morley experiment, The Lorentz transformation –Relativity of length and time. Thevenin and Norton's Theorems. Power Supplies with filters (C,L, LC and T-section), Žener diode characteristics, its voltage regulation, Transistors of DC h-parameters . Transistor as an oscillator, Hartley and Phase shift. FET-Types,

Attainments

Program outcome attainment(POA)	Classroom discussion, solving numerical problems
Program specific outcome attainment (PSOA)	Group discussion, peer learning
Course outcome attainment (COA)	Internal & external assessments, assignments and viva

PHYSICS- Paper-I, 5.3 : Physics Lab-V

Syllabus	**Practical –I**
Curriculum plan	To develop experimental skills. Thevenin and Norton's theorems using ladder circuits, Low pass filter, Characteristics of Zener diode, Voltage regulator using Zener diode .Battery charger. Battery eliminator, CE-amplifier. Hybrid parameters
Strategy	Lab demonstrations , group learning
Tools/techniques used	Lab equipments

Outcomes

Program outcome(PO)	Using methodology and knowledge of physics to design innovative experiments, analyze and interpret the data. Applying modern experimental tools of physics to predict and model problems in physics.
Program Specific Outcome (PSO)	Able to solve physics related problems and demonstrate the physics phenomenon through experiments.
Course Outcome (CO)	Acquiring the skills in doing the experiments in molecular spectra and electronics such as Thevenin and Norton's theorems using ladder circuits, Low pass filter, Characteristics of Zener diode, Voltage regulator using Zener diode .Battery charger. Battery eliminator, CE-amplifier.Hybrid parameters

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Attainments

Program Outcome Attainment (POA)	Performing experiments in the lab
Program Specific Outcome Attainment (PSOA)	Lab demonstration and peer learning
Course Outcome Attainment (COA)	Internal and external assessments, viva

Paper-II practical's , V Semester

PHY5.4:Physics Lab-V

Syllabus	**Practical –II**
Curriculum plan	To develop experimental skills. Planck's constant using Photocell, Thevenin and Norton's theorems using Whetstone's network. High pass filter. Construction of multi range voltmeter. Full wave bridge rectifier. Hartely Oscillator. FET Amplifier. Photo conductive cell (L.DR),
Strategy	Lab demonstrations , group learning
Tools/techniques used	Lab equipments

Outcomes

Program outcome(PO)	Using methodology and knowledge of physics to design innovative experiments analyze and interpret the data. Applying modern experimental tools of physics to predict and model problems in physics.
Program Specific Outcome (PSO)	Able to solve physics related problems and demonstrate the physics phenomenon through experiments.
Course Outcome (CO)	Acquiring the skills in doing the experiments in molecular spectra and electronics such as Planck's constant using Photocell, Thevenin and Norton's theorems using Whetstone's network. High pass filter. Construction of multi range voltmeter. Full wave bridge rectifier. Hartely Oscillator. FET Amplifier. Photo conductive cell (L.DR),

Attainments

Program Outcome Attainment (POA)	Performing experiments in the lab
Program Specific Outcome Attainment (PSOA)	Lab demonstration and peer learning
Course Outcome Attainment (COA)	Internal and external assessments, viva

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I semester, Paper-I

PHY 6.1: Solid state physics, Nuclear physics and nano science

Syllabus	Solid state physics, Nuclear physics and nano science
Curriculum plan	Lattice, lattice translational vectors, basis of crystal structure. Bravais lattices, crystal indices, expression for inter-planar spacing, crystal structure of NaCl and CSl. X-ray spectrum. Bragg's X-ray spectrometer. Specific heat of solids, Weidman-Franz law, Semiconductors Expression for electrical conductivity in case of intrinsic Semiconductors, experimental determination of energy gap, Hal effect. Langevin's theory of diamagnetism and Para magnetism, Ferromagnetism, Domain and hysteresis. Meissner effect, isotope effect and applications. Nano materials; synthesis, characterization, properties and applications Theory of alpha-decay, Geiger-Nuttal law. Fermi theory of Beta-ray spectrum. Liquid-drop model- explanation of semi-emperical formula, Magic numbers. Properties of nuclear forces, Meson Theory of nuclear forces. Detectors and Accelerators
Strategy	Chalk and Talk, Student Seminar
Tools/techniques used	Black board
Program outcome (PO)	Creating comprehensive scientific knowledge to understand, explain and to solve advanced scientific problems related to energy sources. Effectively communicate the knowledge of physics to community. It guides to Classical mechanics, Quantum mechanics and Atomic Physics
Program Specific Outcome (PSO)	Students will be able to discuss the wide range of physical phenomena with underlying principles with respect to solid state physics and nuclear physics with able to solve problems
Course outcome (CO)	Understanding of basic concepts of solid state physics and nuclear physics such as Lattice, lattice translational vectors, basis of crystal structure. X-ray spectrum. Bragg's X-ray spectrometer. Weidman-Franz law, Semiconductors Expression for electrical conductivity in case of intrinsic Semiconductors, Ferromagnetism, Domain and hysteresis. Meissner effect, isotope effect and applications.Fermi theory of Beta-ray spectrum. Liquid-drop model- explanation of semi-emperical formula, Magic numbers. Properties of nuclear forces, Meson Theory of nuclear forces. Detectors and Accelerators

Attainments

HOD OF PHYSICS
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R.T.E.S. Degree College

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Program outcome attainment(POA)	Classroom discussion , solving numerical problems
Program specific outcome attainment (PSOA)	Group discussion, peer learning
Course outcome attainment (COA)	Internal & external assessments, assignments and viva

VI semester, Paper-II

PHY 6.2: Astrophysics, Computational physics, Electronics and communication.

Syllabus	Astrophysics, Computational physics, Electronics and communication
Curriculum plan	To revise basic concepts of Astrophysics, Computational physics, Electronics and communication such as luminosities of stars, apparent and absolute magnitudes, stellar spectra, H-R diagram, binary stars, stellar masses, stellar temperatures, equations of stellar structure, Different types of telescopes and their characteristics. C-Programming. types of ICs, operation of astable multivibrator using 555, Op-amp, Boolen algebra, truth tables, basic theorems, Basic and Universal gates. DTL gates; OR, AN ,NOT, NAND and XOR gates. modulation and Demodulation , FM spectrum,
Strategy	Chalk and Talk, Student Seminar
Tools/techniques used	Black board
Program outcome (PO)	Creating comprehensive scientific knowledge to understand, explain and to solve advanced scientific problems related to energy sources. Effectively communicate the knowledge of physics to community. It guides to Classical mechanics, Quantum mechanics and Atomic Physics.
Program Specific Outcome (PSO)	Students will be able to discuss the wide range of physical phenomena with underlying principles with respect to solid state physics and nuclear physics with able to solve problems
Course outcome (CO)	Understanding of basic concepts of astro physics, electronics and communication such as luminosities of stars, apparent and absolute magnitudes, stellar spectra, H-R diagram, binary stars, stellar masses, stellar temperatures, equations of stellar structure, Different types of telescopes and their characteristics. C-Programming. types of ICs, operation of astable multi vibrator using 555, Op-amp, Boolen algebra, truth tables, basic

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R.T.E.S. Degree College
RANEBENNUR-581 115

	theorems, Basic and Universal gates. DTL gates; OR, AN ,NOT, NAND and XOR gates. modulation and Demodulation

Attainments

Program outcome attainment(POA)	Classroom discussion , solving numerical problems
Program specific outcome attainment (PSOA)	Group discussion, peer learning
Course outcome attainment (COA)	Internal & external assessments, assignments and viva

VI semester- practical -I

PHY 6.3 : Physics Lab-VI

Syllabus	PHY 6.3 : Physics Lab-VI
Curriculum plan	To develop experimental skill by Hall effect, Determination of resistivity of a semiconductor by four probe method. Characteristics of GM counter. GM tube (dead time). Voltage Multipliers using diodes and capacitors. V-I Characteristics of three LED's (emitting different colors). Study of DTL gates. Solar cell characteristics (a) Open circuit voltage (b)Short circuit current,
Strategy	Lab demonstration , group learning
Tools/techniques used	Lab equipments

Outcomes

Program outcome(PO)	Using methodology and knowledge of physics to design innovative experiments analyze and interpret the data. Applying modern experimental tools of physics to predict and model problems in physics.
Program Specific Outcome (PSO)	Able to solve physics related problems and demonstrate the physics phenomenon through experiments.
Course Outcome (CO)	Acquiring the skills in doing the experiments in Hall effect, Determination of resistivity of a semiconductor by four probe method.Characteristics of GM counter. GM tube (dead time). Voltage Multipliers using diodes and capacitors. V-I Characteristics of three LED's (emitting different colors). Study of DTL gates. Solar cell characteristics (a) Open circuit voltage (b)Short circuit current,

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R.T.E.S. Degree College
RANEBENNUR-581 115

Attainments

Program Outcome Attainment (POA)	Performing experiments in the lab
Program Specific Outcome Attainment (PSOA)	Lab demonstration and peer learning
Course Outcome Attainment (COA)	Internal and external assessments, viva

VI semester, practical -II

PHY 6.4 : Physics Lab-VI

Syllabus	**PHY 6.4 : Physics Lab-VI**
Curriculum plan	To develop experimental skills about thermister ,Verification of inverse square law using GM tube, Attenuation of B-radiation, Spectral sensitivity of photovoltaic cell, H.R. diagram: Physical Properties of stars, Use of IC 7400 D'Morgan's theorems & verification of Boolean expressions).Executing C Programs for period of a simple pendulum and range & height of a projectile.
Strategy	Lab demonstration, group learning
Tools/techniques used	Lab equipments

Outcomes

Program outcome(PO)	Using methodology and!
Program Specific Outcome (PSO)	Able to solve physics related problems and demonstrate the physics phenomenon through experiments.
Course Outcome (CO)	Acquiring the skills in doing the experiments in thermister ,Verification of inverse square law using GM tube, Attenuation of B- radiation, Spectral sensitivity of photovoltaic cell, H.R. diagram: Physical Properties of stars, Use of IC 7400 (D'Morgan's theorems & verification of Boolean expressions).Executing C Programs for period of a simple pendulum and range & height of a projectile.

Attainments

Program Outcome Attainment (POA)	Performing experiments in the lab
Program Specific Outcome Attainment (PSOA)	Lab demonstration and peer learning
Course Outcome Attainment (COA)	Internal and external assessments, viva

I Semester 2019-20

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DEPARTMENT OF PHYSICS

PO, PSO & CO

Program Outcome (PO)
Program Specific Outcome (PSO)
Course Outcome (CO)

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RANEBENNUR-581 115

R.T.E.S. Arts, Science, Commerce College

Department of Physics

2021-22

I Semester (NEP)

I semester Physics-PHYDSCCT 1.1

Syllabus	Mechanics and Properties of Matter; Frames of Reference and Special Theory of Relativity: Collisions and Rotational Dynamics: Gravitation and Elasticity: Surface Tension & Viscosity:
Curriculum plan	Concepts of Inertial frames and Non-inertial frames of references, rotating frame of reference, concept of the Coriolis force and its importance with derivation. The Michelson-Morley experiment, significance of negative result. Postulates of special theory of relativity. The Lorentz transformation equations, length contraction, time dilation ,simultaneity, twin paradox, addition of velocities , variation of mass with velocity, mass-energy equivalence. Four vectors in relativity: space-time and energy-momentum vectors and their Lorentz transformation. Two-dimensional elastic and inelastic collisions in center of mass and laboratory frames of reference: Conservation of linear momentum in case of variable mass. Double stage rocket. Angular momentum, Torque, principle of conservation of angular momentum. Rotation about a fixed axis, moment of inertia, theorem of parallel and perpendicular axes. M.I. of rectangular lamina, and circular disc, Theory of gyroscope:

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RANEBENNUR-581 115

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	Theory of compound pendulum, Bar pendulum, experimental, Bifilar suspension with parallel threads. Satellite in circular orbit and geosynchronous orbits. Global Positioning System (GPS): Qualitative discussions on applications of artificial satellites. Review of basic concepts of elasticity: Relation between elastic constants, Poisson's ratio. Twisting couple on a solid cylinder (wire), work done in twisting solid cylinder (wire). Bending of beams-Expression for bending moment .Theory of light cantilever. Review of basics of surface tension. excess pressure inside a spherical liquid drop and excess pressure inside a soap bubble. Angle of contact: case of two liquids in contact with each other and with air, case of solid, liquid and air in contact. Experimental determination of surface tension by Jaeger's method and also Quincke's method. Review of basics of viscosity, significance of Reynolds's number. Derivation of Poiseuille's equation. Experimental determination of co-efficient of viscosity for a liquid by Poiseuille's method. expression for co-efficient of viscosity from Stokes law.
Strategy	Chalk and Talk, Student Seminar
Tools/techniques used	Black board, PPT
Program outcome (PO)	1. culminate in depth knowledge of almost all basic branches of physics such as mechanics, properties of matter, relativity, electricity and magnetism, wave motion, optics, thermal physics, electronics, classical mechanics, quantum mechanics, spectroscopy, nuclear physics, condensed matter physics and also advanced areas like Nanoscience, energy science, astrophysics, instrumentation. 2. communicate effectively physics concepts with examples related to day to day life.

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RANEBENNUR-581 115

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	Acquire ability of recognizing and distinguishing various aspects of physics found in real life. 3. learn, perform and design experiments in the laboratory to demonstrate the concepts principles, laws of physics, theories learnt in the class rooms. 4. acquire ability of critical thinking and logical reasoning in physics problems and their solutions. Develop ability to analyze physics problem including simple to thought provoking problems and apply the acquired knowledge to solve. 5. appreciate the importance of physics subjects and its application for pursuing interdisciplinary and multidisciplinary higher education and research in these areas. 6. understand the vast scope of physics as theoretical and experimental science with application in finding solution of problems in nature spanning from smallest dimension 10^{-15} m to highest dimension 10^{26} m in space, covering energy ranges from 10^{-10} eV to 10^{25} eV. 7. think independently and develop algorithm and program using programming techniques for solving real world physics problems. 8. develop ability of working independently and to make in-depth study of various notions of physics. 9. develop ability to apply the knowledge and skill acquired through experiments of physics in laboratories to solve real life problems. 10. Pursue advanced studies and research in varied areas of physical science.
Program Specific Outcome (PSO)	Students will be able to discuss the wide range of physical phenomena with underlying

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	principles with respect to mechanics, thermal physics, relativity, collisions, gravitational effect, surface tension and viscosity. Able to solve problems to mechanics and fluid mechanics.
Course outcome (CO)	1. Analyze data, (graphical and analytical), through estimation of errors and their sources in experimental determination of physical quantities. Also able to fit experimental data to straight line graph and calculate standard deviation, standard error and probable error. 2. Distinguish inertial, non-inertial and rotational frames of reference. Also able understand and distinguish real, fictitious and Coriolis force and its importance in real life. 3. Distinguish Galilean, Lorentz transformation and their applications .Understand special theory of relativity by studying variation of length, mass and time with relativistic velocity. 4. Analyze collision problems through laboratory and center of mass frame of reference, also able to relate these two frames. 5. Understand concept of moment of inertia of regular/irregular bodies and its variation with axes through distribution of mass. 6. Find Young's modulus, rigidity modulus and their importance in understanding materials and applications. 7. Understand concept of surface tension and viscosity of liquids and their experimental determination. 8. Understand importance of surface tension and viscosity of liquids/fluids in real life situation (everyday life).

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Attainments

rogram outcome attainment(POA)	Classroom discussion, solving numerical problems
Program specific outcome attainment (PSOA)	Group discussion, peer learning
Course outcome attainment (COA)	Internal & external assessments, assignments and viva

I Semester physics (PHYDSCCP-1.1) Practical's

Syllabus	Practical- I
Curriculum plan	To develop experimental skills. Y by bending/cantilever. Parallel/perpendicular axes theorem. Bar Pendulum /Kater's pendulum. Fly-Wheel. Bifilar Suspension. Co-efficient of viscosity of liquid by Poiseuille's method. Surface Tension by Jaeger's Method / Quincke's method. Modulus of Rigidity of a wire using disc/ Maxwell's needle. To find Young's modulus, modulus of rigidity and Poisson's ratio for the material of a wire by Searle's method.
Strategy	Lab demonstrations, group learning
Tools/techniques used	Lab equipments

Outcomes

Program outcome(PO)	Using methodology and knowledge of physics to design innovative experiments analyze and interpret the data. Applying modern experimental tools of physics to predict and model problems in physics.
Program Specific Outcome (PSO)	Able to solve physics related problems and demonstrate the physics phenomenon through experiments.
Course Outcome (CO)	Acquiring the skills in doing the

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	experiments in mechanics and in fluid mechanics. Understanding of theorem of MI parallel and perpendicular axes. Describe techniques of studying viscosity by Poiseuille's method. Demonstrate fly wheel. Determine surface tension by Jaeger's Method / Quincke's method. Modulus of Rigidity of a wire using disc/ Maxwell's needle.To find Youngs modulus, modulus of rigidity and Poisson's ratio for the material of a wire by Searle's method.

Attainments

Program Outcome Attainment (POA)	Performing experiments in the lab
Program Specific Outcome Attainment (PSOA)	Lab demonstration and peer learning
Course Outcome Attainment (COA)	Internal and external assessments, viva

Open Elective Course (OEC)-1

Course Title: PHYOET 1.1

Syllabus	Energy Sources Introduction to Energy Sources: Solar-Energy and its Applications: Wind energy harvesting and Ocean Energy and energy from Biomass:
Curriculum plan	Energy concepts, sources in general, its significance and necessity. Classification of energy sources: primary and secondary sources. Energy consumption as a measure of prosperity. Need of renewable energy sources. Conventional, energy sources, Non-Conventional energy sources (Renewable energy).Advantages of renewable energy. Obstacles to the implementation of renewable energy systems. Prospects of renewable energy sources. Fossil fuels & Nuclear energy-

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	production & extraction, usage rate and limitations. Impact on environment and their issues& challenges. Solar-Energy and its Applications: Potential of solar energy, solar radiation and measurements, different types of solar energy collectors, advantages and disadvantages of different collectors, solar energy storage. Solar hot water supply systems. Solar air heating and cooling systems. Solar thermal electric power generation. Solar pumping, distillation, furnace and green houses. Need and characteristics of photovoltaic (PV) systems, PV models and equivalent circuits, and sun tracking systems. Fundamental of wind energy, wind turbines and different electrical machines in wind turbines, power electronic interfaces and grid interconnection topologies. Ocean Energy: Ocean energy potential against wind and solar, wave characteristics and statics wave energy devices. Tide characteristics and statistics, tide energy technologies ocean thermal energy, osmotic power, ocean bio-mass. Energy from Biomass: Biomass conversion technologies: wet process, dry process, photosynthesis. Biogas generation: Factors affecting bio-digestion. Classification of biogas plants: Floating drum plant, fixed dome plant, advantages and disadvantages of these plants.
Strategy	Chalk and Talk, Student Seminar
Tools/techniques used	Black board
Program outcome (PO)	Creating comprehensive scientific knowledge to understand, explain and to solve advanced scientific problems related to energy sources. Effectively communicate the knowledge of physics to community. It guides to Save energy

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	and use non renewable sources
ogram Specific Outcome (PSO)	It guides to the students Save energy and use non renewable sources: Solar-Energy and its Applications: Wind energy harvesting and Ocean Energy and energy from Biomass in life.
Course outcome (CO)	Understanding of basic concepts of energy sources such as Solar-Energy, Wind energy harvesting and Ocean Energy and energy from Biomass.

Attainments

Program outcome attainment(POA)	Classroom discussion , solving numerical problems
Program specific outcome attainment (PSOA)	Group discussion, peer learning
Course outcome attainment (COA)	Internal & external assessments, assignments and viva

SKILL ENHANCEMENT COURSE (SEC)-I

Course Title: PHYSEC 1.1: BASIC INSTRUMENTATION

Syllabus	BASIC INSTRUMENTATION
Curriculum plan	Basics of Measurement; Instrument accuracy, precision, sensitivity, resolution range etc. Errors in measurements and loading effects. Principle of measurement of dc voltage and dc current, ac voltage, ac current and resistance. Block diagram, principle and working of a digital multi meter. Introduction to CRO, Basic diagram of CRO: Brief introduction to Electron Beam, Operating voltage, Deflecting plates, Deflecting voltages, explanation of waveform display. Mention of uses of CRO.
Strategy	Lab demonstrations, group learning

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ls/techniques used	Lab equipments

Outcomes

Program outcome(PO)	Using basic experiments knowledge of physics to design innovative experiments analyze and interpret the data. Applying modern experimental tools of physics to predict and model problems in physics.
Program Specific Outcome (PSO)	Able to solve physics related problems and demonstrate the physics phenomenon through fundamental experiments.
Course Outcome (CO)	Laboratory Skill Experiments: for enhancing skill of basic experiments are , To observe the loading effect of i) Analog ii) Digital multimeters while measuring across a low resistance and high resistance. Soldering and de-soldering technique Use of CRO – Measurement of AC voltage and frequency for sine and square waves. Determination of phase shift using RC network and study of Lissajous figures. Converting the range of a given measuring instrument. Basics of transformers. Winding a coil / transformer. Using Resistive network study of star to delta network conversion or vice-versa. Experimental study of KVL and KCL using DC source and resistive network. Calibration of analog voltmeter and ammeter. Conversion of galvanometer to ohm-meter for at least two ranges. Study of Capacitor: To check the health of the capacitor using DMM, find capacitor using RC network using step down transformer/ AFG and verify laws of combination of capacitor. Basics and working of Battery Eliminators/ battery charger.

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

Attainments

rogram Outcome Attainment (POA)	Performing experiments in the lab
Program Specific Outcome Attainment (PSOA)	Lab demonstration and peer learning
Course Outcome Attainment (COA)	Internal and external assessments, viva

II Semester Physics

PHYDSCCT 2.1: ELECTRICITY and MAGNETISM

Syllabus	ELECTRICITY and MAGNETISM
Curriculum plan	To review Theory of Dielectrics and Electric Instruments, Measurements such as Polar and nonpolar molecules. Gauss law in a dielectric medium. Relation between D, E and P. Mechanism of polarization. Boundary condition at a dielectric surface. Langevin-Debye theory of polarization in polar dielectrics. moving coil galvanometer to be ballistic & dead beat. Measurement of capacitance of a capacitor. Resonance Circuits, D. C. & AC Bridges: Wheatstone Bridge , Kelvin's double bridge, Maxwell's bridge and Anderson's bridge. Magnetostatics and Thermoelectricity: Tangent law, Helmholtz galvanometer. Ampere's circuital , Seebeck effect, Variation of thermo emf with temperature, neutral temperature & temperature of inversion. Thermoelectric series. Peltier effect, Thomson effect. Thermoelectric generators (TEG), Peltier-cooling, Thermoelectric cooler (TEC). Qualitative discussion on different types of Thermocouples (J-type, K-type and RTD type). Electromagnetic Induction and Electromagnetic Theory: Determination of self-inductance (L) by Rayleigh's method and mutual inductance by

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RANEBENNUR-581 115

	direct method, with necessary theory.
rategy	Chalk and Talk, Student Seminar
Tools/techniques used	Black board
Program outcome (PO)	1. culminate in depth knowledge of almost all basic branches of physics such as mechanics, properties of matter, relativity, electricity and magnetism, wave motion, optics, thermal physics, electronics, classical mechanics, quantum mechanics, spectroscopy, nuclear physics, condensed matter physics and also advanced areas like Nanoscience, energy science, astrophysics, instrumentation. 2. communicate effectively physics concepts with examples related to day to day life. Acquire ability of recognizing and distinguishing various aspects of physics found in real life. 3. learn, perform and design experiments in the laboratory to demonstrate the concepts principles, laws of physics, theories learnt in the class rooms. 4. acquire ability of critical thinking and logical reasoning in physics problems and their solutions. Develop ability to analyze physics problem including simple to thought provoking problems and apply the acquired knowledge to solve. 5. appreciate the importance of physics subjects and its application for pursuing interdisciplinary and multidisciplinary higher education and research in these areas. 6. understand the vast scope of physics as theoretical and experimental science with application in finding solution of problems in nature spanning from smallest dimension 10^{-15} m to highest dimension 10^{26} m in space, covering energy ranges from 10^{-10} eV to 10^{25} eV. 7. think independently and develop algorithm

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HOD OF PHYSICS
R.T.E.S. Degree College

	and program using programming techniques for solving real world physics problems. 8. develop ability of working independently and to make in-depth study of various notions of physics. 9. develop ability to apply the knowledge and skill acquired through experiments of physics in laboratories to solve real life problems. 10. Pursue advanced studies and research in varied areas of physical science.
Program Specific Outcome (PSO)	Students will be able to discuss the wide range of physical phenomena with underlying principles with respect to Theory of Dielectrics and Electric Instruments, Measurements: Resonance Circuits, D.C. & AC Bridges: Magnetostatics and Thermoelectricity: Electromagnetic Induction and Electromagnetic Theory:
Course outcome (CO)	At the end of the course the student should be able to: 1. understand and distinguish application of Gauss law in vacuum and dielectric medium. 2. determine dielectric constant of solid/liquid materials by experiments in laboratory. 3. apply the resonant circuits in the field of communication and signal oscillator building 2. apply concepts of AC and DC bridges to determine values of resistance, capacitance of capacitor and self- inductance of coil. 3. understand how to produce magnetic field from electric current. Understand magnetic field produced by current in toroid and solenoid. 4. distinguish Seeback and Peltier effect and their applications to real life. Also able to distinguish different type of thermocouples as

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	temperature sensors. 5. explain Maxwell's equations to articulate the relationship between varying electric and magnetic field. Also able to explain electromagnetic waves and their characteristics.

Attainments

Program outcome attainment(POA)	Classroom discussion , solving numerical problems
Program specific outcome attainment (PSOA)	Group discussion, peer learning
Course outcome attainment (COA)	Internal & external assessments, assignments and viva

B.Sc Semester- II Practicals

Course Title: PHYDSCCP 2.1: Electricity and Magnetism

Syllabus	Practical's - Electricity and Magnetism
Curriculum Plan	To develop experimental skills. Determination of dielectric constant of a liquid, constants of B.G. Helmholtz galvanometer, magnetic field along the axis of a coil , capacity by absolute method, using B.G., high resistance by leakage method , coefficient of self-inductance (L) by Rayleigh's method/ Anderson's bridge method. Low resistance measurement using Kelvin's double bridge method, thermo-emf and verification of laws of thermoelectricity using / ordinary , Study of Seeback / Peltier Effect (Thermoelectric Cooler-TEC).
Strategy	Lab demonstrations , group learning
Tools/techniques used	Lab equipments

Outcomes

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

gram outcome(PO)	Using methodology and knowledge of physics to design innovative experiments analyze and interpret the data. Applying modern experimental tools of physics to predict and model problems in physics.
Program Specific Outcome (PSO)	Able to solve physics related problems and demonstrate the physics phenomenon through experiments.
Course Outcome (CO)	Acquiring the skills in doing the experiments in Determination of dielectric constant of a liquid, constants of B.G. Helmholtz galvanometer, magnetic field along the axis of a coil , capacity by absolute method, using B.G., high resistance by leakage method , coefficient of self-inductance (L) by Rayleigh's method/ Anderson's bridge method. Low resistance measurement using Kelvin's double bridge method, thermo-emf and verification of laws of thermoelectricity using / ordinary , Study of Seeback/Peltier Effect (Thermoelectric Cooler-TEC).

Attainments

Program Outcome Attainment (POA)	Performing experiments in the lab
Program Specific Outcome Attainment (PSOA)	Lab demonstration and peer learning
Course Outcome Attainment (COA)	Internal and external assessments, viva

III Semester

CBCS syllabus -2021-22

Optional Subject: PHYSICS(DSC-PHYT:301)

Electrostatics and Electricity

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R.T.E.S. Degree College
RANEBENNUR-581 115

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labus	Electrostatics and Electricity
urriculum plan	Introduction to dielectric materials with examples. Concepts of scalar and vector fields with examples, Properties of vector fields: flux and circulation, flux of an electric field, Gauss law of electrostatics in vacuum and in dielectric medium. relation between D,E and P. Boundary condition at a dielectric surface, determination for liquids and solids by Hopkinson's method. Clausius–Mosotti equation. Theory of growth & decay of current through RL & RC circuit. AC bridges and Filters. Measurement of inductance, Theory of Maxwell's bridge and Anderson's bridge. Measurement of capacity by de Sauty's method. Theory of Low pass and high pass constant K–type filters. Current and voltage sources, Thevenin and Norton's Theorems. Electrical instruments, measurements and Electromagnetic induction. Theory of moving coil galvanometer to be ballistic & dead beat. Seebeck effect, Variation of thermo emf with temperature, neutral temperature & temperature of inversion. Thermoelectric series. Peltier effect, Thomson effect. Taitdiagram and its uses. Applications of Thermoelectricity.
Strategy	Chalk and Talk, Student Seminar
Tools/techniques used	Black board
Program outcome (PO)	Creating comprehensive scientific knowledge to understand, explain and to solve advanced scientific problems related to energy sources. Effectively communicate the knowledge of physics to community. It guides Electrostatics and Electricity
Program Specific Outcome (PSO)	Students will be able to discuss the wide range of physical phenomena with underlying

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

	principles with respect to Dielectrics, Transient currents, Alternating current, AC bridges and Filters, Network theorems, Power Supplies, Electrical instruments, measurements and Electromagnetic induction and Thermoelectricity.
Course outcome (CO)	Introduction to dielectric materials with examples. Concepts of scalar and vector fields with examples, Properties of vector fields: to Measure of high resistance by leakage method. Explain the LCR series circuit. Condition for resonance, resonant frequency, Bandwidth, quality factor & their relation. Measurement of capacitance of a capacitor using Ballistic Galvanometer by absolute method. Discuss the Seebeck effect, Thermoelectric series. Peltier effect, Thomson effect.Thermoelectric laws.

Attainments

Program outcome attainment(POA)	Classroom discussion , solving numerical problems
Program specific outcome attainment (PSOA)	Group discussion, peer learning
Course outcome attainment (COA)	Internal & external assessments, assignments and viva

List of third semester Physics(DSC-PHYP:302) Experiments:

Syllabus	Practical III
Curriculum plan	Determination of dielectric constant of a liquid. Calibration of Ballistic Galvanometer (BG): Determination of the constants of B.G. Measurement of capacity by absolute method, using B.G. Verification of Thevenin and Norton's theorem using ladder network. Study of low pass filter. Calibration of a

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	spectrometer. Dispersive curve and dispersive power of a prism. Polarimeter. Diffraction at a wire or aperture using laser.
Strategy	Lab demonstration, group learning
Tools/techniques used	Lab equipments

Outcomes

Program outcome(PO)	Using methodology and knowledge of physics to design innovative experiments analyze and interpret the data. Applying modern experimental tools of physics to predict and model problems in physics.
Program Specific Outcome (PSO)	Able to solve physics related problems and demonstrate the physics phenomenon through experiments.
Course Outcome (CO)	Acquiring the skills in doing the experiments in Determination of dielectric constant of a liquid.Calibration of Ballistic Galvanometer (BG): Determination of the constants of B.G. Measurement of capacity by absolute method, using B.G. Verification of Thevenin and Norton's theorem using ladder network. Study of low pass filter. Calibration of a spectrometer. Dispersive curve and dispersive power of a prism. Polarimeter. Diffraction at a wire or aperture using laser.

Attainments

Program Outcome Attainment (POA)	Performing experiments in the lab
Program Specific Outcome Attainment (PSOA)	Lab demonstration and peer learning
Course Outcome Attainment (COA)	Internal and external assessments, viva

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

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Semester

PHYSICS-DSC-PHYT:401

Electromagnetic theory and Optics

Syllabus	Electromagnetic theory and Optics
Curriculum plan	Concept of fields and their classification. Gauss, Green's and Stokes theorems. Maxwell's equations: Amperes circuital law and its drawback, continuity theorem. Derivation of Maxwell's equations in differential forms, mention of integral forms & their physical significance. Explanation of Cardinal points of a optical system. Equivalent focal length of two thin lenses separated by a distance. Experimental determination of cardinal points of a lens system using Searle's Goniometer and Turn Table.Huygen's eye piece:Construction, Theory and cardinal points. Theory and cardinal points. Spherical & chromatic aberrations.Interference due to division of wave front: Fresnel's biprism. Detemination of wavelength of monochromatic light & thickness of a thin film using biprism. Theory of Newton's rings. Determination of wavelength of monochromatic light using Michelson interferometer. Introduction to diffraction and classification of diffraction phenomena. Theory of half period zones considering plane wavefronts.Zone plate:construction, theory and expression for focal length. Fraunhoffer diffraction at a single slit, at a double slit and N slits with detailed theory. Diffraction grating. Theory of Plane transmission grating. Review of basics of polarization. Malus law. Huygen's theory of double refraction. Positive and negative crystals.Theory of circularly &

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

	elliptically polarized light. Production of circularly and elliptically polarized light. quarter wave plate and half wave plate. Fresnel's explanation of optical rotation, Laurent's Half Shade Polarimeter.
Strategy	Chalk and Talk, Student Seminar
Tools/techniques used	Black board
Program outcome (PO)	Creating comprehensive scientific knowledge to understand, explain and to solve advanced scientific problems related to energy sources. Effectively communicate the knowledge of physics to community. It knowledge's the Electromagnetic theory and Optics
Program Specific Outcome (PSO)	Students will be able to discuss the wide range of physical phenomena with underlying principles with respect to Electromagnetic theory, Maxwell's equations, Cardinal points, Occulars and Aberrations, Interference due to division of wave front, Interference due to division of amplitude, Fresnel diffraction, Fraunhoffer diffraction, Polarisation .
Course outcome (CO)	Concept of fields and their classification. Derivation of Maxwell's equations in differential forms. Experimental determination of cardinal points of a lens system using Searle's Goniometer and TurnTable. Theory and cardinal points. Theory of Newton's rings. Michelson interferometer, diffraction. Comparision of grating and Prism spectra. Laurent's Half Shade Polarimeter.

Attainments

Program outcome attainment(POA)	Classroom discussion , solving numerical problems
Program specific outcome attainment (PSOA)	Group discussion, peer learning
Course outcome attainment (COA)	Internal & external assessments, assignments and viva

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

Physics (DSC-PHYP:402) Experiments:

Practical -I

Syllabus	Practical -VI
Curriculum plan	To develop experimental skills about Goniometer, Turn table, Newton's rings, R.P. of grating. Determination of high resistance by leakage method, using B.G. Verification of Thevenin and Norton's theorem using Wheatstone's bridge .Study of high pass filter.
Strategy	Lab demonstration, group learning
Tools/techniques used	Lab equipments

Outcomes

Program outcome(PO)	Using methodology and knowledge of physics to design innovative experiments analyze and interpret the data. Applying modern experimental tools of physics to predict and model problems in physics.
Program Specific Outcome (PSO)	Able to solve physics related problems and demonstrate the physics phenomenon through experiments.
Course Outcome (CO)	Acquiring the skills in doing the experiments in Goniometer, Turn table, Newton's rings, R.P. of grating. Determination of high resistance by leakage method, using B.G. Verification of Thevenin and Norton's theorem using Wheatstone's bridge .Study of high pass filter.

Attainments

Program Outcome Attainment (POA)	Performing experiments in the lab
Program Specific Outcome Attainment (PSOA)	Lab demonstration and peer learning
Course Outcome Attainment (COA)	Internal and external assessments, viva

HOD OF PHYSICS
R.T.E.S. Degree College

V Semester , paper –I 2021-22

PHY5.1 :Classical mechanics, Quantum mechanics and Atomic Physics

Syllabus	Classical mechanics, Quantum mechanics and Atomic Physics
Curriculum plan	Constraints- types, Holonomic, Nonholonomic, examples. Degrees of freedom, Generalized co-ordinates D 'Alemberts', Principle, Lagrange's equation, Introduction to Quantum theory, Compton scattering, expression for Compton shift. de Broglie hypothesis, Davison and Germer's experiment. Uncertainty principle. Schrodinger's Linear Harmonic oscillator, Statistics of identical particles. Maxwell-Boltzmann; Bose-Einstein and Fermi-Dirac. Degenerate Fermi gas. Vector-model of Atom, Spin orbit interaction, Coupling schemes LS and L-S, The Pauli exclusion principle. Stern-Gerlach experiment, Larmor effect, precession, Normal and Anomalous Zeeman Experimental method to study Zeeman effect.
Strategy	Chalk and Talk, Student Seminar
Tools/techniques used	Black board
Program outcome (PO)	Creating comprehensive scientific knowledge to understand, explain and to solve advanced scientific problems related to energy sources. Effectively communicate the knowledge of physics to community. It guides to Classical mechanics, Quantum mechanics and Atomic Physics
Program Specific Outcome (PSO)	Students will be able to discuss the wide range of physical phenomena with underlying principles with respect to classical mechanics,

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

	quantum mechanics, atomic spectra, magnetic field effect on light. Able to solve problems
Course outcome (CO)	Understanding of basic concepts of classical and quantum mechanics such as Constraints-types, Holonomic, Nonholonomic, examples. Degrees of freedom, Generalized co-ordinates D 'Alemberts', Principle, Lagrange's equation, Compton scattering, expression for Compton shift. de Broglie hypothesis, Davison and Germer's experiment. Uncertainty principle. Maxwell-Boltzmann; Bose-Einstein and Fermi-Dirac. Degenerate Fermi gas. Vector-model of Atom, Spin orbit interaction. Stern-Gerlach experiment, Larmor effect, precession, Normal and Anomalous Zeeman Experimental method to study Zeeman effect

Attainments

Program outcome attainment(POA)	Classroom discussion, solving numerical problems
Program specific outcome attainment (PSOA)	Group discussion, peer learning
Course outcome attainment (COA)	Internal & external assessments, assignments and viva

V semester , Paper-II

PHY 5.2: Molecular Spectra, Lasers, Relativity and Electronics

Syllabus	Molecular Spectra, Lasers, Relativity and Electronics
Curriculum plan	Different types motions in a molecule - electronic, vibration, rotation. molecular energy distribution in the electromagnetic spectrum, Einstein's theory of spontaneous emission, stimulated emission and stimulation .Gas lasers(He-Ne), The Rayleigh's Scattering, the Raman Scattering. Quantum theory, Raman effect and Raman spectrum. Micheison-Morley

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

	experiment, The Lorentz transformation –Relativity of length and time. Thevenin and Norton's Theorems. Power Supplies with filters (C,L, LC and T-section), Žener diode characteristics, its voltage regulation, Transistors of DC h-parameters . Transistor as an oscillator, Hartley and Phase shift . FET- Types,
Strategy	Chalk and Talk, Student Seminar
Tools/techniques used	Black board
Program outcome (PO)	Creating comprehensive scientific knowledge to understand, explain and to solve advanced scientific problems related to energy sources. Effectively communicate the knowledge of physics to community. It guides to Classical mechanics, Quantum mechanics and Atomic Physics
Program Specific Outcome (PSO)	Students will be able to discuss the wide range of physical phenomena with underlying principles with respect to molecular spectra, Raman effect, laser and electronics with able to solve problems
Course outcome (CO)	Understanding of basic concepts of classical and quantum mechanics such as molecular energy distribution in the electromagnetic spectrum, Einstein's theory of spontaneous emission, stimulated emission and stimulation. Raman effect and Raman spectrum. Micheison-Morley experiment, The Lorentz transformation –Relativity of length and time. Thevenin and Norton's Theorems. Power Supplies with filters (C,L, LC and T-section), Žener diode characteristics, its voltage regulation, Transistors of DC h-parameters . Transistor as an oscillator, Hartley and Phase shift. FET-Types,

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

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Attainments

ogram outcome attainment(POA)	Classroom discussion, solving numerical problems
Program specific outcome attainment (PSOA)	Group discussion, peer learning
Course outcome attainment (COA)	Internal & external assessments, assignments and viva

PHYSICS- Paper-I, 5.3 : Physics Lab-V

Syllabus	**Practical –I**
Curriculum plan	To develop experimental skills. Thevenin and Norton's theorems using ladder circuits, Low pass filter, Characteristics of Zener diode, Voltage regulator using Zener diode .Battery charger. Battery eliminator, CE-amplifier. Hybrid parameters
Strategy	Lab demonstrations , group learning
Tools/techniques used	Lab equipments

Outcomes

Program outcome(PO)	Using methodology and knowledge of physics to design innovative experiments, analyze and interpret the data. Applying modern experimental tools of physics to predict and model problems in physics.
Program Specific Outcome (PSO)	Able to solve physics related problems and demonstrate the physics phenomenon through experiments.
Course Outcome (CO)	Acquiring the skills in doing the experiments in molecular spectra and electronics such as Thevenin and Norton's theorems using ladder circuits, Low pass filter, Characteristics of Zener diode, Voltage regulator using Zener diode .Battery charger. Battery eliminator, CE-amplifier.Hybrid parameters

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

Attainments

Program Outcome Attainment (POA)	Performing experiments in the lab
Program Specific Outcome Attainment (PSOA)	Lab demonstration and peer learning
Course Outcome Attainment (COA)	Internal and external assessments, viva

Paper-II practical's , V Semester

PHY5.4:Physics Lab-V

Syllabus	**Practical –II**
Curriculum plan	To develop experimental skills. Planck's constant using Photocell, Thevenin and Norton's theorems using Whetstone's network. High pass filter. Construction of multi range voltmeter. Full wave bridge rectifier. Hartely Oscillator. FET Amplifier. Photo conductive cell (L.DR),
Strategy	Lab demonstrations , group learning
Tools/techniques used	Lab equipments

Outcomes

Program outcome(PO)	Using methodology and knowledge of physics to design innovative experiments analyze and interpret the data. Applying modern experimental tools of physics to predict and model problems in physics.
Program Specific Outcome (PSO)	Able to solve physics related problems and demonstrate the physics phenomenon through experiments.
Course Outcome (CO)	Acquiring the skills in doing the experiments in molecular spectra and electronics such as Planck's constant using Photocell, Thevenin and Norton's theorems using Whetstone's network. High pass filter. Construction of multi range voltmeter. Full wave bridge rectifier. Hartely Oscillator. FET Amplifier. Photo conductive cell (L.DR),

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

Attainments

Program Outcome Attainment (POA)	Performing experiments in the lab
Program Specific Outcome Attainment (PSOA)	Lab demonstration and peer learning
Course Outcome Attainment (COA)	Internal and external assessments, viva

VI semester, Paper-I

PHY 6.1: Solid state physics, Nuclear physics and nano science

Syllabus	Solid state physics, Nuclear physics and nano science
Curriculum plan	Lattice, lattice translational vectors, basis of crystal structure. Bravais lattices, crystal indices, expression for inter-planar spacing, crystal structure of NaCI and CSl. X-ray spectrum. Bragg's X-ray spectrometer. Specific heat of solids, Weidman-Franz law, Semiconductors Expression for electrical conductivity in case of intrinsic Semiconductors, experimental determination of energy gap, Hal effect. Langevin's theory of diamagnetism and Para magnetism, Ferromagnetism, Domain and hysteresis. Meissner effect, isotope effect and applications. Nano materials; synthesis, characterization, properties and applications Theory of alpha-decay, Geiger-Nuttal law. Fermi theory of Beta-ray spectrum. Liquid-drop model- explanation of semi-emperical formula, Magic numbers. Properties of nuclear forces, Meson Theory of nuclear forces. Detectors and Accelerators
Strategy	Chalk and Talk, Student Seminar
Tools/techniques used	Black board
Program outcome (PO)	Creating comprehensive scientific knowledge to understand, explain and to solve advanced scientific problems related to energy sources.

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

	Effectively communicate the knowledge of physics to community. It guides to Classical mechanics, Quantum mechanics and Atomic Physics
Program Specific Outcome (PSO)	Students will be able to discuss the wide range of physical phenomena with underlying principles with respect to solid state physics and nuclear physics with able to solve problems
Course outcome (CO)	Understanding of basic concepts of solid state physics and nuclear physics such as Lattice, lattice translational vectors, basis of crystal structure. X-ray spectrum. Bragg's X-ray spectrometer. Weidman-Franz law, Semiconductors Expression for electrical conductivity in case of intrinsic Semiconductors, Ferromagnetism, Domain and hysteresis. Meissner effect, isotope effect and applications.Fermi theory of Beta-ray spectrum. Liquid-drop model- explanation of semi-emperical formula, Magic numbers. Properties of nuclear forces, Meson Theory of nuclear forces. Detectors and Accelerators

Attainments

Program outcome attainment(POA)	Classroom discussion , solving numerical problems
Program specific outcome attainment (PSOA)	Group discussion, peer learning
Course outcome attainment (COA)	Internal & external assessments, assignments and viva

VI semester, Paper-II

PHY 6.2: Astrophysics, Computational physics, Electronics and communication.

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

Science, Commerce College

abus	Astrophysics, Computational physics, Electronics and communication
Curriculum plan	To revise basic concepts of Astrophysics, Computational physics, Electronics and communication such as luminosities of stars, apparent and absolute magnitudes, stellar spectra, H-R diagram, binary stars, stellar masses, stellar temperatures, equations of stellar structure, Different types of telescopes and their characteristics. C-Programming. types of ICs, operation of astable multivibrator using 555, Op-amp, Boolen algebra, truth tables, basic theorems, Basic and Universal gates. DTL gates; OR, AN ,NOT, NAND and XOR gates. modulation and Demodulation , FM spectrum,
Strategy	Chalk and Talk, Student Seminar
Tools/techniques used	Black board
Program outcome (PO)	Creating comprehensive scientific knowledge to understand, explain and to solve advanced scientific problems related to energy sources. Effectively communicate the knowledge of physics to community. It guides to Classical mechanics, Quantum mechanics and Atomic Physics
Program Specific Outcome (PSO)	Students will be able to discuss the wide range of physical phenomena with underlying principles with respect to solid state physics and nuclear physics with able to solve problems
Course outcome (CO)	Understanding of basic concepts of astro physics, electronics and communication such as luminosities of stars, apparent and absolute magnitudes, stellar spectra, H-R diagram, binary stars, stellar masses, stellar temperatures, equations of stellar structure, Different types of telescopes and their

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

	characteristics. C-Programming. types of ICs, operation of astable multi vibrator using 555, Op-amp, Boolen algebra, truth tables, basic theorems, Basic and Universal gates. DTL gates; OR, AN ,NOT, NAND and XOR gates. modulation and Demodulation

Attainments

Program outcome attainment(POA)	Classroom discussion , solving numerical problems
Program specific outcome attainment (PSOA)	Group discussion, peer learning
Course outcome attainment (COA)	Internal & external assessments, assignments and viva

VI semester- practical -I

PHY 6.3 : Physics Lab-VI

Syllabus	PHY 6.3 : Physics Lab-VI
Curriculum plan	To develop experimental skill by Hall effect, Determination of resistivity of a semiconductor by four probe method. Characteristics of GM counter. GM tube (dead time). Voltage Multipliers using diodes and capacitors. V-I Characteristics of three LED's (emitting different colors). Study of DTL gates. Solar cell characteristics (a) Open circuit voltage (b)Short circuit current,
Strategy	Lab demonstration , group learning
Tools/techniques used	Lab equipments

Outcomes

Program outcome(PO)	Using methodology and knowledge of physics to design innovative experiments analyze and interpret the data. Applying modern experimental tools of physics to

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

	predict and model problems in physics.
Program Specific Outcome (PSO)	Able to solve physics related problems and demonstrate the physics phenomenon through experiments.
Course Outcome (CO)	Acquiring the skills in doing the experiments in Hall effect, Determination of resistivity of a semiconductor by four probe method.Characteristics of GM counter. GM tube (dead time). Voltage Multipliers using diodes and capacitors. V-I Characteristics of three LED's (emitting different colors). Study of DTL gates. Solar cell characteristics (a) Open circuit voltage (b)Short circuit current,

Attainments

Program Outcome Attainment (POA)	Performing experiments in the lab
Program Specific Outcome Attainment (PSOA)	Lab demonstration and peer learning
Course Outcome Attainment (COA)	Internal and external assessments, viva

VI semester, practical -II

PHY 6.4 : Physics Lab-VI

Syllabus	**PHY 6.4 : Physics Lab-VI**
Curriculum plan	To develop experimental skills about thermister ,Verification of inverse square law using GM tube, Attenuation of B-radiation, Spectral sensitivity of photovoltaic cell, H.R. diagram: Physical Properties of stars, Use of IC 7400 D'Morgan's theorems & verification of Boolean expressions).Executing C Programs for period of a simple pendulum and range & height of a projectile.
Strategy	Lab demonstration, group learning

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

Tools/techniques used	Lab equipments

Outcomes

Program outcome(PO)	Using methodology and knowledge of physics to design innovative experiments analyze and interpret the data. Applying modern experimental tools of physics to predict and model problems in physics.
Program Specific Outcome (PSO)	Able to solve physics related problems and demonstrate the physics phenomenon through experiments.
Course Outcome (CO)	Acquiring the skills in doing the experiments in thermister ,Verification of inverse square law using GM tube, Attenuation of B- radiation, Spectral sensitivity of photovoltaic cell, H.R. diagram: Physical Properties of stars, Use of IC 7400 (D'Morgan's theorems & verification of Boolean expressions).Executing C Programs for period of a simple pendulum and range & height of a projectile.

Attainments

Program Outcome Attainment (POA)	Performing experiments in the lab
Program Specific Outcome Attainment (PSOA)	Lab demonstration and peer learning
Course Outcome Attainment (COA)	Internal and external assessments, viva

HOD OF PHYSICS
R.T.E.S. Degree College
RANEBENNUR-581 115

R.T.E.S. Science, Arts, Commerce College

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