

Proposed Agenda Note – Meeting of Board of Studies Date –07th July 2026

Agenda for meeting of Board of Studies of **Department of Mechanical Engineering**

Scheduled at 10.00 AM on 07th July 2026 as below mentioned:

1. To Confirm the Minutes of Meeting of last BOS meeting of the department.
2. To read Action Taken Report for agendas of last meeting of BOS of the department.
3. To report on updating/ modification / restructuring of syllabus for next academic session keeping in view of the policy for common syllabus for all the institutions of the IEM-UEM group.
4. To report on addition of learning Pathways using online certifications from coursera.
5. Any other inputs by the external BOS members.

Minutes of Meeting of Board of Studies for Department of Mechanical Engineering, University of Engineering & Management, Jaipur held on Date – 07th July 2026.

The Meeting of Board of Studies for Department of Mechanical Engineering was held on 07th July 2026 at 10.30 AM in at University of Engineering & Management premises. The following members were present:

1. Dr. Umesh Gurnani, Associate Prof. & Head of Department, Mechanical Engineering, UEM Jaipur.
2. Prof. Anurag Hamilton, Professor, Mechanical Engineering, UEM Jaipur.
3. Dr. Mandeep Singh, Associate Professor, Mechanical Engineering, UEM Jaipur.
4. Mr. Iqbal Ahmad, Assistant Professor, Mechanical Engineering, UEM Jaipur.
5. Mr. Sasthi Charan Hens, Assistant Professor, Mechanical Engineering, UEM Jaipur.
6. Mr. Ravindra Maanju, Assistant Professor, Mechanical Engineering, UEM Jaipur.
7. Mr. Vinod Yadav, Assistant Professor, Mechanical Engineering, UEM Jaipur.
8. Dr. M.L. Meena, Associate Professor, Mechanical Engineering, MNIT Jaipur
9. Mr. Akash, Founder & CEO, Aha Automotive Innovations

Dr. Umesh Gurnani, Head of Department, Mechanical Engineering, UEM Jaipur welcomed all the members of Board of Studies before commencement of the meeting. Thereafter agenda points of the meeting of Board of Studies were taken up for discussion.

The Board of Studies of Department of Mechanical Engineering, UEM Jaipur took the following resolutions:

Agenda Item No-1:

To Confirm the Minutes of Meeting of last BOS meeting of the Department of Mechanical Engineering

The minutes of the last meeting of Board of studies was circulated to all the members in advance through mail. As there was no observation raised in the meeting, it was confirmed.

Agenda Item No-2:

To read the Action Taken Report of last Board of Studies meeting held on 04.07.2025.

The agenda wise Action Taken Report of the last meeting of Board of Studies for Department of Mechanical Engineering held on 04th July 2025, was circulated to all the members in advance through mail. As there was no observation raised, it was confirmed.



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UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

(Approved by AICTE and recognized by UGC, Ministry of HRD, Govt. of INDIA)

'Gurukul', 6 Kms. from Chomu on Sikar Road, Udaipuria Mod, Chomu, Jaipur-303807 (Rajasthan)

Phone : 01423-205168, Email: vc@uem.edu.in, Website : www.uem.edu.in

Agenda Item No-3

To report on updating/modification/restructuring of syllabus for next academic session keeping in view of the policy for common syllabus for all the institutions of the IEM-UEM group.

The syllabus was updated and restructured after modification including all important content which was decided by members of board of studies keeping in view the model curriculum shared by AICTE. The organization is willing to have a common syllabus for all the institutions run by IEM-UEM group. A detailed mapping of syllabus in line with MIT online courses and AICTE model curriculum have also been added in detailed syllabus to ensure that all topics including technological advancements are covered by students of Mechanical Engineering. Apart from discussion on credit points of each subjects, placing the subjects in right year and right semester was also ensured by the BOS team. There was an inclusion of Data Structures and Algorithm as a sessional subject in 3rd sem Mechanical Engineering, keeping in mind the upcoming requirements in companies.

All the points in syllabus were highly appreciated by members and inputs were received by them for successful implementation of those points. The inputs on marks for extracurricular activities were also noted.

Agenda Item No-4

To report on addition of learning Pathways using online certifications from coursera.

The committee discussed the integration of structured learning pathways using Coursera courses for students. It was resolved to incorporate relevant Coursera courses into the curriculum to enhance students' technical knowledge, industry exposure, and employability skills. Students will be encouraged to complete the recommended learning pathways and obtain course certificates as part of their continuous learning and professional development. Completion of one learning pathway is made compulsory for 2nd and 3rd year students

Agenda Item No-5

Any other inputs by the external BOS members

Few of the below mentioned points were shared by External members

1. The external members suggested strengthening industry-oriented learning by incorporating more case studies and real-world engineering problems.
2. The members suggested increasing hands-on learning through laboratory experiments, mini-projects, and design-based activities in core Mechanical Engineering subjects.

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Kolkata Office : 'ASHRAM', GN-34/2, Sec.V, Salt Lake Electronics Complex, Kolkata - 700091 (W.B.) Website : www.iemcal.com

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3. It was recommended to organize more industrial visits, expert lectures, and interaction sessions with professionals from industry to bridge the gap between academia and industry.

4. The external members advised introducing emerging topics such as Industry 4.0, Artificial Intelligence in Manufacturing, Digital Twin, Additive Manufacturing, Electric Vehicles, and Sustainable Engineering wherever appropriate.



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)	-	-	-	-	-

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	ESCM481	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

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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	PFC	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)

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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	PLC	PFME601	Professional Elective- II	3	0	0	3	3
5	HSMC	HSMF601	HSS/Management Elective-I	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 IID (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

Manufacturing B.Tech

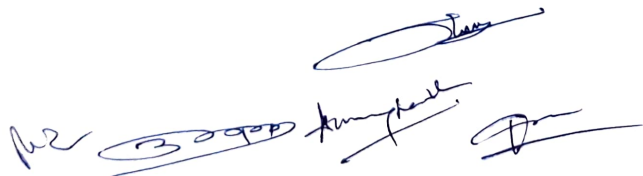
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List of Professional Electives for Elective-II (PEME601)

- 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)



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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
9	MOOCS	MOOCS	MOOCs Certificate Courses (NPTEL/SWAYAM)	1	0	0	1	1
TOTAL							24	20.5
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) | F. Agricultural Engineering (PEME701F) |
| B. Material Handling (PEME701B) | G. Biomedical Engineering (PEME701G) |
| C. Industrial Engineering (PEME701C) | H. Food Technology (PEME701H) |
| D. Industrial Robotics (PEME701D) | I. Nuclear Engineering (PEME701I) |
| E. Aerospace Engineering (PEME701E) | |

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. Industrial Psychology (HSME701B)
- C. Finance & Accounting (HSME701C)

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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
6	MOOCS	MOOCS	MOOCs Certificate Courses (NPTEL/SWAYAM)	1	0	0	1	1
TOTAL							14	15
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





Manufacturing

List of Open Electives for Elective-II

- 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)



IEM Salt Lake Campus, IEM Newtown Campus & IEM Jaipur Campus

New Syllabus Outline Structure

For

B.Tech ME 3rd SEMESTER

B.Tech in Mechanical Engineering

Effective for Academic Year 2026-2027

DEPARTMENT OF MECHANICAL ENGINEERING

1.1. Lecture 3rd Sem

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
TOTAL							29	22
For B.Tech with Minor Degree (Robotics/ Sustainable Energy Engineering/ Artificial intelligence and Machine learning/Additive manufacturing)								
13	MD	MINOR301R	Introduction to Robotics	3	1	0	4	4
14	MD	MINOR301S	Energy and Its Resources	1	1	2	3	3
15	MD	MINOR301A	Introduction to AI & Machine Learning	3	0	2	5	4
16	MD	MINOR301M	Introduction to Additive Manufacturing	3	0	0	3	3
Mandatory Courses								
17	MC	IFC	Industry and Foreign Certification (IFC)	-	-	-	-	-
18	MC	MAR	Mandatory Additional Requirements (MAR)	-	-	-	-	-
For B.Tech Honours Degree								
19	MOOCs	MOOCS	MOOCs Certificate Courses (NPTEL/SWAYAM)	-	-	-		



University of Engineering and Management
Institute of Engineering & Management, Salt Lake Campus
Institute of Engineering & Management, New Town Campus
Institute of Engineering & Management, Jaipur



Subject Name: Mathematics - III
Subject Code: BSM301

Credit: 3
Lecture Hours: 42

Pre-Requisites: Permutation & Combination, Concept of Basic Probability, Evaluation of definite, improper and infinite integrals, Concept of β & Γ functions.

Relevant Links:

Coursera: Probability & Statistics <https://www.coursera.org/learn/machine-learning-probability-and-statistics>

NPTEL Advanced Engineering Mathematics https://onlinecourses.nptel.ac.in/noc24_ma03/preview

Study Material Link (BL 4, 5,6)

<https://drive.google.com/drive/folders/19umqy3stib1-wul1y0h-p0arM0NklzdxC?usp=sharing>

COURSE OBJECTIVES:

1. The syllabus will prepare the learners for Engineering Exit Examinations, ESE and campus placements.
2. Students will apply concepts of various probability distributions to find probabilities.
3. Students will make estimations for a mean, variance, standard deviation and proportions for big data.
4. Students will be eligible to work in the Data domain which is the emerging technology of the future and create more opportunities for creative work.

Students will be able to describe and quantify the uncertainty inherent in predictions made by machine learning models.

COURSE OUTCOMES:

CO	Course Outcomes
CO 1	Illustrate the ideas of probability and random variables, various discrete and continuous probability distributions with their properties and their applications in physical and engineering environment that will make a bridge between elementary statistical tools and probability theory.
CO 2	Find the inter-relation between two or more phenomena with the help of curve fitting.
CO 3	Understand the basic components of sampling and have the knowledge on exact sampling distributions which are essential for estimating and testing hypothetical statements. Know the various sampling methodologies and their efficiencies in theoretical and practical aspects.
CO 4	Estimate and test the parameters associated with the relevant areas for forecasting and verification of economic theory.
CO 5	Apply the statistical tools in business, economical and commercial areas for analyzing problems and to make better decisions for future in their fields.

Detailed Syllabus:

Module No.	Topic	Sub-topics
1	Random Variables and Probability Distributions	Discrete Random Variable: Discrete Probability Distribution, Expectation and Variance of random variables; Binomial and Poisson Distributions; Mean, Variance and Moment Generating Functions of Binomial and Poisson Variates; Convergence of Binomial to Poisson Variate. Continuous Random Variable; Continuous Probability Distributions, Expectation and Variance of random variables, Exponential, Normal Distributions; Mean, Variance and Moment Generating Functions of the corresponding variates.
2	Method of Least Squares and Curve Fitting	Principle of Least Squares, Curve fitting by the method of Least Squares - fitting of straight lines, second degree parabolas and exponential curves.

3	Sampling and Sampling Distributions	Population and Sample, Sampling With and Without Replacement (SRSWR and SRSWOR); Random Samples, Population Parameters, Sample Statistics, Sampling Distributions, Standard Error and Probable Error; Sample Mean, Sampling Distribution of Means; Sample Proportion, Sampling Distribution of Proportions, Sample Variances, Sampling Distribution of Variances; Case where Population Variance is unknown; Central Limit Theorem (Statement only); Degrees of freedom, Chi-square distribution, Mean & Variance of Chi-square variate.
4	Estimation of Parameters	Point and Interval estimations, Biased and Unbiased estimators, Minimum Variance Unbiased Estimator (MVUE), Consistent Estimator, Maximum Likelihood Estimation of Parameters, Applications in populations following theoretical distributions (Binomial, Poisson and Normal), Calculation of confidence limits for population mean and population proportions.
5	Testing of Hypothesis	Large Sample Test: Statistical Hypotheses, Test Statistic, Best Critical Region, Test for single mean, difference of means, single proportion, difference of proportions, and difference of standard deviations. Small Sample Test: Test for single mean, difference of means and correlation coefficients, Test for ratio of variances, Chi-square test for goodness of fit and independence of attributes.

TEXT BOOK:

1. Saktipada Nanda and Sibashis Nanda ", A Course on Probability & Statistics", 2nd Edition (2024), Mindprobooks
2. N.G.Das, "Statistical Methods", Combined Edition Vol. 1 & 2 (2017) McGraw Hill Education

REFERENCE BOOKS:

1. Sheldon M. Ross, "Introduction to Probability and Statistics for Engineers and Scientists", 6th Edition (2020), Academic
2. N.G.Das, "Statistical Methods", Combined Edition Vol. 1 & 2 (2017) McGraw Hill Education

3. Douglas C. Montgomery and George C. Runger, Applied Statistics and Probability for Engineers, 7th edition (2018), John Wiley & Sons.

4. Murray R. Spiegel, John J. Schiller and R. Alu Srinivasan, "Schaum's Outline of Probability & Statistics", 4th Edition (2012), McGraw Hill Education.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	2	1	1	1	1	1	2	1
CO2	3	3	3	3	2	1	1	1	1	1	2	1
CO3	3	3	3	3	2	1	1	1	1	1	2	1
CO4	3	3	3	3	2	1	1	1	1	1	2	1
CO5	3	3	3	2	2	2	1	2	2	2	3	2

PSO	PSO Description
PSO1	Technical knowledge and analysis: Apprehend and analyze specific engineering problems of communication, networking, electrical & electronics circuits, signal processing, computer programming, embedded systems, VLSI design and semiconductor technology by applying the knowledge of basic sciences, engineering mathematics and engineering fundamentals.
SO2	Design and Implementation: Ability to design and implement the acquired technical knowledge with proficiency in logical programming for applications in electronics & communication engineering.
SO3	Development of professional skill and professional ethics: Ability to communicate effectively with excellent professional proficiency, interpersonal skills and demonstrate the practice of professional ethics for societal benefit.



University of Engineering and Management

Institute of Engineering & Management, Salt Lake Campus
Institute of Engineering & Management, New Town Campus
Institute of Engineering & Management, Jaipur



Subject Name: Engineering Thermodynamics

Credit: 4

Subject Code: ESCME302

Lecture Hours: 40

Pre-requisite: BSC M101, BSC CH101

Relevant Links: STUDY MATERIAL

NPTEL

COURSE OBJECTIVES:

The purpose of learning this course is to:

1. To learn about work and heat interactions, and balance of energy between system and its surroundings
2. To learn about application of first law of thermodynamics to various energy conversion devices
3. To evaluate the changes in properties of substances in various processes
4. To understand the difference between high grade and low-grade energies and second law limitations on energy conversion.

COURSE OUTCOMES:

After completion of this course, the learner will be able to:

- CO1. Apply energy balance to systems and control volumes, in situations involving heat and work interactions.
- CO2. Evaluate changes in thermodynamic properties of substances.
- CO3. Evaluate the performance of energy conversion devices.
- CO4. Differentiate between high grade and low-grade energies.

Module number	Topic	Sub-topics
1	Fundamentals	System & Control volume; Property, State & Process; Exact & Inexact differentials; Work-Thermodynamic definition of work; examples; Displacement work; Path dependence of displacement work and illustrations for simple processes.
2	First law of thermodynamics	Temperature, Definition of thermal equilibrium and Zeroth law; Temperature scales; Definition of heat; examples of heat/work interaction in systems- First Law for Cyclic & Non-cyclic processes; Concept of total energy E; Internal energy and Enthalpy. First Law for Flow Processes - Steady state steady flow processes; Examples of steady flow devices; Unsteady processes.
3	Pure substances	Properties of two phase systems - Const. temperature and Const. pressure heating of water; Definitions of saturated states; P-v-T surface; Use of steam tables; Saturation tables; Superheated tables; Identification of states & determination of properties, Mollier's chart.
4	Second law of thermodynamics	Second law - Definitions of direct and reverse heat engines; Definitions of thermal efficiency and COP; Kelvin-Planck and Clausius statements; Definition of reversible process; Internal and external irreversibility; Carnot cycle; Absolute temperature scale.
5	Entropy	Clausius inequality; Definition of entropy S; Demonstration that entropy S is a property; Evaluation of S for solids, liquids, ideal gases and ideal gas mixtures undergoing various processes; Determination of s from steam tables- Principle of increase of entropy; Illustration of processes in Ts coordinates; Second law analysis for a control volume. Exergy. Reversible work and irreversibility, 2nd Law efficiency.
6	Thermodynamic cycles	Thermodynamic cycles; comparison with Carnot cycle. Refrigeration cycles, reversed Carnot cycle; components and analysis of simple vapour compression Refrigeration cycle, Actual Refrigeration cycles, Vapour Absorption Refrigeration cycle. Properties of dry and wet air, use of psychometric chart, processes involving heating/cooling and humidification/dehumidification, dew point.
7	Maxwell relations	Maxwell relations; Clapeyron Equation, Joule Thompson coefficient.
8	Compressors	Reciprocating compressors, staging of reciprocating compressors, optimal stage pressure ratio, effect of intercooling, minimum work for multistage reciprocating compressors.
9.	Compressible flow	Basics of compressible flow. Stagnation properties, Isentropic flow of a perfect gas through a nozzle, choked flow, subsonic and supersonic flows- normal shocks- use of ideal gas tables for isentropic flow and normal shock flow- Flow of steam and refrigerant through nozzle, super saturation- compressible flow in diffusers, efficiency of nozzle and diffuser.

TEXT BOOK:

1. Nag, P.K, 1995, Engineering Thermodynamics, Tata McGraw-Hill Publishing Co.Ltd.
2. Thermodynamics - An Engineering Approach by Yunus A. Cengel, Michael A. Boles
3. Engineering Thermodynamics (Principles & Practices)- Dr. D.S. Kumar, S K Kataria & Sons Publication

REFERENCE BOOKS:

4. Sonntag, R. E, Borgnakke, C. and Van Wylen, G. J., 2003, 6th Edition, Fundamentals of Thermodynamics, John Wiley and Sons.
5. Pokrovskii, Vladimir (2020). Thermodynamics of Complex Systems: Principles and applications. IOP Publishing, Bristol, UK. ISBN 978-0-7503-3451-8
6. Zemansky, Mark W.; Dittman, Richard (1996). Heat and Thermodynamics (7th ed.). McGraw-Hill. ISBN 978-0070170599

ONLINE RESOURCES:

COURSERA

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	2	3	-	1	-	-	-	-	1
CO2	2	3	3	2	3	-	1	-	-	-	-	1
CO3	2	3	3	2	3	-	1	-	-	-	-	1
CO4	2	3	3	2	3	-	1	-	-	-	-	1



University of Engineering and Management

Institute of Engineering & Management, Salt Lake Campus
Institute of Engineering & Management, New Town Campus
Institute of Engineering & Management, Jaipur



Subject Name: Engineering Materials & Applications

Credit: 3

Subject Code: PCCME301

Lecture Hours: 36

Prerequisites: Basic Knowledge of structure of materials

COURSE OBJECTIVES:

1. Broad understanding of different types of engineering materials and their applications.
2. Correlation between the internal structure of materials and their mechanical properties.
3. Various methods to quantify the mechanical integrity of materials and their failure criteria.
4. Interpretation of equilibrium phase diagrams of alloys.
5. Different heat treatment methods to tailor the properties of Fe-C alloys.

COURSE OUTCOMES:

- CO1: Student will be able to identify crystal structures for various materials.
- CO2: Student will be able to understand defects in crystal structures.
- CO3: Understand how to tailor material properties of ferrous and non-ferrous alloys.
- CO4: How to quantify mechanical integrity and failure in materials.

Relevant Links: Study Material (PCCME301)

NPTEL course link: https://onlinecourses.nptel.ac.in/noc22_me90/preview



University of Engineering and Management

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Relevant Links: Study Material (PCCME301)

NPTEL course link: https://onlinecourses.nptel.ac.in/noc22_me90/preview

Module number	Topic	Sub-topics
1	Engineering Materials and Classification	Metals, plastics, ceramics and composites; Relevant properties (physical, mechanical, thermal, electrical, chemical), cost; Range of applications; Material designation and standards; Ashby diagrams; Selection criteria and process
2	Mechanical Properties and Testing	Tensile, compression, torsion, fatigue, fracture and wear tests; Young's modulus; Relations between true and engineering stress-strain curves; Generalized Hooke's law; Yielding and yield strength; ductility, resilience, toughness and elastic recovery; Hardness measurement their relation to strength; SN curve, endurance and fatigue limits; Introduction to non-destructive testing (NDT).
3	Metal and Alloys	Iron and steel; Stainless steel and tool steels; Copper & its alloys – brass, bronze & cupro-nickel; Aluminium & Al-Cu-Mg alloys; Nickel based superalloys & Titanium alloys; Phase diagrams and interpretation of microstructure; Iron Iron-carbide phase diagram and cooling (TTT) diagrams.
4	Heat Treatment	Heat treatment of Steel; Annealing, tempering, normalizing, spheroidising, austempering, martempering, case hardening, carburizing, nitriding, cyaniding, carbo-nitriding, flame and induction hardening, vacuum and plasma hardening
5	Polymers, Ceramics and Composites	Polymers – Classification and applications; Polymerization techniques; Ceramics – Oxide ceramics, ceramic insulators, bio-ceramics and Glasses; Composites – Reinforcement, matrix, metal matrix composites, ceramic composites, polymer composites; Other advanced materials – biomaterials, optical materials, high temperature materials, energy materials, and nano materials.
6	Electrical and Magnetic Materials	Conducting and resisting materials – types, properties and applications; Semiconducting materials – properties and applications; Magnetic materials – Soft and hard magnetic materials and applications; Superconductors and dielectric materials – properties and applications; Smart materials; Sensors and actuators; Piezoelectric, magnetostrictive and electrostrictive materials.

Learning Resources

Text Book:

1. R.K.Rajput, "Material Science and Engineering", 5th Edition, Katson Publications.

2. W. D. Callister, 2006, "Materials Science and Engineering-An Introduction", 6th Edition, Wiley India.

3. William F Smith, Hashemi, Prakash, "Materials Science and Engineering" Mc Graw Hill

Reference Book:

1. V. Raghavan, "Material Science and Engineering", Prentice Hall of India Private Limited, 1999.

2. U. C. Jindal, "Engineering Materials and Metallurgy". Pearson, 2011.

3.. M.F. Ashby and D.R.H. Jones, Engineering Materials I - An Introduction to Properties, Applications and Design, Butterworth-Heinemann, USA, 2011.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	2	3	-	1	-	-	-	-	1
CO2	2	3	3	2	3	-	1	-	-	-	-	1
CO3	2	3	3	2	3	-	1	-	-	-	-	1
CO4	2	3	3	2	3	-	1	-	-	-	-	1

5	Column Buckling	Critical loads using Euler's theory; Different boundary conditions; Eccentric columns.
6	Torsion of Shafts	Torsion stresses and deformation of circular and hollow shafts; Polar moment of area, stepped shafts; Deflection of shafts fixed at both ends; Stresses and deflection of helical springs
7	Pressure Vessels	Axial and hoop stresses in cylinders subjected to internal pressure; Deformation of thin and thick cylinders; Deformation in spherical shells subjected to internal pressure; Combined thermo- mechanical stress; Examples and case studies (boilers).

Course Outcomes:

After completing this course,

1. They can recognize various types of loads applied on machine components of simple geometry and understand the nature of internal stresses that will develop within the components.
2. They can evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading.
3. They will have a clear idea regarding selection of correct materials in different Cases like resisting bending stresses, deflection, torsion etc.
4. They can analyse different mechanical structures from strength and deformation point of view.

Learning Resources:

Text Books

1. Mechanics of Materials, F P Beer & E Russel Johnston, J T Dewolf, D F Mazurek, Mc Graw Hill
2. Strength of Materials, S S. Rattan, McGraw Hill
3. Strength of Materials, S.S. Bhavikatti, Vikas Publishing House

Reference Books

1. S Timoshenko 'Strength of Materials', CBS Publishers, 2011.
2. S. Ramamrutham & R. Narayanan, 'Strength of Materials', Dhanpat Rai Publishing Company, 2020.

Online Learning Materials:

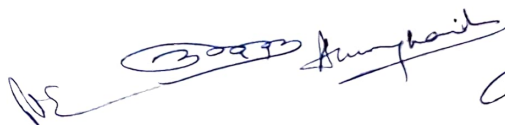
1. Coursera: <https://www.coursera.org/learn/mechanics-1>
<https://www.coursera.org/learn/mechanics2>
<https://www.coursera.org/learn/beam-bending>

<https://www.coursera.org/learn/materials-structures>

2. NPTEL: <https://archive.nptel.ac.in/courses/112/107/112107147/#>
<https://archive.nptel.ac.in/courses/105/105/105105108/>
<https://nptel.ac.in/courses/105106172>

CO-PO Mapping:

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CO1	3	2	3	3	2	-	1	-	-	-	-	1
CO2	2	3	3	2	2	-	1	-	-	-	-	1
CO3	2	3	3	3	2	-	1	-	-	-	-	1
CO4	2	3	3	2	2	-	1	-	-	-	-	1





University of Engineering and Management

Institute of Engineering & Management, Salt Lake Campus

Institute of Engineering & Management, New Town Campus

Institute of Engineering & Management, Jaipur



Subject Name: Manufacturing Processes I

Credit: 3

Subject Code: PCCME303

Lecture Hours: 36

Prerequisites: Workshop Technology

Relevant Links: STUDY MATERIALS

NPTEL

Course Objective(s):

The purpose of learning this course is to:

1. Motivate and challenge students to understand and develop an appreciation of the processes in correlation with material properties.
2. Impart thorough knowledge of casting, molding and forming which change the shape, size and form of the raw materials into the desirable product by conventional manufacturing methods.
3. Impart indepth learning on welding, welding defects and inspection.

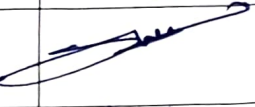
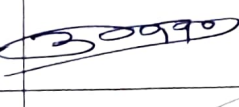
Module number	Topic	Sub-topics
1	Introduction	History, Primary manufacturing processes, and classification Additive, subtractive and shaping processes; Relative advantages and limitations.
2	Material Shaping Processes: Casting	Casting Types of foundries, steps in making a casting; cast metals; casting types (sand, die, centrifugal, and investment casting), Heat transfer, Melting, pouring and solidification. Casting quality and defects analysis in microscope.

		Moulding processes and their characteristics; shell moulding; moulding materials (Moulding sands: types, composition, properties); gating and risering (sprue, runner, gate & riser); melting furnaces; Pattern material and type, allowances of patterns
3	Material Shaping Processes: Forming	Forming Basic metal working concepts and plasticity; yield criterion; instability and anisotropy slip line fields; estimation of force and energy requirements and power calculation; technology of bulk and sheet metal forming processes; precision forming processes; various features of different types of metal forming dies; springback calculation; Hot, and cold working, recrystallization, grain structure and lubrication principles of powder forming. Basic principles, Classification, characteristics, equipment & tools, and applications of metal forming processes; Forging, Wire and tube drawing, deep drawing; Rolling; Extrusion, bending, Shearing, parting, blanking, piercing & notching, Cupping (drawing), Spinning & deep drawing, Coining & embossing.
4	Joining and Fastening Processes:	Welding: Physics of welding, welding energy sources, and their characteristics; arc characteristics; fluxes and coatings; weldability and welding of various metals and alloys; metallurgical characteristics of welded joints; Weld testing and inspection. Welding processes, types, principles, equipment's, characteristics & applications – arc welding, gas welding, MIG, TIG, SMAW, ESW, EBW, PAW, USW, Resistance welding;

Attendance Sheet for Meeting of Board of Studies

Department of Mechanical Engineering
University of Engineering & Management, Jaipur

Date - 7th July 2026

S.no.	Name	Designation	Signature
1	Dr. Umesh Gurnani	Head of Department, Mechanical Engineering, UEM Jaipur (Chairman)	
2.	Prof. Anurag Hamilton	Professor, Department of Mechanical Engineering, UEM Jaipur (Member)	
3.	Dr. Mandeep Singh	Assistant Professor, Department of Mechanical Engineering, UEM Jaipur (Member)	
4.	Iqbal Ahmad	Assistant Professor, Department of Mechanical Engineering, UEM Jaipur (Member)	
5.	Sasthi Charan Hens	Assistant Professor, Department of Mechanical Engineering, UEM Jaipur (Member)	
6.	Ravindra Maanju	Assistant Professor, Department of Mechanical Engineering, UEM Jaipur (Member)	
7.	Vinod Yadav	Assistant Professor, Department of Mechanical Engineering, UEM Jaipur (Member)	
8.	Dr. M. L. Meena	Professor, Department of Mechanical Engineering MNIT Jaipur	
9.	Mr. Aakash	Founder & CEO, Aha Automotive Innovations, Jaipur	
10.	Mr. Rajan Bhardwaj	Founder & Director, mPower Green Energy Pvt. Ltd, Jaipur	