CO – PO MAPPING

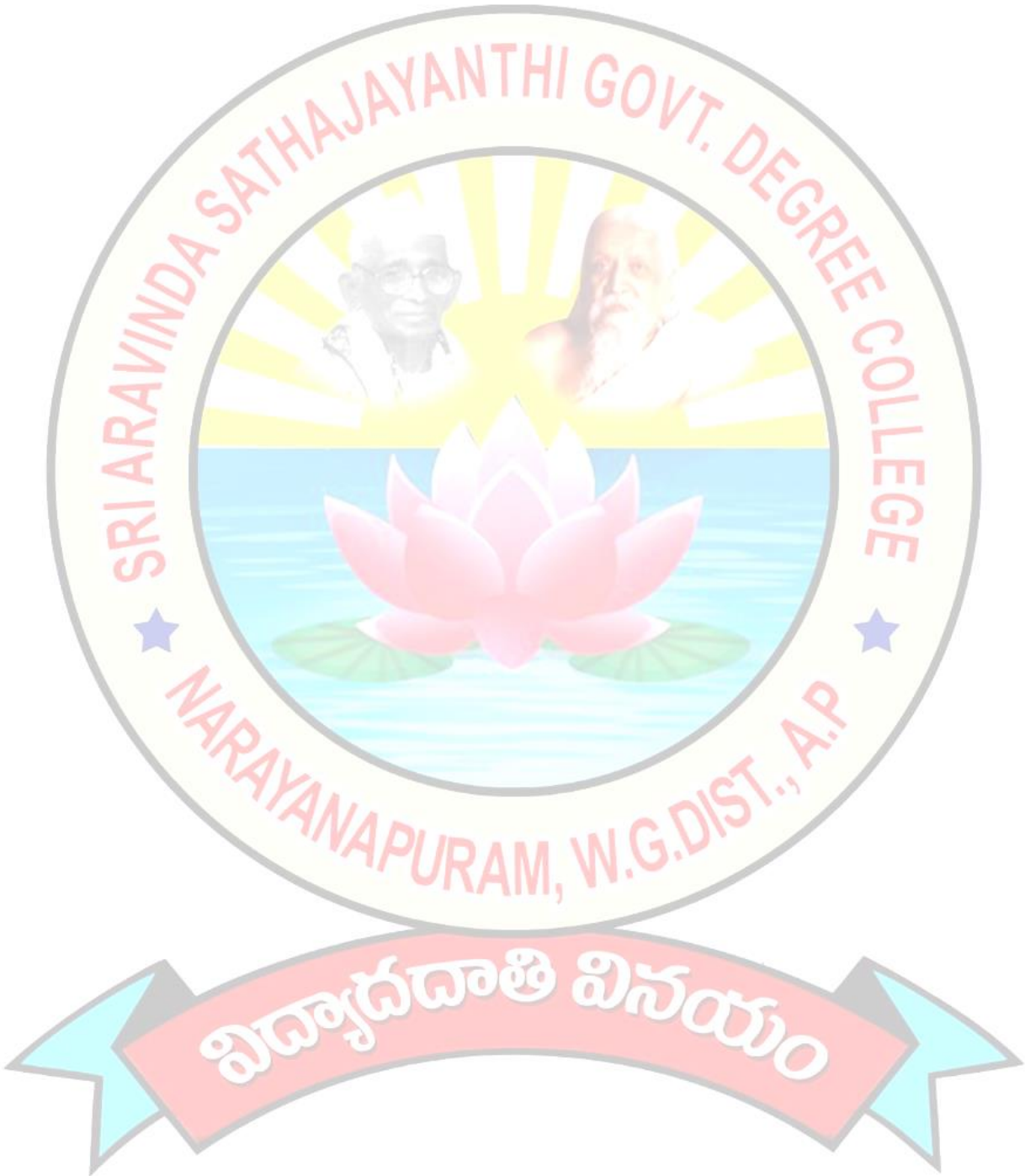
FOR

B.Sc. (PHYSICS)

(W.E.F 2020-21)

DEPARTMENT OF PHYSICS

S.A.S GOVT. DEGREE COLLEGE, NARAYANAPURA


SRI ARAVINDA SATHAJAYANTHI GOVT. DEGREE COLLEGE
NARAYANAPURAM, W.G.DIST., A.P.
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DEPARTMENT OF PHYSICS

B.Sc(PHYSICS)

VISION:

Excel in producing and disseminating scientific knowledge, foster in students a culture of inquiry, intellectual exploration, and care for one another and the environment

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MISSION:

To teach its students about the wonder and majesty of the field of physics, its linkages to other fields, and its enormous potential to improve people's lives. To improve their capacity for producing new knowledge and communicating it, as well as to instill in them a scientific mindset and a feeling of civic duty. To carry out excellent research that will uncover new scientific facts and use them for the benefit of the greater living world.

DEPARTMENT OF PHYSICS
B.Sc (M.P.C)

PROGRAMME OUTCOMES

PO1. Acquire a comprehensive understanding of domain-specific knowledge and demonstrate their acquired skills effectively during practical transactions within the specific domain.

PO2. Demonstrate proficient analytical and problem-solving skills through the application of critical thinking strategies to address real-world situations effectively.

PO3. Master effective communication, collaborate skillfully with diverse stakeholders, nurture meaningful dialogues, build strong professional bonds in and beyond college.

PO4. Exhibit proficiency in ethically using information from diverse sources, analyzing and synthesizing data effectively for real-world research.

PO5. Exemplify ethical standards in personal and professional contexts, appreciate diverse cultures, evaluate social responsibility's impact on well-being, and advocate for women students' betterment.

PO6 . Actively promote social awareness through community service, contributing to a more inclusive and compassionate global community.

PO7. Embrace continuous learning, create professional growth chances, and prioritize personality development and physical well-being for a holistic approach.

PO8. Foster self-confidence, advocate women empowerment, demonstrate expertise for growth in studies, employment, and entrepreneurship, creating a brighter and equitable future.

MATHS PHYSICS CHEMISTRY

PROGRAM SPECIFIC OUTCOMES

PSO1 Understand the concepts of vector spaces, group theory, quantum mechanics, optical, thermal, electrical, mechanical properties of a materials, probability, algorithm design, data base

PSO2 Analyse the concepts of mathematics, physics and chemistry able to relate them in numerical programming of models of physical systems.

PSO3 To impart knowledge of a broad range of Chemistry, and mathematical techniques, and the capability of applying them to analyze and design complex systems.

PSO4 Acquire logical and analytical skills to apply the concepts to model and solve real life problems in related areas.

PSO5 Engage in professional development in the fields of Information Technology and Computer Science.

SEM 1

COURSE NAME: MECHANICS, WAVES AND OSCILLATIONS

CO1: Understand the concepts Newtonian Mechanics and Theory of Relativity

- **Analise:Explain** Newton's laws of motion and motion of variable mass system
- **Understand:**Illustrate application to rocket motion and the concepts of impact parameter, scattering cross section,and derive the relationship between them
- **Application:solve** the corresponding problems
- **Understand**: Summerise postulates of Special theory of relativity and its consequences such as length contraction, time dilation, relativistic mass and mass-energy equivalence.

CO2: Understand rotational kinematics and can create ultrasonic and waves in streached strings:

- **Application:Apply** the rotational kinematic relations, the principle and working of gyroscope and its applications and the precessional motion of a freely rotating symmetric top.
- **Evaluation**: **Deduce** the formulation of the problem of coupled oscillations
- **Analysis: Analise** the coupled oscillations to obtain normal modes of oscillation and their frequencies in simple mechanical systems
- **Creation:**Discuss the formation of harmonics and overtones in a stretched string and production of Ultrasonics

CO3: **Summerise** the general characteristics of central forces and: Distinguish between un damped, damped and forced oscillations

- **Understand:Summerise** the general characteristics of central forces and the application of Kepler's laws
- **Creation**: **Discuss** the motion of planets and satellite in circular orbit through the study of law of Gravitation
- **Analysis**:Distinguish between un damped, damped and forced oscillations.

CO. No.	**Upon the successful completion of the course, students will be able to**	**POs mapped**	**Cognitive Level**
CO - 1	Understand the concepts Newtonian Mechanics and Theory of Relativity equivalence	PO1,PO2,PO4,PO8	L2,L3,L4
CO - 2	Understand rotational kinematics and can create ultrasonic and waves in streached strings:	PO1,PO2,PO4,PO8	L3,L5,L4,L6
CO - 3	Summerise the general characteristics of central forces and: Distinguish between un damped, damped and forced oscillations	PO1,PO2,PO4,PO8	L2,L3,L6

CO	PO							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	3	1	3	1	1	1	3
CO2	3	3	1	3	1	1	1	3
CO3	3	3	1	3	1	1	1	3

SEM 2

Course Name: Wave Optics

CO1:Understand and distinguish the phenomenoa of interference and diffraction

- **Analise(L4)** the phenomenon of interference of light due to division of wave front and due to division of amplitude.
- **Compare(L5)** between Fresnel's diffraction and Fraunhoffer diffraction and observe the diffraction patterns in the case of single slit and the diffraction grating.
- **Describe(L2)** the construction and working of zone plate and make the comparison of zone plate with convex lens**.**

CO2:Explain the transverse nature of light and can summerise the applications

- **Explain** (L4)the various methods of production of plane, circularly and polarized light and their detection and the concept of optical activity..
- **Summerise(L2)** the basic principle of laser, the working of He-Ne laser and Ruby lasers and their applications in different fields.

CO3:**Explain the errors in image formation and can understand the concepts of modern optics**

- **Explain(L4)** about the different aberrations in lenses and discuss the methods of minimizing them.
- **Understand(L2)** the basic principles of fibreoptic communication and explore the field of Holography and Nonlinear optics and their applications.

CO. No.	**Upon the successful completion of the course, students will be able to**	**POs mapped**	**Cognitive Level**
CO - 1	Understand and distinguish the phenomenoa of interference and diffraction	PO1,PO2,PO4,PO8	L2,L4,L5,
CO - 2	Explain the transverse nature of light and can summerise the applications	PO1,PO2,PO4,PO8	L2,L4,
CO - 3	Explain the errors in image formation and can understand the concepts of modern optics	PO1,PO2,PO4,PO8	L2,L4

CO	PO							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	3	1	3	1	1	1	3
CO2	3	3	1	3	1	1	1	3
CO3	3	3	1	3	1	1	1	3

SEM 3

COURSE NAME:HEAT AND THERMODYNAMICS

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CO1.Explain kinetic theory of gases and the concept of black body

- **Explain(L4)** the basic aspects of kinetic theory of gases, Maxwell-Boltzman distribution law, equipartition of energies, mean free path of molecular collisions
- **Summersise(L**2) the transport phenomenon in ideal gases . the nature of black body radiations and the basic theories
- **deduce** (L5)the corresponding relations between theories of black body radiation

CO2:Understand the basics of thermodynamics and its applications

- **Outline(L2)** the basic concepts of thermodynamics, the first and the second law of thermodynamics,
- **Analyse(L4)** the working of Carnot's ideal heat engine, Carnot cycle and its efficiency
- .**Develop(L6)** critical understanding of concept of Thermodynamic potentials, the formulation of Maxwell's equations and its applications
- **Explain** (L2)the basic principles of refrigeration, the concept of entropy ,the thermodynamic potentials and their physical interpretations and

CO3.Build the knowledge about low temperature physics

- **Distnguish(L4)** between principles and methods to produce low temperature and liquefy air
- **Choose(L3)** the proper refrigirent for practical applications of substances at low temperatures.

CO. No.	Upon the successful completion of the course, students will be able to	POs mapped	Cognitive Level
CO - 1	Explain kinetic theory of gases and the concept of black body	PO1,PO2,PO4,PO8	L2,L4,L5
CO - 2	Understand the basics of thermodynamics and its applications	PO1,PO2,PO4,PO8	L2,L4,L6
CO - 3	Build the knowledge about low temperature physics	PO1,PO2,PO4,PO8	L4,L3

CO	PO							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	3	1	3	1	1	1	3
CO2	3	3	1	3	1	1	1	3
CO3	3	3	1	3	1	1	1	3

SEM 4

COURSE NAME: ELECTRICITY, MAGNETISM AND ELECTRONICS

CO1.Explain Gauss law and its applications in Electricity and magnetism

- **Deduce(L5)** the Gauss law and its application to obtain electric field in different cases
- **Develope(L6)** the relationship between electric displacement vector, electric polarization, Susceptibility, Permittivity and Dielectric constant..
- **Summerise** (L2)Biot and Savart's law and Ampere's circuital law to describe and explain the generation of magnetic fields by electrical currents

CO2.Illustrate the applications of electro magnetic induction

- **Distinguish(L4)** between the magnetic effect of electric current and electromagnetic induction and **apply** the related laws in appropriate circumstances
- **Develop(L6)** an understanding on the unification of electric and magnetic fields and Maxwell's equations governing electromagnetic waves. Phenomenon of resonance in LCR AC-circuits, sharpness of resonance, Q- factor, Power factor and the
- **Compare(L5)** of series and parallel resonant circuits

CO3.**Describe and analise basic and digital electronics**

- **Describe(L2)** the operation of p-n junction diodes, zener diodes, light emitting diodes and transistors
- **Analise(L4)** the operation of basic logic gates and universal gates and their truth tables
- **Choose**(L3) the proper logic gates to **construct** required circuit

CO. No.	Upon the successful completion of the course, students will be able to	POs mapped	Cognitive Level
CO - 1	. Explain Gauss law and its applications in Electricity and magnetism	PO1,PO2,PO4,PO8	L2,L5,L6
CO - 2	Illustrate the applications of electro magnetic induction	PO1,PO2,PO4,PO8	L4,,L5,L6
CO - 3	Describe and analise basic and digital electronics	PO1,PO2,PO4,PO8	L2,L3,L4

CO	PO							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	3	1	3	1	1	1	3
CO2	3	3	1	3	1	1	1	3
CO3	3	3	1	3	1	1	1	3

SEM4

COURSE NAME: MODERN PHYSICS

CO1: Develop an understanding on the concepts of Atomic and Modern Physics, basic elementary particles

- **Explain(L4)** on the concepts of Atomic and Modern Physics
- ,**Identify(L3)** the basic properties of nuclei, characteristics of Nuclear forces, salient features of Nuclear models and different nuclear radiation detectors
- **classify(L4)** Elementary particles based on their mass, charge, spin, half life and interaction

CO2**:Develop basic elementary quantum mechanics and nuclear physics**

- . **Develop (L3)** critical concept of Matter waves and Uncertainty principle**.**
- **Analise** (L4) the principles of quantum mechanics and the formulation of Schrodinger wave equation
- **Deduce(L5)** Schrodinger wave equation applications.

CO3: **Familiarise with the nano materials, superconductors and their applications**

- **Summerise(L2)** the preparation of nano materials,
- **Identity(L3)** unique properties of nano materials and their applications
- **Improve(L6)** the practical applications of superconductors

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CO. No.	**Upon the successful completion of the course, students will be able to**	**POs mapped**	**Cognitive Level**
CO - 1	Develop an understanding on the concepts of Atomic and Modern Physics, basic elementary particles	PO1,PO2,PO4,PO8	L3,L4,
CO - 2	Develop basic elementary quantum mechanics and nuclear physics	PO1,PO2,PO4,PO8	L3,L4,L5
CO - 3	Familiarise with the nano materials, superconductors and their applications	PO1,PO2,PO4,PO8	L2,L3,L6

CO	PO							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	3	1	3	1	1	1	3
CO2	3	3	1	3	1	1	1	3
CO3	3	3	1	3	1	1	1	3

SEM 5

COURSE NAME: LOW TEMPERATURE PHYSICS & REFRIGERATION(6B)

CO1: Develop the concepts of low temperature and its applications

- **Develop(L6)** low temperatures in the Laboratory.
- **Explain(L5)** the concept of refrigeration and air conditioning.
- **Classify(L4)** refrigerants based on properties of and their effects on environment

CO2:Understand the concepts of refrigeration and available refrigerents

- **Demonstrate(L2)** skills of Refrigerators through hands on experience
- A**nalise(L4)** different refrigeration components and their accessories working.

CO3:Conclude the applications of Low Temperature Physics and refrigeration

- **List (L1)**the applications of low temperature
- **Explain(L2)** the application of low temperature in different fields

CO. No.	**Upon the successful completion of the course, students will be able to**	**POs mapped**	**Cognitive Level**
CO - 1	Develop the concepts of low temperature and its applications	PO1,PO2,PO4,PO8	L4, L5, L6
CO - 2	Understand the concepts of refrigeration and available refrigerents	PO1,PO2,PO4,PO8	L2,L4
CO - 3	Conclude the applications of Low Temperature Physics and refrigeration	PO1,PO2,PO4,PO8	L1. L2

CO	PO							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	3	1	3	1	1	1	3
CO2	3	3	1	3	1	1	1	3
CO3	3	3	1	3	1	1	1	3

SEM 5

COURSE NAME: Solar Energy and Applications (7B)

CO1: Acquire a critical knowledge in Solar energy and its applications

- **Recall(L1)** Sun structure, forms of energy coming from the Sun
- **Identify(L3)** the methods for the measurement of Solar energy.
- **Explain(L4)** the working of thermal and photovoltaic collectors.

CO2: Demonstrate skills related to solar thermal appliances

- **Construct(L3)** solar thermal appliances through hands on experience.
- **Choose(L5)** the correct testing procedures
- **Analyse(L4)** thermal collectors and PV modules

CO3: Summerise the applications of thermal collectors and PV modules

- **Discuss(L6)** the applications of Solar thermal collectors and PV modules

CO. No.	**Upon the successful completion of the course, students will be able to**	**POs mapped**	**Cognitive Level**
CO - 1	Acquire a critical knowledge in Solar energy and its application	PO1,PO2,PO4,PO8	L1,L3,L4
CO - 2	Demonstrate skills related to solar thermal appliances	PO1,PO2,PO4,PO8	L3,L4,L5
CO - 3	Summerise the applications of thermal collectors and PV modules	PO1,PO2,PO4,PO8	L6

CO	PO							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	3	1	3	1	1	1	3
CO2	3	3	1	3	1	1	1	3
CO3	3	3	1	3	1	1	1	3