



“Education for Knowledge, Science, and Culture”  
- Shikshanmaharshi Dr. Bapuji Salunkhe  
**Shri Swami Vivekanand Shikshan Sanstha's**  
**Vivekanand College, Kolhapur**  
**(Autonomous)**



**Curricular Relevance: Course Outcomes with Relevance to Local, Regional, National, Global Needs**  
**(2018-19 to 2023-24)**

Sr. No.	Name of the Course	Course code	Year of Introduction	COs with relevance to local/ regional needs	COs with relevance to national needs	COs with relevance to global needs
M.Sc. Physics (Newly Introduced between 2018-19 and 2022-23)						
1.	Mathematical methods of Physics	CC-1100A	2018-19	CO-2) Understand the elementary ideas and have acquired facility with numerical tools for solving mathematical problems in Complex Variables.	CO-3) understand the complications associated with the Fourier Series and Transform CO-4) Learn about the concept of some special functions, Frobenius power series and polynomials.	
2.	Classical Mechanics	CC-1101A	2018-19	CO-3) develop important basic understanding about overall Mechanics.	CO-4) Learn about the concept of Lagrange's and Hamilton's theory.	CO-2) Gain basic knowledge of Canonical Transformation and Special Relativity and the evolutionary significance of it.



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3.	Quantum Mechanics I	CC-1102A	2018-19		CO-2) develop theoretical knowledge of Angular Momentum operator CO-3) develop important basic understanding about time independent perturbation theory, and its applications.	CO-4) Learn about the concept of various aspects of quantum theory.
4.	Condensed Matter Physics	CC-1103A	2018-19	CO-2) Describe and understand fundamental concepts of crystal defects.	CO-4) Assess and critique Semiconductor theory, semiconductor materials, which will eventually lead to a general framework of concepts applicable across a variety of semiconductor devices.	
5.	Quantum Mechanics-II	CC-1106B	2018-19		CO-3) learn about quantum computation, Paradoxes of entanglement. CO-4) Learn about the concept of various aspects of quantum theory.	
6.	Statistical Mechanics	CC-1107B	2018-19	CO-2) gained an understanding about classical statistics. CO-3) gained an understanding about Quantum statistics.		CO-4) gained an understanding about problem solutions regarding classical Quantum statistics
	Electrodynamics	CC-1108B	2018-19	CO-1) get fundamental understanding of the Maxwell's equations and	CO-3) gain a sound understanding of	CO-4) gain a sound understanding of the



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				propagation of plane electromagnetic wave	Electromagnetic fields and Radiations	Relativistic mechanics and covariance.
8.	Atomic & Molecular Physics	CC-1109B	2018-19	CO-1) get fundamental understanding of the atom Model for two valance electrons.	CO-2) Better understanding of the Zeeman and Paschen-Back Effect. CO-3) gain a sound understanding of the basics of Microwave. CO-4) gain a sound understanding of the basics Infra-Red Spectroscopy.	
9.	Nuclear and Particle Physics	CC-1112C	2019-20		CO-3) Develop the understanding of cosmic rays and elementary particles and their properties. CO-4) Learn about the concept of particle physics classification like charge, spin, parity, isospin, strangeness etc.	
10.	Thin film deposition and other techniques	CBP-1113C	2019-20		CO-2) clarify the concepts of Solid solutions like substitutional, disordered, ordered, interstitial hardening. Age hardening, dispersion hardening, phase transformation hardening principles of hot and cold working of metals and their effects on mechanical properties.	CO-4) develop the understanding of Heat treatment furnaces like Oil and Gas fired furnaces, Electric furnaces, Batch furnace and their types. Semi continuous and continuous furnace. Air convection furnace. salt bath furnace



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					CO-3) impart knowledge of Raman Scattering rotational and vibrational spectra, Raman Electron Spin Resonance (ESR Hyperfine structure, ESR of Transition metals	
11.	Solid State Physics- I (Thin Film Deposition Techniques Magnetic and Electric Properties)	CC-1114C	2019-20		CO-3) Learn the basics of the Magnetic behaviour of various materials and their types	CO-2) Provide a critical and systematic understanding on advanced chemical methods of thin film deposition like Chemical bath deposition, electro deposition, Spray pyrolysis, (SILAR), Sol-gel, hydrothermal deposition techniques etc.
12.	Solid State Physics-II (Semiconductor Physics)	CC-1115C	2019-20		CO-1) get critical and systematic understanding of energy bands and charge carriers in Semiconductors. CO-2) Learn the basics of excess carriers in semiconductors, Optical absorption, Luminescence, diffusion and drift of carriers.	CO-3) Provide a broad view of fabrication of p-n junctions and current flow through at a junction, Capacitance of p-n junctions, heterojunction.CO-4) Provide a broad view of current flow mechanism across p-n junction.



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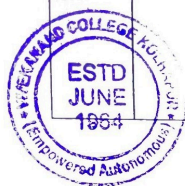


13.	Experimental Techniques	CC-1118D	2019-20		<p>CO-1) Provide a critical and systematic understanding on vacuum techniques like rotary, diffusion, and sputter ion pumps</p> <p>CO-2) Provide a critical and systematic understanding on measurement of low pressure and simple methods of LD, palladium barrier and halogen leak detectors.</p>	<p>CO-3) Learn the basics of the Atomic Absorption Spectrometry and Low Temperature and Microscopy Techniques like Optical microscopy, scanning electron microscopy, electron microprobe analysis, low energy electron diffraction.</p> <p>CO-4) Impart the knowledge about X-Ray Fluorescence Spectrometry and Mössbauer Spectroscopy.</p>
14.	Electronic Devices and Applications	CBP-1119D	2019-20	<p>CO-1) Understand the working, structure and operation and functions of (BJT), (JFET), MOSFET, MESFET, and diodes.</p>	<p>CO-2) Identify the problems and applications of Magneto-optic and acousto-optic, Piezoelectric, Electrostrictive and magnetostrictive effects.</p> <p>CO-3) Acquire basic knowledge about Light emitting Diodes, OLED, Infrared LED, Photodetector, Photoconductor, Photodiode, p-n junction Solar cells, Semiconductor Lasers.</p>	



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15.	Solid State Physics-III (Physical Properties of Solid)	CC-1120D	2019-20	CO-1) Understand the matter interaction Electronic Structure of Crystals	CO-4) Learn the techniques of Thermistor, and sensors. CO-2] Identify the problems and applications of Transport Properties of Metals. CO-3] Acquire basic knowledge about Phonons, Plasmons, Polaritons, and Polarons	CO-4] Impart the knowledge about the Defects in crystals.
16.	Solid State Physics-IV (Energy Conversion and Storage Devices)	CC-1121D	2019-20		CO-1) Understand the concept and applications of Solar Photovoltaics.	CO-4) Impart the knowledge and provide a broad view about the Supercapacitors and Batteries. CO-2) Identify the problems and applications of Dye and Quantum Dot Sensitized Solar Cell. CO-3) Acquire basic knowledge of Perovskite and Organic Solar cell
<b>M.Sc. Physics (Revised between 2023-24)</b>						
17.	Mathematical Physics	DSC12PHY11	2023-24	CO-2) Understand the elementary ideas and have acquired facility with numerical tools for solving mathematical problems in Complex Variables.	CO-3) understand the complications associated with the Fourier Series and Transform CO-4) Learn about the concept of some special	



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					functions, Frobenius power series and polynomials.	
18.	Classical Mechanics	DSC12PHY12	2023-24	CO-3) develop important basic understanding about overall Mechanics.	CO-4) Learn about the concept of Lagrange's and Hamilton's theory.	CO-2) Gain basic knowledge of Canonical Transformation and Special Relativity and the evolutionary significance of it.
19.	Research Methodology	MIN12PHY11	2023-24	CO-2) Understand the methods of data collection. CO-3) Learn about various tool of literature survey	CO-2) Understand the methods of data collection. CO-3) Learn about various tool of literature survey	CO-1) Understand the meaning of research, research design. CO-4) Learn about Thin film deposition technics and learn how to study properties and analysis of thin films.
20.	Solid State Physics-I	OEC12PHY11	2023-24	CO-1) get critical and systematic understanding of energy bands and charge carriers in Semiconductors.		CO-2) Learn the basics of excess carriers in semiconductors, Optical absorption, Luminescence, diffusion and drift of carriers. CO-3) Provide a broad view of fabrication of p-n junctions and current flow through at a junction, Capacitance of p-n junctions, heterojunction.



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						CO-4) Understand the concepts of solar photovoltaics.
21.	Quantum Mechanics	DSC12PHY19	2023-24		CO-1) understand basic concepts in the Origin and general formalism and representation of states and quantum dynamics. CO-2) develop theoretical knowledge of Angular Momentum operator	CO-3) develop important basic understanding about time independent perturbation theory, and its applications. CO-4) develop important basic understanding angular momentum, operators, approximation method etc
22.	Condensed Matter Physics	DSC12PHY19	2023-24	CO-1) Understand and describe various crystal structures in crystallography.	CO-2) Describe and understand fundamental concepts of crystal defects. CO-3) Discuss different aspects of Dielectric, Magnetism & Superconductivity.	CO-4) Assess and critique Semiconductor theory, semiconductor materials, which will eventually lead to a general framework of concepts applicable across a variety of semiconductor devices.
23.	Solid State Physics-II	DSC12PHY19	2023-24	CO-1) Understand the working, structure and operation and functions of (BJT), (JFET), MOSFET, MESFET, and diodes.	CO-2) Identify the problems and applications of Magneto-optic and acousto-optic, Piezoelectric, Electrostrictive and magnetostrictive effects. CO-3) Acquire basic knowledge about Light emitting Diodes, OLED, Infrared LED, Photodetector,	



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					Photoconductor, Photodiode, p-n junction Solar cells, Semiconductor Lasers CO-4) Learn the techniques of Thermistor, and sensors.	
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