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UNIVERSITY OF ENGINEERING & MANAGEMENT
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IEM Salt Lake Campus, IEM Newtown Campus & IEM Jaipur Campus

New Syllabus Outline Structure

For

B.Tech in Mechanical Engineering

Effective from Academic Year 2026-2027

DEPARTMENT OF MECHANICAL ENGINEERING

B.Tech ME 3rd SEMESTER

Sl. No.	Category	Code	Course Title	Hours per week			Contact hours	Credits
Theory Papers				L	T	P		
1	BSC	BSM301	Mathematics - III	3	0	0	3	3
2	ESC	ESCME302	Engineering Thermodynamics	3	1	0	4	4
3	PCC	PCCME301	Engineering Materials & Applications	2	1	0	3	3
4	PCC	PCCME302	Mechanics of Deformable Solids	2	1	0	3	3
5	PCC	PCCME303	Manufacturing Process- I	2	1	0	3	3
6	HSMC	ESP301	Essentials Studies for Professionals – III	2	0	0	2	0.5
Practical / Sessional Papers								
7	ESC	ESCME381	Basic Electronics Engineering	0	1	2	3	2
8	PCC	PCCME391	Mechanical Engg Lab IA (Materials Testing)	0	0	2	2	1
9	PCC	PCCME392	Mechanical Engg Lab IIA (Manufacturing Process)	0	0	2	2	1
10	ESC	ESCME382	Data Structure & Algorithms	0	0	2	2	1
11	PRJ	PRJME381	Project I (CAD-Based)	0	0	2	2	1
12	HSMC	SDP381	Skill Development for Professionals –III	0	0	2	2	0.5
13	MOOCs	MOOCS	MOOCs Certificate Courses (NPTEL/SWAYAM)	1	0	0	1	1
TOTAL							**30**	**23**
For B.Tech with Minor Degree (Robotics/ Sustainable Energy Engineering/ Artificial intelligence and Machine learning/Additive manufacturing)								
	MD	MINOR301R	Introduction to Robotics	3	1	0	4	4
	MD	MINOR301S	Energy and Its Resources	1	1	2	3	3
	MD	MINOR301A	Introduction to AI & Machine Learning	3	0	2	5	4
	MD	MINOR301M	Introduction to Additive Manufacturing	3	0	0	3	3
Mandatory Courses								
	MC	IFC	Industry and Foreign Certification (IFC)	-	-	-	-	-
	MC	MAR	Mandatory Additional Requirements (MAR)	-	-	-	-	-

NPTEL Courses for B.Tech 3rd Semester Mechanical Engineering (Any one certification is mandatory)
1. Materials Processing (Casting, Forming, and Welding) - https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_me191 2. Techniques of Materials Characterization - https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_mm79

Learning Pathway B.Tech 3rd Semester Mechanical Engineering (Any one certification is mandatory)
1. Materials Science for Advanced Technological Applications Specialization - https://www.coursera.org/specializations/materials-science-for-advanced-technological-applications 2. 3D Printing and Additive Manufacturing Specialization - https://www.coursera.org/specializations/3d-printing-additive-manufacturing

B.Tech 3rd Semester Mechanical Engineering MOOCs (At least one certification from each pool for both the subjects is mandatory)
ESCME302: Engineering Thermodynamics 1. Introduction to Thermodynamics: Transferring Energy from Here to There - https://www.coursera.org/learn/thermodynamics-intro 2 Statistical Thermodynamics Specialization - https://www.coursera.org/specializations/statistical-thermodynamics-engineering 3. Basics of Air Conditioning & Heat Load Calculation - https://www.coursera.org/learn/designing-air-conditioning-systems-and-heat-load-calculation
PCCME302: Mechanics of Deformable solids 1. Mechanics of Materials I: Fundamentals of Stress & Strain and Axial Loading - https://www.coursera.org/learn/mechanics1 2. Mechanics of Materials IV: Deflections, Buckling, Combined Loading & Failure Theories - https://www.coursera.org/learn/materials-structures 3. Mechanics of Materials II: Thin-Walled Pressure Vessels and Torsion - https://www.coursera.org/learn/mechanics2

B.Tech ME 4th SEMESTER

Sl. No.	Category	Code	Course Title	Hours per week			Contact hours	Credits
Theory Papers				L	T	P		
1	BSC	BSM401	Mathematics- IV	3	0	0	3	3
2	PCC	PCCME401	Fluid Mechanics & Fluid Machines	3	1	0	4	4
3	PCC	PCCME402	Kinematics & Dynamics of Machines	2	1	0	3	3
4	PCC	PCCME403	Internal Combustion Engine & Gas Turbine	2	1	0	3	3
5	PCC	PCCME404	Measurements & Metrology	2	1	0	3	3
6	HSMC	ESP401	Essentials Studies for Professionals – IV	2	0	0	2	0.5
Practical / Sessional Papers								
7	MC	MCC471	Sustainability, Climate Action & Environmental Science	0	1	2	3	2
8	PCC	PCCME491	Mechanical Engg Lab IIIA (Fluid Mechanics)	0	0	2	2	1
9	PCC	PCCME492	Mechanical Engg Lab IIIB (IC Engine)	0	0	2	2	1
10	PCC	PCCME493	Mechanical Engg Lab IIB (Measurements & Metrology)	0	0	2	2	1
11	ESC	ESCME481	Object Oriented Programming	0	0	2	2	1
12	PRJ	PRJME481	Project II (Research Methodology)	0	0	2	2	1
13	HSMC	SDP481	Skill Development for Professionals -IV	0	0	2	2	0.5
14	MOOCs	MOOCS	MOOCs Certificate Courses (NPTEL/SWAYAM)	1	0	0	1	1
TOTAL							**34**	**25**
For B.Tech with Minor Degree (Robotics/ Sustainable Energy Engineering/ Artificial intelligence and Machine learning/Additive manufacturing)								
	MD	MINOR401R	Mechanics of Robots	3	0	0	3	3
	MD	MINOR401S	Climate Change Understanding & Observations	1	1	2	3	3
	MD	MINOR401A	Introduction to Data Analytics	3	0	2	5	4
	MD	MINOR401M	Design for Additive Manufacturing	3	0	2	5	4
Mandatory Courses								
	IFC	IFC	Industry and Foreign Certification (IFC)	0	0	0	0	0
	MAR	MAR	Mandatory Additional Requirements (MAR)	0	0	0	0	0

NPTEL Courses for B.Tech 4th Semester Mechanical Engineering (Any one certification is mandatory)
1. IC Engines and Gas Turbines - https://nptel.ac.in/courses/112103262 2. Fundamentals of Manufacturing Processes - https://nptel.ac.in/courses/112107219

Learning Pathway B.Tech 4th Semester Mechanical Engineering (Any one certification is mandatory)
1. Materials Science for Advanced Technological Applications Specialization - https://www.coursera.org/specializations/materials-science-for-advanced-technological-applications 2. 3D Printing and Additive Manufacturing Specialization - https://www.coursera.org/specializations/3d-printing-additive-manufacturing

B.Tech 4th Semester Mechanical Engineering MOOCs (At least one certification from each pool for both the subjects is mandatory)
PCCME401: Fluid Mechanics Fluid Machines 1. Fundamentals of Fluid Power - https://www.coursera.org/learn/design-and-assemble-an-ic-engine-using-solidworks 2 Computational Fluid Mechanics - Airflow Around a Spoiler - https://www.coursera.org/specializations/design-assemble-mechanical-systems-solidworks 3. Applied Computational Fluid Dynamics - https://www.coursera.org/learn/automotive-industrial-engineering
PCCME403: IC Engine & Gas Turbine 1. Design and Assemble an IC Engine Using SolidWorks - https://www.coursera.org/learn/design-and-assemble-an-ic-engine-using-solidworks 2. Design & Assemble Mechanical Systems in SolidWorks Specialization - https://www.coursera.org/specializations/design-assemble-mechanical-systems-solidworks 3. Automotive Industrial Engineering - https://www.coursera.org/learn/automotive-industrial-engineering

B.Tech ME 5th SEMESTER

SL NO	Category	Paper Code	Paper Name	L	T	P	Contact Hrs	Credits
Theory Papers								
1	PCC	PCCME501	Heat Transfer & Thermal Machines	3	1	0	4	4
2	PCC	PCCME502	Machine Element & System Design	3	1	0	4	4
3	PCC	PCCME503	Manufacturing Process- II	3	0	0	3	3
4	PCC	PCCME504	Mechatronics, Robotics & Control	2	0	0	2	2
5	PEC	PEME501	Professional Elective - I	3	0	0	3	3
6	HSMC	ESPME501	Essential Studies for Professionals (ME) - V	2	0	0	2	0.5
Practical / Sessional Papers								
7	PCC	PCCME591	Mechanical Engg Lab IIIC (Applied Thermodynamics & Heat Transfer)	0	0	2	2	1
8	PCC	PCCME592	Mechanical Engg Lab IB (Machine Drawing)	0	0	2	2	1
9	PCC	PCCME593	Mechanical Engg Lab IC (Kinematics & Dynamics of Machines)	0	0	2	2	1
10	PCC	PCCME594	Mechatronics, Robotics & Control Lab	0	0	2	2	1
11	PRJ	PRJME581	Project-III	0	0	2	2	1
12	HSMC	SDP581	Skill Development for Professionals - V	0	0	2	2	0.5
13	HSMC	HSMME582	Seminar & Communication	0	0	2	2	1
14	MOOCs	MOOCS	MOOCs Certificate Courses (NPTEL/SWAYAM)	1	0	0	1	1
TOTAL							**33**	**24**
For B.Tech with Minor Degree (Robotics/ Sustainable Energy Engineering/ Artificial intelligence and Machine learning/Additive manufacturing)								
	MD	MINOR501R	Microprocessors & Embedded Systems	3	0	2	5	4
	MD	MINOR501S	Energy Storage Systems for Renewables	1	1	2	3	3
	MD	MINOR501A	Deep Learning and Neural Network	3	0	2	5	4
	MD	MINOR501M	3D Printing and Prototyping	2	0	2	4	3
Mandatory Courses								
	MC	IFC	Industry and Foreign Certification (IFC)	0	0	0	0	0
	MC	MAR581	Mandatory Additional Requirements (MAR)	0	0	0	0	0

List of Professional Electives for Elective-I (PEME501)

A. Mechanical Vibration (PEME501A)
B. Advanced Welding Technology (PEME501B)
C. Micro and Nano Manufacturing (PEME501C)
D. Power Plant Engineering (PEME501D)
E. Die, Mould and Tool Engineering (PEME501E)
F. Computational Fluid Dynamics (PEME501F)

NPTEL Courses for B.Tech 5th Semester Mechanical Engineering (Any one certification is mandatory)
1. Introduction to Composites - https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_me156 2. Aluminium based Alloys and Metal Matrix Composites - https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_mm70

Learning Pathway B.Tech 5th Semester Mechanical Engineering (Any one certification is mandatory)
1. Digital Manufacturing & Design Technology Specialization - https://www.coursera.org/specializations/digital-manufacturing-design-technology 2. Lean Six Sigma Specialization - https://www.coursera.org/specializations/lean-six-sigma

B.Tech 5th Semester Mechanical Engineering MOOCs (At least one certification from each pool for both the subjects is mandatory)
PCCME502: Machine Elements & System Design 1. Machine Design Part I - https://www.coursera.org/learn/machine-design1 2. Design of Specific Systems - https://www.coursera.org/learn/design-of-specific-systems-effluent-treatment-safety-relief 3 .Design of General Utility Systems - https://www.coursera.org/learn/design-of-general-utility-systems
PCCME504: Mechatronics, Robotics & control 1. Modern Robotics: Mechanics, Planning, and Control Specialization - https://www.coursera.org/specializations/modernrobotics 2. Introduction to Robotics with Webots Specialization - https://www.coursera.org/specializations/introduction-robotics-webots 3. Robotic Process Automation - https://www.coursera.org/specializations/roboticprocessautomation

B.Tech ME 6th Semester

SL NO	Category	Paper Code	Paper Name	L	T	P	Contact (Hrs)	Credits
Theory Papers								
1	PCC	PCCME601	Computer-Aided Design & Analysis	2	0	0	2	2
2	PCC	PCCME602	Manufacturing Automation	3	0	0	3	3
3	PCC	PCCME603	Production & Operation Management	2	1	0	3	3
4	PEC	PEME601	Professional Elective- II	3	0	0	3	3
5	HSMC	HSME601	HSS/Management Elective-1	3	0	0	3	3
6	HSMC	ESP(ME)601	Essentials Studies for Professionals (ME) – VI	2	0	0	2	0.5
Practical / Sessional Papers								
7	PCC	PCCME681	Product Innovation & Entrepreneurship	0	1	1	2	1.5
8	PCC	PCCME691	Mechanical Engg Lab IIC (Advanced Manufacturing & Automation)	0	0	3	3	1.5
9	PCC	PCCME692	Mechanical Engg Lab ID (Computer Aided Design & Analysis)	0	0	2	2	1
10	PCC	PCCME693	Mechanical Engg Lab IIID (Refrigeration and Air Conditioning)	0	0	2	2	1
11	ESC	ESCME681	Database Management System	0	0	2	2	1
12	PRJ	PRJME681	Project-IV (Minor)	0	0	4	4	2
13	HSMC	SDP681	Skill Development for Professionals -VI	0	0	2	2	0.5
14	MOOCs	MOOCS	MOOCs Certificate Courses (NPTEL/SWAYAM)	1	0	0	1	1
TOTAL							**34**	**24**
For B.Tech with Minor Degree (Robotics/ Sustainable Energy Engineering/ Artificial intelligence and Machine learning/Additive manufacturing)								
	MD	MINOR601R	Control of Robotic Systems	3	0	0	3	3
	MD	MINOR601S	Electronics for Renewables	1	1	2	3	3
	MD	MINOR601A	Special topics in Artificial Intelligence	3	0	0	3	3
	MD	MINOR601M	Material, Processing & Application of 3D Printing	4	0	0	4	4
Mandatory Courses								
	MC	IFC	Industry and Foreign Certification (IFC)	0	0	0	0	0
	MC	MAR	Mandatory Additional Requirements (MAR)	0	0	0	0	0

List of Professional Electives for Elective-II (PEME601)

A. Refrigeration and Air Conditioning (PEME601A)
B. Additive Manufacturing (PEME601B)
C. Turbo Machinery (PEME601C)
D. Finite Element Analysis (PEME601D)
E. Tribology (PEME601E)
F. Composite Materials (PEME601F)
G. Design for Manufacturing & Assembly (PEME601G)

List of HSS/Management Elective-1 (HSME601)

A. Project Management (HSME601A)
B. Operations Research (HSME601B)

NPTEL Courses for B.Tech 6th Semester Mechanical Engineering (Any one certification is mandatory)
1. Manufacturing Automation - https://nptel.ac.in/courses/112104288
2. Fundamentals of Additive Manufacturing Technologies - https://onlinecourses.nptel.ac.in/e-learning/preview/noc22_me122

Learning Pathway B.Tech 6th Semester Mechanical Engineering (Any one certification is mandatory)
1. Digital Manufacturing & Design Technology Specialization - https://www.coursera.org/specializations/digital-manufacturing-design-technology
2. Lean Six Sigma Specialization - https://www.coursera.org/specializations/lean-six-sigma

B.Tech 6th Semester Mechanical Engineering MOOCs (At least one certification from each pool for both the subjects is mandatory)
PCCME601: Computer Aided Design & Analysis 1. Computer Aided Design - https://www.coursera.org/learn/computer-aided-design 2. Design & Assemble Mechanical Systems in SolidWorks Specialization - https://www.coursera.org/specializations/design-assemble-mechanical-systems-solidworks 3. Solidworks 3D CAD for Education Specialization - https://www.coursera.org/specializations/practice-solidworks-3d-cad
PCCME602: Manufacturing Automation 1. Advanced Manufacturing Process Analysis - https://www.coursera.org/learn/advanced-manufacturing-process-analysis 2. Manufacturing Industry 5.0 - https://www.coursera.org/learn/manufacturing-industry-101 3. Additive Manufacturing - https://www.coursera.org/specializations/additive-manufacturing

B.Tech ME 7th SEMESTER

SL NO	Category	Paper Code	Paper Name	L	T	P	Contact Hrs	Credits
Theory Papers								
1	PEC	PEME701	Professional Elective -III	3	0	0	3	3
2	OEC	OEME701	Open Elective-I	3	0	0	3	3
3	OEC	OEME702	Open Elective-II	3	0	0	3	3
4	HSMC	HSME701	HSS/Management Elective-2	3	0	0	3	3
5	HSMC	ESPME701	Essential Studies for Professionals (ME) - VII	2	0	0	2	0.5
Practical / Sessional Papers								
6	PRJ	PRJME781	Project-V	0	0	5	5	2.5
7	PRJ	INP781	Internship I	0	0	0	0	4
8	HSMC	SDP781	Skill Development for Professionals - VII	0	0	2	2	0.5
			TOTAL				**23**	**19.5**
For B.Tech with Minor Degree (Robotics/ Sustainable Energy Engineering/ Artificial intelligence and Machine learning/Additive manufacturing)								
	MD	MINOR781R	Project in Robotics I	1	0	2	3	2
	MD	MINOR701S	Solar Energy Technologies and System Design	1	1	2	3	3
	MD	MINOR701A	Applications of AI	3	0	0	3	3
	MD	MINOR701M	3D Metal Printing	3	0	0	3	3
Mandatory Courses								
	IFC	IFC	Industry and Foreign Certification (IFC)	0	0	0	0	0
	MAR	MAR	Mandatory Additional Requirements (MAR)	0	0	0	0	0

List of Professional Elective -III (PEME701)

A. Automobile Engineering (PEME701A)
B. Material Handling (PEME701B)
C. Industrial Engineering (PEME701C)
D. Industrial Robotics (PEME701D)
E. Aerospace Engineering (PEME701E)
F. Agricultural Engineering (PEME701F)
G. Biomedical Engineering (PEME701G)
H. Food Technology (PEME701H)
I. Nuclear Engineering (PEME701I)

List of Open Electives for Open Elective-I (OEME701)

A. Process Planning and Cost Estimation (OEME701A)
B. Renewable Energy Engineering (OEME701B)
C. Electric Vehicles (OEME701C)

List of Open Electives for Open Elective-II (OEME702)

A. Industry 4.0 (OEME702A)
B. Optimization Techniques (OEME702B)
C. Data Analytics (OEME702C)

HSS/Management Elective-2 (HSME701)

A. Principles & Practices of Management (HSME701A)
B. Operations Research (HSMME701B)
C. Industrial Psychology (HSME701C)
D. Finance & Accounting (HSME701D)

B.Tech 7th Semester Mechanical Engineering MOOCs (At least one certification from each pool for all the subjects is mandatory)
PEME701A: Automobile Engineering 1. Automotive Industrial Engineering - https://www.coursera.org/learn/automotive-industrial-engineering 2. Self-Driving Cars Specialization - https://www.couhttps://www.coursera.org/specializations/self-driving-cars 3. Autonomous Vehicle Engineering - https://www.coursera.org/specializations/autonomous-vehicle-engineering
OEME701B: Renewable Energy Engineering 1.Renewable Energy Technology Fundamentals - https://www.coursera.org/learn/renewable-energy-technology-fundamentals 2.Renewable Energy Specialization - https://www.coursera.org/specializations/renewable-energy 3. Energy : The Enterprise - https://www.coursera.org/learn/energy-industry-overview?specialization=energy-industry
OEME702A: Industry 4.0 1. Industry 4.0 and its impact on Manufacturing Sector - https://www.coursera.org/learn/industry-4-point-0-and-its-impact-on-manufacturing-sector 2. Key Industry 4.0 Technologies in Manufacturing - https://www.coursera.org/learn/key-industry-4-point-0-technologies-in-manufacturing---1 3. Industry 4.0 & Impact in Manufacturing - https://www.coursera.org/learn/industry-4-point-0-and-its-impact-on-manufacturing-sector
HSMME701B : Operations Research 1. Operations Research Specialization - https://www.coursera.org/specializations/operations-research 2. Operations Research : Models & Application - https://www.coursera.org/learn/operations-research-modeling 3. Operations Research : Optimization Algorithm - https://www.coursera.org/learn/operations-research-algorithms 4. Operation Research Theory - https://www.coursera.org/learn/operations-research-theory

B.Tech ME 8th SEMESTER

SL NO	Category	Paper Code	Paper Name	L	T	P	Contact Hrs	Credits
Theory Papers								
1	HSMC	HSME801	Universal Human Values	2	0	0	2	2
2	OEC	OECME801	Open Elective-III	3	0	0	3	3
Practical / Sessional Papers								
3	PRJ	PRJME881	Project-VI (Prototype & Testing)	0	0	8	8	4
4	PRJ	INP881	Internship II	0	0	0	0	4
5	PRJ	PRJME882	Comprehensive viva	0	0	0	0	1
TOTAL							**13**	**14**
For B.Tech with Minor Degree (Robotics/ Sustainable Energy Engineering/ Artificial intelligence and Machine learning/Additive manufacturing)								
	MD	MINOR881A	Project in AIML	0	0	4	4	2
	MD	MINOR881R	Project in Robotics II	0	0	4	4	2
	MD	MINOR801S	Solar Energy System Installations and Maintenance	1	1	2	3	3
	MD	MINOR801M	3D Printing Project	0	0	6	6	3
Mandatory Courses								
	IFC	IFC	Industry and Foreign Certification (IFC)	0	0	0	0	0
	MAR	MAR	Mandatory Additional Requirements (MAR)	0	0	0	0	0

List of Open Electives for Elective-III

A. Total Quality Management (OECME801A)
B. Maintenance Engineering (OECME801B)
C. Quality & Reliability Engineering (OECME801C)
D. Machine Learning (OECME801D)
E. Biomechanics & Biomaterials (OECME801E)
F. Soft Computing Optimization (OECME801F)

B.Tech 8th Semester Mechanical Engineering MOOCs **(At least one certification from each pool for all the subjects is mandatory)**
HSMME801 : Universal Human Values 1. Human Resource Management - https://www.coursera.org/specializations/human-resource-management-corporate-fundamentals 2. Human Rights for Open Societies - https://www.coursera.org/programs/uemj-passout-batch-2028-4ok2/learn/humanrights?source=search 3. Leading: Human Resource Management and Leadership Specialization - https://www.coursera.org/specializations/hr-management-leadership
OECME801A : Total Quality Management 1. TQM Excellence: Lean Six Sigma & Quality Systems Specialization - https://www.coursera.org/specializations/tqm-excellence-lean-six-sigma-quality-systems 2. Operations and Lean Management Specialization - https://www.coursera.org/specializations/operations-and-lean-management 3. Quality Control & Regulatory Science - https://www.coursera.org/learn/quality-control-and-regulatory-in-cosmetic-science