



Ready for
Every Good Work

SACRED HEART COLLEGE (AUTONOMOUS)

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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 Programme: MSc. Physics

S No	Title Of The Paper	Course Code	Course Objectives	Course Outcomes	Relevance
1	Elective: Electronic Devices And Applications	P720A	<ul style="list-style-type: none"> To introduce structures, physical operations and circuit applications of semiconductor devices. To develop the ability design electronic circuits and to grasp the basic ideas of op-amps and its applications. To acquaint and demonstrate the concepts on waveform generators using Op-amp and 555 timer. To understand analog and digital signals and conversion techniques . To impart the fixed function of combinational and sequential logical circuits and their implementation 	<ul style="list-style-type: none"> Understand the characteristics and applications of special purpose diodes. Analyze input/output relations for various applications of Op-amp in analog circuits. Explain the operation of oscillators and multivibrators using op-amp and 555 timer. Recognize the relationship between digital and analog values in D/A and A/D converters. Analyze, design and implement combinational and sequential logic circuits 	national, developmental needs
2	Elective: Astrophysics	P720C	<ul style="list-style-type: none"> To understand astrophysical processes and systems, ranging from sun to stars, galaxies and Universe. To Study of birth and death of stars and types of stars. 	<ul style="list-style-type: none"> Classify different celestial objects and understand about universe Understand the impact of astronomical bodies and formation of stars. Explain stellar evolution, including red giants, supernovas, neutron stars, pulsars, 	national developmental needs

			<ul style="list-style-type: none"> To know the effect of temperature on stellar spectra and basics of its quantitative analysis To know the members of our solar systems and its atmosphere. To understand the working principle of Astronomical Telescope. 	<p>white dwarfs and black holes, using evidence and presently accepted theories.</p> <ul style="list-style-type: none"> Describe the features of objects in the Solar System (Sun, planets, moons, asteroids, comets, planetary interiors, atmospheres) Demonstrate the ability to observe the celestial objects by astronomical telescopes and instrumentation. 	
3	Electromagnetic Theory	P821	<ul style="list-style-type: none"> To provide a clear and logical presentation of problems in electrostatics. To apply Biot-Savart law, scalar and vector potentials to measure magnetic fields. To learn Maxwell's Equations and their applications. To understand Fields and Radiation of Electromagnetic Sources To develop an understanding of the propagation of electromagnetic waves and their properties. 	<ul style="list-style-type: none"> Solve few electrostatics problems using Laplace equation. Use Biot-Savart law, magnetic scalar and vector potentials to deduce magnetic fields due to current carrying elements. Apply Maxwell's equations for the conservation of electromagnetic energy and momentum. Understand fields and radiation from antennas and deduce expression for power radiated from radiation sources. Describe the propagation of electromagnetic waves in various media and discuss the kinematics and dynamic properties of electromagnetic waves. 	national developmental needs
4	Elective: Geophysics	P823B	<ul style="list-style-type: none"> To explore the fundamental background of geophysics and its importance among the earth science. To make them understand the geomagnetic field and Magnetic elements. To provide an understanding of Laboratory measurements of the physical properties of rocks. To Study Natural and Artificial seismology and its relation to other Earth System. 	<ul style="list-style-type: none"> Understand the physics and geology that form the basis for geophysical observation and measurement. Explain the principles of geothermal flux distribution over continents and oceans. Explain fundamental concepts underlying common exploration of petrophysics. Acquire the knowledge of application of seismology. Obtain knowledge about classification of minerals. 	National developmental needs

			<ul style="list-style-type: none"> To familiarize the students with the physical properties of minerals 		
5	Self-Study Paper: Shock Waves And High Pressure Physics In Material Science		<ul style="list-style-type: none"> To create awareness about shock waves and types of shock waves To import knowledge of different types of shock tubes To make the students to understand the interaction of high pressure energy in atomic level in the materials To enable the students to acquire knowledge on the high pressure materials science and its applications. To explore the behavior of materials properties at harsh environments. 	<ul style="list-style-type: none"> Explain the fundamental concepts of shock waves and high pressure experiments in materials. Construct table top shock tubes Develop a strong understanding about the materials properties under shock loaded and high pressure conditions. Distinguish the static shock and dynamic shock phenomena Understand the unusual behavior of materials in harsh conditions. 	National developmental needs
6	Elective: Digital Signal Processing	P1017C	<ul style="list-style-type: none"> To introduce the basic principles of digital signal processing (DSP) and provide an understanding of the fundamentals, implementation and applications of DSP techniques. To introduce signals, systems, time and frequency domain concepts and the associated mathematical tools those are fundamental to all DSP techniques. To provide a thorough understanding and working knowledge of design, implementation, analysis and comparison of digital filters for processing of discrete time signals. 	<ul style="list-style-type: none"> Understand the fundamental concepts such as linearity, time-invariance, frequency response, z-transforms and the discrete time Fourier transform as applied to discrete time signal processing systems. Understand the analytical tools such as Fourier transforms, Discrete Fourier transforms, Fast Fourier Transforms and Z-Transforms required for digital signal processing. Get familiarized with various structures of IIR and FIR systems. Design and realize various digital filters for digital signal processing. 	National developmental needs

			<ul style="list-style-type: none">• To impart the knowledge of spectral properties of discrete-time systems through the use of Discrete Fourier transform (FFT) of sequences.• To introduce various sampling techniques and different types of filters.	<ul style="list-style-type: none">• Familiarize with techniques of analysis of discrete-time signals and the use of Z-transforms	
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