

## Curriculum

## 5-yr Integrated MSc Physics - 2022

Course Code	Course Title	L T P	Cr	E S	Course Code	Course Title	L T P	Cr	ES
<b>SEMESTER 1</b>					<b>SEMESTER 2</b>				
	Mathematics -1 (Single variable calculus)	3 1 0	4			Mathematics – II - Multivariable variable calculus	3 1 0	4	
	Introduction to Biology	2 1 0	3			Introductory Cellular and Molecular Biology	2 1 0	3	
	Physics 1- Mechanics	3 1 0	4			Physics II-Electricity and Magnetism	3 1 0	4	
	Chemistry- I General Chemistry	3 0 1	4			Chemistry - II Principles of Physical Chemistry	3 1 0	4	
	Introduction to Programming -Python	3 0 0	3			Physics Lab - I	0 0 2	1	
	Communicative English	2 0 2	3			Chemistry Lab - I	0 0 2	1	
	Scientific Programming Lab - I	0 0 2	1			Professional Communication	1 0 2	2	
	Cultural Education- I	2 0 0	2			Cultural Education - II	2 0 0	2	
	<b>TOTAL</b>		<b>24</b>			<b>TOTAL</b>		<b>21</b>	
<b>SEMESTER 3</b>					<b>SEMESTER 4</b>				
	Chemistry- III Physical Organic Chemistry	3 1 0	4			Chemistry- IV- Principles of Inorganic Chemistry	3 1 0	4	
	Physics III- Waves & optics	3 1 0	4			Physics – 4- Basic Electronics	3 1 0	4	
	Mathematics –III	3 1 0	4			<b>Soft Skills-II</b>	20 0	2	
	<b>Soft skills-I</b>	2 0 0	2						
	Environmental Science and Sustainability	3 1 0	4			Mathematical Physics (computational)	3 1 0	4	
	Chemistry Lab-II	0 0 2	1			Physics Lab - III	0 0 2	1	
	Physics Lab – II	0 0 2	1			Basics of experimental techniques	3 1 0	4	
	Scientific Programming lab-II	1 0 2	2						
	<b>TOTAL</b>		<b>22</b>			<b>TOTAL</b>		<b>21</b>	
<b>SEMESTER 5</b>					<b>SEMESTER 6</b>				
	Intermediate Mechanics	4 1 0	4			Basic Quantum Mechanics	3 1 0	4	
	Thermal and Statistical Physics	3 1 0	4			Basic Mathematical Physics	3 1 0	4	
	Applied electronics	3 1 0	4			Elements of Condensed matter physics	3 1 0	4	
	Basics of Electrodynamics	3 1 0	4						
	Open Elective/Live in Lab	3 0 0	3			<b>Core Elective - II</b>	3 0 0	3	
	Physics Lab - IV	0 0 3	1						
	<b>Core Elective – I</b>		3			Modern Optics	3 1 0	4	
	Professional elective (Minor) - I	3 0 0	3			Professional Elective (Minor) – II	3 0 0	3	
	<b>TOTAL</b>		<b>26</b>			<b>TOTAL</b>		<b>22</b>	
					<b>TOTAL (for Exit-option students)</b>		134		
<b>SEMESTER 7</b>					<b>SEMESTER 8</b>				
	Quantum mechanics	3 1 0	4			Nuclear and Particle Physics	3 1 0	4	
	Classical Mechanics	3 1 0	4			Atomic and Molecular Spectroscopy	3 1 0	4	
	Mathematical Physics	3 1 0	4			<b>Core Elective-IV</b>	3 0 0	3	
	Electrodynamics	3 0 1	4						
	Physics Lab - VI (Project Based Lab)	0 0 4	2			Condensed Matter Physics	3 1 0	4	
	<b>Core Elective - III</b>	3 0 0	3			Physics Lab - VII (Project Based)	0 0 4	2	

		3 1 0	4				<b>Core Elective –V</b>	3 0 0	3	
	Statistical Mechanics									
							Research Methodology	2 0 0	2	
	<b>TOTAL</b>		<b>25</b>				<b>TOTAL</b>	<b>22</b>		
<b>SEMESTER 9</b>						<b>SEMESTER 10</b>				
	Project –Phase 1		10				Project Phase –II -Dissertation		10	
	Viva voce ( Theory )		2							
	<b>TOTAL</b>		<b>12</b>				<b>TOTAL</b>		<b>10</b>	
							<b>TOTAL CREDITS 211</b>			

### Physics Electives

Code	Theoretical Physics- Specialization	L	T	P	Cr	Code	MINOR COURSE II & III	L	T	P	Cr
	Relativistic Quantum Mechanics	3	0	0	3	18CSA209	Data Structures and Algorithms	3	1	0	4
	Advanced Particle Physic	3	0	0	3	18CSA308	Machine Learning I	3	1	0	4
	Physics of Compact Stars	3	0	0	3	18CSA316	Machine Learning II	3	1	0	4
	Theory of Nanostructures	3	0	0	3	18MAT541	Probability and Statistics with R	3	1	0	4
	Special Theory of Relativity	3	0	0	3	18MAT542	Optimization Methods	3	1	0	4
	Introduction to Classical field theory	3	0	0	3	18PHY551	Computational Physics II	3	0	0	3
	Introduction to General Theory of Relativity	3	0	0	3	18PHY552	Computational Condensed Matter Physics	3	0	0	3
	Quantum Field Theory	3	0	0	3	18PHY553	Nonlinear Dynamics	3	0	0	3
	<b>Applied Materials- Specialization</b>	3	0	0	3						
	Physics of Semiconductors	3	0	0	3		<b>OPEN ELECTIVES (Physics)</b>				
	Physics of Nanomaterials	3	0	0	3	18OEL297	History and Philosophy of Science	3	0	0	3
	Thin Film Technology	3	0	0	3	18OEL298	EU History of Science and Technology	4	0	0	3
	Advanced Solar Cell Fabrication	3	0	0	3						
	Optoelectronic Devices	3	0	0	3						
	Electrochemical Energy Storage										
	X-Ray & Electron Diffraction Techniques	3	0	0	3						
	Physics of Smart Materials	3	0	0	3						
	Thermodynamics of Defects and Phase Transitions in Solid State	3	0	0	3						
	Biomaterials	3	0	0	3						
	Micro and Nano Magnetism Materials and its Applications	3	0	0	3						
	Computational Materials Science	3	0	0	3						

## Open Electives

Course Code	Course Title	L – T – P	Cr.	ES
18OEL231	Advertising	3 0 0	3	J
18OEL232	Basic Statistics	3 0 0	3	J
18OEL233	Citizen Journalism	3 0 0	3	J
18OEL234	Creative Writing for Beginners	3 0 0	3	J
18OEL235	Desktop Support and Services	3 0 0	3	J
18OEL236	Development Journalism	3 0 0	3	J
18OEL237	Digital Photography	3 0 0	3	J
18OEL238	Emotional Intelligence	3 0 0	3	J
18OEL239	Essence of Spiritual Literature	3 0 0	3	J
18OEL240	Film Theory	3 0 0	3	J
18OEL241	Fundamentals of Network Administration	3 0 0	3	J
18OEL242	Gender Studies	3 0 0	3	J
18OEL243	Glimpses of Indian Economy and Polity	3 0 0	3	J
18OEL244	Graphics and Web-designing Tools	3 0 0	3	J
18OEL245	Green Marketing	3 0 0	3	J
18OEL246	Healthcare and Technology	3 0 0	3	J
18OEL247	History of English Literature	3 0 0	3	J
18OEL248	Indian Writing in English	3 0 0	3	J
18OEL249	Industrial Relations and Labour Welfare	3 0 0	3	J
18OEL250	Introduction to Ancient Indian Yogic and Vedic Wisdom	3 0 0	3	J
18OEL251	Introduction to Computer Hardware	3 0 0	3	J
18OEL252	Introduction to Event Management	3 0 0	3	J
18OEL253	Introduction to Media	3 0 0	3	J
18OEL254	Introduction to Right to Information Act	3 0 0	3	J
18OEL255	Introduction to Translation	3 0 0	3	J
18OEL256	Linguistic Abilities	3 0 0	3	J
18OEL257	Literary Criticism and Theory	3 0 0	3	J
18OEL258	Macro Economics	3 0 0	3	J
18OEL259	Managing Failure	3 0 0	3	J
18OEL260	Media Management	3 0 0	3	J
18OEL261	Micro Economics	3 0 0	3	J
18OEL262	Micro Finance, Small Group Management and Cooperatives	3 0 0	3	J
18OEL263	Negotiation and Counselling	3 0 0	3	J
18OEL264	New Literatures	3 0 0	3	J
18OEL265	Non-Profit Organization	3 0 0	3	J
18OEL266	Personal Effectiveness	3 0 0	3	J
18OEL267	Perspectives in Astrophysics and Cosmology	3 0 0	3	J
18OEL268	Principles of Marketing	3 0 0	3	J
18OEL269	Principles of Public Relations	3 0 0	3	J
18OEL270	Science, Society and Culture	3 0 0	3	J
18OEL271	Statistical Analysis	3 0 0	3	J
18OEL272	Teamwork and Collaboration	3 0 0	3	J
18OEL273	The Message of Bhagwad Gita	3 0 0	3	J
18OEL274	Understanding Travel and Tourism	3 0 0	3	J
18OEL275	Videography	3 0 0	3	J
18OEL276	Vistas of English Literature	3 0 0	3	J
18OEL277	Web-Designing Techniques	3 0 0	3	J
18OEL278	Organic Farming	3 0 0	3	J
18OEL279	Basic Legal Awareness on Protection of Women and Rights	3 0 0	3	J
18OEL280	Ritual Performances of Kerala	3 0 0	3	J
18OEL281	Documenting Social Issues	3 0 0	3	J
18OEL282	Fabrication of Advanced Solar Cell	3 0 0	3	J
18OEL283	Basic Concepts of X-ray Diffraction	3 0 0	3	J
18OEL284	Introduction to FORTRAN and GNUPLOT	3 0 0	3	J
18OEL285	Introduction to Porous Materials	3 0 0	3	J
18OEL286	Forensic Science	3 0 0	3	J
18OEL287	Introduction to solar Physics	3 0 0	3	J
18OEL288	Recycling Recovery and Treatment Methods for Wastes	3 0 0	3	J
18OEL289	Acting and Dramatic Presentation	2 0 2	3	J
18OEL290	Computerized Accounting	2 0 2	3	J
18OEL291	Kerala Mural Art and Painting	2 0 2	3	J
18OEL292	Painting	2 0 2	3	J

18OEL293	Reporting Rural Issues	3 0 0	3	J
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