

COURSE STRUCTURES FOR UG PROGRAMME

Department of Physics

B.Tech. Course Structure for Engineering Physics (without Minor or Second Major 2025-26 onwards)					
Category	Deviation	B.Tech. with Internship Program Components	Proposed	Recommended (IV Years)	
				Min	Max
HLM	0	Humanities, Social Science, Language and Management	11	10	---
IS	0	Institute Science	26	22	---
IE	0	Institute Engineering	15	15	---
EP	0	Engineering Drawing (Manual and Computer Aided), Manufacturing Practices and Practice course of Department/ School	9	8	---
ODC+DE	0	Department/Programme Core + Elective Courses	70	68	---
OE	0	Open Electives	6	6	---
Indl/RI/SUE	0	Industrial/Research Internship/Start-up or Entrepreneurship	15	15	---
DP	0	Exploratory Project	3	3	3
æTotal			155	147	161
*SP		*Stream Projects for B.Tech. Honours	10	10	10
		Total (Hons.)	165	157	171
L: Lecture Hours; T: Tutorial Hours; P: Laboratory/Practical Hours; C: Credits					
ODC+DE: The Department or Program Core (DC) should typically be between 50 to 70% of the total DC+DE credits: 61.4%					
æ Shows the minimum and the maximum credit limits for a B.Tech. degree.					

B.Tech. Course Structure for Engineering Physics (2025-2026 onwards) (without minor or Second Major)

UG-CRC Code	Course Code	Course Name	L–T–P			Credits
Engineering Physics : B.Tech. Semester I						
	HLM101	Universal Human Values	2	0	0	2
GY.PE101.14	PE101	Elementary Physical Education	0	1	3	2.5
GY.CP101.14	CP101	Creative Practices #	0	1	3	2.5
		Total	2	2	6	7
	HLM102	English*	2	0	0	2
		Total	4	2	6	9
#Creative Practices course to be announced by Dean Academic Office						
*Basic English course to be taken by student as recommended after Diagnostic Test						
Engineering Physics: B.Tech. Semester I						
IS.PHY102.25	PHY102	Introduction to Engineering Electromagnetics	3	1	2	5
IS.CY101.14	CY101	Chemistry – I	2	1	2	4
IS.MA101.14	MA101	Engineering Mathematics - I	3	1	0	4
IE.CSO101.14	CSO101	Computer Programming	3	1	2	5
EP.ME106.14	ME106	Manufacturing Practice - II	0	0	3	1.5
EP.ME104.14	ME104	Engineering Drawing	1	0	3	2.5
		Total	12	4	12	22

UG-CRC Code	Course Code	Course Name	L-T-P			Credits
Engineering Physics : B.Tech. Semester II						
IS.PHY101.25	PHY101	Classical, Relativistic & Quantum Mechanics	3	1	2	5
IS.MA102.14	MA102	Engineering Mathematics – II	3	1	0	4
DC.PHY103.25	PHY103	Modern Physics	2	0	0	2
DC.PHY104.25	PHY104	Electromagnetic Radiation and Optics	3	0	0	3
EP.EP101.25	EP101	Practices of Engineering Physics and Instrumentation	2	0	3	3.5
EP.ME105.14	ME105	Manufacturing Practice I	0	0	3	1.5
HLM	HLM	HLM - 1	3	0	0	3
		Total	16	2	8	22

Engineering Physics: B.Tech. Semester III						
IE.EO101.25	EO101	Fundamentals of Electrical Engineering	3	1	0	4
IE.EO102.25	EO102	Fundamentals of Electronics Engineering	3	1	2	5
MC.PHY201.15	PHY201	Quantum Physics	3	1	0	4
DC.PHY202.25	PHY202	Classical Mechanics	3	0	0	3
DC.PHY203.25	PHY203	Condensed Matter Physics	3	0	0	3
DC.PHY291.25	PHY291	Engineering Physics Lab I	0	0	3	1.5
DC.PHY292.25	PHY292	Engineering Physics Lab II	0	0	3	1.5
Total			15	3	8	22

Engineering Physics: B.Tech. Semester IV						
IS.MA202.25	MA202	Probability and Statistics	3	1	0	4
MC.EO202.25	EO202	Digital Circuits	3	0	0	3
DC.PHY204.25	PHY204	Semiconducting Electronic Devices	3	0	0	3
DC.PHY205.25	PHY205	Mathematical and Computational Physics	3	1	2	5
IE.EO103.25	EO103	Basic Electrical Engineering Lab	0	0	2	1
DC.PHY293.25	PHY293	Engineering Physics Lab III	0	0	3	1.5
DC.PHY294.25	PHY294	Engineering Physics Lab IV	0	0	3	1.5
DP.DP291.15	DP291	Exploratory Project	0	0	6	3
Total			12	2	16	22

Engineering Physics: 4-Year B.Tech. without Minor or Second Major Semester V						
DC.PHY301.15	PHY301	Atomic and Molecular Physics	3	0	0	3
DC.PHY302.25	PHY302	Nuclear and Particle Physics	3	0	0	3
DC.PHY303.25	PHY303	Thermodynamics and Statistical Physics	3	1	0	4
MC.EO274.25	EO274	Digital Circuits Lab	0	0	2	1
DE-1	DE-1	Departmental Elective - 1	3	0	0	3
OE-1	OE-1	Open Elective - 1	3	0	0	3
Total			15	1	2	17

*List of Electives DE-1						
DE.PHY305.25	PHY305	Physics of Oscillations	3	0	0	3
DE.PHY311.25	PHY311	Solar and Space Plasma Physics	3	0	0	3
DE.PHY312.25	PHY312	Elements of Astronomy	3	0	0	3
DE.PHY321.25	PHY321	Physics of Materials	3	0	0	3
DE.PHY331.25	PHY331	Fibre Optics	3	0	0	3
DE.EP341.15	EP341	Biophysics	3	0	0	3
DE.EP361.15	EP361	Remote Sensing	3	0	0	3

Engineering Physics: 4-Year B.Tech. without Minor or Second Major Semester VI						
		Internship	0	0	30	15
DE-2	DE-2	Department Elective - 2 from SWAYAM / NPTEL	3	0	0	3
Total			3	0	30	18

Engineering Physics: 4-Year B.Tech. without Minor or Second Major Semester VII						
DE-3	DE-3	Departmental Elective - 3	3	0	0	3
DE-4	DE-4	Departmental Elective - 4	3	0	0	3
DE-5	DE-5	Departmental Elective - 5	3	0	0	3
OE-2	OE-2	Open Elective - 2	3	0	0	3
HLM-2	HLM-2	HLM-2	3	0	0	3
Total (Non-Hons Students)			15	0	0	15

UG-CRC Code	Course Code	Course Name	L-T-P			Credits
SP.SP493.25	SP493	Stream Project (Hons. Students)	0	0	10	5
		Total (Hons Students)	15	0	10	20
*Semester VII Electives DE-3 to DE-5 Courses						
DE.PHY401.25	PHY401	Introduction to Quantum Computation	3	0	0	3
DE.PHY501.25	PHY501	Relativistic Electrodynamics	3	0	0	3
DE.PHY502.25	PHY502	Introduction to Quantum Field Theory	3	0	0	3
DE.PHY503.25	PHY503	Phase Transition & Critical Phenomena	3	0	0	3
DE.PHY511.25	PHY511	Introduction to Astronomy & Astrophysics	3	0	0	3
DE.PHY512.25	PHY512	Space Weather	3	0	0	3
DE.PHY513.25	PHY513	Magnetohydrodynamics	3	0	0	3
DE.PHY514.25	PHY514	General Theory of Relativity and Cosmology	3	0	0	3
DE.PHY521.25	PHY521	Condensed Matter Physics-II	3	0	0	3
DE.PHY531.25	PHY531	Integrated Optics	3	0	0	3
DE.PHY532.25	PHY532	Fourier Optics and Imaging	3	0	0	3
DE.PHY533.25	PHY533	Laser Physics	3	0	0	3
DE.PHY541.25	PHY541	Nanoscience and Nanotechnology	3	0	0	3
DE.PHY551.25	PHY551	Non-Conventional Energy Sources	3	0	0	3
DE.PHY561.25	PHY561	Satellite Image Processing	3	0	0	3
Engineering Physics : 4-Year B.Tech. without Minor or Second Major Semester VIII						
DE-6	DE-6	Departmental Elective - 6	3	0	0	3
DE-7	DE-7	Departmental Elective - 7	3	0	0	3
DE-8	DE-8	Departmental Elective - 8	3	0	0	3
DE-9	DE-9	Departmental Elective - 9	3	0	0	3
HLM-3	HLM-3	HLM-3	3	0	0	3
		Total (Non-Hons Students)	15	0	0	15
SP.SP494.25	SP494	Stream Project (Hons. Students)	0	0	10	5
		Total (Hons Students)	15	0	10	20
*Semester VIII Electives DE-6 to DE-9 Courses						
DE.PHY504.25	PHY504	Nonlinear Dynamics	3	0	0	3
DE.PHY505.25	PHY505	Advanced Quantum Mechanics	3	0	0	3
DE.PHY506.25	PHY506	Advanced Mathematical Methods	3	0	0	3
DE.PHY507.25	PHY507	Advanced Quantum Field Theory	3	0	0	3
DE.PHY508.25	PHY508	Advanced Nuclear Physics	3	0	0	3
DE.PHY509.25	PHY509	Nuclear Technologies for Industrial Applications	3	0	0	3
DE.PHY571.25	PHY571	Simulation Methods in Statistical Physics	3	0	0	3
DE.PHY511.25	PHY511	Introduction to Astronomy & Astrophysics	3	0	0	3
DE.PHY514.25	PHY514	General Theory of Relativity and Cosmology	3	0	0	3
DE.PHY515.25	PHY515	Physics of the Sun and Stars	3	0	0	3
DE.PHY516.25	PHY516	Astronomical Techniques	3	0	0	3
DE.PHY517.25	PHY517	Astrophysical Fluids and Plasmas	3	0	0	3
DE.PHY522.25	PHY522	Advanced Condensed Matter Physics	3	0	0	3
DE.PHY523.25	PHY523	Materials Characterization Techniques	3	0	0	3
DE.PHY524.25	PHY524	Spintronics and Quantum Circuits	3	0	0	3
DE.PHY501.25	PHY534	Photonics & Optoelectronics	3	0	0	3
DE.PHY535.25	PHY535	Quantum Optics	3	0	0	3
DE.PHY541.25	PHY541	Biophysical Techniques	3	0	0	3
DE.PHY552.25	PHY552	Fuel Cell	3	0	0	3
DE.PHY553.25	PHY553	Renewable Energy Sources	3	0	0	3
DE.PHY562.25	PHY562	Antenna & Radar Engineering	3	0	0	3
DE.PHY563.25	PHY563	Microwave Remote Sensing	3	0	0	3
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