**GOVERNMENT DEGREE COLLEGE, RAVULAPALEM**

**DEPARTMENT OF PHYSICS**

**COURSE OBJECTIVES OF PHYSICS FOR THE ACADEMIC YEARS 2017-2018 TO 2019-2020**

***COURSE OUTCOMES***

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| ***S.No*** | ***Course code*** | ***Name of the Course*** | ***Course Outcomes*** |
| ***PHYSICS*** |
| ***1.*** | ***I Sem*** | **Mechanics & Properties Of Matter** | After Completion of this course the student would be able to:***CO1:***To gain the knowledge about the physical significance of gradient of scalar field, divergence and curl of vector field and understand the line, surface and volume integrals.***CO2:*** To gain knowledge on motion of variable mass system, Collisions in two and three dimensions, Rutherford scattering problem***CO3:*** To understand the concepts of rotational kinematics of rigid body, Moment of inertia tensor, Euler equations, Precision of top, equinoxes and Gyroscope***CO4:*** To gain understanding on conservative forces, equation of motion under central forces, Keppler's laws. To know about GPS (global positioning system)***CO5:*** To learn about Galilean-Lorentz frames of references, Lorentz transformations, Michelson-Morley experiment, Postulates of special theory of relativity, length contraction, time dilation, addition of masses, mass energy relation and 4 vector notation. |
| ***2*** | ***II Sem*** | **Waves & Oscillations** | ***CO1:*** To learn about physical properties of Simple Harmonic Motion (SHM), Torsional pendulum, Compound pendulum and their applications, Lissajous figures***CO2:*** . 2. To be able to solve the differential equations for forced harmonic oscillator and damped harmonic oscillator and compare the results with simple harmonic oscillator***CO3:***To gain the knowledge about Fourier theorem and analysis of periodic wave functions-square wave ,triangular wave,saw tooth wave.***CO4:*** Figure out the formation of harmonics and overtones in a stretched string***CO5:*** To learn about basics of Ultrasonics, production detection of ultrasonics, measurement of frequency and velocity of ultrasonics and the applications of ultrasonics |
| ***3*** | ***III Sem*** | **Wave Optics** | ***CO1:***To know the types of aberrations and their minimizing methods***CO2:*** To understand the principle of superposition, coherence, Interference by division of wave front and amplitude, Fresnel's bi-prism, thin film interference, wedge shaped film interference, Newton's rings, Michelson's interferometer and their applications to sodium D lines and thickness of thin film.***CO3:*** To learn about Fresnel and Fraunhoffer diffraction, Fraunhoffer diffraction due to single slit, double slit, N-slit, grating. They would also learn about Fresnel's half period zones, zone plate, phase reversal zone plates, comparison of zone plate & convex lens, interference & diffraction.***CO4:*** To learn about methods of polarization, Brewster's law, Malus law, Nicol prism, Quarter wave plate, half wave plate, Babinet's compensator and optical activity analysis by Laurent's half shade polarimeter.***CO5:*** To understand the principles of optical fiber communication, classification of optical fibers, applications of optical fibers. To learn about principles of LASER, Einstein coefficients, He-Ne laser, Ruby laser, applications of laser, principles of holography, limitations of Gabor's hologram and applications of holography. |
| ***4*** | ***IV Sem*** | **Thermodynamics & Radiation Physics** | ***CO1:*** To Understand the basic aspects of kinetic theory of gases, Maxwell- Boltzman distribution law, equip partition of energies, mean free path of molecular collisions and the transport phenomenon in ideal gases***CO2***: To Gain knowledge on the basic concepts of thermodynamics, the first and the second law of thermodynamics, the basic principles of refrigeration ,the concept of entropy, the thermodynamic potentials and their physical interpretations***CO3:*** To develop critical understanding of concept of Thermodynamic potentials, the formulation of Maxwell’s equations and its applications.***CO4:*** To gain the knowledge about the low temperature physics and production of low temperature by various methods.***CO5:*** To examine the nature of black body radiations and the basic theories and working of pyrometer and pyrheliometre |
| ***5*** | ***V Sem*** | **Electricity, Magnetism and Electronics** | ***CO1:*** To understand the concepts of electric field and electric potential due to point charge.***CO2:*** To understand Biot and Savart’s law and Ampere’s circuital law to describe and explain the generation of magnetic fields by electrical currents.***CO3:***To gain the knowledge about alternating currents.***CO4:*** To describe the operation of p-n junction diodes, Zener diodes, light emitting diodes and transistors***CO5:*** To understand the operation of basic logic gates and universal gates and their truth tables |
| ***6*** | ***V Sem*** | **Modern Physics** | ***CO1:*** To understan the concepts of Atomic and Modern Physics, basic elementary Quantum Mechanics and Nuclear Physics***CO2:*** To Develop critical understanding of concept of Matter Waves and Uncertainty Principle***CO3:*** To learn the Schrodinger wave equations, particle in one dimension potential***CO4:*** : To understand the basic properties of nuclei, characteristics of Nuclear forces, salient features of Nuclear models and different nuclear radiation detectors***CO5:*** To learn about Amorphous and crystalline materials, unit cell, Miller indices, reciprocal lattice, types of lattices, diffraction of X-rays by crystals, Bragg’s law, experimental techniques, Laue’s method and powder diffraction method |
| ***7*** | ***VI Sem*** | **Analog and digital electronics** | ***CO1:***To understand the construction and working of FET ,MOSFET***CO2:***To learn about the operational amplifier.***CO3:***To study the applications of Op-Amp***CO4:***To understand the data processing circuits and IC 555 Timer***CO5:***To learn about the sequential digital circuits. |
| ***8*** | ***VI Sem*** | **Material science** | ***CO1:*** To learn about Materials and Crystal Bonding: Materials, Classification, Crystalline, Amorphous, Glasses; Metals, Alloys, Semiconductors, Polymers, Ceramics, Plastics, Bio-materials, Composites.***CO2:*** To learn about Defects and Diffusion in Materials: Introduction – Types of defects - Point defects- Line defects- Surface defects- Volume defects***CO3:*** To learn about Mechanical Behavior of Materials: Different mechanical properties of engineering materials – Creep – Fracture – Technological Properties ***CO4:*** To learn about Magnetic Materials: Dia – Para – Ferro and Ferromagnetic materials, Classical Langevin theory of dia magnetism, Quantum mechanical treatment of Para magnetism. Curie’s law, Weiss’s theory of ferromagnetism, Ferromagnetic domains. Discussion of B-H Curve. Hysteresis and energy Loss.***CO5:*** To learn about Dielectric Materials: Dielectric constant, dielectric strength and dielectric loss, polarizability, types of dielectric materials, applications; ferroelectric, piezoelectric and pyroelectric materials. |
| ***9*** | ***VI Sem*** | **Renewable energy** | ***CO1***: To understand the energy resources and environmental degradation due to energy production and utilization.***CO2***: to gain the knowledge about the energy consumption.***CO3***: To gain the knowledge of solar energy and its applications.***CO4***: To gain the knowledge about the ocean energy and hydrogen energy.***CO5:*** To gain the knowledge about the bio energy resources. |

**GOVERNMENT DEGREE COLLEGE, RAVULAPALEM**

**DEPARTMENT OF PHYSICS & ELECTRONICS**

**COURSE OBJECTIVES OF PHYSICS FOR THE ACADEMIC YEARS 2020-21 to 2022-2023**

***COURSE OUTCOMES***

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| ***S.No*** | ***Course code*** | ***Name of the Course*** | ***Course Outcomes*** |
| ***PHYSICS*** |
| ***1*** | ***I Sem*** | **Mechanics, waves & Oscillations**  | After Completion of this course the student would be able to:***CO1:*** Recognize the motion of the charged Prticle in electromagnetic field ***CO2:*** Describe the conservation of energy,work,force,linear momentum and angular momentum.***CO3:*** Learn the fundamentals of harmonic oscillator model ,including damped and forced oscillators***CO4:*** Describe the production , deduction of ultrasonic waves and applications***CO5:*** Explain the obsorption and reflection of sound by various materials and describe the requirements for good architecture acoustics.***CO6:*** Understand the effect of gravitation on objects and understand the principle of rocket |
| ***2*** | ***II Sem*** | **Wave Optics** | ***CO1:*** Students would learn about principle of superposition, coherence, Interference by division of wavefront and amplitude, Fresnel's bi-prism, Lloyd's mirror, thin film interference, wedge shaped film interference, Newton's rings, Michelson's interferometer and their applications to sodium D lines and thickness of thin film.CO2: Students would learn about Fresnel and Fraunhoffer diffraction, Fraunhoffer diffraction due to circular aperture, single slit, and double slit, N-slit, grating. They would also learn about Fresnel's half period zones, zone plate, phase reversal zone plates, comparison of zone plate & convex lens, interference & diffraction.CO3: Students would learn about methods of polarization, Brewster's law, Malus law, Nicol prism, Quarter wave plate, half wave plate, babinet's compensator and optical activity analysis by Laurent's half shade polarimeter.CO4: Students would learn about various monochromatic and chromatic aberrations and their removal techniques. They would also learn about fiber optics types and applicationsCO5: Students would learn about principles of LASER, He-Ne laser, Ruby laser, applications of laser, Principles of optical fiber communication, classification of optical fibers, applications of optical fiers, principles of holography, limitations of Gabor's hologram and applications of holography |
| ***3*** | ***III Sem*** | **Heat & Thermodynamics** | ***CO1:*** To understand differentiate the terms heat and temperature ***CO2:*** understand specific heat capacity of gas and different theories on specific heat capacity***CO3:*** To understand differentiate between princi[les and methods to produce low temperature, liquefy air, helium and hydrogen***CO4:*** to understand postulates of kinetic theory of gases and arrive the theorem of equipartition of energy ***C05:*** To understand different thermal processes and understand laws of thermodynamics and identify its outcomes |
| ***4*** | ***IV Sem*** | **Electricity, Magnetism and Electronics** | ***CO1:*** To understand the concepts of electric field and electric potential due to point charge.***CO2:*** To understand Biot and Savart’s law and Ampere’s circuital law to describe and explain the generation of magnetic fields by electrical currents.***CO3:*** To gain the knowledge about alternating currents.***CO4:*** To describe the operation of p-n junction diodes, Zener diodes, light emitting diodes and transistors***CO5:*** To understand the operation of basic logic gates and universal gates and their truth tables |
| ***5*** | ***IV Sem*** | **Modern Physics** | ***CO1:*** To understan the concepts of Atomic and Modern Physics, basic elementary Quantum Mechanics and Nuclear Physics***CO2:*** To Develop critical understanding of concept of Matter Waves and Uncertainty Principle***CO3:*** To learn the Schrodinger wave equations, particle in one dimension potential***CO4:*** : To understand the basic properties of nuclei, characteristics of Nuclear forces, salient features of Nuclear models and different nuclear radiation detectors***CO5:*** To learn about Amorphous and crystalline materials, unit cell, Miller indices, reciprocal lattice, types of lattices, diffraction of X-rays by crystals, Bragg’s law, experimental techniques, Laue’s method and powder diffraction method |
| ***6*** | ***V Sem*** | **Low temperature physics & refrigeration** | ***CO1*** Identify various methods and techniques used to produce low temperatures in the Laboratory.***CO2*** Acquire a critical knowledge on refrigeration and air conditioning***CO3*** Demonstrate skills of Refrigerators through hands on experience and learns about refrigeration components and their accessories***CO4*** Understand the classification, properties of refrigerants and their effects on environment***CO5*** Comprehend the applications of Low Temperature Physics and refrigeration |
| ***7*** | ***V Sem*** | **Solar energy and applications** | ***CO1*** Understand Sun structure, forms of energy coming from the Sun and its measurement. ***CO2*** Acquire a critical knowledge on the working of thermal and photovoltaic collectors***CO3*** Demonstrate skills related to callus culture through hands on experience ***CO4*** Understand testing procedures and fault analysis of thermal collectors and PV modules***CO5*** Comprehend applications of thermal collectors and PV modules. |

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| ***S.No*** | ***Course code*** | ***Name of the Course*** | ***Course Outcomes*** |
| ***ELECTRONICS*** |
| ***1*** | ***I Sem*** | **Circuit Theory and Electronic Devices**  | After Completion of this course the student would be able to:***CO1:*** Students would learn about various rectifier configurations using diodes and their parameters like ripple factor,efficiency etc. They would also learn about regulation and hormonic components in the rectified output.***CO2:*** Students would learn about various filters using inductors and capacitors, series, shunt regulators and 78xx, 79xx IC regulators. They would also learn about Switch mode powersupply.***CO3:*** Students would learn about RC coupled CE amplifier, the concepts of negative and positive feedback. They would also learn about the effect of negative feedback on various amplifier circuit parameters.***CO4:*** Students would learn about the basic components of operational amplifier, the working of differential amplifier in various configurations.  |
| ***2*** | ***II Sem*** | **Digital Electronics** | ***CO1:*** To understand the number systems, Binary codes andComplements. ***CO2:*** To understand the Boolean algebra and simplification of Boolean expressions. ***CO3:*** To analyze logic processes and implement logical operations using combinational logiccircuits. ***CO4:*** To understand the concepts of sequential circuits and to analyze sequential systems in terms of statemachines. ***CO5:*** To understands characteristics of memory and theirclassification. To implement combinational and sequential circuits usingVHDL.  |
| ***3*** | ***III Sem*** | **Analog circuits and Communication Electronics** | ***CO1:*** **T**o understand the concepts, working principles and key applications of linear integrated circuits. ***CO2:*** To perform analysis of circuits based on linear integrated circuits. ***CO3:*** To design circuits and systems for particular applications using linear integrated circuits. ***CO4:*** To introduce students to various modulation and demodulation techniques of analog communication. ***CO5:*** To analyse different parameters of analog communication techniques. It also focuses on Transmitters and Receivers.  |
| ***4*** | ***III Sem*** | **Microprocessor System** | ***CO1:*** To understand basic architecture of 16 bit and 32 bit microprocessors. ***CO2:*** To understand interfacing of 16 bit microprocessor with memory and peripheral chips involving system design. ***CO3:*** To understand techniques for faster execution of instructions and improve speed of operation and performance of microprocessors ***CO4:*** To understand RISC based microprocessors. ***CO5:*** To understand concept of multi core processors.  |
| ***5*** | ***IV Sem*** | **Microcontroller** | ***CO1:*** To understand the concepts of microcontroller based system. ***CO2:*** To enable design and programming of microcontroller based system. ***CO3:*** To know about the interfacing Circuits  |
| ***6*** | ***V Sem*** | **Embedded system design** | ***CO1:*** To introduce the Building Blocks of Embedded System***CO2:*** To Educate in Various Embedded Development Strategies ***CO3:*** To Introduce Bus Communication in processors, Input/output interfacing. ***CO4:*** To impart knowledge in various processor scheduling algorithms. ***CO5:*** To introduce Basics of Real time operating system and example tutorials to discuss on one real time operating system too |
| ***7*** | ***V Sem*** | **Consumer electronics** | ***CO1:*** To study Microwave ovens – block diagram - working - types – wiring and safety instructions. – care and cleaning ***CO2:*** To study washing machines – block diagram - working - types – wiring and safety instructions. – care and cleaning ***CO3:*** To study Air conditioners and refrigerators – block diagram - working - types – wiring and safety instructions. – care and cleaning ***CO4:*** To study Home/Office digital devices – block diagram - working - types – wiring and safety instructions. – care and cleaning ***CO5:*** To study Digital access devices like – block diagram - working - types – wiring and safety instructions. – care and cleaning  |