

**B.TECH. (ENGINEERING PHYSICS)
COMPONENT WISE DISTRIBUTION**

Main Curriculum Components	Sub Components	Approved Credits for B.Tech.	Approved Credits Range	Proposed Credits for B.Tech. by Department	Proposed Credits Range
Institute Core Course	HSSC	5	52-58	5	53
	HSSEC	6		6	
	MC	3		3	
	BSC	12-20		16	
	ESC	8-20		12	
	DSC	4		4	
	ESSC	3		3	
	TM	4		4	
Program Core Course	CCCC	40-48	87-91	48	90
	AI/ML	2		2	
	Engg. Analysis and design (design thinking based project)/Industry Oriented Problem Solving/ Lab based Project/ Practical Problem/ Case study	4		4	
	Technical Communication	2		2	
	BTP/Entrepreneurship/ Project-based internship/PEC	6-10		6	
	PEC	22-26		22	
	TEB	6-8		6	
	OEC	9-12	9-12	9-12	9-12
	CORE	2	2	2	2
	Total	150-160		154-157	
	MSC/DHC	18/20		18/20	
	Grand Total			172-177	

DEPARTMENT OF PHYSICS
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Program Code : 122 B.Tech. (Engineering Physics)
Department : PH Physics

Teaching Scheme

Year	Credits in Autumn Semester	Credits in Spring Semester	Credits (Year – wise)
1	23	20	43
2	21/22	22/23	43/45
3	24/25	22	46/47
4	16	6	22
Grand Total			154-157
Total with MSC/DHC	With addition 18-20 credits		172-177

Non-Credit Elements (NCE)	Components	Maximum Units	Minimum Units	Comments
	Discipline (DIS)	16	8	To be evaluated by DoSW
	NCC/NSS/NSO	8	4	To be evaluated by DoSW
	Internship (INT)	24	8	1-week internship= 1 unit (to be coordinated by the deptt. /Centres/School)
	Participation in professional development programs by Industry experts/ field experts (PPD-1 & PPD-2)	8	4	To be coordinated by the departments/Centres/school (2 nd & 3 rd Years)
Minimum non-credit units to be earned: 24				

DEPARTMENT OF PHYSICS

Program Code : 122 - B.Tech.(Engineering Physics)
Department : Department of Physics
Year : I

Teaching Scheme					Contact Hours/Week			Exam Duration (Hrs.)		Relative Weights(%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
(Autumn)														
1	HSI-101	Soft Skills	HSSC	3	2	0	2	2	0	10-25	25	15-25	30-40	-
2	MAI-101	Mathematics-I	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3	PHI-101	Physics-I	BSC	4	3	1	2/2	3	0	15-30	20	15-25	30-40	-
4	PHC-101	Computer Programming	PCC	4	3	0	2	3	-	10-25	25	15-25	30-40	-
5	TMI-102	Tinkering and Mentoring*	TMI	2	-	-	-	-	-	60	40	-	-	-
6	TMI-103	Basics of IP and Entrepreneurship*	TMI	2	2	0	0	2	-	50	-	-	50	-
7	EEE-102	Basic Electrical Engineering	ESC	4	3	1	2/2	3	0	15-30	20	15-25	30-40	-
		Total		23										
(Spring)														
1	IKS-102	Indian Knowledge System	HSSC	2	2	0	0	2	0	20-35	-	20-30	40-50	-
2	MAI-102	Mathematics-II	BSC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3	ESS-102	Environmental Science and Sustainability	ESSC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
4	PHC-102	Mechanics and Relativity	PCC	3	3	0	0	3	0	20-35	-	20-30	40-50	-
5	PHC-104	Analog Electronics	PCC	4	3	1	0	3	0	10-25	25	15-25	30-40	-
6	EEE-103	Measurements and Transducers	ESC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
		Total		20										

* These two courses were taught as single course (TMI-101: Tinkering & Mentoring – 4 Credits) for 2023-24 admitted students

DEPARTMENT OF PHYSICS

Program Code : 122 - B.Tech. (Engineering Physics)
Department : Department of Physics
Year : II

[illegible]

DEPARTMENT OF PHYSICS

Program Code : 122 - B.Tech. (Engineering Physics)
Department : Department of Physics
Year : III

[illegible]

DEPARTMENT OF PHYSICS

Program Code : 122 - B.Tech. (Engineering Physics)
Department : Department of Physics
Year : IV

[illegible]

List of Program Elective Courses

PECs (Programme Elective Courses) in 3rd year:

[illegible]

PECs (Programme Elective Courses) in 4th year:

Teaching Scheme					Contact Hours/Week			Exam Duration (Hrs.)		Relative Weight (%)				
S. No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
1	PHL-501	Nuclear Astrophysics	PCC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
2	PHL-502	Physics of Nano systems	PCC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
3	PHL-503	Super fluidity and Superconductivity	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
4	PHL-504	Fiber and Nonlinear Optics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
5	PHL-505	Quantum Optics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
6	PHL-506	Advanced Quantum Computing	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
7	PHL-507	Advanced topics in Mathematical Physics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
8	PHL-508	Introduction to Superstring Theory	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
9	PHL-509	Advanced Electroceramics Technology	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
10	PHL-510	Advanced Characterization Techniques	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
11	PHL-511	Atomic and Molecular Collision Physics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
12	PHL-512	A Primer in Quantum Field Theory	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
13	PHL-513	Astrophysics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
14	PHL-514	Solar-Terrestrial Physics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
15	PHL-515	General Relativity	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
16	PHL-516	Computational Nuclear Physics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
17	PHL-517	Particle Physics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
18	PHL-518	Advanced Atomic and Molecular Physics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
19	PHL-520	Quantum Theory of Solids	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
20	PHL-521	Weather Forecasting	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
21	PHL-522	Nuclear Instrumentation	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
22	PHL-523	Physics and Technology of Thin Films	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
23	PHL-524	Advanced Nuclear reactions	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
24	PHL-525	Semiconductor Photonics	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
25	PHL-526	Advanced Light Sources	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-
26	PHL-527	Superconducting Radio Frequency for particle accelerators	PEC	4	3	1	-	3	0	20-35	-	20-30	40-50	-

List of Talent Enhancement Course

Teaching Scheme					Contact Hours/Week			Exam Duration		Relative Weight (%)				
S. No.	Course Code	Course Title	Area	Cr.	L	T	P	Th.	Pr.	CWS	PRS	MTE	ETE	PRE
TEB-A														
1	PHT-101	Experimental Techniques in Quantum Materials	TEB	2	0	1	3	-	-	100				
2	PHT-102	Ad. Experimental Techniques in Quantum Materials	TEB	4	1	1	3	-	-	100				
TEB-B														
1	PHT-103	Experimental Techniques in Laser Physics	TEB	2	0	1	3	-	-	100				
2	PHT-104	Ad. Experimental Techniques in Photonics	TEB	4	1	1	3	-	-	100				
TEB-C														
1	PHT-105	Experimental Techniques in Gamma Spectroscopy	TEB	2	0	1	3	-	-	100				
2	PHT-106	Experimental Techniques in Charged Particle Spectroscopy	TEB	4	1	1	3	-	-	100				
TEB-D														
1	PHT-107	Methods and Experiments in Atmospheric and Space Physics	TEB	2	0	1	3	-	-	100				
2	PHT-108	Ad. Experimental Techniques in Atmospheric and Space Physics	TEB	4	1	1	3	-	-	100				
TEB-E														
1	PHT-109	Principles of Electroceramic Processing & Fabrication	TEB	2	0	1	3	-	-	100				
2	PHT-110	Advanced Techniques of Electroceramic Characterization	TEB	4	1	1	3	-	-	100				

TEB-F										
1	PHT-111	Theoretical & Computational Techniques	TEB	2	0	1	3	-	-	100
2	PHT-112	Ad. Computational Techniques	TEB	4	1	1	3	-	-	100

Minor Specialisation Courses

S.No.	Code	Course title	Semester	Credits
1	PHC-102	Mechanics and Relativity	Spring	3
2	PHC-206	Applied Optics	Spring	4
3	PHC-311	Classical Electrodynamics	Autumn	4
4	PHC-313	Classical Mechanics	Autumn	4
5	PHC-204	Quantum Mechanics - I	Spring	4
6	PHC-316	Quantum Mechanics - II	Spring	3
7	PHC-302	Condensed Matter Physics	Spring	3
8	PHC-308	Quantum Electronics and Devices	Spring	3