Program Course Structure

Birla Institute of Technology, Mesra, Ranchi

Course Structure for B.Tech. (Mechanical Engineering)

Based on NEP-2020, CBCS and OBE, Effective from 2024-2025

Sr. No.	Semester of Study (Recommended)	Category of Course	Course Code	Subjects	Mode of Delivery & Credits *L-Lecture; T-Tutorial; P-Practical*			Total Credits
					L (*Periods/ Week*)	T (*Periods/ Week*)	P (*Periods/ Week*)	
	FIRST	**THEORY**						
I.1		FS	MA24101	Mathematics - I	3	1	0	4
I.2			PH24101	Physics	3	1	0	4
I.3			BE24101	Biological Science for Engineers	2	0	0	2
I.4		GE	CS24101	Programming for Problem Solving	3	1	0	4
I.5			EE24101	Basics of Electrical Engineering	2	1	0	3
		LABORATORIES						
I.6		FS	PH24102	Physics Laboratory	0	0	2	1
I.7		GE	CS24102	Programming for Problem Solving Laboratory	0	0	2	1
I.8			EE24102	Electrical Engineering Laboratory	0	0	2	1
I.9		HSS	HS24131	Communication Skill - I	0	0	3	1.5
I.10		MC	MC24 101/102/103 /104/105	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA) /Entrepreneurship	0	0	2	1
TOTAL (Theory + Labs)								**22.5**
	SECOND	**THEORY**						
II.1		FS	MA24103	Mathematics - II	3	1	0	4
II.2			CH24101	Chemistry	3	1	0	4
II.3		GE	EC24101	Basic Electronics	2	1	0	3
II.4			ME24101	Basics of Mechanical Engineering	2	1	0	3
II.5		FS	CE24101	Environmental Science	2	0	0	2
		LABORATORIES						
II.6		FS	CH24102	Chemistry Laboratory	0	0	2	1
II.7		GE	EC24102	Basic Electronics Laboratory	0	0	2	1
II.8			ME24102	Engineering Graphics	0	0	4	2
I.9			PE24102	Workshop Practice	0	0	2	1

I.10		MC	MC24 106/107/108/109 /110	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA) /Entrepreneurship	0	0	2	1
TOTAL (Theory + Labs)								**22**
GRAND TOTAL FOR FIRST YEAR								**44.5**
Vocational Courses for Exit after 1st Year								
VOC I: ME24104: Working with AUTOCAD					1	0	4	3
VOC II: PE24190; Welding Technology					1	0	4	3
	THIRD		**THEORY**					
III.1		PC	ME24201	Thermodynamics	3	0	0	3
III.2		PC	ME24203	Fluid Mechanics and Hydraulic Machines	3	0	0	3
III.3			ME24205	Strength of Materials	3	1	0	4
III.4			PE24201	Introduction to Materials Engineering	3	0	0	3
III.5			PE22297	Manufacturing Processes	3	0	0	3
III.6		FS	MA24201	Numerical Methods	2	0	0	2
III.7		HSS	MT24131	UHV-II: Understanding Harmony	3	0	0	3
				LABORATORIES				
III.8		FS	MA24202	Numerical Methods Lab	0	0	2	1
III.9		PC	ME24202	Fluid Mechanics and Hydraulic Machines Lab	0	0	2	1
III.10		MC	MC24 201/202/203/204 /205	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA) / Entrepreneurship	0	0	2	1
	TOTAL (Theory + Labs)							**24**
	FOURTH		**THEORY**					
IV.1		PC	ME24207	Kinematics and Dynamics of Machines	3	1	0	4
IV.2		PC	ME24209	Thermal Energy Conversion Systems	3	1	0	4
IV.3		PC	ME24211	Machine Design	3	1	0	4
IV.4		PE	ME24,215, 217, 219	Programme Elective -I	3	1	0	4
IV.5		OE	XXXXXX /MO24201	Open Elective - I / MOOC - I	3	0	0	3
IV.6		HSS	HS24211	Indian Knowledge System	2	0	0	0
				LABORATORIES				
IV.7		PC	ME24208	Basic Mechanical Engineering lab	0	0	2	1
IV.8		PC	ME24210	Dynamics of Machines Lab	0	0	3	1.5
IV.9		PC	PE24298	Manufacturing processes Lab	0	0	3	1.5
IV.10		MC	MC24 206/ 207/208 /	Choice of :	0	0	2	1

			209/210	NCC/NSS/ PT & Games/ Creative Arts (CA) / Entrepreneurship				
TOTAL (Theory + Labs)								**24**
GRAND TOTAL FOR SECOND YEAR								**48**
Vocational Courses for Exit after 2nd Year								
VOC III: ME24212: Installation, Testing and maintenance of Solar Appliances					1	0	4	**3**
VOC IV: PE24290: CNC Machining					1	0	4	**3**
	FIFTH	THEORY						
V.1		PC	ME24301	I C Engines and Gas Turbines	3	1	0	4
V.2		PC	ME24303	Mechanical Vibration	3	0	0	3
V.3		PC	ME24305	Heat and Mass Transfer	3	0	0	3
V.4		PE	ME24 313, 315, 317, 319, PE24313	Programme Elective -II	3	0	0	3
V.5		PE	ME24 321,323, 325, PE24315	Programme Elective -III	3	0	0	3
V.6		OE	XXXXXXX /MO24301	Open Elective - II / MOOC - II	3	0	0	3
		LABORATORIES						
V.7		PC	ME24302	Heat Transfer Lab	0	0	2	1
V.8			ME24304	Internal Combustion Engines Lab	0	0	2	1
V.9		HSS	HS24133	Communication Skill - II	0	0	3	1.5
V.10		PC	ME24300	Project - I				2
TOTAL (Theory + Labs)								**24.5**
	SIXTH	**THEORY**						
VI.1		PC	ME24307	Computer Aided Design	2	0	0	2
VI.2		PC	ME24309	Automobile Engineering	3	1	0	4
VI.3		PC	ME24311	Robotics Engineering	3	1	0	4
VI.4		PE	ME24, 331, 333, 329, PE24335	Programme Elective -IV	3	0	0	3
VI.5		PE	ME24 335, 337,339 PE24345	Programme Elective -V	3	0	0	3
VI.6		OE	XX24XXX/ MO24303	Open Elective - III / MOOC - III	3	0	0	3
		LABORATORIES						
VI.7		PC	ME24306	Robotics and Automation Lab	0	0	3	1.5
VI.8			ME24308	Automobile Engineering Lab	0	0	3	1.5
VI.9			ME24310	Computer Aided Design and Drafting lab	**0**	**0**	**2**	1
VI.10			ME24350	Project - II				2
TOTAL (Theory + Labs)								**25**
GRAND TOTAL FOR THIRD YEAR								**49.5**

	SEVENTH	**THEORY**						
VII.1		PC	ME24401	Refrigeration and Air Conditioning	3	1	0	4
VII.2		PE	ME24 403, 405, 407, PE24 407, 413	Prog Elective -VI	3	0	0	3
VII.3		PE	XXXXXX/MO24401	Open Elective - IV / MOOC - IV	3	0	0	3
VII.4		HSS	MT24204	Constitution of India	2	0	0	0
		LABORATORIES						
VII.5		PC	ME24404	Refrigeration and Air Conditioning Lab	**0**	**0**	**2**	1
VII.6		MC	MC24400	Summer Training (Minimum Four Weeks / 160 Hrs)				4
VII.7		PC	ME24400	Project - III				3
TOTAL (Theory + Labs)								**18**
VIII.1	**EIGHTH**	PC	ME24450/ ME24490	Project-IV / Industry Internship				6
VIII.2			ME24498	Comprehensive Viva				2
	TOTAL (Theory + Labs)							**8**
GRAND TOTAL FOR FOURTH YEAR								**26**
GRAND TOTAL FOR B.TECH.								**168**

DEPARTMENT OF MECHANICAL ENGINEERING
PROGRAM ELECTIVES (PE)

Level	Course Code	Course Name	Mode of delivery & credits *L-Lecture; T-Tutorial; P-Practical*			Total Credit *C- Credit*
			L (*Periods/ week*)	**T (*Periods/ week*)**	**P (*Periods/ week*)**	**C**
2(PE-I) 4th SEM	ME24215	Composite Materials	3	1	0	4
	ME24217	Renewable Energy Resources	3	1	0	4
	ME24219	Non-Destructive Testing	3	1	0	4
3(PE-II) 5th SEM	ME24313	Measurement & Instrumentation	3	0	0	3
	ME24315	Turbomachinery	3	0	0	3
	PE24313	Advanced Welding Technology	3	0	0	3
	ME24317	Finite Element Methods	3	0	0	3
	ME24319	Computational Fluid Dynamics	3	0	0	3
3(PE-III) 5th SEM	ME24321	Advanced Solid Mechanics	3	0	0	3
	ME24323	Mechatronics	3	0	0	3
	PE24315	Rapid Prototyping and Tooling	3	0	0	3
	ME24325	Industrial Tribology	3	0	0	3
3(PE -IV) 6th SEM	ME24329	Design of Mechanisms	3	0	0	3
	PE24335	Surface Engineering & Laser Additive Manufacturing	3	0	0	3
	ME24331	Power Plant Engineering	3	0	0	3
	ME24333	Gas Dynamics	3	0	0	3
3(PE -V) 6th SEM	ME24335	Hydraulic & Pneumatic Control	3	0	0	3
	ME24337	Power Gear Train	3	0	0	3
	PE24345	Engineering Optimization	3	0	0	3
	ME24339	Combustion	3	0	0	3
4(PE-VI) 7th SEM	ME24403	Industrial Management	3	0	0	3
	ME24405	Advanced Heat Transfer	3	0	0	3
	ME24407	Theory of Elasticity	3	0	0	3
	PE24407	Non- Conventional Machining Processes	3	0	0	3
	PE24413	A I and Data Analytics	3	0	0	3

DEPARTMENT OF MECHANICAL ENGINEERING
OPEN ELECTIVES (OE)*

Level	Course Code	Course Name	Mode of delivery & credits *L-Lecture; T-Tutorial; P-Practical*			Total Credit *C- Credit*
			L (*Periods/ week*)	**T *(Periods/ week)***	**P *(Periods/ week)***	**C**
2(OE-I) 4th SEM	ME24223	Smart & New Materials	3	0	0	3
	ME24225	Experimental Methods in Engineering	3	0	0	3
3(OE-II) 5th SEM	ME24341	Renewable Energy Sources	3	0	0	3
	ME24343	Elements of Hydel & Thermal Power Plants	3	0	0	3
3(OE-III) 6th SEM	ME24345	Elements of Nuclear & Diesel Power Plants	3	0	0	3
4(OE-IV) 7th SEM	ME24411	Mechatronics & its applications	3	0	0	3
	ME24413	Industrial Robotics & Automation	3	0	0	3

*** OPEN ELECTIVES TO BE OFFERED ONLY TO THE STUDENTS OF OTHER DEPARTMENT.**

DEPARTMENT OF MECHANICAL ENGINEERING
Course Structure for B.Tech. MINOR in "Mechanical Engineering"
Based on NEP-2020, CBCS and OBE, Effective from 2024-2025

Sr. No.	Semester of Study (Recommended)	Category of Course	Course Code	Subjects	Mode of Delivery & Credits *L-Lecture; T-Tutorial; P-Practical*			Total Credits
					L (*Periods/ Week*)	**T (*Periods/ Week*)**	**P (*Periods / Week*)**	
	FIFTH	**THEORY**						
I.1		PC	ME24305	Heat and Mass Transfer	3	0	0	3
I.2			ME2203	Fluid Mechanics and Hydraulic Machines	3	0	0	3
		LABORATORY						
I.3		PC	ME24202	Fluid Mechanics and Hydraulic Machines Lab	0	0	2	1
TOTAL (Theory + Labs)								**7.0**
	SIXTH	**THEORY**						
II.1		PC	ME24301	I C Engines and Gas Turbines	3	1	0	4
II.2			ME24205	Strength of Martials	3	1	0	4
		LABORATORY						
II.3		PC	ME24304	Internal Combustion Engines Lab	0	0	2	1
TOTAL (Theory + Labs)								**9.0**
	SEVENTH	**THEORY**						
III.1		PC	ME24211	Machine Design	3	1	0	4
		LABORATORY						
III.2		PC	ME24310	Computer Aided Design and Drafting lab	0	0	2	1
		TOTAL (Theory + Labs)						**5**
		GRAND TOTAL **Minimum requirement for minor degree award**						**21.0**