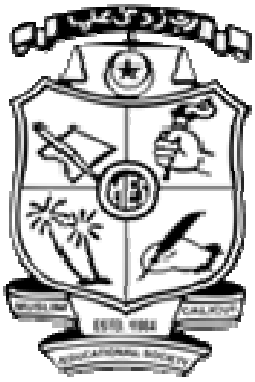
MES College Nedumkandam

Affiliated to Mahatma Gandhi University, Kottayam and Accredited by NAAC



Course Outcome- Physics

For 2020-21 Academic year

Chembalam PO, Idukki District, Kerala

Pin code: 685553

Tel: +91 4868232043, 233060 E mail: mesndkm@gmail.com

Fax: +91 4868 233060

BSc Physics- Model II		
SEMESTER I		
Theory - Core	**Methodology & Perspectives of Physics**	**PH1CRT01**
CO1	The students will be able to list various scientists and their contributions	
CO2	Understand the fundamentals of codes and number system	
CO3	Able to convert various number system and perfom binary arithematics	
CO4	Identity and minimize different types of errors in experiments	
CO5	Develop skills in the use of vectors and vector operations	
Theory - Vocational	**Principles of Electronic Components**	**AE1VOT01**
CO1	Students will be able to use various electronics components.	
CO2	To differentiate the basic electronic components and circuits.	
CO3	To give knowledge about the manufacturing of passive components.	
CO4	To use switches in different electronic and electrical applications in their daily life	
CO5	To identify various Displays	
Theory - Vocational	**Electronics Application**	**AE1VOT02**
CO1	Students will learn the application of electronics	
CO2	Study measurement of electrical quantities and instruments used.	
CO3	Study different electronics circuits	
CO4	Understand filter circuits and their applications	
CO5	Learn basics of Printed Circuit Board	
SEMESTER II		
Theory - Core	**Mechanics & Properties of Matter**	**PH2CRT02**
CO 1	Study the elastic behaviour and working of torsional pendulum	
CO 2	Study of bending behaviour beams and analyse the expression for young's modulus	
CO 3	Understand the surface tension and viscosity of fluid	
CO 4	Able to derive expression for moment of inertia of regular bodies	
CO 5	Become familiar with different terms associated with wave motion and able to derive various mathematical equations related to wave motion	

Theory - Vocational	**Basics Of Power Electronics**	**AE2VOT03**
CO 1	Study about Field effect transistors and it's different types	
CO 2	Understand the working of FET	
CO 3	Learn about working principle of MOSFET	
CO 4	Familiarise with FET amplifiers	
Theory - Vocational	**Power Electronics**	**AE2VOT04**
CO 1	Describe basic operation and compare performance of various power semiconductor devices	
CO 2	Design and Analyze power converter circuits and learn to select suitable power electronic devices	
CO 3	To develop skills to build, and troubleshoot power electronics circuits.	
CO 4	Foster ability to understand the use of power converters in commercial and industrial applications.	
CO 5	Describe four layer power electronics devices like SCR,Triac and IGBT	
Theory - Complementary	**Mechanics And Astrophysics**	**PH2CMT01**
CO 1	Able to derive expression for moment of inertia of regular bodies using parallel and perpendicular axes theorem	
CO 2	derive various mathematical equations related to wave motion	
CO 3	Differentiate periodic and oscillatory motion and understand the theories related to progressive waves	
CO 4	Explain various physical parameters that affecting the star.	
CO 5	Understand various theories of evolution of stars	
SEMESTER III		
Theory - Core	**Optics, Laser and Fiber Optics**	
CO1	**To apply the basic phenomena of Wave Otics such as interference diffraction and polarization in various optical device**	
CO2	To describe the working principle of LASER and Optical Fiber, list the application of both and use the fundamentals in understanding advance theories (optical fiber communication).	
CO3	To solve numerical problems on wave optics, Laser and fiber optics.	
Theory -	**Micro Processor & Interfacing Devices**	

Vocational		
CO1	Assess and solve basic binary math operations using the microprocessor and explain the microprocessor's internal architecture	
CO2	Apply knowledge and demonstrate programming proficiency using the various instructions of the target microprocessor	
CO3	Compare accepted standards and guidelines to select appropriate Microprocessor to meet specified performance requirements.	
CO4	Analyze assembly language programs; select appropriate assemble into machine a cross assembler utility of a microprocessor.	
CO5	Evaluate assembly language programs and download the machine code that will provide solutions real-world control problems.	
Theory - Vocational	**Communication Electronics**	
CO1	Learn fundamentals of communication systems	
CO2	Study about different communication systems	
CO3	Basics of Colour television	
CO4	**Learn about Radio wave propagation**	
CO5	**Fundamentals of radar communication systems**	
Practical – Core	**Optics and Semiconductor Physics**	**PH4CRP02**
CO1	To perform the experiments for enhancing their scientific understanding of the fundamentals of physics	
Practical – Vocational	**Microprocessor and Linear Integrated Circuits**	**AE4VOP02**
CO1	Apply knowledge and demonstrate programming, binary math operations using 8085 assembly language programming.	
CO2	Design assembly language programms for conversion of different number system.	
CO3	Design assembly language programms for block data transfer from a memory address to another.	
CO4	Design and construct a circuits for various oscillators with a specific frequency.	
CO5	Apply knowledge about active filters in different frequency waves with the help of operational amplifiers.	
Practical – Vocational	**Microprocessor and Communication Electronics**	**AE4VOP02**

CO1	To perform the experiments for enhancing their scientific understanding of the fundamentals of Microprocessor and Electronics	
Practical - Complementary	**Complementary Physics Practical 2**	**PH4CMP02**
CO1	To perform the experiments for enhancing their scientific understanding of the fundamentals of physics	
SEMESTER IV		
Theory - Core	**Semiconductor Physics**	**PH4CRT04**
CO 1	**To design simple electronic circuits using junction diode**	
CO 2	**to design simple electronic circuits using transistors**	
Theory - Vocational	**Linear Integrated Circuits**	**AE4VOT07**
CO 1	Develop skills to design simple circuits using OP-AMP	
CO 2	Gain knowledge about various multiplier circuits, modulators and demodulators.	
CO 3	Gain knowledge about PLL	
CO 4	Learn about various techniques to develop A/D and D/A convertors	
CO 5	Develop skills to develop simple filter circuits and various amplifiers	
Theory - Vocational	**Applications Of Microprocessors**	**AE4VOT08**
CO 1	Develop an ALP in 8085 microprocessor	
CO 2	Describe the architecture and functional block of 8051 microcontroller	
CO 3	Explain various peripherals devices such as 8255,8259	
CO 4	Explain microcontroller application and basic architecture	
CO 5	Decribe difference between microcontroller and microprocessor	
Theory - Complementary	**Optics & Electricity**	**PH4CMT01**
CO 1	Explain the phenomenon of interference, diffraction and polarization	
CO 2	Describe the principle and properties of lasers	
CO 3	explain the electrical behavior of dielectric materials	
CO 4	Describe RC, LC, LR and LCR circuits.	

CO 5		
SEMESTER V		
Theory - Core	**Electricity & Electrodynamics**	
CO1	To apply the theory of alternating current in the various electronic circuits	
CO2	To describe the describe the various thermos electric phenomena	
CO3	To describe the concepts and theory of the various electromagnetic phenomena	
CO4	To solve numerical problems on Electronics, Electricity, magnetism and Electrodynamics.	
Theory - Core	**Classical & Quantum Mechanics**	
CO1	Describe the motion of different mechanical systems using Lagrange- Hamilton method	
CO2	Explain the differences between classical and quantum mechanics	
CO3	Pinpoint the historical aspects of quantum mechanics	
CO4	Interpret the wave function and apply operators to it.	
Theory - Core	**Digital Electronics & Programming**	
CO1	Have a thorough understanding of the fundamental concepts and techniques used in digital electronics	
CO2	To understand and examine the structure of various number systems and its application in digital design	
CO3	The ability to understand, analyze and design various combinational and sequential circuits.	
CO4	Design C programs for problems	
CO5	Write and execute C programs for simple applications	
Theory - Core	**Environmental Physics & Human Rights**	
CO1	Able to give awareness to the general public about the need of conservation of environment.	
CO2	Generation of courage to ensure the rights of fellow citizens and fellow species in the surroundings	
CO3	Able to adopt different waste management strategies suitable to their home and work places	
Theory – Open	**Physics in Daily Life**	
CO1	Able to define various units and its conversion from one to another	
CO2	Able to learn that light as a form of energy and sort materials	

	according to the degree to which they allow light through	
CO3	Able to explain how reflection, refraction, interference , diffraction and scattering produce natural phenomena	
CO4	Explain why corrective lenses are used to enhance eyesight	
CO5	Able to understand power generation using different techniques.	
CO6	Able to understand various steps in power transfer.	
Practical – Core	**Electricity, Magnetism and LASER**	
CO1	To perform the experiments for enhancing their scientific understanding of the fundamentals of physics	
Practical – Core	**Digital Electronics**	
CO1	Use the basic logic gates and various reduction techniques of digital logic circuit in detail.	
CO2	Design combinational and sequential circuits.	
CO3	Design and implement hardware circuit to test performance and application.	
Practical – Core	**Thermal Physics, Spectroscopy & C++ Programming**	**PH6CRP05**
CO1	To perform the experiments for enhancing their scientific understanding of the fundamentals of physics, spectroscopy and Computer programming	
Practical – Core	**Acoustics, Photonics & Advanced Semiconductor Physics**	**PH6CRP06**
CO1	To perform the experiments for enhancing their scientific understanding of the fundamentals of physics	

M Sc PHYSICS

Semester II

Theory	Mathematical methods in Physics-II	PH010201
CO 1	Understand Complex Analysis	
CO 2	Learn about Laplace and Fourier Transforms	
CO 3	Familiarise with special functions and differential equations	
CO 4	Able to solve partial differential equations by finite difference method	
Theory	Quantum Mechanics-I	PH010202
CO 1	use the basic operator formalism of Quantum mechanics	
CO 2	Derive eigen value and eigen kets of various quantum mechanical problems	
CO 3	Apply various time independent approximation methods and perform calculations using angular momentum technique+	
Theory	Statistical Mechanics	
CO 1	Able to understand the basics of thermodynamics	
CO 2	Capable of understading the physical significance	
CO 3	A deep knowledge of ensembles and behaviour of ideal gas	
CO 4	Understand about phases and their transitions	
Theory	Condensed Matter Physics	PH010204
CO 1	capable to classifying materials based on their magnetic property.	
CO 2	Ability to explain the specific heat capacity of materials with different theories on specific heat.	
CO 3	Ability to explain the origin of band gap of materials with models.	
CO 4	Able to distinguish materials based on the band gap.	

CO 5	capacity to make a link between magnetism and temperature dependence.	
SEMESTER III		
Theory	Quantum Mechanics-II	PH010301
CO 1	Acquisition of clear knowledge and problem solving capacity of various quantum states.	
CO 2	Gain basic knowledge about relativistic quantum mechanics.	
CO 3	Understand the basics of time dependent perturbation theory and it's application to semiclassical theory of atom - radiation interaction.	
CO 4	Understand the theory of identical particles and it's application to helium.	
Theory	Computational Physics	PH010302
CO 1	Introduces computational methods in solving physics problems	
CO 2	Solve system of non linear equations	
CO 3	Solve problems using numerical methods	
CO 4	Solve differential equations using finite difference method	
CO 5	Learn curve fitting of a given number of data points	
Theory	Atomic and Molecular Physics	PH010303
CO 1	Able to identify the atomic structure and spectra of typical one-electron and two-electron systems	
CO 2	Understand the theory of microwave and infrared spectroscopies as well as the electronic spectroscopy of molecules	
CO 3	Understand the basics of Raman scattering and the nonlinear Raman effects	
CO 4	Have a deep knowledge of spin resonance spectroscopies such as nuclear magnetic resonance ,electron spin resonance and transition of gamma radiation by Mossbauer spectroscopy	
Theory	Solid State Physics for materials	PH810301
CO 1	Able to identify characteristic physical properties of different categories of solid materials, with an emphasis on the crystalline state.	

CO 2	Understand the influence of crystal binding energy on crystalline structure.	
CO 3	Able to apply the phase diagram to analyze the micro structural changes during heat removal treatment	
Practical	Advanced Practicals in Material Science	PH810302
CO 1	Analysis of dielectric constant of a non-polar liquid	
CO 2	Finding the compressibility of a liquid from an acoustic grating	
CO 3	Measuring the dipole moment of a polar molecule	
CO 4	Measuring the bandgap energy of a semiconductor	
CO 5	To determine the beam waist of a laser source	
SEMESTER IV		
Theory	Nuclear and Particle Physics	PH010401
CO 1	Able to explain the properties of elementary particles	
CO 2	Ability to check the stability of a given nucleus.	
CO 3	capable to find the physical properties of a nucleus with given specifications.	
CO 4	Ability to check whether a given reaction is happened or not	
CO 5	Able to explain the existence of nucleus with different nuclear models.	
Theory	Science of Advanced Materials	PH010402
CO 1	Deep understanding of different types ofceramics,polymers and composites, its properties.	
CO 2	Understand superconductuvity its theory and applications	
CO 3	Understand thin film and crystal, its growth mechanism and different growth methods.	
Theory	Nanostructures and Material Characterization	PH010403

CO 1	Understand the properties and synthesis of nanoparticles	
CO 2	Able to understand the applications of nanomaterials	
CO 3	Study the emission and optical spectra of nanomaterials	
CO 4	Deep knowledge of different characterization methods	
	MSc PHYSICS - SEMESTER III	
Theory	Quantum Mechanics-II	PH010301
CO1	Acquisition of clear knowledge and problem solving capacity of various quantum states.	
CO2	Gain basic knowledge about relativistic quantum mechanics.	
CO3	Understand the basics of time dependent perturbation theory and it's application to semi classical theory of atom - radiation interaction.	
CO4	Understand the theory of identical particles and it's application to helium.	
Theory	Computational Physics	PH010302
CO1	Introduces computational methods in solving physics problems	
CO2	Solve system of non linear equations	
CO3	Solve problems using numerical methods	
CO4	Solve differential equations using finite difference method	
CO5	Learn curve fitting of a given number of data points	
Theory	Atomic and Molecular Physics	PH010303
CO1	Able to identify the atomic structure and spectra of typical one-electron and two-electron systems	
CO2	Understand the theory of microwave and infrared spectroscopies as well as the electronic spectroscopy of molecules	
CO3	Understand the basics of Raman scattering and the nonlinear Raman effects	
CO4	Have a deep knowledge of spin resonance spectroscopes such as nuclear magnetic resonance ,electron spin resonance and transition of gamma radiation by Mossbauer spectroscopy	
CO5		
Theory	Solid State Physics for materials	PH810301

CO1	Able to identify characteristic physical properties of different categories of solid materials, with an emphasis on the crystalline state.	
CO2	Understand the influence of crystal binding energy on crystalline structure.	
CO3	Able to apply the phase diagram to analyze the micro structural changes during heat removal treatment	
Practical	Advanced Practicals in Material Science	PH810302
CO1	Analysis of dielectric constant of a non-polar liquid	
CO2	Finding the compressibility of a liquid from an acoustic grating	
CO3	Measuring the dipole moment of a polar molecule	
CO4	Measuring the bandgap energy of a semiconductor	
CO5	To determine the beam waist of a laser source	