



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 (4<sup>th</sup> Cycle – under RAF) with CGPA of 3.31 / 4 at 'A+' Grade

## Name of the Programme: M. Sc Physics

S No	Title Of The Paper	Course Code	Course Objectives	Course Outcomes	Relevance
1	Advanced Physics Practicals	PP809	<ul style="list-style-type: none"><li>To provide the students with a broad understanding of experimental procedures, calculations of some physical parameters such as young's modulus, viscosity</li><li>To help the students towards the critical and creative thinking through few spectroscopic experiments</li><li>To make the students to evaluate the electrical resistivity and conductivity of semiconducting materials</li><li>To empower the students to demonstrate few heat experiments</li><li>To train the students towards the skill development of advanced general physics experiments</li></ul>	<ul style="list-style-type: none"><li>Do Young's modulus experiments and to calculate the young's modulus, poisson's ratio and viscosity for the given materials</li><li>Set up the apparatus to get the spectra of light sources such as hydrogen, arcs of alloys/metals etc.</li><li>Determine the electrical conductivity and resistivity of a semiconducting material using four probe apparatus</li><li>Obtain the saturation temperature of a black body and hence they are able to calculate the stefan's constant and temperature coefficient of thermistor</li><li>Do themselves independently few advanced general experiments such as half shade polarimeter, Planck's constant experiment</li></ul>	regional developmental needs

2	Elective: Microprocessor 8085 And Microcontroller 8051	P823A	<ul style="list-style-type: none"> <li>To illustrate the architecture and interrupts of 8085 Microprocessor.</li> <li>To familiarize students with instruction sets, addressing modes and programming of 8085 microprocessor.</li> <li>To familiarize the students with interfacing of memory with 8085 microprocessor.</li> <li>To illustrate the architecture of 8051 Microcontroller.</li> <li>To familiarize students with instruction sets, addressing modes and programming of 8051 Microprocessor.</li> </ul>	<ul style="list-style-type: none"> <li>Gain knowledge about architecture and working of 8085 Microprocessor.</li> <li>Develop assembly language programs using various programming tools in 8085 Microprocessor.</li> <li>Illustrate how the different peripherals are interfaced with 8085 Microprocessor.</li> <li>Understand the internal design of 8051 microcontroller along with the features.</li> <li>Develop assembly language programming to design microcontroller-based systems.</li> </ul>	regional developmental needs
3	Self-Study Paper: Dielectric Spectroscopy		<ul style="list-style-type: none"> <li>To understand polarization and its dependence on frequency and temperature</li> <li>To comprehend impedance spectrum and modulus spectrum</li> <li>To derive the contribution to electrical conductivity due to grains and grain boundaries</li> <li>To apply the hands on training and to interpret the data</li> <li>To analyze the AC and DC conductivity of the dielectric materials</li> </ul>	<ul style="list-style-type: none"> <li>Understand the various polarization mechanisms and dependence of polarization on frequency and temperature</li> <li>Explain the principle and construction of instrumentation and sample preparation</li> <li>Separate the contribution to electrical conductivity due to grains and grain boundaries</li> <li>Analyse the importance of the real and imaginary part of the modulus spectrum</li> <li>Collect data and to interpret the data</li> </ul>	Regional developmental needs
4	C Programming And Research Methodology	P919	<ul style="list-style-type: none"> <li>To introduce to the students the fundamentals of C programming.</li> <li>To enhance skill on problem solving by constructing algorithm/program.</li> <li>To familiarize the students with the nature of research and scientific writing.</li> </ul>	<ul style="list-style-type: none"> <li>Explain the fundamental concepts of C programming and applications in problem solving.</li> <li>Develop programs using the basic elements like control statements, arrays, strings and functions.</li> <li>Identify the good research problems and formulate the research design.</li> </ul>	Regional developmental needs

			<ul style="list-style-type: none"> <li>To introduce to the students various quality metrics to be followed while publishing paper.</li> <li>To analyze, interpret and evaluate scientific hypotheses and theories using rigorous methods such as statistical and mathematical techniques.</li> </ul>	<ul style="list-style-type: none"> <li>Write quality research papers and publish them in reputed journals.</li> <li>Analyze the data with the use of appropriate tools and create the qualitative and quantitative solutions to problems.</li> </ul>	
5	Elective: Nanoscience And Technology	P920A	<ul style="list-style-type: none"> <li>To provide an introduction to nanomaterials, their properties and applications.</li> <li>To know about synthesis of nanomaterials</li> <li>To acquire knowledge about the preparation of nanomaterials by physical methods</li> <li>To understand basic principles and instrumentation</li> <li>To introduce to various thin films deposition techniques and characterization techniques.</li> </ul>	<ul style="list-style-type: none"> <li>Develop an understanding of nanomaterials applications</li> <li>Understand Advantages and disadvantages of chemical method</li> <li>Know the methods of nanomaterial preparations</li> <li>Acquire in depth knowledge about various characterization techniques which will in turn kindle their research interest.</li> <li>Know some of the applications of Nanomaterials and thin films that are applicable in day today life.</li> </ul>	Regional developmental needs
6	Nuclear And Particle Physics	P1016	<ul style="list-style-type: none"> <li>To provide brief introduction on the basic concept of nucleus including size, force and nuclear models</li> <li>To impart the knowledge on two body system and nuclear interaction.</li> <li>To provide an in-depth knowledge on types of nuclear reactions and its relation</li> <li>To enhance the knowledge about various fundamental particles, their decay and transitions.</li> </ul>	<ul style="list-style-type: none"> <li>Differentiate the different models of the nucleus and apply their idea in calculating the parameters theoretically.</li> <li>Solve the two body problems in connection with nuclear interaction</li> <li>Be able to identify the reason behind the mode of decay, transitions between the nuclear decays and have strong physical reasoning and problem solving skill and able to find solutions to the problems related with nuclear physics</li> <li>Be able to demonstrate the different types of nuclear reaction and its applications in day today life including nuclear fission, fusion and its role in the construction of nuclear reactor.</li> </ul>	regional developmental needs

			<ul style="list-style-type: none"> <li>To make the students to understand about the basic ideas on elementary particles and its classifications and interaction of quarks</li> </ul>	<ul style="list-style-type: none"> <li>Be able to explain the basic concept of elementary particles based on the combination quarks projection and also acquire knowledge on strong and weak interaction.</li> </ul>	
7	Microprocessor, Microcontroller And C Programming Experiments	PP1010	<ul style="list-style-type: none"> <li>To develop the skill of understanding Instruction sets and opcode of 8085 microprocessor and 8051 Microcontroller.</li> <li>To familiarize the students with interfacing with 8085 microprocessors to other Input/output devices.</li> <li>To enable students to write assembly language programs for software and interfacing devices.</li> <li>To familiarize the students about the C programming.</li> <li>To analyze and evaluate the various theories, statistical methods and mathematical techniques using C programming</li> </ul>	<ul style="list-style-type: none"> <li>Write assembly level language programs for both software and hardware interfacing using 8085 microprocessors.</li> <li>Write an assembly level language programs for software and hardware interfacing using 8051 microcontrollers.</li> <li>Understand the different applications of microprocessor and microcontroller.</li> <li>Develop C programs using the basic elements like control statements, arrays, strings and functions.</li> <li>Use appropriate mathematical techniques and concepts to obtain quantitative solutions to problems in Physics using C program.</li> </ul>	Regional developmental needs
8	Elective: Reactor Physics	P1017B	<ul style="list-style-type: none"> <li>To make the students to understand the concepts of nuclear reaction, cross section and chain reaction.</li> <li>To make the students to differentiate between the types of neutrons produced in a nuclear reaction and the concept of neutron diffusion.</li> <li>To provide an in-depth knowledge of fuels and materials used for the nuclear energy production.</li> <li>To explain the concept of moderation of neutron in a nuclear reactor and its critical condition in the operation of a nuclear reactor</li> </ul>	<ul style="list-style-type: none"> <li>Understand the basic ideas of nuclear reaction, cross section and the process of chain reaction.</li> <li>Identify and differentiate the various energy ranges of neutrons produced in a chain reaction and its diffusion property</li> <li>Explain and analyze the properties of fuels and materials used in a typical reactor</li> <li>Demonstrate the importance of neutron production and critical condition through diffusion equation</li> <li>Apply the knowledge chain reaction ,able to calculate the critical value for a typical nuclear reactor and understand the working concept of different reactors and their applications.</li> </ul>	Regional developmental needs

			<ul style="list-style-type: none"><li>• To provide an extravagant details on the types of nuclear reactors and it working principle.</li></ul>		
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