

Programme Specific Outcomes (PSO) and Course Outcomes (CO) of Bachelor of Science (Physics) at Rajah Serfoji Government College, Thanjavur-613005, Tamilnadu

B.Sc., Physics

PSO:

PSO - 1: Attain strong foundation in the fundamentals of physics with and ability to pursue higher education and research.

PSO - 2: Formulate, solve and analyze Physics problems.

PSO - 3: Perform laboratory procedures in the core areas of physics as per the laboratory standard norms.

PSO - 4: Skilled in facing competitive examinations for employment and higher education.

Course code/Paper/ Semester	Title	Course Outcomes
S1PH1 Core Paper – 1 I Semester	Properties of Matter and Sound	By the end of the course the students will know about the concepts of elastic nature of a material, the bending of beams and its importances, the surface tension and its applications, the basic concepts of viscosity and its implications, sound, musical and acoustical important waves.
S1PHP1 Core Practical- I I Semester	Major Practical - I	Validate the fundamentals of physics. Verify the theoretical concepts in physics through experiments. Understand the behavior of thermal properties of materials. Understand the validity of basic laws and theories to determine various properties of materials. Understand the application of various experiments in our day to day life.
S2PH2 Core Paper – 2 II Semester	Mechanics	By the end of the course, the student will be able to validate the fundamentals of physics. Verify the theoretical concepts in physics through experiments. Understand the behavior of thermal properties of materials. Understand the validity of basic laws and theories to determine various properties of materials. Understand the application of various experiments in our day to day life. Apply the knowledge of the fundamentals of physics and instrumentation to arrive at a solution for various problems.

S2PHP2 Core Practical- II II Semester	Major Practical - II	Validate the fundamentals of physics. Verify the theoretical concepts in physics through experiments. Understand the behavior of thermal properties of materials. Understand the application of various experiments in our day to day life. Apply the knowledge of the fundamentals of physics and instrumentation to arrive at solution for various problems.
S3PH3 Core Paper – 3 III Semester	Heat and Thermodynamics	Understanding the fundamentals of impulse, impact of bodies. Fundamental concepts of dynamics of body and understanding the conservation of momentum. Learn about gravitational field, center of pressure and gravity. Understanding the concepts of relativity and its significance.
S3PHP3 Core Practical-III III Semester	Major Practical - III	Validate the fundamentals of physics. Verify the theoretical concepts in physics through experiments. Understand the behavior of thermal properties of materials. Understand the application of various experiments in our day to day life. Apply the knowledge of the fundamentals of physics and instrumentation to arrive at a solution for various problems.
S4PH4 Core Paper – 4 IV Semester	Optics	Understand geometrical optics. Get idea of diffraction and interference, Grasp the basics of polarization and Understand the concept of LASER
S4SB2G Skill based Elective II IV Semester	Computer Hardware and Networking	Students can understand various hardware parts and model assembling and networking
S4PHP4 Core Practical-IV IV Semester	Major Practical - IV	Validate the fundamentals of physics. Verify the theoretical concepts in physics through experiments. Understand the behavior of thermal properties of materials. Understand the application of various experiments in our day to day life. Apply the knowledge of the fundamentals of physics and instrumentation to arrive at solution for various problems.
S5PH5 Core Paper – 5 V Semester	Atomic and Solid State Physics	This study forms the basis of material science

S5PHEL1A Elective Course V Semester	Electricity and Magnetism	To know the fundamental laws of electrodynamics.
S5PHEL2A Elective Course V Semester	Basic Electronics	Students can infer knowledge about applications of components in linear electronic circuits
S5PHEL1B Elective Course V Semester	Ultrasonics and its Applications	Students can be exposed to know applications of ultrasonics in biomedical applications
S5PHEL2B Elective Course V Semester	Energy Physics	Students can concentrate on the various sources of energies in energy crisis times.
S5PHEL2C Elective Course V Semester	Materials Synthesis and Characterization	Students can know about the applications of synthesized materials
S5PHEL1C Elective Course V Semester	Laser and Applications	To have the knowledge on practical applications of Laser emissions
S5SB3J Skill Based Elective III V Semester	Mobile Servicing	Students can have hand on training and learn to service the cell phones and its software which are used to the self-employment purposes.
S5PHP5 Core Practical-V V Semester	Major Practical - V	Validate the fundamentals of physics. Verify the theoretical concepts in physics through experiments. Understand the behavior of thermal properties of materials. Understand the validity of basic laws and theories to determine various properties of materials.
S6PH6 Core Paper – 6 VI Semester	Wave Mechanics and Nuclear Physics	Students can know fundamental wave nature of particles in sub atomic levels.
S6PH7 Core Paper – 7 VI Semester	Digital Electronics	Students can infer the digital operations of electronic circuits.
S6PHEL3A Elective Course VI Semester	Microprocessor and C Programming	Students can know various functions of computers using programming languages.
S6PHEL3B Elective Course VI Semester	X-Ray Crystallography and Biophysics	Students can infer about the fundamentals of crystallography and biomolecules

<p>S6PHEL3C Elective Course VI Semester</p>	<p>Principles of Communication Systems</p>	<p>Students can infer basic ideas about wireless communication systems</p>
<p>S6PHP6 Core Practical- VI VI Semester</p>	<p>Major Practical - VI</p>	<p>Validate the fundamentals of physics. Verify the theoretical concepts in physics through experiments. Understand the behavior of thermal properties of materials. Understand the validity of basic laws and theories to determine various properties of materials. Understand the application of various experiments in our day to day life. Apply the knowledge of the fundamentals of physics and instrumentation to arrive at a solution for various problems.</p>

**Programme Specific Outcomes (PSO) and Course Outcomes (CO) of Master of Science
(Physics) at Rajah Serfoji Government College, Thanjavur-613005, Tamilnadu**

M.Sc., Physics

PSO:

PSO - 1: Identify and associate the fundamental and advanced concepts, principles and processes of physical phenomena in various branches starting from classical mechanics to quantum mechanics and extended to electrodynamics, statistical mechanics, atomic, molecular and solid-state physics, nanomaterials and electronic science.

PSO - 2: Demonstrate mathematical, statistical, computational and experimental techniques in problem solving.

PSO - 3: Execute laboratory oriented numerical calculations and experimental data interpretation and project work independently.

PSO - 4: Formulate and analyze physics concepts, effective presentation and communication skills through seminars and group discussions.

PSO - 5: Attain the skill of research article writing along with detailed presentation and effective communication.

PSO - 6: Writing an review of research papers, books for publications in journals.

PSO - 7: Design and carry out projects in basic, applied and interdisciplinary science to acquire conceptual understanding and a focus towards research.


Course code/Paper/ Semester	Title	Course Outcomes
S1PPH1 Core Paper 1 I Semester	Mathematical Physics - I	Acquire Knowledge of vector calculus for application to problems in Electromagnetic theory, Fluid dynamics etc. Basics of Tensors and its applications. Knowledge of Matrix theory. Understand the use of complex variables for solving definite integrals. Obtain the knowledge of Fourier and Laplace transforms. Expertise of special functions and their application in Initial value problems and Boundary value problems.
S1PPH2 Core Paper 2 I Semester	Classical Dynamics	Acquire fundamental knowledge of classical dynamics. Use D'Alembert's principle to derive the Lagrange equations of motion. Understand theory of small oscillations in normal modes and their frequencies. Understand the Lagrangian and Hamiltonian methods. Gain the knowledge of relativity and its consequence
S1PPH3 Core Paper 3 I Semester	Electromagnetic Theory	Get idea of how electrostatics and magnetostatics. Understand the meaning of Maxwell equations. Understand how EM waves propagate in different media. Understand how antenna works

<p>S1PPHEL1A Elective Course I Semester</p>	<p>Communication Electronics</p>	<p>Explain the operation of VHF,UHF and microwave antenna. Understand the principle of microwave propagation and its applications. Demonstrate the working principle, design and applications of colour television. Understand the concepts of fiber fabrications. Understand the role of transmitter and receiver in satellite Communication networks. Study of basics of cellular communications.</p>
<p>S1PPHEL1B Elective Course I Semester</p>	<p>Bioelectronics and Biosensors</p>	<p>Get idea of biological systems. Understand how modern sensor and devices work</p>
<p>S1PPHEL1C Elective Course I Semester</p>	<p>Space Science</p>	<p>Get the knowledge of earth atmosphere and magnetosphere. Understand different activity of sun. Get idea of Star formation. Understand the structure and dynamics of universe</p>
<p>S1PPHP1 Core Practical I Semester</p>	<p>Physics Practical - I</p>	<p>Understand the properties of materials Explain the various semiconducting devices</p>
<p>S2PPH4 Core Paper 4 II Semester</p>	<p>Quantum Mechanics</p>	<p>Understand the fundamental concepts of quantum mechanics. Understand the importance Schrodinger equation and their simple applications. Understand approximation methods like time independent degenerate, non-degenerate Perturbation theories, variation methods etc. Study scattering theory and calculate scattering amplitude and cross section. Understand the basic ideas of Clebsch-Gorden coefficients. Understand the basics of relativistic quantum mechanics and its wide ramifications.</p>
<p>S2PPH5 Core Paper 5 II Semester</p>	<p>Mathematical Physic - II</p>	<p>Acquire Knowledge of complex variable. understand Fourier and Laplace equations, solve DE. Understand the use of green function in solving PDE. Acquire knowledge of probability basics. Knowledge of group theory and its application to spectroscopy and Nuclear Physics. Acquisition of relevant mathematical skills to predict the dynamics of physical systems.</p>

<p>S2PPH6 Core Paper 6 II Semester</p>	<p>Solid State Physics</p>	<p>Able to correlate the X-ray diffraction pattern for a given crystal structure based on the corresponding reciprocal lattice and understand the types of crystalline imperfections. To enhance the ability of students to understand electron and band theories. Able to explain how the predicted electronic properties of solids differ in the classical free electron theory, quantum free electron theory and the nearly free electron theory. To explain various magnetic phenomena and describe the different types of magnetic ordering based on the exchange interaction. Acquisition of knowledge concerning the electrical behavior of dielectric materials (polar and non-polar). Explain the structural dependence of electrical, optical and mechanical properties of modern engineering materials.</p>
<p>S2PPHEL2A Elective Course II Semester</p>	<p>Microprocessor and Microcontroller</p>	<p>Understand the basic ideas of operational amplifier and its applications. Acquire knowledge of microprocessor 8085, 8086 and microcontroller 8051. Gain knowledge about interfacing devices. Learn and write the assembly language programs. Apply the circuit theory to design sequential logic circuits. Construction of ALU as a midway to build a digital computer.</p>
<p>S2PPHEL2B Elective Course II Semester</p>	<p>Opto Electronics</p>	<p>Get knowledge of opto electronic devices.</p>
<p>S2PPHEL2C Elective Course II Semester</p>	<p>Analytical Instrumentation</p>	<p>Understand function of various analytical instruments for research</p>
<p>S2PPHP2 Core Practical – 2 II Semester</p>	<p>Physics Practical – II Advanced General Experiments</p>	<p>Understand the properties of materials and explain the various semiconducting devices.</p>
<p>S3PPH7 Core Paper 7 III Semester</p>	<p>Statistical Mechanics</p>	<p>Understand the laws of thermodynamics and give an account of the relevant quantities used to describe the macroscopic system, thermodynamic potentials etc. Describe the Reciprocity theorem, Thermodynamic Equilibrium and Nernst Heat theorem. Give an account of kinetic theory of gases.</p>

<p>S3PPH8 Core Paper 8 III Semester</p>	<p>Spectroscopy</p>	<p>Analyze IR spectra and apply the instrumentation techniques in recording Infrared (IR) spectrum. Comprehend the basics and importance of Raman spectroscopy and also able to extend the concepts of electronic spectroscopy to UV – visible analysis. Identify the appropriate spectral technique as an analytical tool to investigate the characteristics of materials. Understand resonance spectroscopy. Get Idea of Applications of resonance spectroscopy</p>
<p>S3PPH9 Core Paper 9 III Semester</p>	<p>Nuclear and Particle Physics</p>	<p>Understand the fundamentals of nuclear properties and deuterons. Illustrate the radioactive processes and their corresponding decay. Realize the importance of nuclear energy resources through various nuclear reactions. Understand the knowledge of elementary particles. Acquire a thorough knowledge on fission and fusion reactions for production of energy as well as weapons.</p>
<p>S3PPHEL3A Elective Course III Semester</p>	<p>Thin Film Physics</p>	<p>Understand the growth of thin film. Synthesis of thin film using simple and vacuum technology. Know the high-level thin film preparation techniques. Characterize the thin film growth</p>
<p>S3PPHEL3B Elective Course III Semester</p>	<p>Computational Physics</p>	<p>Students can infer various analytical and computational methods to solve the physical problems.</p>
<p>S3PPHEL3C Elective Course III Semester</p>	<p>Signal Processing</p>	<p>Students can infer the signal processing for transfer of data.</p>
<p>S3PPHP3 Core Practical- 3 III Semester</p>	<p>Physics Practical - III</p>	<p>Learners getting analyzing skill in microelectronics applications and C-programming</p>
<p>S4PPH10 Core Paper 10 IV Semester</p>	<p>Theoretical Physics</p>	<p>Get knowledge of solar systems, comet and galaxies. Understand evolutions of stars. Get idea of theories of universe. Get idea to apply computer in deterministic and stochastic systems. Study nonlinear behavior. Apply QM to</p>

		fields
S4PPHPW Project Work IV Semester	Project Work	This will bring out innovative ideas from the students
S4PPHEL4A Elective Course IV Semester	Applied Physics	Get idea of different renewable energy . Get idea of how solar cell works. Understand rocket and satellite systems. Apply physics to biological systems. Study phenomena of plasma.
S4PPHEL4C Elective Course IV Semester	High Energy Physics	The familiarization in validation of fundamental laws in sub atomic particles will lead the students for technology developments
S4PPHEL5B Elective Course IV Semester	Robotics	The outcome of these will bring out the students about the basic ideas about mechanization.
S4PPHEL5C Elective Course IV Semester	Nonlinear Optics	Understand the nonlinear optics. Applying the principle of nonlinear optics in various applications.
S4PPHEL5A Elective Course IV Semester	Materials Science	By having the knowledge about the science of materials the students can analyze the materials and their properties and applications.
S4PPHP4 Core Practical 4 IV Semester	Physics Practical - IV	Learners getting analyzing skill in microelectronics applications and C-programming


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