COURSE STRUCTURES FOR UG PROGRAMME

Department of Metallurgical Engineering

B.Tech. Course Structure of Metallurgical Engineering (without Minor or Second Major 2025-26 onwards)				
Category	**B.Tech. with Internship Program Components**	**Proposed**	**Recommended**	
			Minimum	**Maximum**
HLM	Humanities, Social Science, Language and Management	**11**	10	
IS	Institute Science	**22**	22	
IE	Institute Engineering	**17**	15	
EP	Engineering Drawing (Manual and Computer Aided), Manufacturing Practices, and Practice courses of Department/ School	**8.5**	8	
DC+DE	Department/Program Core +Elective	**76.5**	68	
OE	Open Electives	**6**	6	
Indl/RI/ SUE	Industrial/research internship/Start-up or Entrepreneurship	**15**	15	
DP	Exploratory project	**3**	3	3
	Total	**159**	**147**	**165**
*SP	*Stream Projects for B.Tech. Honours	10	10	10
	Total	**169**	**157**	**175**

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

UG-CRC Code	Course Code	Course Name	L–T–P			Credits
Metallurgical Engineering : 4-Year B.Tech. I-Semester						
IH.H101.14	H101	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**
LM.HL101.14	HL101	English*	2	0	1	2.5
		Total	**4**	**2**	**7**	**9.5**
#Creative Practices course to be announced by Dean Academic Office						
*Basic English course to be taken by student as recommended after Diagnostic Test						
Metallurgical Engineering : 4-Year B.Tech. I-Semester						
IS.PHY102.14	PHY102	Physics – II Introduction to Electromagnetics	3	1	2	5
IS.MA101.14	MA101	Engineering Mathematics – I	3	1	0	4
IS.CY101.14	CY101	Chemistry-1	2	1	2	4
IE.CSO101.14	CSO101	Computer Programming	3	1	2	5
EP.ME105.14	ME105	Manufacturing Practices – I	0	0	3	1.5
DC.MT101.19	MT101	Introduction to Metallurgy and Materials Engineering	2	0	0	2
		Total	**13**	**4**	**9**	**21.5**
L: Lecture Hours, T: Tutorials Hours, P: Practical Or Laboratory Hours, C: Credits						
Metallurgical Engineering : 4-Year B.Tech. II-Semester						
IS.PHY101.14	PHY101	Physics I: Classical, Quantum & Relativistic Mechanics	3	1	2	5
IS.MA102.14	MA102	Engineering Mathematics - II	3	1	0	4
IE.EO102.25	EO102	Fundamentals of Electronics Engineering	3	1	2	5

UG-CRC Code	Course Code	Course Name	L–T–P			Credits
DC.MT201.19	MT201	Structure of Materials	3	0	0	3
DC.MT102.19	MT102	Metallurgical Thermodynamics and Kinetics	3	0	0	3
EP.ME104.14	ME104	Engineering Drawing	1	0	3	2.5
		Total	**16**	**3**	**7**	**22.5**
Metallurgical Engineering : 4-Year B.Tech. III-Semester						
IE.MO102.14	MO102	Transport Phenomena	3	0	0	3
IE.ME214.14	ME214	Mechanics of Materials	3	1	0	4
DC.MT202.19	MT202	Principles of Extractive Metallurgy	3	0	0	3
DC.MT203.19	MT203	Materials Testing	3	0	0	3
DC.MT205.19	MT205	Phase Diagrams	3	0	0	3
EP.MT206.19	MT206	Materials Testing Practical	0	0	3	1.5
DC.MT204.19	MT204	Extractive Metallurgy Practical	0	0	3	1.5
DP.MT291.19	MT291	Exploratory Project	0	0	6	3
		Total credits in the semester	**15**	**1**	**12**	**22**
Metallurgical Engineering : 4-Year B.Tech. IV-Semester						
DC.MT321.19	MT321	Phase Transformations	3	0	0	3
DC.MT211.19	MT211	Iron Making Technologies	3	0	0	3
DC.MT221.19	MT221	Metallography Techniques	3	0	0	3
DC.MT301.19	MT301	Mechanics of Deformation and Fracture	3	0	0	3
DC.MT302.19	MT302	Non-Ferrous Extractive Metallurgy	3	0	0	3
EP.MT313.19	MT313	Ferrous Metallurgy Practical	0	0	3	1.5
DC.MT206.19	MT206	Transport Phenomena Practical	0	0	3	1.5
DC.MT222.19	MT222	Metallography Techniques Practical	0	0	3	1.5
		Total credits in the semester	**15**	**0**	**9**	**19.5**
Metallurgical Engineering : 4-Year B.Tech. V-Semester						
DC.MT311.19	MT311	Steel Making Technologies	3	0	0	3
DC.MT304.19	MT304	Heat Treatment	3	0	0	3
DC.MT323.19	MT323	Mechanical Behaviour of Materials	3	0	0	3
DC.MT314.19	MT314	Materials Processing Technologies	3	0	0	3
DC.MT305.19	MT305	Heat Treatment Practical	0	0	3	1.5
EP.MT411.15	MT411	Materials Processing Practical	0	0	3	1.5
OE1	OE1	Open Elective (OE) - I	3	0	0	3
OE2	OE2	Open Elective (OE) - 2	3	0	0	3
		Total credits in the semester	**18**	**0**	**6**	**21**
Metallurgical Engineering : 4-Year B.Tech. VI-Semester						
		Industrial/Research Internship			30	15
IH.Hxxx	IH	HLM-1 from NPTEL/SWAYAM	3	0	0	3
		Total credits in the semester	**3**	**0**	**30**	**18**
Metallurgical Engineering : 4-Year B.Tech. VII-Semester						
DE-1	DE	Department Elective (DE)-1	3	0	0	3
DE-2	DE	Department Elective (DE)-2	3	0	0	3
DE-3	DE	Department Elective (DE)-3	3	0	0	3
IH.HXXX		HLM-2	3	0	0	3
DC.MT404.19	MT404	Modelling and Simulation in Metallurgy	3	0	0	3
IH.H101.14	IH101	Universal Human Values	1	1	0	2
		Total credits in the semester	**16**	**1**	**0**	**17**
SP-1		Stream Project (Hons)	0	0	10	5
		Total Credits in the Semester (Hons.)	**16**	**1**	**10**	**22**
Metallurgical Engineering : 4-Year B.Tech. VIII-Semester						
IH.HXXX		HLM-3	3	0	0	3
DE-4	MT	Department Elective (DE) - 4	3	0	0	3
DE-5	MT	Department Elective (DE) - 5	3	0	0	3
DE-6	MT	Department Elective (DE) - 6	3	0	0	3

UG-CRC Code	Course Code	Course Name	L–T–P			Credits
DE-7	MT	Department Elective (DE) - 7	3	0	0	3
DC.MT401.15	MT402	Electrometallurgy and Corrosion Practical	0	0	2	1
DC.MT409.19	MT409	Modelling and Simulation in Metallurgy Practical	0	0	3	1.5
		Total credits in the semester	**15**	**0**	**5**	**17.5**
SP-2		Stream Project (Hons)	0	0	10	5
		Total Credits in the Semester (Hons.)	**15**	**0**	**15**	**22.5**
# Students can study one HLM course from the bouquet of HLM choices given.						

List of Deparment Electives	
	Departmental Electives for Odd Sem - (DE-1, DE-2,DE-3)
MT541	Solidification Processing
MT583	Stainless Steel Technologies
MT425	Powder Metallurgy
MT324	Electronic and Magnetic Materials
MT401	Electrometallurgy and Corrosion
MT552	Failure Analysis
MT502	Advanced X-ray and Electron Metallography
MT322	Instrumental Analysis
MT303	Nuclear Metallurgy
MT413	Computational Thermodynamics of Materials
Departmental Electives for Even Sem - (DE-4, DE-5,DE-6, DE-7)	
MT312	Fuels and Refractories
MT524	Physical Metallurgy of Alloy Steels
MT406	Advanced Processing Technologies
MT522	Heat Treatment of Advanced Ferrous Alloys
MT542	Near-Net Shape Processing of Materials
MT306	Composite Materials
MT315	Alternative Routes of Iron and Steel Making
MT568	Metal Joining Technologies
MT413	Non-metallic Materials
MT423	Computational Design of materials
MT426	Machine leaning in Material and Metallurgical Engineering