

DEPARTMENT OF PHYSICS
BIRLA INSTITUTE OF TECHNOLOGY- MESRA, RANCHI
NEW COURSE STRUCTURE - To be effective from academic session 2018- 19
Based on CBCS & OBE model
Recommended scheme of study
For I.M.Sc. (Physics) & M.Sc. (Physics)

Semester/ Session of Study	Level	Category of course	Course Code	Courses	Mode of delivery & credits <i>L-Lecture; T-Tutorial;P- Practicals</i>			Total Credits <i>C- Credits</i>
					L (Periods/ week)	T (Periods/ week)	P (Periods/ week)	C
SEM - I	1	THEORY						
		PC	PH101	Mechanics	3	1	0	4
			PH102	Electricity & Magnetism	3	1	0	4
		HSS	MT123	Buisness Communications	2	0	2	3
		FS	CH111	Chemistry I	3	1	0	4
		LABORATORIES						
		PC	PH103	Mechanics Lab	0	0	4	2
			PH104	Electricity& Magnetism Lab	0	0	4	2
		FS	CH112	Chemistry I Lab	0	0	3	1.5
		MC	MC101/102/103 / 104	NCC/ NSS/PT & Games/ Creative Arts				1
Total							21.5	
SEM-II	1	THEORY						
		PC	PH105	Mathematical Physics-I	3	1	0	4
			PH106	Waves and Optics	3	1	0	4
		FS	MA108	Mathematics III	5	1	0	6
			CE101	Environmental Science	2	0	0	2
		GE	CS101/EE101/ EC101 / ME101	Programming for problem solving / Basics of Electrical Engineering / Basics of Electronics and Communication Engineering / Basics of Mechanical Engineering	3	1	0	4
		LABORATORIES						
		PC	PH 107	Mathematical Physics-I Lab	0	0	4	2
			PH 108	Waves and Optics Lab	0	0	4	2
		GE	CS 102/PE 101/EC 102/ME 102	Programming for problem solving Lab / Workshop practice / Electronics and Communication Lab/ Engineering Graphics Lab	0	0	3	1.5
MC	MC105/106/107 / 108	NCC/ NSS/PT & Games/ Creative Art				1		
Total							26.5	
SEM-III	2	THEORY						
		PC	PH 201	Thermal Physics	3	1	0	4
			PH 202	Digital Systems & Applications	4	0	0	4
			PH 203	Classical Dynamics	4	1	0	5
		FS	CH 213	Chemistry II	3	1	0	4
	OE		Open Elective I				4.5	
	LABORATORIES							
	PC	PH204	Thermal Physics Lab	0	0	4	2	
		PH205	Digital Systems & Applications Lab	0	0	4	2	
	FS	CH214	Chemistry II Lab	0	0	3	1.5	
MC	MC201/202/203/ 204	NCC/ NSS/PT & Games/ Creative Art				1		
Total							28	
SEM-IV	2	THEORY						
		PC	PH206	Mathematical Physics II	3	1	0	4
			PH207	Elements of Modern Physics	3	1	0	4
			PH208	Analog Systems & Applications	3	1	0	4
		FS	MA207	Mathematics IV	5	1	0	6
	LABORATORIES							
	PC	PH209	Mathematical Physics II Lab	0	0	4	2	
		PH210	Elements of Modern Physics Lab	0	0	4	2	
		PH211	Analog Systems & Applications Lab	0	0	4	2	
	MC	MC205/206/207 / 208	NCC/ NSS/PT & Games/ Creative Art				1	
Total							25	

SEM-V	3	THEORY							
		PC	PH301	Quantum Mechanics and Applications	3	1	0	4	
			PH302	Solid State Physics	4	0	0	4	
		PE	PH303/ PH 304	PE -I (Annexure I)	3	0	0	3	
			PH305/PH306 /PH 307	PE -II (Annexure I)	3	0	0	3	
		LABORATORIES							
		PC	PH308	Quantum Mechanics Lab	0	0	4	2	
			PH309	Solid State Physics Lab	0	0	4	2	
		PE	PH310/PH311	PE -I Lab (Annexure I)	0	0	4	2	
			PH312/PH313	PE -II Lab (Annexure I)	0	0	4	2	
Total							22		
SEM-VI	3	THEORY							
		PC	PH314	Electromagnetic Theory	3	1	0	4	
			PH315	Statistical Mechanics	3	1	0	4	
		PE	PH316/PH317/ PH318	PE -III(Annexure I)	3	0	0	3	
			PH319/PH320	PE -IV(Annexure I)	3	0	0	3	
		LABORATORIES							
		PC	PH321	Electromagnetics Lab	0	0	4	2	
			PH322	Statistical Mechanics Lab	0	0	4	2	
		PE	PH323	PE -III Lab (Annexure I)	0	0	4	2	
			PH324 /PH325	PE -IV Lab (Annexure I)	0	0	4	2	
Total							22		
Total Credit of I.M.Sc. - I to VI Semesters = 145									
Notes:	The Exit option with B.Sc. (Physics Honours) can be offered to the student who wants to get it after successful completion of 6 th semester.								
I. M.Sc. Physics (Semester VII to X semester) /M.Sc. Physics (Semester I to IV Semester)									
I. M.Sc. VII / M.Sc. I	4	PC	PH401	Mathematical Method in Physics	3	0	0	3	
			PH402	Electrodynamics	3	0	0	3	
			PH403	Classical Mechanics	3	0	0	3	
			PH404	Quantum Mechanics	2	1	0	3	
			PH405	Modern Computational Techniques and Programming	2	0	0	2	
	OE		Open Elective II	3	0	0	3		
	LABORATORIES								
	4	PC	PH406	Modern Computational Techniques and Programming Lab	0	0	4	2	
			PH407	Modern Physics Lab	0	0	4	2	
	2	MC	MT204	Constitution of India	2	0	0	Non-credit	
Total							21		
I. M.Sc. VIII / M.Sc. II	4	PC	PH408	Statistical Physics	3	1	0	4	
			PH409	Atomic and Molecular Spectroscopy	3	1	0	4	
			PH410	Electronic Devices & Circuits	3	0	0	3	
			PH411	Condensed Matter Physics	3	0	0	3	
		OE		Open Elective III	3	0	0	3	
	LABORATORIES								
	PC	PH412	Electronics Lab	0	0	4	2		
		PH413	Condensed Matter Physics Lab	0	0	4	2		
	Total							21	
	I. M.Sc. IX / M.Sc. III	5	THEORY						
PC			PH501	Nuclear and Particle Physics	3	1	0	4	
			PH502	Advanced Quantum Mechanics	3	1	0	4	
			PH503	Laser Physics and Applications	3	1	0	4	
PE			PH504 to PH512	PE - V: One paper from Either Group A or B or C or D or E: Specialization	4	0	0	4	
			PH500	Dissertation (Part I) from Either Group A or B or C or D or					4
LABORATORIES									
PC			PH513	Laser Physics Lab	0	0	4	2	
Total							22		

THEORY																									
I. M.Sc. X / M.Sc. IV	5	PE	PH514 to PH530 (Annexure-II)	PE - VI: One paper from Either Group A or B or C or D or E: Specialization			4																		
				PE - VII: One paper from Either Group A or B or C or D or E: Specialization			4																		
			PH550	Dissertation (Part II) from Either Group A or B or C or D or E			8																		
Total =							16																		
Total Credits of I.M.Sc. Physics (VII to X Semesters) /M.Sc. Physics (I to IV Semesters) =						80																			
Grand Total for I.M.Sc. (I to X Semesters)=						145+80 = 225																			
<i>Minimum requirement for Degree award</i>																									
<p>*Once a group is selected in Sem IX, student has to take the papers from same group in Sem-X.</p> <p>Credit Distributions of I.M.Sc.(I to X Semesters)</p> <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: left;">Category of Course</th> <th style="text-align: left;">Credit</th> </tr> </thead> <tbody> <tr> <td>PC</td> <td>133</td> </tr> <tr> <td>PE</td> <td>44</td> </tr> <tr> <td>HSS</td> <td>3</td> </tr> <tr> <td>FS</td> <td>25</td> </tr> <tr> <td>OE</td> <td>10.5</td> </tr> <tr> <td>GE</td> <td>5.5</td> </tr> <tr> <td>MC</td> <td>4</td> </tr> <tr> <td>Total</td> <td>225</td> </tr> </tbody> </table>								Category of Course	Credit	PC	133	PE	44	HSS	3	FS	25	OE	10.5	GE	5.5	MC	4	Total	225
Category of Course	Credit																								
PC	133																								
PE	44																								
HSS	3																								
FS	25																								
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GE	5.5																								
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Total	225																								

DEPARTMENT OF PHYSICS
BIRLA INSTITUTE OF TECHNOLOGY- MESRA, RANCHI
NEW COURSE STRUCTURE - To be effective from academic session 2018- 19
Based on CBCS & OBE model
Recommended scheme of study
PE for I.M.Sc. (Physics) & M.Sc. (Physics)

Semester/ Session of Study	Level	Category of course	Course Code	Courses	Pre-requisites	Co-requisites	Mode of delivery & credits <i>L-Lecture; T-Tutorial; P- Practicals</i>			Total Credits C- Credits
							L (Periods/ week)	T (Periods/ week)	P (Periods/ week)	
PE Theory Papers										
SEM-V	3	PE-I	PH303	Advanced Mathematical Physics			3	0	0	3
			PH304	Nano Materials and Applications			3	0	0	3
		PE-II	PH305	Computational Physics			3	0	0	3
			PH306	Materials Science and Nanotechnology			4	1	0	5
		PH307	Experimental Technique			3	0	0	3	
	3	PE -I Lab	PH310	Advanced Mathematical Physics Lab		PH303	0	0	4	2
			PH311	Nano Materials and Applications Lab		PH304	0	0	4	2
		PE -II Lab	PH312	Computational Physics Lab		PH305	0	0	4	2
		PH313	Experimental Technique Lab		PH307	0	0	4	2	
PE Theory Papers										
SEM-VI	3	PE -III	PH316	Nonconventional Sources of Energy			3	0	0	3
			PH317	Introduction to Nuclear and Particle Physics			4	1	0	5
			PH318	Nuclear Hazard and Waste Managements			4	1	0	5
		PE -IV	PH319	Atmospheric Physics			3	0	0	3
			PH320	Advanced Experimental Technique			3	0	0	3
SEM-VI	3	PE III Lab	PH323	Nonconventional Sources of Energy Lab		PH316	0	0	4	2
		PE -IV Lab	PH324	Atmospheric Physics Lab		PH319	0	0	4	2
			PH325	Advanced Experimental Technique Lab		PH320	0	0	4	2
PE papers offered for ISc (VII to X Semesters) and M.Sc. (I to IV Semesters)										
PE for PG level										
	Level		Course Code	Courses	Pre-requisites	Co-requisites	L (Periods/ week)	T (Periods/ week)	P (Periods/ week)	C
SEM-IX	5	PE -V One paper from Either Group A or B or C or D or E	Group A- Theoretical and Computational Physics:							
			PH504	Numerical Methods for Physicists			2	0	4	4
			PH505	Theory of Solids			3	1	0	4
			Group B- Condensed Matter Physics:							
			PH505	Theory of Solids			3	1	0	4
			PH506	Functional Materials			4	0	0	4
			Group C – Photonics:							
			PH507	Fiber and Integrated Optics			3	1	0	4
			PH508	Quantum & Nonlinear Optics			3	1	0	4
			Group D- Electronics							
			PH509	Instrumentation and Control			3	1	0	4
			PH510	Physics of Low dimensional Semiconductors Devices			4	0	0	4
			Group E- Plasma Sciences:							
			PH511	Introduction to Plasma Physics			3	1	0	4
			PH512	Plasma Processing of Materials			4	0	0	4

SEM-X	5	PE -VI & VII Two papers from any group (Papers shall be chosen from same group in IX and X Semesters)	Group A- Theoretical and Computational Physics:							
			PH514	Theoretical and Computational Fluid Dynamics			2	0	4	4
			PH515	Theoretical and Computational Condensed Matter Physics			2	0	4	4
			PH516	Nonlinear Dynamics and Chaos			2	0	4	4
			Group B- Condensed Matter Physics:							
			PH517	Nonconventional Energy Materials			4	0	0	4
			PH518	Cryogenic Physics			4	0	0	4
			PH519	Physics of Thin Films			4	0	0	4
			PH520	Theory of Dielectrics and Ferroics			3	1	0	4
			PH515	Theoretical and Computational Condensed Matter Physics			2	0	4	4
			Group C- Photonics:							
			PH521	Photonic and Optoelectronic Devices			3	1	0	4
			PH522	Holography and Applications			3	1	0	4
			PH523	Quantum photonics and applications			3	1	0	4
			PH524	Introduction to Nanophotonics			3	1	0	4
			Group D- Electronics:							
			PH525	Microprocessor and Microcontroller Applications			3	1	0	4
			PH526	Integrated Electronics			3	1	0	4
			PH527	Microwave Electronics			3	1	0	4
			Group E- Plasma Sciences:							
			PH528	Theory of Plasmas			3	1	0	4
			PH529	Plasma Confinement			4	0	0	4
			PH530	Waves and Instabilities in Plasma			3	1	0	4
			PH519	Physics of Thin Films			4	0	0	4

NEW COURSE STRUCTURE - To be effective from academic session 2018- 19
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OE for other papers

Semester/ Session of Study	Level	Category of course	Course Code	Courses	Pre-requisites	Co-requisites	Mode of delivery & credits <i>L-Lecture; T-Tutorial; P- Practicals</i>			Total Credits C- Credits
				OE of UG level 1-4			L (Periods/ week)	T (Periods/ week)	P (Periods/ week)	
SEM-Odd		Theory papers	PH314	Electromagnetic Theory	NIL		3	1	0	4
			PH316	Nonconventional Sources of Energy	NIL		3	0	0	3
			PH319	Atmospheric Physics	NIL		3	0	0	3
			PH320	Advanced Experimental Technique	NIL		3	0	0	3
			PH304	Nano Materials and Applications	NIL		3	0	0	3
			PH305	Computational Physics	NIL		3	0	0	3
			PH307	Experimental Technique	NIL		3	0	0	3
SEM - Odd		Lab papers	PH311	Nano Materials and Applications Lab	NIL	PH304	0	0	4	2
			PH312	Computational Physics Lab	NIL	PH305	0	0	4	2
			PH313	Experimental Technique Lab	NIL	PH307	0	0	4	2
SEM-Even		Lab papers	PH321	Electromagnetic Lab	NIL	PH314	0	0	4	2
			PH323	Nonconventional Sources of Energy Lab	NIL	PH316	0	0	4	2
			PH324	Atmospheric Physics Lab	NIL	PH319	0	0	4	2
			PH325	Advanced Experimental Technique Lab	NIL	PH320	0	0	4	2
OE for level 4-5										
Semester/ Session of Study	Level			Courses	Pre-requisites	Co-requisites	L (Periods/ week)	T (Periods/ week)	P (Periods/ week)	C
SEM-Odd		OE	PH504	Numerical Methods for Physicists			2	0	4	4
			PH506	Functional Materials			4	0	0	4
			PH507	Fiber and Integrated Optics			3	1	0	4
			PH508	Quantum & Nonlinear Optics			3	1	0	4
			PH511	Introduction to Plasma Physics			3	1	0	4
			PH514	Theoretical and Computational Fluid Dynamics			2	0	4	4
SEM-Even		OE	PH517	Nonconventional Energy Materials			4	0	0	4
			PH519	Physics of Thin Films			4	0	0	4
			PH521	Photonic and Optoelectronic Devices			3	1	0	4
			PH522	Holography and Applications			3	1	0	4
			PH524	Introduction to Nanophotonics			3	1	0	4
FS for I.M.Sc. (Chemistry, Food Technoogy and Mathematics Students) offered by Physics Department										
1		FS	PH109	Physics I			3	1	0	4
			PH110	Physics I Lab			0	0	3	1.5
			PH111	Physics II			3	1	0	4
			PH112	Physics II Lab			0	0	3	1.5
FS for B. Tech Students offered by Physics Department										
2		FS	PH113	Physics			3	1	0	4
			PH114	Physics Lab			0	0	3	1.5

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NEW COURSE STRUCTURE - To be effective from academic session 2018- 19
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Recommended scheme of study

Minor in Engineering Physics (level 1-5)

Semester/ Session of Study	Level	Category of course	Course Code	Courses	Pre-requisite	Co-requisite	Mode of delivery & credits <i>L-Lecture; T-Tutorial; P- Practicals</i>			Total Credits C- Credits		
							L <i>(Periods/ week)</i>	T <i>(Periods/ week)</i>	P <i>(Periods/ week)</i>		C	
SEM-Odd	3	Theory papers	PH301	Quantum Mechanics & Applications	Nil	PH113	3	1	0	4		
			PH315	Statistical Mechanics	Nil	PH113	3	1	0	4		
	1		PH105	Mathematical Physics-I	Nil	PH113	3	1	0	4		
	3		PH302	Solid State Physics	Nil	PH113	4	0	0	4		
			PH314	Electromagnetic Theory	Nil	PH113	3	1	0	4		
			PH304	Nano Materials and Applications	Nil	PH113	3	0	0	3		
			PH305	Computational Physics	Nil	PH113	3	0	0	3		
			SEM-Even	5	PH316	Nonconventional Sources of Energy	Nil	PH113	3	0	0	3
					PH319	Atmospheric Physics	Nil	PH113	3	0	0	3
	PH520				Photonic and Optoelectronic Devices	Nil	PH113	3	1	0	4	
PH521	Holography and Applications	Nil			PH113	3	1	0	4			
SEM-Odd	1	Lab papers	PH107	Mathematical Physics - I Lab	Nil	PH105	0	0	4	2		
			PH309	Solid State Physics Lab	Nil	PH302	0	0	4	2		
	3		PH321	Electromagnetics Lab	Nil	PH314	0	0	4	2		
			PH311	Nano Materials and Applications Lab	Nil	PH304	0	0	4	2		
			PH312	Computational Physics Lab	Nil	PH305	0	0	4	2		
			SEM-Even	PH323	Nonconventional Sources of Energy Lab	Nil	PH316	0	0	4	2	
				PH324	Atmospheric Physics Lab	Nil	PH319	0	0	4	2	