CAUSSANEL COLLEGE OF ARTS AND SCIENCE

(Affiliated to Alagappa University, Karaikudi)

Accredited with 'A' Grade by NAAC

Recognized by UGC under 2(f) & 12(B)

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OUTCOME OF THE DEPARTMENT

Type of Graduation	Under Graduation & Post Graduation
Programme Name	M.Sc PHYSICS
Regulation (CBCS)	2017

Outcome of the Programme

- To understand the basic laws and explore the fundamental concepts of physics
- To understand the concepts and significance of the various physical phenomena.
- To carry out experiments to understand the laws and concepts of Physics.
- To apply the theories learnt and the skills acquired to solve real time problems.
- To acquire a wide range of problem solving skills, both analytical and technicaland to apply them.
- To enhance the student's academic abilities, personal qualities and transferable skills this will give them an opportunity to develop as responsible citizens.
- To produce graduates who excel in the competencies and values required for leadership to serve a rapidly evolving global community
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- To motivate the students to pursue PG courses in reputed institutions.
- This course introduces students to the methods of experimental physics. Emphasis will be given on laboratory techniques specially the importance of accuracy of measurements

Specific Outcome of the Programme

- Would learn use of mathematical tools in solving complex physical problems and have the solid background and experience required to model, analyze, and solve advanced problems in physics.
- Would able to apply advanced theoretical and/or experimental methods, including the use of numerical methods and simulations.

- This course would empower the student to acquire scientific and engineering skills and the required practical knowledge by performing experiments in general physics and electronics.
- Would also get some research oriented experience by doing theoretical and experimental projects in the last semester under the supervision of faculty.
- The course as a whole opens up several career doors for the students interested in various areas of science and technology in private, public and government sectors.
- Students may get job opportunities in higher education, research organizations, physics consultancy, radiology, radiation oncology and many others. Some of the institutions where physics students can start their carrier are: BARC, DRDO, NPTC, IISc, ISRO, ONGC, BHEL, PRL, NPL, SINP, VECC, IITs, NITs, IIPR etc.

Sem	Subject Code	Subject Title	Outcome	Specific Outcome
I	**7MPH1C1**	**MATHEMATICAL PHYSICS-I**	Problem Solving. Find the scalar and vector quantity of physical variables. Learn about Gradient, Divergence and Curl in orthogonal curvilinear and their typical applications in physics. Learn about special type of matrices that are relevant in physics and then learn about tensors.	To measures angles and distance between the panels in the satellite. Learn different ways of solving second order differential equations and familiarized with singular points and Frobenius method. Learn the fundamentals and applications of Fourier series, Fourier

				and Laplace transforms, their inverse transforms etc.
I	**7MPH1C2**	**CLASSICAL DYNAMICS AND RELATIVITY**	To understand the classical background of Quantum mechanics and get familiarized with Poisson brackets and Hamilton -Jacobi equation Learn the behaviour of physical systems and predictions of quantum mechanics have been verified experimentally and extremely high degree of occuracy	To understand the Lagrangian and Hamiltonian approaches in classical mechanics. Understand the negative result of michelson morley experiment, galilean and Lorentz transformation
I	**7MPH1C3**	**QUANTUM MECHANICS - I**	Linear vector spaces, Hilbert space, concepts of basis and operators and bra and ket notation. Theory of angular momentum and spin matrices, orbital angular momentum and Clebsh Gordan Coefficient. Space-time symmetries and conservation laws, theory of identical particles.	Both schrodinger and Heisenberg formulations of time development and their applications Theory of scattering and calculation of scattering cross section, optical theorem, Born approximation, partial wave analysis etc.
I	**7MPHE1B**	**CRYSTAL GROWTH PROCESSES AND CHARACTERIZATION**	An idea about all types of crystal defects and dislocations. Information about Phase diagrams and general diffusion theory in detail	State of the art facts and techniques of the synthesis and characterization of nano materials.

II	**7MPH2C1**	**SOLID STATE PHYSICS**	Have a basic knowledge of crystal systems and spatial symmetries - be able to account for how crystalline materials are studied using diffraction, including concepts like reciprocal lattice and Brillouin zones. Know what phonons are, and be able to perform estimates of their dispersive and thermal properties, be able to calculate thermal and electrical properties in the free-electron model.	Know Bloch's theorem and what energy bands are and know the fundamental principles of semiconductors Know the fundamentals of dielectric and ferroelectric properties of materials Know basic models of dia, para and ferro magnetism Be able to explain superconductivity using BCS theory
II	**7MPH2C2**	**MATHEMATICAL PHYSICS - II**	Approximation methods for time-independent problems like the WKB approximation. The variational equation and its application to ground state of the hydrogen and Helium atom Perturbation theory and Interaction of an atom with the electromagnetic field	Relativistic Quantum Mechanics using Dirac equation, Dirac matrices, The Klein Gordon equation, etc. Second quantization of the Schrödinger wave field for bosons and fermions.
II	**7MPH2C3**	**ELECTROMAGNETIC THEORY**	Have gained a clear understanding of Maxwell's equations and electromagnetic boundary conditions. Have grasped the idea of electromagnetic wave propagation through wave guides and transmission lines. Have grasped the idea of electromagnetic wave propagation through wave guides and transmission	Know that laws of reflection, refraction are outcomes of electromagnetic boundary conditions. They will also be able design dielectric coatings which act like antireflection coatings. They will be able to distinguish between a good metal and a good dielectric.

			lines.	
II	**7MPH2C4**	**QUANTUM MECHANICS - II**	Approximation methods for time-independent problems like the WKB approximation. The variational equation and its application to ground state of the hydrogen and Helium atom. Perturbation theory and Interaction of an atom with the electromagnetic field.	Relativistic Quantum Mechanics using Dirac equation, Dirac matrices. The Klein Gordon equation, etc. Second quantization of the Schrödinger wave field for bosons and fermions.
III	**7MPH3C1**	**ATOMIC AND MOLECULAR PHYSICS**	Know about different atom model and will be able to differentiate different atomic systems, different coupling schemes and their interactions with magnetic and electric fields. Have gained ability to apply the techniques of microwave and infrared spectroscopy to elucidate the structure of molecules.	Be able to apply the principle of Raman spectroscopy and its applications in the different field of science & Technology. To become familiar with different resonance spectroscopic techniques and its applications. To find solutions to problems related different spectroscopic systems.
III	**7MPH3C2**	**NUCLEAR AND PARTICLE PHYSICS**	Have a basic knowledge of nuclear size, shape, binding energy, etc and also the characteristics of nuclear force in detail. Be able to gain knowledge about various nuclear models and potentials associated. Acquire knowledge about nuclear decay processes and their outcomes.	Grasp knowledge about Nuclear reactions, Fission and Fusion and their characteristics. Understand the basic forces in nature and classification of particles and study in detail conservations laws and quark models in detail.

			Have a wide understanding regarding beta and gamma decay.	
III	**7MPH3C3**	**ADVANCED ELECTRONICS**	Field Effect Transistors, their principles and applications Photonic devices like LED, Laser diode, photo detectors, solar cells etc and their working in Detail. Basic operational amplifier characteristics, OP-AMP parameters, applications as inverter, integrator, differentiator etc	Digital electronics basics using logic gates and working of major digital devices like flip flops, CMOS, CCD etc
III	**7MPHE2B**	**MODERN OPTICS AND LASER PHYSICS**	Understand the basic principle of laser and characteristics Understand the theory of Young's experiment, Michelson Interferometer, etc. Perform the procedures into applications oriented one	To Understand the basic concepts of fourier optics and holography. Understand the applications part of optical fibre into communications systems.
IV	**7MPHE2B**	**NANO SCIENCE**	Understand the introduction of nanotechnology Understand the carbon nano tubes Understand the fabrication methods	Perform the procedures into applications of characterization Understand the applications of nano devices

IV	**7MPHE4A**	**THERMODYNAMICS AND STATISTICAL PHYSICS**	Explain statistical physics and thermodynamics as logical consequences of the postulates of Statistical mechanics. Apply the principles of statistical mechanics to selected problems Grasp the basis of ensemble approach in statistical mechanics to a range of situations	To learn the fundamental differences between classical and quantum statistics and learn about quantum statistical distribution laws. Study important examples of ideal Bose systems and Fermi systems.
IV	**7MPHE5A**	**ENERGY AND ENVIRONMENTAL PHYSICS**	Understand how physical principles influence energy use. Assess and interpret graphs and quantitative data. Understand the process by which science generates knowledge. .	The students are going to be able to describe and explain the origins of global effects on the environment caused by human activities, the physical basis for the exploitation of various energy sources, and make assessments on different energy technologies (potential, pros and cons).