

DEPARTMENT OF PHYSICS

B.Sc – Local / National / Regional / Global Developmental Needs 2024 - 2025

Course Code	Course Name	Nature of the Course – Local /National/ Regional/ Global developmental needs	Course Outcomes
1102	B.Sc	Local	PO1: Conceptual and In-depth Knowledge: Students get equipped with the conceptual and in-depth knowledge of the domain subjects. PO2: Analysis and Evaluation Techniques: Students would be able to understand, analyse and evaluate various aspects pragmatically. PO3:Decision making and Entrepreneurial Skills: Students would acquire decision making skills and entrepreneurial abilities. PO4: Communication and Soft Skills: Students would be able to express their thoughts and ideas confidently to impart their knowledge efficiently by making use of the Soft Skills they have learnt. PO5: Life Skills: Students would be able to design appropriate solutions to various problems they may encounter in their personal and professional lives. PO6: Usage of ICT Tools: Students would be able to make use of ICT tools effectively and they would be able to make use of technology to meet the local, regional and national needs. PO7: Eco-friendly and Environment

			sustainability practices: Students would be able to adopt eco-friendly practices for environmental sustainability. PO8: Team Spirit: Student would function effectively as an individual and work with harmony and integrate diverse teams. PO9: Employability Skills and Leadership traits: Student would learn the required Employability Skills and become competent to face the competitive world and can be assured of good careers. PO10: Human values and Professional Ethics: Students would emerge as vibrant, ethical and socially responsible citizens.
1102	Essentials And Applications of Mathematical, Physical and Chemical Sciences, Advances of Mathematical, Physical and Chemical Sciences, Mechanics And Properties Of Matter, Waves And Oscillations	Local	PSO 1: Proficiency in high level Numerical methods: Students would develop proficiency in high level Mathematical methods. They would also acquire Analytical and Logical thinking skills.
	Optics, Heat And Thermodynamics, Electronic Devices And Circuits , Analog And Digital Electronics		PSO2: Knowledge in Experimentation: The students would acquire necessary skills to carry out experiments in order to verify the laws and concepts of Physics.
	Electricity, Magnetism And Electronics, Modern Physics, Introduction To Nuclear And Particle Physics.		PSO3: Problem Solving and Programming Skills: Students would get hands- on experience in various practical aspects. They would also learn problem solving and programming techniques.
1102	Mechanics, Waves And		PSO1: Becomes professionally skilled for

	Oscillations, Wave Optics		higher studies in research institutions and to work in chemical industries.
	Heat And Thermodynamics, Electricity, Magnetism And Electronics, Modern Physics		PSO2: In-depth knowledge helps to qualify in competitive exams.
	Low Temperature Physics & Refrigeration, Solar Energy And Applications	National	PSO3: Gains complete knowledge about all fundamental aspects of Chemistry.
			PSO4: Understands the background of organic reaction mechanisms, complex chemical Structures, and instrumental method of chemical analysis, molecular rearrangements and separation techniques.
			PSO5: Ability to interlink the skills and knowledge in mathematics, physics and chemistry and develop an aptitude to address the problems in various fields.
			PSO6: Analyse the concepts of mathematics, physics and chemistry and understand the relation among them like physical chemistry, mathematical modelling of physics and chemistry problems.
			PSO7: Understand the theoretical concepts of physical and chemical properties of materials and the role of importance.
1102	Mechanics, Waves And Oscillations, Wave Optics		PSO1: To prepare students to excel in postgraduate programs or to succeed in industry/technical profession through global and comprehensive education.
	Heat And Thermodynamics, Electricity, Magnetism And Electronics, Modern Physics		PSO2: To provide students with a solid foundation in scientific and quantitative electronics fundamentals required to solve technical problems and also to pursue higher studies.

	Low Temperature Physics & Refrigeration, Solar Energy And Applications	National	PSO3: To train students with good technical and scientific breadth so as to comprehend, analyze, design and create novel products and solutions for real life problems.
			PSO4: To inculcate in students professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach and an ability to relate Science and engineering issues to broader social context.
			PSO5: To prepare student with an academic environment aware of excellence, leadership, written ethical codes and guidelines and the life-long learning needed for a successful professional career.
	Semester - 1: Course-1 : Essentials And Applications of Mathematical, Physical and Chemical Sciences, Course-2 Advances of Mathematical, Physical and Chemical Sciences,	Local	CO1: To understand basic theories related with properties of matter and its applications to determine values of various physical quantities associated with matter. CO2: Be able to apply knowledge of the properties of matter to explain natural physical processes and related technological advances. CO3: To learn about fundamentals of verbal and mathematical concepts of waves and oscillations CO4: We should make the students to know their skills required to get the information from the syllabus and use them in a proper way.
1102	Semester – II: Course-3: Mechanics And Properties of Matter, Course-4: Waves and Oscillations	Local	Semester - 1: Paper-I : Mechanics and Properties of Matter, Waves & Oscillations CO1: To understand basic theories related with properties of matter and its applications to determine values of various physical quantities associated with matter. CO2: Be able to apply knowledge of the properties of matter to explain natural physical processes and related technological advances. CO3: To learn about fundamentals of verbal and mathematical concepts of waves and oscillations CO4: We should make the students to know

			their skills required to get the information from the syllabus and use them in a proper way.
1102	Semester - III: Course-5: Optics Course-6: Heat And Thermodynamics Course-7: Electronic Devices And Circuits Course-8: Analog And Digital Electronics	Local	Semester - 3: Course 5: Optics CO1: Understand the nature of light and principles of Laser and holography. CO2: Analyse the intensity variation of light due to interference, diffraction and polarization. CO3: Solve problems in Optics by selecting the appropriate equations and performing numerical or analytical calculations. CO4: Student can able to operation of optical devices including polarizers, interferometers, and Lasers. Semester-3: Course 6: Heat and Thermodynamics: CO1: Students will be able to Perform experiments and interpret the results of observation, including making an assessment of experimental uncertainties. CO2: They develop the ability to apply the knowledge acquired in the classroom and laboratories to specific problems in theoretical and experimental Physics. CO3: To apply the theories learnt and the skills acquired to solve real time problems CO4: To understand the concepts and significance of the various physical phenomena. Course-7: Electronic Devices And Circuits: CO1. Understand the behavior of P-N junction diodes in forward and reverse bias conditions and analyze the impact of junction capacitance on diode characteristics. CO2. Analyze and compare the characteristics and operation of different BJT configurations (CB, CE, and CC) and demonstrate proficiency in biasing techniques. CO3. Comprehend the operation and characteristics of FETs, including JFETs and MOSFETs, and explain the working principles and characteristics of UJT. CO4. Describe the operation and applications of various photoelectric devices such as LEDs, photo diodes, phototransistors, and LDRs. CO5. Understand the operation of rectifiers (half-wave, full-wave, and bridge), analyze the ripple factor and efficiency, and demonstrate knowledge of different filter types and three-terminal voltage regulators Course-8: Analog And Digital Electronics :

			CO1.Understand Principles and Working of Operational Amplifier CO2.Apply their knowledge on OP-Amp in different Applications CO3.To understand the number systems, Binary codes and Complements. CO4.To understand the Boolean algebra and simplification of Boolean expressions. CO5.To analyze logic processes and implement logical operations using combinational logic circuits. CO6.To understand the concepts of sequential circuits and to analyze sequential systems in terms of state machines.
1102	Semester-IV: Course-9: Electricity And Magnetism Course-10: Modern Physics Course-11: Introduction To Nuclear And Particle Physics		Semester - 4: Course 9: Electricity, Magnetism: CO1: To learn about Gauss law and solve the electric field and magnetic field for various geometric objects and to learn basic electronic concepts in analog and digital theory. CO2: To be Explain all the topics of Experiments, Concepts and Derivations to the student CO3: Apply the principles of electronics in day to day life. CO4: Encourage all the students to study higher educational courses in reputed institutes and to enrich the students with creative, logical and analytical skills and to motivate the students towards research side. Semester - 4: Course 10 : Modern Physics: CO1: To create awareness on the topics of Atomic & Molecular Physics, Quantum mechanics, Nuclear Physics, and Solid state physics. CO2: To be Explain all the topics of Experiments, Concepts and Derivations to the student. CO3: Explain the basic principles of quantum mechanics and apply to Atomic, Molecular structure of energy levels etc. CO4: Motivate all the students to pursue PG courses in reputed institutes and to endow the students with creative and analytical skills; this will equip them to become entrepreneurs. Course-11: Introduction To Nuclear And Particle Physics: CO1.know about high energy particles and their applications which prepares them for further study and research in elcitrapp physics CO2. Students can explain important concepts on

			nucleon-nucleon interaction, such as its short-range, spin dependence, isospin, and tensors. CO3. Students can show the potential shapes from nucleon nucleon interactions. CO4.Students can explain the single particle model, its strengths, and weaknesses CO5.Students can explain magic numbers based on this model.
	Semester - 5: Paper VI: Low Temperature Physics & Refrigeration	National	Semester - 5: Paper VI: 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.
	Semester - 5: Paper VII: Solar Energy and Applications	National	Semester - 5: Paper VII: 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