

2024

**Programme Manual
for
B.Tech. in Mechanical Engineering
with specialization in
Rail Engineering**

SCHOOL OF TECHNOLOGY

GATI SHAKTI VISHWAVIDYALAYA

VADODARA, GUJARAT

गति शक्ति विश्वविद्यालय

GATI SHAKTI VISHWAVIDYALAYA

(A Central University under the Ministry of Railways, Government of India)

B.Tech. in Mechanical Engineering (Specialization: Rail Engineering)

PROGRAMME CURRICULA

YEAR-I SEMESTER-I

Sr. No.	COURSE CODE	COURSE TITLE	L	T	P	C
1	IDL101	Introduction to Mechanical and Civil Engineering	4	0	0	4
1	IDP102	Workshop Practices & Engineering Survey Lab	0	0	2	1
2	IDP103	Computer Programming - I (Python)	1	0	2	2
3	1DL104	Design Thinking	2	0	0	2
4	REL101	Introduction to Rail Systems Engineering	2	0	0	2
5	MAL101	Engineering Mathematics-I	3	1	0	4
6	PHL101	Engineering Physics	3	0	0	3
7	PHP102	Engineering Physics Lab	0	0	2	1
8	HSP101	Health, Wellness and Yoga	0	0	2	1
TOTAL			15	1	8	20

SEMESTER-II

Sr. No.	COURSE CODE	COURSE TITLE	L	T	P	C
1	IDL105	Engineering Mechanics	2	1	0	3
2	IDP106	Engineering Mechanics Lab	0	0	2	1
3	IDL107	Introduction to Electrical and Electronics Engineering	4	0	0	4
4	IDP108	Basic Electrical and Electronics Engineering Lab	0	0	2	1
5	IDP109	Computer Programming - II (C Language)	1	0	2	2
6	TLL101	Introduction to Multimodal Transportation Ecosystem	1	0	0	1
7	MAL102	Engineering Mathematics-II (Including Statistics)	3	1	0	4
8	CYL101	Engineering Chemistry	3	0	0	3
9	CYP102	Engineering Chemistry Lab	0	0	2	1
10	MEI101	Summer Internship - I (2 - 3 Weeks)	0	0	2	1
TOTAL			14	2	10	21

गति शक्ति विश्वविद्यालय
GATI SHAKTI VISHWAVIDYALAYA
(A Central University under the Ministry of Railways, Government of India)

YEAR-II
SEMESTER-III

Sr. No.	COURSE CODE	COURSE TITLE	L	T	P	C
1	MAL203	Numerical Methods using MATLAB	2	0	2	3
2	MEL202	Material Science and Metallurgy	2	0	0	2
3	MEP203	Material Science Lab	0	0	2	1
4	IDL210	Strength of Materials	3	1	0	4
5	IDP211	Strength of Materials Lab	0	0	2	1
6	IDL212	Fluid Mechanics and Hydraulics	3	0	0	3
7	IDP213	Fluid Mechanics and Hydraulics Lab	0	0	2	1
8	MEL204	Manufacturing Technology	3	0	0	3
9	MEP205	Manufacturing Technology Lab	0	0	2	1
10	MEL206	Thermodynamics: Principles and Applications	3	1	0	4
11	MEP207	Thermodynamics Lab	0	0	2	1
TOTAL			16	2	12	24

SEMESTER-IV

Sr. No.	COURSE CODE	COURSE TITLE	L	T	P	C
1	REL202	Principles of Railway Operations	2	0	0	2
2	MEL208	Heat Transfer Processes	2	1	0	3
3	MEP209	Heat Transfer Processes Lab	0	0	2	1
4	IDP214	Engineering Graphics and Design Lab	1	0	2	2
5	MEL210	Theory of Machines and Vibrations	3	0	0	3
6	MEP211	Theory of Machines and Vibrations Lab	0	0	2	1
7	IDL215	Mechatronics	3	0	0	3
8	IDP216	Mechatronics Lab	0	0	2	1
9	IDL217	Electrical Machines and Drives	2	0	0	2
10	MEI212	Summer Internship – II (4 to 6 Weeks)	0	0	4	2
TOTAL			13	1	12	20

गति शक्ति विश्वविद्यालय
GATI SHAKTI VISHWAVIDYALAYA
(A Central University under the Ministry of Railways, Government of India)

YEAR-III
SEMESTER-V

Sr. No.	COURSE CODE	COURSE TITLE	L	T	P	C
1	IDL318	Ethics in Engineering Practice	2	0	0	2
2	IDL319	Engineering Economics, Costing, Estimation, and Tendering	3	0	0	3
3	MEL313	Metrology and Instrumentation	2	0	0	2
4	MEP314	Metrology and Instrumentation Lab	0	0	2	1
5	REL303	High Speed Rail Vehicle Dynamics	3	1	0	4
6	REL304	Energy Sustainability - 1 (BEE)	3	0	0	3
7	IDL320	Robotics	3	0	0	3
8	IDL321	Refrigeration & Air-Conditioning	3	0	0	3
9	IDP322	Refrigeration & Air-Conditioning Lab	0	0	2	1
10	MEP315	Computer Aided Design Lab	0	0	4	2
TOTAL			19	1	8	24

SEMESTER-VI

Sr. No.	COURSE CODE	COURSE TITLE	L	T	P	C
1	REL306	Electric Traction & Power Supply	3	1	0	4
2	REP307	Electrical Traction Lab	0	0	2	1
3	REL305	Energy Sustainability - 2 (BEE)	3	0	0	3
4	MEL316	Machine Design	2	1	0	3
5	MEP317	Finite Element Analysis using ANSYS with Lab	2	0	2	3
6	IDL323	Artificial Intelligence and Machine Learning	3	0	0	3
7	MEL3XX	Elective-I	2	0	0	2
8	MEI318	Summer Internship - III (6 to 8 Weeks)	0	0	6	3
TOTAL			15	2	10	22

गति शक्ति विश्वविद्यालय

GATI SHAKTI VISHWAVIDYALAYA

(A Central University under the Ministry of Railways, Government of India)

YEAR-IV SEMESTER-VII

Sr. No.	COURSE CODE	COURSE TITLE	L	T	P	C
1	REL408	Electric Traction & Rolling Stock	3	1	0	4
2	REL409	Urban Rail Transport System, Maglev & Hyperloop	3	0	0	3
3	IDL424	Entrepreneurship and Innovation	2	0	0	2
4	MED419	B.Tech. Project-I	0	0	4	2
5	TLL402	Logistics and Supply Chain Management	2	0	0	2
6	IDL425	Operations Research	2	1	0	3
7	MEL4XX	Elective-II	2	0	0	2
8	IDL426	Reliability, Availability, Maintainability and Safety	3	0	0	3
TOTAL			17	2	4	21

SEMESTER-VIII

Sr. No.	COURSE CODE	COURSE TITLE	L	T	P	C
1	MED420	B.Tech. Project-II	0	0	16	8
TOTAL			0	0	16	8

SUMMARY OF CREDITS DISTRIBUTION

S.No.	Total Credits in Odd Semester (Nos.)	Total Credits in Even Semester (Nos.)	Year	Total Credits in Year
1	I Semester: 20	II Semester: 21	Year -I	41
2	III Semester: 24	IV Semester: 20	Year -II	44
3	V Semester: 24	VI Semester: 22	Year -III	46
4	VII Semester: 21	VIII Semester: 8	Year -IV	29
Total number of credits of the Programme				160

1 Credit = 15 Hrs. for Theory courses and 1 Credit = 30 Hrs. for practical courses

LIST OF ELECTIVES

Smart Materials	2
Impact Dynamics and Crashworthiness	2
Corrosion and Prevention	2
Waste Management Technologies	2
Unconventional Machining Processes	2
Vehicle Condition Monitoring	2
Advanced Heat Treatment processes	2
Solid and Hazardous Waste Management	2
Tribology	2
Nondestructive and Destructive Testing methods	2
Instrumentation Control	2
Non-conventional Energy Resources	2
Urban Planning Models	2
Urban, Rural, Regional Transport Planning Models	2
Air and Noise Pollution Control	2
Applied Hydraulic and Pneumatic Engineering	2
Material, Testing and Evaluation	2
Computational Fluid Dynamics	2
Utilization of Solar Thermal Energy	2
Aircraft Propulsion	2
Fracture and fatigue of Rolling Stock	2
Rolling stock incident investigation and vehicle performance monitoring	2
Safety and Reliability of High Speed Operation	2
Railway Braking and Brake Testing Systems	2