MECHANICAL ENGINEERING

B. Tech. Mechanical Engineering – 2023 Batch
COURSE COMPONENT AND CREDIT STRUCTURE

S. No.	Courses Category / Component	Abbreviation	Credits	
			Half Semester Project	Full semester Project
1	Basic Sciences	**BSC**	14	14
2	Engineering Sciences	**ESC**	21	21
3	Humanities and Social Sciences including Management	**HSMC**	9	9
4	Program Core	**PCC**	63	63
5	Professional Electives with Half Semester Project	**PEC**	24	--
	Professional Electives with Full Semester Project		--	18
6	Open Electives	**OEC**	9	9
7	Skill-Based Courses	**SBC**	8	8
8	Industrial Training Program Mini Project Summer Internship Program Internship	**P**	4	4
	Half Semester Project		8	--
	Full Semester Project		--	14
9	Mandatory Courses	**MC**	0	0
10	MOOC Courses	**MOOC**	5	5
		Total Credits	**165**	**165**

CURRICULUM STRUCTURE AND COMPONENTS

BASIC SCIENCE COURSES (BSC)							
S. No	**Code No.**	**Course Title**	**Hours per week**			**Credits**	**Semester**
			L	**T**	**P**		
1	23ME1001	Engineering Materials	3	0	0	3	I
2	23ME1002	Drone Technology	2	0	0	2	I
3	23MA1006	Linear Algebra, Calculus and Ordinary Differential Equations	2	0	2	3	I
4	23MA1007	Partial Differential Equations, Transforms and Numerical Methods	2	0	2	3	II
5	23MA2004	Probability and Statistics for Mechanical Engineering	2	0	2	3	III
Number of credits to be earned in Basic Sciences Category						**14**	
ENGINEERING SCIENCE COURSES (ESC)							
S. No	**Code No.**	**Course Title**	**Hours per week**			**Credits**	**Semester**
			L	**T**	**P**		
1	23ME1003	Innovation and Creativity	2	0	0	2	II
2	23ME1004	Industrial Robotics	3	0	0	3	II
3	23ME1006	Engineering Materials Laboratory	0	0	2	1	I
4	23ME1007	Computer Graphics Laboratory (AutoCAD)	0	0	4	2	I
5	23ME1010	Innovation and Creativity Laboratory	0	0	2	1	II
6	23EE1008	Electric Circuits and Electronic Devices	3	0	0	3	II

7	23EE1009	Electric Circuits and Electronic Devices Lab.	0	0	4	2	II
8	23CS1015	C Programming and Applications	2	0	0	2	I
9	23CS1016	C Programming and Applications Lab.	0	0	2	1	I
10	23CS1017	Coding for Problem Solving - Python	3	0	0	3	II
11	23CS1018	Coding for Problem Solving - Python Lab.	0	0	2	1	II
Number of credits to be earned in Engineering Sciences Category						**21**	
HUMANITIES & SOCIAL SCIENCES INCLUDING MANAGEMENT COURSES (HSMC)							
S. No	**Code No.**	**Course Title**	**Hours per week**			**Credits**	**Semester**
			L	**T**	**P**		
1	23ME2014	Engineering Economics and Operation Research	2	0	0	2	IV
2	NPTEL	Professional English	1	0	0	1	I
3	23MS2001	Concepts and Applications in Entrepreneurship	3	0	0	3	I
4	23MS1001	Data Analytics and Optimization Laboratory	0	0	2	1	II
5	23MS2004	Business Plan for Start-up	2	0	0	2	VI
Number of credits to be earned in Humanities & Social Sciences including Management Category						**9**	

PROGRAM CORE COURSES (PCC)							
S. No	**Code No.**	**Course Title**	**Hours per week**			**Credits**	**Semester**
			L	**T**	**P**		
1	23ME2006	Engineering Mechanics	3	0	0	3	III
2	23ME2007	Thermodynamics	3	0	0	3	III
3	23ME2008	Fluid Mechanics and Fluid Machines	3	0	0	3	III
4	23ME2009	Fluid Power Control Engineering	2	0	0	2	III
5	23ME2010	Electric Vehicle Design	3	0	0	3	III
6	23ME2011	Strength of Materials	3	0	0	3	IV
7	23ME2012	Kinematics and Dynamics of Machinery	3	0	0	3	IV
8	23ME2013	Applied Thermodynamics	3	0	0	3	IV
9	23ME2015	Piping Design and Instrumentation	2	0	0	2	IV
10	23ME2016	Design of Machine Elements	3	0	0	3	V
11	23ME2017	Smart Manufacturing	3	0	0	3	V
12	23ME2018	Heat and Mass Transfer	3	0	0	3	V
13	23ME2019	Finite Element Methods in Engineering	3	0	0	3	VI
14	23ME2020	Gas Dynamics and Jet Propulsion	3	0	0	3	VI
15	23ME2021	Computational Fluid Dynamics	3	0	0	3	VII
16	23ME2022	Fluid Mechanics Laboratory	0	0	2	1	III
17	23ME2023	Thermodynamics Laboratory	0	0	2	1	III
18	23ME2025	Strength of Materials Laboratory	0	0	2	1	IV
19	23ME2027	Applied Thermodynamics Laboratory	0	0	2	1	IV
20	23ME2028	Metrology and Measurements Laboratory	0	0	2	1	IV

21	23ME2030	Heat Transfer Laboratory	0	0	2	1	V
22	23EC2020	Printed Circuit Board Design and Arduino Programming	2	0	0	2	IV
23	23EC2021	Printed Circuit Board Design and Arduino Programming Laboratory	0	0	2	1	IV
24	23EC2023	Industry 5.0	2	0	0	2	V
25	23CS2051	ANN and Machine Learning	2	0	0	2	V
26	23CS2052	ANN and Machine Learning Laboratory	0	0	2	1	V
27	23EC2017	Semiconductor and Chip Design	2	0	0	2	VI
28	23CS2053	JAVA Programming	2	0	0	2	VI
29	23AE2072	Subsonic Aerodynamics Laboratory	0	0	2	1	VI
30	23CS2054	JAVA Programming Laboratory	0	0	2	1	VI
Number of credits to be earned in Program Cores Category						**63**	
PROFESSIONAL ELECTIVE COURSES (PEC)							
S. No	**Code No.**	**Course Title**	**Hours per week**			**Credits**	**Semester**
			L	**T**	**P**		
1	23ME2033	Hydrogen Fuel Cell Design	3	0	0	3	V to VIII
2	23ME2034	Transmission System for Smart Vehicles	3	0	0	3	
3	23ME2035	Biomechanics and Human Movement	3	0	0	3	
4	23ME2036	Design and Programming of Industrial Robots	3	0	0	3	
5	23ME2037	Sustainable Energy Technologies	3	0	0	3	
6	23ME2038	Automotive Cybersecurity	3	0	0	3	
7	23ME2039	Energy Harvesting Technologies	3	0	0	3	
8	23ME2040	Artificial Intelligence in Mechanical Systems	3	0	0	3	
9	23ME2041	Industrial IoT for Mechanical Systems	3	0	0	3	
10	23ME2042	Experimental Methods in Engineering	3	0	0	3	
11	23ME2043	Data Science and Engineering	3	0	0	3	
Half Semester Project - Number of credits to be earned in Professional Electives Category						**24**	
Full Semester Project - Number of credits to be earned in Professional Electives Category						**18**	
OPEN ELECTIVE COURSES (OEC)							
S. No	**Code No.**	**Course Title**	**Hours per week**			**Credits**	**Semester**
			L	**T**	**P**		
1	23ME2044	Industrial Safety Engineering	3	0	0	3	V to VII
2	23ME2045	Modern Vehicle Technology	3	0	0	3	V to VII
3	23ME2046	Automotive Materials and Electronics	3	0	0	3	V to VII
4	23ME2047	Modern Manufacturing Techniques	3	0	0	3	V to VII
5	23ME2048	Robotic Engineering	3	0	0	3	V to VII
6	23ME2049	Fluid Power Applications	3	0	0	3	V to VII
7	23ME2051	Fuel Cells Technology	3	0	0	3	V to VII
8	23ME2052	MEMS and Micro Systems Fabrication	3	0	0	3	V to VII
Number of credits to be earned in Open Electives Category						**9**	

SKILL BASED COURSES (SBC)							
S. No	**Code No.**	**Course Title**	**Hours per week**			**Credits**	**Semester**
			L	**T**	**P**		
1	23ME1008	Welding Technology Laboratory	0	0	2	1	I
2	23ME1009	Additive Manufacturing Laboratory	0	0	2	1	I
3	23ME2024	Fluid Power Control Engineering Laboratory	0	0	2	1	III
4	23ME2026	Design Laboratory - II	0	0	2	1	IV
5	23EC2022	Sensors, Data Acquisition and Control Laboratory	0	0	2	1	IV
6	23ME2029	3D Printing and Computer Aided Manufacturing Laboratory	0	0	2	1	V
7	23ME2031	Computational Fluid Dynamics Laboratory	0	0	2	1	VII
8	23ME2032	Simulation and Analysis Laboratory	0	0	2	1	VII
Number of credits to be earned in Skill Based Courses Category						**8**	

PROJECT							
S. No	**Code No.**	**Course Title**	**Hours per week**			**Credits**	**Semester**
			L	**T**	**P**		
1	ITP2921	Industrial Training Program	2 weeks			1	II
	MP2921	Mini Project					
	ISP2921	Internship					
	SIP2921	Summer Internship Program					
2	ITP2922	Industrial Training Program	2 weeks			1	III
	MP2922	Mini Project					
	ISP2922	Internship					
	SIP2922	Summer Internship Program					
3	ITP2923	Industrial Training Program	2 weeks			1	IV
	MP2923	Mini Project					
	ISP2923	Internship					
	SIP2923	Summer Internship Program					
4	ITP2924	Industrial Training Program	2 weeks			1	VI
	MP2924	Mini Project					
	ISP2924	Internship					
	SIP2924	Summer Internship Program					
5	23ME2998	Half-Semester Project	45 Days			8	VIII
	23ME2999	Full-Semester Project	90 Days			14	VIII
Number of credits to be earned in Project Category						**12/18**	

MANDATORY COURSES							
S. No	**Code No.**	**Course Title**	**Hours per week**			**Credits**	**Semester**
			L	**T**	**P**		
1	18MS2014	Constitution of India	2	0	0	0	I
2	18CH2001	Environmental Studies	2	0	0	0	II
					Total	**0**	
MOOC COURSES (NPTEL)							

S. No	Code No.	Course Title	Hours per week			Credits	Semester
			L	T	P		
1	MOOC	NPTEL Course-1	2	-	-	2	II
2	MOOC	NPTEL Course-2	2	-	-	2	III
3	MOOC	NPTEL Course-3	1	-	-	1	IV
					Total	**5**	

SEMESTERWISE CURRICULUM

SEMESTER- I (Focus towards Basics of Programming)						
S. No.	**Course Code**	**Course Title**	**Hours per Week**			**Credits**
			L	**T**	**P**	
	Theory Courses					
1	23ME1001	Engineering Materials	3	0	0	3
2	23ME1002	Drone Technology	2	0	0	2
3	NPTEL	Professional English	1	0	0	1
4	23MA1006	Linear Algebra, Calculus and Ordinary Differential Equations	2	0	2	3
5	23CS1015	C Programming and Applications	2	0	0	2
6	23MS2001	Concepts and Applications in Entrepreneurship	3	0	0	3
7	18MS2014	Constitution of India	2	0	0	0
		Sub Total Credits for Theory Courses				**14**
	Laboratory Courses					
1	23ME1006	Engineering Materials Laboratory	0	0	2	1
2	23ME1007	Computer Graphics Laboratory (AutoCAD)	0	0	4	2
3	23ME1008	Welding Technology Laboratory	0	0	2	1
4	23ME1009	Additive Manufacturing Laboratory	0	0	2	1
5	23CS1016	C Programming and Applications Lab.	0	0	2	1
		Sub Total Credits for Laboratory Courses				**6**
					Total	**20**
SEMESTER- II (Focus towards Basics of Programming)						
S. No.	**Course Code**	**Course Title**	**Hours per Week**			**Credits**
			L	**T**	**P**	
	Theory Courses					
1	23ME1003	Innovation and Creativity	2	0	0	2
2	23ME1004	Industrial Robotics	3	0	0	3
3	23MA1007	Partial Differential Equations, Transforms and Numerical Methods	2	0	2	3
4	23EE1008	Electric Circuits and Electronic Devices	3	0	0	3
5	23CS1017	Coding for Problem Solving - Python	3	0	0	3
6	18CH2001	Environmental Studies	2	0	0	0
7	MOOC	NPTEL Course-1				
		Sub Total Credits for Theory Courses				**14**
	Laboratory Courses					
1	23ME1010	Innovation and Creativity Laboratory	0	0	2	1
2	23EE1009	Electric Circuits and Electronic Devices Lab.	0	0	4	2
3	23MS1001	Data Analytics and Optimization Laboratory	0	0	2	1
4	23CS1018	Coding for Problem Solving - Python Lab.	0	0	2	1
5	ITP2921	Industrial Training Program	2 weeks			1
	MP2921	Mini Project				
	ISP2921	Internship				
	SIP2921	Summer Internship Program				

		Sub Total Credits for Laboratory Courses				**6**
					Total	**20**
SEMESTER- III (Focus towards Automobile sector)						
S. No.	**Course Code**	**Course Title**	**Hours per Week**			**Credits**
			L	**T**	**P**	
	Theory Courses					
1	23ME2006	Engineering Mechanics	3	0	0	3
2	23ME2007	Thermodynamics	3	0	0	3
3	23ME2008	Fluid Mechanics and Fluid Machines	3	0	0	3
4	23ME2009	Fluid Power Control Engineering	2	0	0	2
5	23ME2010	Electric Vehicle Design	3	0	0	3
6	23MA2004	Probability and Statistics for Mechanical Engineering	2	0	2	3
7	MOOC	NPTEL Course-2				
		Sub Total Credits for Theory Courses				**17**
	Laboratory Courses					
1	23ME2022	Fluid Mechanics Laboratory	0	0	2	1
2	23ME2023	Thermodynamics Laboratory	0	0	2	1
3	23ME2024	Fluid Power Control Engineering Laboratory	0	0	2	1
4	ITP2922	Industrial Training Program	2 weeks			1
	MP2922	Mini Project				
	ISP2922	Internship				
	SIP2922	Summer Internship Program				
		Sub Total Credits for Laboratory Courses				**4**
					Total	**21**
SEMESTER- IV (Focus towards Construction, Oil and Gas industry sector)						
S. No.	**Course Code**	**Course Title**	**Hours per Week**			**Credits**
			L	**T**	**P**	
	Theory Courses					
1	23ME2011	Strength of Materials	3	0	0	3
2	23ME2012	Kinematics and Dynamics of Machinery	3	0	0	3
3	23ME2013	Applied Thermodynamics	3	0	0	3
4	23ME2014	Engineering Economics and Operation Research	2	0	0	2
5	23ME2015	Piping Design and Instrumentation	2	0	0	2
6	23EC2020	Printed Circuit Board Design and Arduino Programming	2	0	0	2
7	MOOC	NPTEL Course-3				
		Sub Total Credits for Theory Courses				**15**
	Laboratory Courses					
1	23ME2025	Strength of Materials Laboratory	0	0	2	1
2	23ME2026	Design Laboratory - II	0	0	2	1
3	23ME2027	Applied Thermodynamics Laboratory	0	0	2	1
4	23ME2028	Metrology and Measurements Laboratory	0	0	2	1
5	23EC2021	Printed Circuit Board Design and Arduino Programming Laboratory	0	0	2	1
6	23EC2022	Sensors, Data Acquisition and Control Laboratory	0	0	2	1
7	ITP2923	Industrial Training Program	2 weeks			1
	MP2923	Mini Project				
	ISP2923	Internship				
	SIP2923	Summer Internship Program				
		Sub Total Credits for Laboratory Courses				**7**
					Total	**22**

SEMESTER- V (Focus towards Design and Manufacturing sector)						
S. No.	**Course Code**	**Course Title**	**Hours per Week**			**Credits**
			L	**T**	**P**	
	Theory Courses					
1	23ME2016	Design of Machine Elements	3	0	0	3
2	23ME2017	Smart Manufacturing	3	0	0	3
3	23ME2018	Heat and Mass Transfer	3	0	0	3
4	23EC2023	Industry 5.0	2	0	0	2
5	23CS2051	ANN and Machine Learning	2	0	0	2
6	PEC	Professional Elective - 1	3	0	0	3
7	OEC	Open Elective -1	3	0	0	3
		Sub Total Credits for Theory Courses				**19**
	Laboratory Courses					
1	23ME2029	3D Printing and Computer Aided Manufacturing Laboratory	0	0	2	1
2	23ME2030	Heat Transfer Laboratory	0	0	2	1
3	23CS2052	ANN and Machine Learning Laboratory	0	0	2	1
		Sub Total Credits for Laboratory Courses				**3**
					Total	**22**
SEMESTER- VI (Focus towards Aerospace, Nuclear and Marine sector)						
S. No.	**Course Code**	**Course Title**	**Hours per Week**			**Credits**
			L	**T**	**P**	
	Theory Courses					
1	23ME2019	Finite Element Methods in Engineering	3	0	0	3
2	23ME2020	Gas Dynamics and Jet Propulsion	3	0	0	3
3	23CS2053	JAVA Programming	2	0	0	2
4	23MS2004	Business Plan for Start-up	2	0	0	2
5	23EC2017	Semiconductor and Chip Design	2	0	0	2
6	PEC	Professional Elective - 2	3	0	0	3
7	OEC	Open Elective -2	3	0	0	3
		Sub Total Credits for Theory Courses				**18**
	Laboratory Courses					
1	23AE2077	Subsonic Aerodynamics Laboratory	0	0	2	1
2	23CS2054	JAVA Programming Laboratory	0	0	2	1
3	ITP2924	Industrial Training Program	2 weeks			1
	MP2924	Mini Project				
	ISP2924	Internship				
	SIP2924	Summer Internship Program				
		Sub Total Credits for Laboratory Courses				**3**
					Total	**21**
SEMESTER- VII (Focus towards Sustainable Energy and Healthcare Sector)						
S. No.	**Course Code**	**Course Title**	**Hours per Week**			**Credits**
			L	**T**	**P**	
	Theory Courses					
1	23ME2021	Computational Fluid Dynamics	3	0	0	3
2	PEC	Professional Elective - 3	3	0	0	3
3	PEC	Professional Elective - 4	3	0	0	3
4	PEC	Professional Elective - 5	3	0	0	3
5	PEC	Professional Elective - 6	3	0	0	3
6	OEC	Open Elective -3	3	0	0	3
		Sub Total Credits for Theory Courses				**18**

	Laboratory Courses					
1	23ME2031	Computational Fluid Dynamics Laboratory	0	0	2	1
2	23ME2032	Simulation and Analysis Laboratory	0	0	2	1
		Sub Total Credits for Laboratory Courses				**2**
					Total	**20**

SEMESTER- VIII (Project focusing on Food, Water, Sustainable Energy and Healthcare Sectors and KITS 25 Technology Missions)

S. No.	Course Code	Course Title	Hours per Week			Credits
			L	T	P	
	Theory Courses and Half Semester Project					
1	PEC	Professional Elective - 7[1]	3	0	0	3
2	PEC	Professional Elective - 8[1]	3	0	0	3
3	23ME2998	Half-Semester Project	45 Days			8
		Sub Total Credits for Theory Courses				**14**
	Full Semester Project					
4	23ME2999	Full-Semester Project	90 Days			14
		Sub Total Credits for Project				**14**
					Total	**14**

[1]**Professional Electives 7 & 8 are applicable only for students who opt for Half Semester project.**

PERCENTAGE CREDITS DISTRIBUTION SEMESTER WISE

			% Credits Contribution	
SEMESTER	**Credits**	**MOOC Credits**	**Theory**	**Laboratory**
I	20	-	65.00	35.00
II	20	2	65.00	35.00
III	21	2	76.19	23.81
IV	22	1	68.18	31.82
V	22	-	86.36	13.64
VI	21	-	85.71	14.29
VII	20	-	90.00	10.00
VIII	14	-	0.00	100.00
Total	**160**	**5**	**67.60**	**32.40**

B. Tech. Mechanical Engineering with Specialization in Artificial Intelligence – 2022 Batch

COURSE STRUCTURE

S. No.	Course Code	Course Title	Course Component	No of Courses	Credits for Course	Total Credits
1	22ME2001	Industrial Applications of AI Techniques	**PE**	1	3	3
2	22ME2002	Industrial Applications of AI Techniques Laboratory	**Laboratory**	1	2	2
3	22ME2996	Project for AI	**P**	1	6	6
4		MOOC Course		3	1	3
5	22ME2901	Industry Certification Course - I*		1	2	2
6	22ME2902	Industry Certification Course - II*		1	2	2
					Total	**18**

Industry Certification Course I & II are Common to Electrical Vehicle and 3D Printing Specializations as well.

B. Tech. (Mechanical Engineering) with Specialization in Electric Vehicles / Artificial Intelligence and Machine Learning / Cyber Physical Systems –– 2023 Batch

Curriculum Components		
S. No.	**Curriculum Component**	**Credits**
1.	Theory and Lab Courses	5
2.	Project	6
3.	Online / MOOC Course	3
4.	Industry Certification Courses	4
	Total	**18**

B.Tech. Mechanical Engineering (2023 Batch)
(Specialization in Electric Vehicles)

S. No.	Course Code	Course Title	Course Component	No of Courses	Credits for Course	Total Credits
1	21ME2015	Design of Electrical Vehicles and Battery Management	**PE**	1	3	3
2	21ME2016	Electrical Vehicles Laboratory	**Laboratory**	1	2	2
3	23ME2998	Project for EV	**P**	1	6	6
4		MOOC Course		3	1	3
5	23ME2901	Industry Certification Course - I*		1	2	4
6	23ME2902	Industry Certification Course - II*		1	2	
					Total	**18**

B.Tech. Mechanical Engineering (2023 Batch)
(Specialization in Artificial Intelligence and Machine Learning)

S. No.	Course Code	Course Title	Course Component	No of Courses	Credits for Course	Total Credits
1	22ME2001	Industrial Applications of AI Techniques	**PE**	1	3	3
2	22ME2002	Industrial Applications of AI Techniques Laboratory	**Laboratory**	1	2	2
3	23ME2997	Project for AI&ML	**P**	1	6	6
4		MOOC Course		3	1	3
5	23ME2901	Industry Certification Course - I*		1	2	4
6	23ME2902	Industry Certification Course - II*		1	2	
					Total	**18**

B.Tech. Mechanical Engineering (2023 Batch)
(Specialization in Cyber Physical Systems)

S. No.	Course Code	Course Title	Course Component	No of Courses	Credits for Course	Total Credits

1	23ME2053	Cyber-Physical System Application Domains and Foundations	**PE**	1	3	3
2	23ME2054	Cyber-Physical System Laboratory	**Laboratory**	1	2	2
3	23ME2996	Project for AI	**P**	1	6	6
4		MOOC Course		3	1	3
5	23ME2901	Industry Certification Course - I*		1	2	4
6	23ME2902	Industry Certification Course - II*		1	2	
					Total	**18**
	Industry Certification Course I & II are Common to All specializations.					