Department of Physics

Sri GVG Visalakshi College for Women, (Autonomous)
Affiliated to Bharathiar University
Re- Accredited at A^+ Grade by NAAC (Fourth Cycle)
An ISO 9001:2015 Certified Institution
Udumalpet - 642128, Tamilnadu

Programme Outcomes

On completion of B.Sc. Physics, students will able to

PO 1 : Acquire systematic understanding of the concepts and applications of various disciplines of Physics and its linkages with related subjects.

PO 2 : Promote experiential learning through an integrated approach of theory with Experiments

PO 3 : Develop skill in solving the problems systematically and draw logical conclusions.

PO 4 : Expose and develop technical, analytical and creative skills.

PO 5 : Promote and uphold Self-Discipline, Leadership Qualities, Secular Outlook, National Integration and Civic Responsibility.

PO 6 : Augment the Acquisition of Micro and Macro Skills of Tamil, Malayalam, Hindi and French Language Usages.

PO 7 :Enhance Communicative Linguistic Competency and Employability Quotient.

PO 8 : Exhibit consistent academic excellence and integrated personality towards lifelong learning

Programme Specific Outcomes:

PSO 1: To develop scientific reasoning skills and enhance mastery of the subject

PSO 2: To develop skill in handling and calibrating the equipments and to adopt good laboratory practices

PSO 3: To develop investigative research skill and independent / collaborative learning skills through interdisciplinary research work and field work.

UG Physics - Course details for the academic year 2021-2022

Semester	Course Code	Name of the course
I	121P01	Properties of Matter and Sound
II	221P02	Heat and Thermodynamics
	221P03	Physical and Laser optics
	221PP1	Core Practical I
III	317P04	Atomic and Solid state Physics
	317NSE	Non Major Elective - Science in Everyday Life
	320PS1	SEC I Professional English
IV	418P05	Core V- Classical Mechanics and Mathematical Physics
	417PP2	Core Practical II
	420PS2	SEC II- Instrumentation Physics I
	417ALP	ALC I Space Physics
V	517P06	Core VI Electronic Devices and Circuits
	517P07	Core VII- Nano Sciences (517P07)
	517PP3	Core Practical III
	517PE1	Elective I Scilab (T&P)
	517PE2	Elective I Atmospheric Science (517PE2)
	517PE3	Elective II Project and Viva-voce (517PE3)
	517PS3	SEC III -Electronic Instrumentation
VI	617P08	Core VIII Electricity and Magnetism
	617P09	Core IX Quantum Mechanics and Relativity
	617P10	Core X Digital Electronics and Microprocessors
	617PP4	Core Practical IV
	617PE4	Elective III Computational Physics using C Programming

	617PE5	Elective III Computational Physics using MATLAB Programming
	617PE6	Elective Practical - Computational Physics using C Programming
	617PE7	Elective Practical - Computational Physics using MATLAB Programming
	617PS4	Part IV – Skill Enhancement Course- IV Institutional Training
	617ALP	Advanced Learners course II Energy Physics
I	121AM1/ 121AC1	Allied I Physics I for Mathematics & Chemistry
II	221AM3/ 221AC2	Allied II Physics II for Mathematics & Chemistry
II	221AMP / 221ACP	Allied Physics Practicals

Semester I & II

Core I Properties of Matter and Sound (121P01)

CO	Statement	BTL
CO 1	Describe the methods of determination of 'G' & 'g' and solve related problems	**A**
CO 2	Discuss the elastic properties of matter and solve the problems of elastic constants of materials	**A**
ÇO 3	Describe the methods of determination of viscosity of liquids and solve the problems involved in it	**A**
CO4	Explain surface tension of fluids, Determination, correlate the property with different natural phenomena and solve the problems	**A**
CO 5	Discuss the concept of waves, origin of sound, velocities of sound and it's variation with various physical parameters	**U**
CO 6	Explain the vibration of sound and acoustics of buildings.	**U**

Core II Heat and Thermodynamics (221P02)

CO 1	Explain the behavior and kinetic theory of gases and solve the problems	**A**
CO 2	Discuss heat transport phenomena in gases and heat effect on the mechanical systems	**U**
ÇO 3	State the thermo dynamical laws, the disorder associated with the universal systems and find the solution for the problems of thermodynamical systems	**A**
CO 4	Deduce thermo dynamical scale of temperature, Maxwell's thermodynamical relations, entropy and solve the problems	**A**
CO 5	Explain the statistical distribution of particles in the thermo dynamical systems	**U**

Core III Physical and Laser Optics (221P03)		
CO 1	Explain the types of aberration in lenses, the methods of rectification and solve the problems using it	**A**
CO 2	Describe the concept of interference, design and working of interferometer and its applications for the determination of wavelength	**A**
ÇO 3	Explain the concept and theory of diffraction and polarization of light and solve the related problems	**A**
CO 4	Discuss the principle, Characteristics and population inversion of Lasers.	**U**
CO 5	Distinguish different types of Lasers and its operation and applications.	**U**
Core Practical I (221PP1)		
CO 1	Determine the acceleration due to gravity at a place using compound pendulum	**An**
CO 2	Determine the elastic constants of the materials and analyse the results	**An**
CO 3	Determine the optical parameters using optical sources and lasers and interpret the results.	**An**
CO 4	Determine of viscosity and surface tension of liquids by appropriate methods and interpret the results	**An**
CO 5	Verify the laws of vibrations of the stretched string and calculate frequencies of the tuning fork and ac frequency	**An**
CO 6	Determine the thermal properties of solids and liquids	**An**
Semester III & IV		
Core IV - Atomic and Solid state Physics (317P04)		
CO 1	Describe vector atom model, fine structure and explain the magnetic splitting of spectral lines.	**R**
CO 2	Gain knowledge in the generation of Positive rays, X-rays and X-ray spectra.	**U**
CO 3	Relate crystalline structure to X-ray diffraction data and the reciprocal lattice.	**A**
CO 4	Discuss the properties of super conducting materials	**A**
CO 5	Distinguish magnetic materials and its related theories	**U**
CO 6	Assimilate knowledge in the magnetic and dielectric behavior of the materials.	**U**
CO 7	Outline the importance of solid state physics in the modern society.	**U**
CO 8	Solve problems relating to Zeeman effect, Vector atom model, X rays	**A**
Part IV - Non Major Elective - Science in Everyday Life (317NSE)		
CO 1	Recognize the significance of Health and life sciences	**R**
CO 2	Relate everyday life with science	**A**
ÇO 3	Discuss the applications of earth sciences and physical sciences in everyday life	**U**
CO 4	Express the knowledge of life sciences and general sciences in the day to day events.	**U**
Part IV –Skill Enhancement Course I -Professional English for Physics (320PS1)		

CO 1	Recognise their own ability to improve their own competence in using the language	**U**
CO 2	Use language for speaking with confidence in an intelligible and acceptable manner	**U**
CO 3	Read independently unfamiliar texts with comprehension	**U**
CO 4	Write simple sentences without committing error of spelling or grammar	**U**
Core V- Classical Mechanics and Mathematical Physics (418P05)		
CO 1	Explain Gauss divergence theorem, Stokes theorem and Green's theorem and its applications to solve Physics problems	**U**
CO 2	Write gradient, divergence, curl and Laplacian in different co- ordinate systems.	**A**
ÇO 3	Describe Lagrangian and Hamiltonian and D'Alembert's Principle	**U**
CO 4	Solve the problems for different physical systems under Classical Mechanics.	**A**
CO 5	Obtain the solution for the problems involving differentiation, integration and simultaneous algebraic equations numerically.	**U**
CO 6	Discuss the need for finding approximate solution by using numerical methods and able to assess the reliability of the solution	**A**
Core Practical II (417PP2)		
CO 1	Calibrate the given electrical meters using appropriate circuit components, record the data, draw the calibration graph and interpret the results.	**An**
CO 2	Determine the optical parameters using optical sources and interpret the results.	**An**
CO 3	Construct an electrical circuit, perform the experiments and determine the electrical parameters	**An**
ÇO 4	Determine the moment of the magnet and the magnetic flux density using magnetometer	**An**
Part IV Skill Enhancement Course II -Instrumentation Physics –I (420PS2)		
CO 1	Discuss the characteristics of instruments and measurement systems	**A**
CO 2	Measure the mechanical parameters and interpret the instrumental and measurement errors	**An**
ÇO 3	Describe the types of thermometers of different ranges and study the variation of resistance with temperature	**A**
CO 4	Perform the measurements using Microscope, telescope and Spectrometer	**A**
Advanced Learners Course I Space Physics (417ALP)		
CO 1	Derive the expression for escape velocity and explain artificial satellites, Geostationary, polar orbits.	**U**
CO 2	Discuss about the various satellite probes and planets	**U**
ÇO 3	Explain the working concept of Indian launch vehicles.	**U**
CO 4	Elaborate the uses of Indian launch vehicles for various applications.	**U**
Semester V		
Part III Core VI Electronic Devices and Circuits (517P06)		

CO 1	Recollect the basics of diodes and discuss current voltage Characteristics.	**R**
CO 2	Explain the working principle of diodes, rectifiers, transistors and op-amp	**U**
ÇO 3	Draw the circuit diagrams to explain the function of diodes,transistors and op-amp	**U**
CO 4	Discuss the applications of diodes, rectifiers, transistors and op-amp	**U**
CO 5	Construct amplifiers, Oscillators and wave shaping circuits using electronic components and equipments.	**A**
CO 6	Apply theoretical knowledge to solve problems involving electronic circuits	**A**
Core VII- Nano Sciences (517P07)		
CO 1	Explain the fundamental aspects of Nano science.	**U**
CO 2	Discuss the classification and properties Nano materials.	**U**
ÇO 3	Describe the methods of synthesis of nano structures.	**U**
CO 4	Explain the instruments used for characterization of nano structures.	**U**
CO 5	Discuss the applications of nano materials and nano structures	**A**
CO 6	Discuss a recent developments in Nanoscience and Nanotechnology	**A**
Core Practical III (517PP3)		
CO 1	Determine the optical parameters using optical sources and lasers and interpret the results.	**A**
CO 2	Calculate the absolute value of capacity and the high resistance using BG	**Ev**
CO 3	Determine the band gap energy, dielectric constant, Planck's constant, magnetic properties and compressibility using appropriate devices and analyze the results	**An**
ÇO 4	Study the characteristics of FET, differentiating, integrating, clipping and clamping circuits and give scientific reasoning for the results	**Ev**
CO 5	Construct voltage doubler, rectifiers, amplifiers and oscillators using transistors, operational amplifiers and electronic components, record the data and analyze the results .	**An**
CO 6	Synthesize nano particles and deposit thin films using appropriate techniques and instruments .	**An**
Elective I Scilab (T&P) (517PE1)		
CO 1	Explain about the main features of SCILAB environment	**U**
CO 2	Explain Scilab data types, graphics and its Programming structures	**U**
ÇO 3	Apply working knowledge of Scilab to solve Physics problems and to the electrical circuits in Physics	**A**
CO 4	Solve and simulate the electrical circuits in Scicos environment	**A**
CO 5	Realize the importance of the course and evaluate, analyse and present the results	**A**
CO 6	Identify the errors and predict the output of the program	**A**
Elective I Atmospheric Science (517PE2)		
CO 1	Explain the composition and structure of the atmosphere.	**R**

CO 2	Apply natural sciences to investigate and understand atmospheric phenomena.	**U**
CO 3	Describe the atmospheric general circulation and the basic principles of physical and applied climatology and climate change.	**U**
CO 4	Use and interpret weather charts, maps, and diagrams.	**U**
CO 5	Diagnose and forecast synoptic and mesoscale weather phenomena.	**U**
CO 6	Comprehend the underlying physical principles and measurement of meteorological variables and the operating principles and performance characteristics of instruments used to make those measurements.	**A**
Elective II Project and Viva-voce (517PE3)		
CO 1	Develop the skill of identifying an area for Project work at micro level.	**U**
CO 2	Choose appropriate equipments for their project	**U**
CO 3	Acquire skill of handling equipments used for Project in an effective way	**A**
CO 4	Analyse and interpret the results of their work	**A**
CO 5	Write a report and present it with suitable figures, graphs, circuit diagrams, photos etc.	**A**
CO 6	Work confidently and behave with high ethical standards, team spirit and integrity	**A**
Part IV Skill Enhancement Course III –Electronic Instrumentation (517PS3)		
CO 1	Explain CRO for its design, operation and application	**U**
CO 2	Sketch A/D acquisition systems and discuss its applications	**U**
ÇO 3	Describe data converters and computer controlled instrumentation systems.	**U**
CO 4	Handle the equipments CRO, AFO and test for its performance and to test ICs, diodes and resistors for its functioning	**A**
Semester VI		
Core VIII Electricity and Magnetism (617P08)		
CO 1	Recollect the basic concepts in electricity, magnetism, circuit parameters	**R**
CO 2	Explain Coulombs law and Gauss law of electrostatics and its applications	**U**
ÇO 3	Discuss the types of capacitor and energy stored in the capacitor	**U**
CO 4	Explain the concept of magnetic field due to steady current	**U**
CO 5	Demonstrate the principle of electromagnetic induction, measurement of inductance and its applications	**U**
CO 6	Sketch the DC and AC circuits, explain its operation and solve problem related to it.	**A**
CO 7	Use appropriate concepts and equations to solve problems in electricity and magnetism.	**A**
CO 8	Develop an Understand of network theorems and apply the concepts of nodes, branches and network theorems to solve circuit problems.	**A**
Core IX Quantum Mechanics and Relativity		
CO 1	Explain the main aspects of the historical development of quantum	**U**

	mechanics and be able to interpret the experiments that reveal the wave properties of matter, as well as replacement of classical mechanics equation to a wave equation.	
CO 2	Express the central concepts and principles in quantum mechanics, such as the Schrödinger equation, the wave function and its interpretation.	**U**
CO 3	Explain the uncertainty principle and the elementary concepts in statistics, such as expectation values and variance.	**U**
CO 4	Solve the Schrödinger equation for simple systems and be able to use these solutions to calculate expectation values and uncertainties with their physical interpretations.	**A**
CO 5	Apply quantum concepts in solving the problems in wave mechanics and operators.	**A**
CO 6	Establish the non-existence of the hypothesized stationary ether through the results of Michelson-Morley experiment with interferometer.	**U**
CO 7	Explain the true nature of Newtonian mechanics and Lorentz Transformation equations to understand the concept of constant relative motion of different bodies in different frames of references.	**U**
Core X Digital Electronics and Microprocessors (617P10)		
CO 1	Develop a digital logic and apply it to solve real life problems.	**R**
CO 2	Design, implement and analyse sequential logic circuits.	**U**
ÇO 3	Explain step by step industrial method of IC Fabrication	**R**
CO 4	Discuss the fundamentals and areas of applications for the integrated circuits.	**U**
CO 5	distinguish Semiconductor Memories such as RAM, ROM and magnetic memories	**U**
CO 6	Apply the fundamentals of assembly level Programming of Microprocessors	**A**
CO 7	Demonstrate the ability to design practical circuits that perform the desired operations.	**A**
Core Practical IV (617PP4)		
CO 1	Use optical sources and lasers to study the optical parameters, record the data and interpret the results.	**A**
CO 2	Draw the electrical circuit, select the appropriate meters, perform the experiments, record and interpret the results	**A**
CO 3	Determine the physical constants such as Stefan's constant, dielectric constant, e/m of an electron using appropriate devices and analyse the results	**A**
ÇO 4	Construct the logic circuits using appropriate IC's to verify gates, Universal building block, flip flops, De-Morgans theorem, counters and verify the output.	**A**
CO 5	Write assembly language program execute it for its output using microprocessor 8085.	**A**
Elective III Computational Physics using C Programming (617PE4)		
CO 1	Describe the basic features of C programming	**U**
CO 2	Explain the format of the branching and looping structures in C programming.	**U**

ÇO 3	Implement operations on arrays	**U**
CO 4	Handle character arrays and strings in c	**A**
CO 5	Write program using user-defined functions and arrays	**A**
CO 6	Write C code for a given problem	**A**
Elective III Computational Physics using MATLAB Programming (617PE5)		
CO 1	Describe the main features of the MATLAB windows	**R**
CO 2	Explain operators, data types and other salient features of MATLAB.	**U**
ÇO 3	Distinguish function file and script files	**U**
CO 4	Use conditional statements and loop structures of MATLAB for coding	**A**
CO 5	Apply plot functions for formatting two dimensional plots	**A**
CO 6	Write simple programs in MATLAB to solve scientific and mathematical problems	**A**
Elective Practical - Computational Physics using C Programming (617PE6)		
CO 1	Write algorithm and C code for Physics problems, execute it and analyze for its output	**A**
CO 2	Write C program for problem based on numerical analysis and mathematical concepts, execute it for its output.	**A**
ÇO 3	Write C program by using characters, arrays and execute it for its output.	**A**
Elective Practical - Computational Physics using MATLAB Programming (617PE7)		
CO 1	Write MATLAB code for physics problems involving physical, electrical and mechanical properties, execute it and analyze its output	**A**
CO 2	Write MATLAB code for the problems electricity and electronics, execute it for its output	**A**
ÇO 3	Write MATLAB code for problems using numerical methods, execute it for its output	**A**
Part IV – Skill Enhancement Course- IV Institutional Training (617PS4)		
CO 1	gain knowledge about the availability of testing methods and calibration techniques.	**R**
CO 2	familiarize about the equipments and will be able to handle them with care during the programme as well as in future.	**U**
ÇO 3	acquire an Understand about the parametric measurements and the need to conduct the testing for the purpose.	**U**
CO 4	interpret on the results obtained by conducting the analysis in-depth and thus generating an awareness about validity and performance of the equipments	**A**
CO 5	Write a Report and present it with suitable figures, graphs, tabulations etc	**A**
CO 6	Work confidently and behave with high ethical standards, team spirit and integrity,	**A**
Advanced Learners course II Energy Physics (617ALP)		
CO 1	Describe the environmental aspects of non-conventional energy resources in comparison with various conventional energy systems, their prospects and limitations.	**R**

CO 2	Discuss the need for renewable energy resources and the latest developments in the field.	**R**
ÇO 3	Describe the use of solar energy and the various components used in the energy production with respect to applications like - heating, cooling, power generation etc.	**R**
CO 4	Appreciate the need of Wind Energy and the various components used in energy generation and know the classifications and applications.	**U**
CO 5	Understand the concept of Biomass energy resources and their classification, types of biogas Plants- applications	**U**
CO 6	Acquire the knowledge of fuel cells, classification of batteries and advantages.	**R**
Allied Courses (I & II Semester)		
Allied I Physics I for Mathematics & Chemistry (121AM1 /121AC1)		
CO 1	Recollect the basic definitions in gravitation, elasticity and describe the determination of G, g & elastic constants	**U**
CO 2	Explain the low temperature physics concepts and super conductivity	**U**
CO 3	Discuss the determination of the velocity of sound in different media and outline the applications of ultrasonics	**U**
CO 4	Describe the different types of Particle accelerators and detectors	**U**
ÇO 5	Elaborate the production and the measurement of low pressure	**U**
Allied II - Physics-II for Mathematics & Chemistry(221AM3 /221AC2)		
CO 1	Describe the lasers and optical fibers for its types, production and applications.	**U**
CO 2	Explain the constructional details and uses of transducers and its applications	**U**
ÇO 3	Describe the principle and working of Carey Foster's bridge, potentiometer and ballistic galvanometer.	**U**
CO 4	Explain the basic concepts of semiconductor devices and optoelectronic devices	**U**
CO 5	Describe the design and working of logic gates and its applications.	**U**
Allied Physics Practicals (221AMP / 221ACP		
CO 1	Determine the acceleration due to gravity at a place using compound pendulum	**An**
CO 2	Determine the elastic constants of the materials and analyse the results	**An**
CO 3	Determine the optical parameters using optical sources and lasers and interpret the results.	**An**
ÇO 4	Calibrate the given electrical meters using appropriate circuit components, record the data, draw the calibration graph and interpret the results.	**An**
CO 5	Draw the logic circuits choose appropriate IC's to verify gates, Universal building block, De-Morgans theorems.	**An**