



SACRED HEART COLLEGE (AUTONOMOUS)

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Ready for
Every Good Work

A Don Bosco Institution of Higher Education, Founded in 1951 * Affiliated to Thiruvalluvar University, Vellore * Autonomous since 1987

Accredited by NAAC (4th Cycle – under RAF) with CGPA of 3.31 / 4 at 'A+' Grade

Name of the Course	Course Code	Name of the Program	Activities with direct bearing on Employability/ Entrepreneurship/ Skill development	Year of introduction
Mathematical Physics-I	P717	M.Sc Physics	Skill Development: Contents: Matrices and Complex numbers, Integral Transforms, Ordinary Differential equations, Tensor Analysis Activities: Problem solving, MCQ's, Assignment.	2021-22
Classical Mechanics and Statistical Mechanics	P718	M.Sc Physics	Skill Development: Contents: Lagrangian and Hamiltonian formulations , rigid body dynamics and its applications: Application to Kepler's planetary motion, oscillations and frequencies of free vibration - linear tri atomic molecule. Euler's equation of motion-torque free motion-Symmetric top –Precession and nutation. Thermodynamic	2021-22

			properties of Bose Einstein gas-Liquid Helium-Fermi-Dirac distribution- Degeneracy-energy of Fermi gas - thermionic emission. Activities: Problem solving, exercises on thermodynamical problems.	
Quantum Mechanics-I	P719	M.Sc Physics	Skill Development: Contents: 100% Activities: Virtual Interactive Illustrations of QM Concepts	2021-22
Electronic Devices and Applications	P720A	M.Sc Physics	Skill Development: Contents: Op-amp Applications, Wave generators, D/A and A/D converters, Sequential and Combinational Circuits. Activities: Solving complex circuits using various theorems, Analyzing input/output relations for various applications of Op-amp in analog circuits.	2021-22
Energy and Environmental Physics	P720B	M.Sc Physics	Skill Development: Contents: Energy and Thermodynamics, Fission power and environment , Fission power and environment, Renewable energy,	2021-22

			Environmental Pollution Activities: Demonstration of concepts, seminar and Quiz on Classification of fossil fuels, composition, physico- chemical characteristics and energy content of coal, petroleum, and natural gas, Solar energy, geothermal, wind energy - Principals of generation of hydroelectric power	
Astrophysics	P720C	M.Sc Physics	Skill Development: Contents: Galaxies and The Universe, Stellar Evolution, Binary and Variable Stars, Stellar Evolution, Binary and Variable Stars, Solar System, Astronomical Telescope Activities : Investigate the way light is affected when moving from one medium to another, Observing refraction factor through water	2021-22
Mathematical Physics-II	P820	M.Sc Physics	Skill Development: (80%) Contents: Matrices and Complex numbers, Integral Transforms,	2021-22

			Ordinary Differential equations, Tensor Analysis Activities: Problem solving, MCQ's, Assignment.	
Electromagnetic Theory	P821	M.Sc Physics	Skill Development: Contents: Electrostatics, magnetostatics, fields and radiation of localized sources, wave propagation and wave guide. Activities : Inerative discussion on electricfield and magnetic field.	2021-22
Quantum Mechanics-II	P822	M.Sc Physics	Skill Development: Contents: 100% Activities: Problem solving on Variation Methods, Seminars on Partial Wave Analysis, Interactive Discussions on time evolution problems	2021-22
Advanced Physics Practicals	PP809	M.Sc Physics	Skill Development: Contents: Experiments in Mechanics and Thermal Physics, Experiments on Oscillations, Waves and in Mechanics Activities: Demonstration of concepts, Hands-on-learning, Record writing, Experimental learning,	2021-22

			Interpretation of graphs, Result and Error Analysis	
Electronic Experiments	PP810	M.Sc Physics	Skill Development: Contents: Experiments in Analog and Digital Electronics Activities: Demonstration of concepts, Hands-on-training, Work sheet preparation, Interpretation of graphs and Error Analysis	2021-22
Microprocessor 8085 and Microcontroller 8051	P823A	M.Sc Physics	Skill Development: Contents: Instruction Set and Programming of 8085, Interfacing Memory and I/O devices, Instruction Set and Programming of 8051, Activities: Writing assembly language programs for performing various arithmetic and Logical operations. Entrepreneurship: Contents: Architecture and Interrupts of 8085A Microprocessor, Interfacing Memory and I/O devices, Architecture of 8051 Microcontroller.	2021-22

			Activities: Project work	
Geophysics	P823B	M.Sc Physics	<p>Skill Development: Contents: solar system, earth's position in the solar system, oceanography and Hydrology, shape and size of the earth, classification of earth quakes. Activities : Inerative discussion on solar system and their geophysical observation and measurement</p>	2021-22
Bio Physics	P823C	M.Sc Physics	<p>Skill Development: Contents: Cell transportation and malignant tumor growth - Cell aging and death- Differentiation of cultured cells- Water and ion transport Activities : Group discussion , Assignment, Test</p>	2021-22

Ultrasonics and its Applications		M.Sc Physics	<p>Skill Development: (60%) Contents: Fundamentals of Ultrasonic Waves and its sources, Ultrasonic instrumentation and General applications, Ultrasonic Studies for Molecular Interactions Activities: Group discussion, assignment, MCQ's</p>	2021-22
Dielectric Spectroscopy		M.Sc Physics	<p>Skill Development: Contents: Evolution of Broadband dielectric spectroscopy- Dielectric materials- Polarization, Instrumentation and data collection, Impedance Spectrum, Modulus Spectrum, Conductivity Studies Activities: Investigating by Demonstration, Hands-on-learning, seminar, Quiz, Interpretation of concepts, Results and Error Analysis, web based learning</p>	2021-22
Crystal growth techniques		M.Sc Physics	<p>Skill Development: Contents: Learning different methods of growing crystals (solution, Gel, SR method, Flux</p>	2021-22

			growth) and studying their properties Activities: project work, Assignments, Seminar, Group discussion, Web based learning	
Solid State Physics	P917	M.Sc Physics	Skill Development: Contents: X-ray diffraction-Bragg's law-Lattice vibrations, BCS theory-single particle tunnelling-Josephson tunnelling, Quenching of orbital angular momentum-Adiabatic demagnetization-Bloch theorem-Kronig-Penny model - Brillouin zone.	2021-22
Nanoscience and Technology	P920A	M.Sc Physics	Skill Development: Contents: Properties and classification of nano materials. Characteristic technique, bio sensors, drug delivery system. Activities : Demonstration of various method involved preparation of the nanomaterials.	2021-22
Optical Physics	P920B	M.Sc Physics	Skill Development: Contents: electromagnetic waves, lasers, optical fibres, optical devices and	2021-22

			<p>applications of optics.</p> <p>Activities: Demonstration of concepts, seminar and Quiz on Ferroelectric, Liquid crystal materials for these devices, Piezoelectric, Electrostrictive and magnetostrictive effects</p>	
Computational Quantum Mechanics	P920C	M.Sc Physics	<p>Skill Development: 100%</p> <p>Contents: Schrodinger formulation and its approximation , Basic molecular modelling methods, Ab initio calculation and density functional theory , calculation of equilibrium geometries, force constantsvibrational spectra and its transition states.</p> <p>Activities: Problem solving, exercises on thermodynamical problems.</p>	2021-22

Shock Waves and High Pressure Physics in Material Science		M.Sc Physics	<p>Skill Development: Contents: shock waves, origin: natural and artificial, types of sonic waves, Shock Tube, Behaviour of materials under shock loaded conditions, Static high pressure compression of solids, Conditions Activities: Investigating by Demonstration, Hands-on-learning, seminar, Quiz, Interpretation of concepts, Results and Error Analysis, web based learning</p> <p>Skill Development: Contents: Modelling and Measurement, Basic Instrumentation and Clinical Applications. Activities: Demonstrations on instruments in Research Institutions, Quiz on modelling and measurement</p>	2021-22
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Electrical Appliances		M.Sc Physics	<p>Skill Development: Contents: The basics of electrical/electronic components, understand the electrical components in our household applications, series and parallel electrical connections in the household appliances, principle and design of electric iron household appliances in our day to day life, the fundamentals and working of consumer electronics appliances Activities : Investigating by Demonstration, Hands-on-learning, seminar, Quiz, Interpretation of concepts, Results and Error Analysis, web based learning</p>	2021-22
Research and Publication ethics		M.Sc Physics	<p>Skill Development: Contents: publications misconduct, academic integrity, predatory publications, the publication ethics, authorship and contributorship- Identification of publication misconduct etc. Activities:</p>	2021-22

			Demonstration of plagiarism software like Turnitin, Urkund and other open source software tools	
Electronic Instrumentation Techniques	P1015	M.Sc Physics	<p>Skill Development: Principle, block diagram and working: Ramp type digital voltmeter, potentiometric type digital voltmeter - Digital Multimeter, digital LCR meters, digital pH meter, digital conductivity meter and digital storage Oscilloscope – introduction to virtual instrumentation, Supervisory control and data acquisition - Principles and Experimental techniques: X-ray Photoelectron Spectroscopy (XPS), Auger Electron Spectroscopy, Atomic Absorption Spectroscopy, Atomic Emission Spectroscopy, Flame Photometry-SIMS, CHNS.</p>	2021-22
Nuclear and Particle Physics	P1016	M.Sc Physics	<p>Skill Development: Contents: Basic properties, Semi-empirical mass formula, Two body problem</p>	2021-22

			Activities: Group discussion , Assignment, Test, Proble solving	
Modern Physics Practicals	PP1009	M.Sc Physics	Skill development: Contents: 100% (all the experiments) Activities: Hands-on-learning, Demonstration, Record writing, Experimental learning, Interpretation of Graphs, Result and Error Analysis	2021-22
Microprocessor and C Programming Experiments	PP1010	M.Sc Physics	Skill Development: Content: 100% Activities: Enable students to write an assemble level an language program and execute a simple program , Writing assembly language programs Problem analysis assignments, Problem solving Exercises, Debugging.	2021-22
Reactor Physics	P1017B	M.Sc Physics	Skill Development: Contents: Chain reaction reaction rate, diffusion Equation- solution of diffusion equation , Nuclear fuels etc Activities : Group discussion , Assignment, Test, Proble solving	2021-22

Digital Signal Processing	P1017C	M.Sc Physics	Skill Development: Contents: Discrete-Time Signals and Systems, Structures for Discrete Time Systems, Filter Design Techniques, Advance DSP Techniques Activities: Project for designing various filters	2021-22
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