

UNIVERSITY OF JAMMU

(NAAC ACCREDITED A + GRADE UNIVERSITY)
Baba Sahib Ambedkar Road, Jammu-180006 (J&K)

NOTIFICATION

(22/Nov/Adp/73)

It is hereby notified for the information of all concerned that the Vice-Chancellor, in anticipation of the approval of the Competent Bodies, has been pleased to authorize the adoption of the revised Syllabi and Courses of Studies in **Bachelor of Engineering (Mechanical Engineering)** for Semester I & II under the **Credit Based System** as per the model curriculum of the AICTE (as given in the Annexure) for the candidates of (Govt./Pvt.) Engineering Colleges affiliated with the University of Jammu for the Examinations to be held in the years indicated against each Semester as under:-

Branch	Semester	For the Examination to be held in the years
Mechanical	Semester-I	December 2022, 2023, 2024 and 2025
	Semester-II	May 2023, 2024, 2025 and 2026

The Syllabi of the course is available on the University Website: www.jammuuniversity.in.

Sd/-
DEAN ACADEMIC AFFAIRS

No. F.Acd/III/22/9976-9984

Dated: 22/11/2022

Copy for information & necessary action to:-

1. Dean Faculty of Engineering
2. Principal, GCET MBSCET BCET YCET
3. C.A to the Controller of Examinations
4. Deputy Assistant Registrar (Exams Confidential)
5. Incharge University Website

Sumitasharma
22/11/22
Deputy Registrar (Academic)

SS
22/11/22

SS
22/11/22

**B.E. Mechanical Engineering First Semester Examination to be held in the
Year December 2022, 2023, 2024, 2025**

Contact Hrs.: 25 hrs.

COURSE CODE	COURSE TYPE	COURSE TITLE	Load Allocations			Marks Distribution		Total Marks	Credits	% Change
			L	T	P	Internal	External			
BST1101	Basic Science Course	Engineering Mathematics I	2	1	0	50	100	150	3	100
BST1102	Basic Science Course	Applied Engineering Chemistry	2	1	0	50	100	150	3	100
HMT1101	Humanities & Management Course	Technical Communication Skill	2	0	0	25	75	100	2	100
MET5101	Engineering Science Course	Engineering Mechanics	2	1	0	50	100	150	3	100
CST3101	Engineering Science Course	Computer Programming	2	1	0	50	100	150	3	100
BSP1112	Basic Science Course	Applied Engineering Chemistry (Lab)	0	0	2	50	-	50	1	100
HMP1111	Humanities & Management Course	Technical Communication Skills (Lab)	0	0	2	50	-	50	1	100
MEP5111	Engineering Science Course	Engineering Mechanics (Lab)	0	0	2	50	-	50	1	100
CSP3111	Engineering Science Course	Computer Programming (Lab)	0	0	2	50	-	50	1	100
MEP5112	Engineering Science Course	Workshop Technology	0	0	3	50	-	50	1.5	100
TOTAL			10	4	11	475	475	950	19.5	

Handwritten signature

Handwritten signature

Handwritten signature

(2)

Handwritten signature

Handwritten signature

Handwritten signature

Handwritten signature

Handwritten signature

BRANCH: COMMON TO ALL BRANCHES

CREDITS 3

CLASS: B.E. 1st SEMESTER

COURSE TITLE – ENGINEERING MATHEMATICS-I

COURSE NO.- BST1101

DURATION OF EXAM: 3 HOURS

L	T	P	MARKS	
			THEORY	SESSIONAL
2	1	0	100	50

Course Outcomes: At the end of the course the students will be able to

CO 1 Learn general theorems of calculus, find maximum and minimum value of functions of two variables.

CO 2 Understand the concept of definite integrals.

CO 3 Learn basic concepts of complex trigonometry.

CO 4 Find the rank, eigen values/ vectors of matrices.

SECTION - A

UNIT-I: DIFFERENTIAL CALCULUS

Partial differentiation, Euler's theorem on homogeneous functions, Rolle's theorem, Mean value theorem, Taylor's and Maclaurin's series with remainder, Taylor's series in two variables, Maxima and Minima of functions of two variables, Method of Lagrange's multipliers. (12 hrs)

UNIT-II: INTEGRAL CALCULUS

Definite integrals with important properties, differentiation under the integral sign, Gamma, Beta and error functions with simple problems, double and triple integrals with simple problems. (8 hrs)

SECTION - B

UNIT-III: COMPLEX TRIGONOMETRY

Hyperbolic functions of a complex variable, Inverse Hyperbolic functions, Logarithmic function of a complex variable; Summation of series by C+iS method. (8 hrs)

UNIT-IV: MATRICES

Introduction, Rank of a matrix, Elementary transformations, Elementary matrices, Inverse using elementary transformation, Normal form of a matrix, Eigen values and Eigen vector, Properties of Eigen value, Cayley Hamilton Theorem, Diagonalization of matrix. (14 hrs)

BOOKS RECOMMENDED:

1.	Calculus and Analytic Geometry	Thomas and Finney, 9 th Edition, Pearson, 2002.
2.	Differential Calculus	S. Narayan and P.K. Mittal, S.Chand, New Delhi.
3.	Higher Engineering Mathematics	B.S Grewal, Khanna Publishers, New Delhi
4.	Engineering Mathematics-I	Dr. Bhopinder Singh
5.	Engineering Mathematics-II	Dr. Bhopinder Singh

NOTE: There shall be total eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of calculator is allowed.

Deepshikha

Q

ni

③

Dr

Shaw

Shaw

2

BS

Examination to be held in the Year December 2022, 2023, 2024, 2025

BRANCH: MECHANICAL/ CIVIL ENGINEERING
CLASS: B.E. 1st SEMESTER
COURSE TITLE – APPLIED ENGINEERING CHEMISTRY
COURSE NO.- BST1102
DURATION OF EXAM: 3 HOURS

CREDITS: 3

L	T	P	MARKS	
			THEORY	SESSIONAL
2	1	0	100	50

COURSE OUTCOMES: On completion of the course the students will be able to:	
CO1	Know the importance of green chemistry and apply the knowledge of Drugs in day to day life.
CO2	Summarize the different types, preparation and uses of Explosives and the importance of Nano particles.
CO3	Acquire Knowledge about the identification of newly synthesized products through Spectroscopy.
CO4	Get acquainted with the basic knowledge of various Electrochemical Cells, metallic corrosion.
CO5	Get acquainted with various chemical processes encountered in the water softening and the impact of lubrication in machinery.

SECTION – A

Unit – I

GREEN CHEMISTRY, FUEL AND DRUGS

Green Chemistry: Definition and Need of Green Chemistry, Principles and Applications of Green Chemistry.

Fuels: Characteristics of a good Fuel, calorific value and types of Fuels.

Drugs: Definition, structure and applications of following drugs: -

- Tranquilizers
- Antibiotics

(8 hrs)

Unit – II

NANO CHEMISTRY AND EXPLOSIVES

Nano Chemistry: Introduction and properties of nano particles, nano materials- Graphene and Fullerenes.

Explosives:- Definition, classification, preparation and uses of TNT and RDX.

(6 hrs)

Unit – III

SPECTROSCOPIC TECHNIQUES AND APPLICATIONS

UV Spectroscopy: Principle, Band nature of UV Spectrum, types of electronic transitions and applications.

IR Spectroscopy: Principle, molecular vibrations and applications.

NMR Spectroscopy: Principle, shielding and de-shielding, equivalent and non-equivalent protons, chemical shift and applications of NMR.

(8 hrs)

SECTION – B

Unit – IV

MATERIAL SCIENCE

Material Science: Types, Properties and importance of materials: Metals, Semiconductors and Insulators.

Electrochemistry: Introduction to Electrolysis and Faraday's laws, Electrochemical cells: Galvanic cell and its application. Mass transfer by electroplating and diffusion.

Corrosion: Dry and wet corrosion, factors influencing rate of corrosion, Remedial Measures against corrosion –cathodic protection, Protective Coatings- galvanizing.

(10 hrs)

Unit – V

WATER TREATMENT AND LUBRICANTS

Water Treatment: Introduction, softening of water by Zeolite and ion-exchange processes, priming and foaming, sludge and scale formation, determination of hardness of water by EDTA method, Numerical on hardness and softening of water.

Lubricants: Classification, mechanism and importance of lubricants.

(10 hrs)

Books Recommended:

- | | |
|--|---------------------|
| 1. Engineering Chemistry | Sharma, B.K. |
| 2. Material Science and Engineering | William Callister |
| 3. An introduction to Nanomaterials and Nano science | A.K Das & Mahua Das |
| 4. Spectroscopy of Organic Compounds | Kalsi, P.S. |

Reference Books:

- | | |
|--------------------------------------|------------------|
| 1. Engineering Chemistry | Shashi, Chawla |
| 2. Spectroscopy of Organic Compounds | Silverstein |
| 3. Electrochemistry | Samuel Glasstone |

NOTE: There will be total eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section.

(4)

Examination to be held in the Year December 2022, 2023, 2024, 2025

BRANCH: MECHANICAL/ CIVIL ENGINEERING
CLASS: B.E. 1st SEMESTER
COURSE TITLE - TECHNICAL COMMUNICATION SKILLS
COURSE NO.- HMT1101
DURATION OF EXAM: 3 HOURS

CREDITS: 2

L	T	P	MARKS	
			THEORY	SESSIONAL
2	0	0	75	25

COURSE OUTCOMES : At the end of this course, students will able to :

CO1	Acquire proficiency in reading, writing, speaking & listening skills
CO2	Equip themselves with grammatical and communicative competence.
CO3	To help them to develop positive attitude & personality to deal with the complexities of life.
CO4	To encourage the all-round development of students by focusing on soft skills.

SECTION-A

UNIT-1: Communication skills & writing practice: Introduction, Elements of Business Communication, Media of Verbal Communication (oral & written), Barriers to Communication, Technology-Enabled Business Communication, **Types of letter-** Inquiry Letter, Reply to Inquiry, Claims Letter, Adjustment and Sales letter, Job Letter (8 hrs)

UNIT-2: Listening skills: Process of Listening, Types of listening, Techniques to improve listening ability, **Group Discussion-** Advantages, Purpose, Group Dynamics, and Guidelines for Effective Group discussion. **Speaking Skills-** Skills of Effective speaking, Tips for writing Scripts and Speeches. (7 hrs)

SECTION-B

UNIT-3: Personality Development- Introduction, Importance of Personality Development, Personality Development tips, Different types of Personality, Personality Traits, Personality Disorder, Personality traits of a Good Manager. (8 hrs)

UNIT-4: Life Management Skills: Introduction, Need and importance of Life Management Skills, Concept of Hard and Soft skills; Difference between Hard and Soft Skills, **Interviews-** Meaning, Types of Interview, tips for giving an interview and handling questions. (7 hrs)

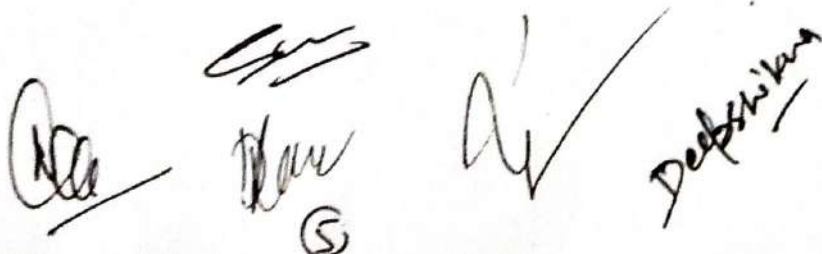
Recommended Books:

- Communication Skills Skills (Second Edition) by Sanjay Kumar & Pushap Lata, Oxford University Press.
- Functional Aspects of Communication Skills by Dr. Prajapati Prasad, Published by S.K Kataria & Sons.

Reference Books:

- An Approach to Communication Skills by Indrajit Bhattacharya, Published by Dhanpat Rai & Co Ltd
- Communication Skills by Varinder Kumar and Bodh Raj, Published by Kalyani Publishers.
- Master of Life Management by Dr.Dantu Murali Krishna, published by Invincible Publishers.
- Kagan Jerome (1969), Personality Development, Harcourt Brace, New York.

NOTE: There shall be total eight questions, four from each section. Each question carries 15 marks. Five questions will have to be attempted, selecting at least two from each section.



BRANCH: MECHANICAL ENGINEERING
CLASS: B.E. 1st SEMESTER
COURSE TITLE – ENGINEERING MECHANICS
COURSE NO.- MET5101
DURATION OF EXAM: 3 HOURS

CREDITS: 3

L	T	P	MARKS	
			THEORY	SESSIONAL
2	1	0	100	50

COURSE OUTCOMES : At the end of this course, students will able to :

CO1:	Understand and analyze system of units and their conversion from one to another.
CO2:	Gather and demonstrate knowledge on basic forces calculation, their resultants and resolution.
CO3:	Gather knowledge and approach to a conclusion of forces causing equilibrium.
CO4:	Be proficient in the use of integral and moment methods for calculating centre of gravity.
CO5:	Develop a stable, environment friendly structure for various engineering purpose using various methods.

SECTION-A

STATICS

Scope and basic concepts (Rigid body, force, units, etc), concept of free body diagram, Resultant of Co-planar concurrent forces in a plane and space, moment of force, Principle of Moments, Coplanar and spatial applications. Virtual work method and its applications.

Analysis of trusses, Equilibrium and its equations for a planar and spatial systems, Method of joints and sections.

Theory of friction, its laws and applications (inclined plane). Square threaded screws, Bolt friction, Centroids and center of gravity, centroids of lines and composite areas, centroids determined by integration.

Moment of inertia, Area M.O.I, Transfer theorems, Polar M.O.I, Product of inertia, Principal M.O.I, Mohr's circle for area M.O.I, Transfer theorems and axes M.O.I of composite bodies. (20 hrs.)

SECTION-B

DYNAMICS

Kinematics of a particle rectilinear motion, motion curves, Rectangular components of curvilinear motion, Flight of Projectile, Normal and tangential components of acceleration, Radial and transverse components, Newton's Laws. D'Alembert's Principle.

Kinematics of rigid bodies: Types of rigid body motion, Angular motion, fixed axis rotation, Analysis of plane motion and its applications, Instantaneous center and Instantaneous axis of rotation.

Kinetics of Particle: Translation, Analysis of a particle as a rigid body.

Kinetics of rigid bodies: Equations of plane motion, fixed axis rotation, Rolling bodies, General plane motion, Impulse and momentum in plane motion, Angular momentum. (20 hrs.)

RECOMMENDED BOOKS:

- | | |
|---|-----------------------------------|
| 1. Engineering Mechanics (Statics & Dynamics) | Beer and Johnson |
| 2. Engineering Mechanics (Statics & Dynamics) | Mariam and Kraige |
| 3. Engineering Mechanics (Statics and Dynamics) | Timoshenko and Young |
| 4. Engineering Mechanics (Statics and Dynamics) | Sarbjeet Singh and Pardeep Singh. |

NOTE: There shall be total eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of calculator is allowed.

Examination to be held in the Year December 2022, 2023, 2024, 2025

BRANCH: COMPUTER/CSE/IT/E&C/ MECHANICAL ENGINEERING

CREDITS: 3

CLASS: B.E. 1st SEMESTER

COURSE TITLE – COMPUTER PROGRAMMING

COURSE NO.- CST3101

DURATION OF EXAM: 3 HOURS

L	T	P	MARKS	
			THEORY	SESSIONAL
2	1	0	100	50

COURSE OUTCOMES : At the end of this course, students will able to :

CO 1	Understand various software development tools like algorithm, pseudo codes and flow charts for solving problems.
CO 2	Understand the use of loops and decision making statements to solve the problems.
CO 3	Apply different operations on arrays and user-defined functions to solve real-time problems.
CO 4	Analyze the operation of pointers, structures and unions.
CO 5	Implement file operations in C programming for a given application.

SECTION A

1. **Introduction to Programming (Flow chart/pseudocode, compilation etc.)**

Evolution of programming languages, the compilation process, object code, source code, executable code, fundamentals of algorithms, flow charts. (4 Hrs)

2. **Introduction to C, Data Types, Constants, Variables, Expressions, Statements, Operators, Data Input and Output** - Character set, Identifiers, Keywords, Data Types, Constant and Variables, Statements, Expressions, Operators, Precedence of operators, Input-output Assignments. (6 Hrs)

3. **Control Statements, Storage Classes, Library Functions.**

Control structures, Decision making and Branching, Decision making & looping.

Storage Classes: Types of storage classes, Scoping rules.

Standard Library Functions, advantages and use of various library functions (I/O functions, String, Character, Mathematics, Time and Date, functions). (10 Hrs)

SECTION B

4. **Functions, Arrays, Recursion, User Defined Data Types, Structures, Unions, Passing Structure to Functions.**

User defined and standard functions, Formal and Actual arguments, Functions category, function prototypes, parameter passing, Call-by-value, Call-by-reference, Nested function, Recursion.

One dimensional Array, One dimensional Array, 2- dimensional arrays: declaration and their applications, Searching in an array: Linear search and Binary search.

Sorting in an array: Bubble sort, Selection sort, Insertion sort, String Manipulation functions, Passing array to a Function, Declaration of structures, declaration of unions, pointer to structure & unions. (10 Hrs)

5. **Pointers, Operation on Pointers, Passing Pointers to Functions, Data Files – Opening, Closing, Creating Data Files**

Pointer variable and its importance, Pointer Arithmetic, passing parameters by reference, pointer to pointer, pointers to functions, Dangling pointer, dynamic memory allocation. Console input output functions, Disk input output functions, opening closing and creating Data files. (10 Hrs)

BOOKS RECOMMENDED:

- | | |
|--------------------------|----------------------|
| C How to Program, 7/e | - Paul J. Deitel |
| Programming With C | - Byron Gottfried. |
| Programming With C | - E. Balaguruswamy. |
| C The Complete Reference | - Herbert Schildt. |
| Let us C | - Yashwant Kanitkar. |

NOTE: There shall be total eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of calculator is allowed.

3d

Examination to be held in the Year December 2022, 2023, 2024, 2025

BRANCH: MECHANICAL/ CIVIL ENGINEERING

CLASS: B.E. 1st SEMESTER

COURSE TITLE - APPLIED ENGINEERING CHEMISTRY LAB

COURSE NO.- BSP1112

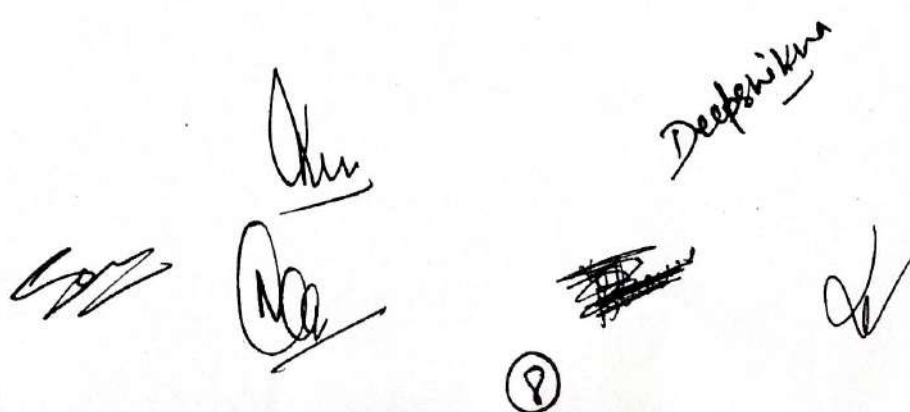
CREDITS: 1

L	T	P	MARKS
0	0	2	PRACTICAL
0	0	2	50

COURSE OUTCOMES : At the end of this course, students will able to :	
CO1	Visualize and understand chemical engineering unit, operations related to fluid and practical mechanics and mass transfer.
CO2	Analyse an overview of preparation and identification of organic compound.
CO3	Understand the quantitative analysis and makes use of simple equation to illustrate the concept involved.
CO4	Estimate the total hardness of water by EDTA complexometric method.

S. No.	TITLE OF EXPERIMENT
1.	To Determine Volumetrically the number of molecules of water of crystallization present in the given sample of Mohr's salt, x gms. of which have been dissolved per litre provided N/10 $K_2Cr_2O_7$ (using an external indicator).
2.	To Determine Volumetrically the percentage of Cu in a sample of $CuSO_4$ crystals, Z gms of which have been dissolved per litre, provided 0.1N $Na_2S_2O_3$.
3.	To determine the coefficient of viscosity of an unknown liquid using Ostwald Viscometer.
4.	Determine the surface tension of a unknown liquid Stalagmometer.
5.	To prepare a pure and dry sample of Aspirin.
6.	To prepare a pure and dry sample of Glucosazone.
7.	To analyse the given antacid tablets.
8.	To analyse the trend of absorbance of solution at different concentrations by UV Spectrophotometer.
9.	Determine the method of purification of organic compounds by paper chromatography.
10.	Organic Analysis: Identify the following organic compounds (preparation of at least one derivative).
11.	Determine the total hardness of a sample of water by complexometric method (using EDTA).
12.	Determine the percentage of calcium oxide in cement.

Note:- A minimum of ten experiments to be performed.



Examination to be held in the Year December 2022, 2023, 2024, 2025

BRANCH: MECHANICAL/ CIVIL ENGINEERING

CLASS: B.E. 1st SEMESTER

COURSE TITLE- TECHNICAL COMMUNICATION SKILLS LAB

COURSE NO.- HMP1111

CREDITS: 1

L	T	P	MARKS
0	0	2	PRACTICAL
			50

COURSE OUTCOMES : At the end of this course, students will able to :

CO1	Acquire proficiency in reading, writing, speaking & Listening skills.
CO2	Develop presentation, interview and interpersonal skills

List of Practical's:

Listening Skills

1. Listen to text read aloud in normal speed with focus on intonation.
2. After listening the student can fill in blanks, choose a suitable title, make a summary, and be able to answer comprehension questions from the passage read aloud.

Speaking skills

3. Conversation Skills
4. Presentation Skills

Personality Development

5. Types of Personality
6. Personality Disorder

Interpersonal Skills

7. Group Discussion
8. Interviews, Mock Interviews

Career Building & Resume writing

9. SWOT Analysis
10. Resume Writing

Note: 1. Eligibility to appear in Practical Test: 8 practicals
2. Simulation/ virtual labs are used to enhance the practical ability of students.

(Handwritten signatures and marks)

⑨

Examination to be held in the Year December 2022, 2023, 2024, 2025

BRANCH: MECHANICAL ENGINEERING
CLASS: B.E. 1st SEMESTER
COURSE TITLE - ENGINEERING MECHANICS LAB
COURSE NO- MEP5111

CREDITS: 1

L	T	P	MARKS
			PRACTICAL
0	0	2	50

COURSE OUTCOMES : At the end of this course, students will able to :	
CO1	Understand and implement fundamentals of statics and motion principles of engineering problems.
CO2	Contain knowledge on finding stable structures of engineering practice and bending of beams.
CO3	Understand, analyse and solve engineering problems related to motion.
CO4	Demonstrate the knowledge on basic calculation of forces and their resultant and resolution.

1. To Verify Parallelogram Law of Forces.
2. To Verify LAMIS Theorem.
3. To Verify Bending Moment.
4. To Find the Coefficient of Friction between Glass and Wooden surface on inclined Plane.
5. To find out velocity ratio and mechanical advantage of single/ double purchase winch crab.
6. To Find the Coefficient of Friction between Glass and steel roller on inclined Plane.
7. To find out velocity ratio and mechanical advantage of worm & worm wheel.
8. To find out support reactions in case of simply supported beam.

NOTE: Minimum of Six experiments to be performed

H

Pratishtha

R

2

Examination to be held in the Year December 2022, 2023, 2024, 2025

BRANCH: COMPUTER/CSE/IT/E&C/ MECHANICAL ENGINEERING
CLASS: B.E. 1st SEMESTER
COURSE TITLE - COMPUTER PROGRAMMING LAB
COURSE NO.- CSP3111

CREDITS: 1

L	T	P	MARKS
0	0	2	PRACTICAL
			50

LABORATORY OUTCOMES:

After Completion of this course the student would be able to –

CO 1	Understand the working of different compilers and editors for writing programs in C.
CO 2	Exercise basic syntax, operators and control statements to write C programs.
CO 3	Execute programs based on user defined functions and recursive functions.
CO 4	Implement arrays, pointers to access variables and functions.
CO 5	Write programs that perform operations using derived data types and files.

Lab Experiments:

Experiment 1: Problem solving using computers: Familiarization with programming Environment.

Experiment 2: Variable types and type conversions: Simple computational problems using arithmetic expressions.

Experiment 3: Branching and logical expressions: Problems involving if-then-else Structures.

Experiment 4: Loops, while and for loops: Iterative problems e.g., sum of series

Experiment 5: 1D Arrays: searching, sorting: 1D Array manipulation

Experiment 6: 2D arrays and Strings, memory structure: Matrix problems, String Operations

Experiment 7: Functions, call by value: Simple functions

Experiment 8: Recursion, structure of recursive calls: Recursive functions

Experiment 9: Pointers, structures and dynamic memory allocation: Pointers and Structures

Experiment 10: File handling: File creation, writing and reading a file, File manipulation Operations

NOTE: Minimum of Eight experiments to be performed

Reddy

San

Shankar

Shankar

Examination to be held in the Year December 2022, 2023, 2024, 2025

BRANCH: MECHANICAL / ELECTRICAL ENGINEERING
CLASS: B.E. 1st SEMESTER
COURSE TITLE – WORKSHOP TECHNOLOGY
COURSE NO.- MEP5112

CREDITS: 1.5

L	T	P	MARKS
			INTERNAL
0	0	3	50

COURSE OUTCOMES:- At the end of the course, the student will demonstrate the ability to: -

CO1	Introduction to different manufacturing methods in different fields of engineering.
CO2	Understanding different manufacturing techniques and their relative advantages/disadvantages with respect to different applications
CO3	Acquire a minimum practical skill with respect to the different materials.
CO4	Creation of simple components using different materials.

SHOP PRACTICE: -

Unit -1: - Carpentry

1. Middle/Cross lap joint
2. Mortise and Tenon Joint T -Joint
3. Pattern making of open bearing

Unit II: -Foundry

1. Moulding of open bearing (simple pattern)
2. Moulding of Sliding Job of Bench Vice (Split piece pattern)

Unit -III: - Smithy

1. Upsetting, drawing and bending operation

Unit -IV: - Welding

1. Preparation of single V- Butt joint by arc/gas welding.
2. Preparation of Double V-Butt joint by gas /arc welding.
3. Corner Joint by arc/gas welding
4. Lap Joint by arc/gas welding

Unit – V: - Fitting

1. Assembly of snap fitting of MS-Flat pieces (Male and Female)
2. Assembly and fitting of two L-shaped rectangular MS-flat pieces.

Books Recommended: -

1. Workshop Technology by Hajra and Chowdhary
2. Manufacturing Technology Vol I and II by Rao. P.N
3. Manufacturing Technology by Gowri. P. Hariharan and A. Suresh Babu.

NOTE: Minimum of Eight experiments to be performed.

(12)

ANNEXURE - II

**B.E. Mechanical Engineering Second Semester Examination to be held in the
Year May 2023, 2024, 2025, 2026**

Contact Hrs.: 22 hrs.

COURSE CODE	COURSE TYPE	COURSE TITLE	Load Allocations			Marks Distribution		Total Marks	Credits	% Change
			L	T	P	Internal	External			
BST1201	Basic Science Course	Engineering Mathematics-II	2	1	0	50	100	150	3	100
HMT1201	Humanities & Management Course	Universal Human Values and Professional Ethics	2	1	0	50	100	150	3	100
CET6201	Engineering Science Course	Environmental Science	2	1	0	50	100	150	3	100
BST1203	Basic Science Course	Advanced Engineering Physics	2	1	0	50	100	150	3	100
MET5202	Engineering Science Course	Engineering Drawing	3	0	0	50	100	150	3	100
ECT1201	Engineering Science Course	Fundamentals of Electronics Engineering	2	1	0	50	100	150	3	100
BSP1213	Basic Science Course	Advanced Engineering Physics (Lab)	0	0	2	50	-	50	1	100
ECP1211	Engineering Science Course	Fundamentals of Electronics Engg. (Lab)	0	0	2	50	-	50	1	100
TOTAL			13	5	4	400	600	1000	20	

Examination to be held in the Year May 2023, 2024, 2025, 2026

BRANCH: COMMON TO ALL BRANCHES

CLASS: B.E. 2nd SEMESTER

CREDITS 3

COURSE TITLE – ENGINEERING MATHEMATICS-II

COURSE NO.- BST1201

DURATION OF EXAM: 3 HOURS

L	T	P	MARKS	
			THEORY	SESSIONAL
2	1	0	100	50

Course Outcomes: At the end of the course the students will be able to	
CO 1	Learn different tests to check the convergence or divergence of a series.
CO 2	Find the Fourier series of a function.
CO 3	Solve the differential equations of first order and higher order.
CO 4	Learn the concept of linear and non- linear partial differential equations.

SECTION A

UNIT-I: INTRODUCTION TO INFINITE SERIES

Convergence and divergence of a Series: p-test, Comparison Test, Cauchy Root Test, D'Alembert Ratio Test, Raabe's Test, Gauss Test, Logarithmic Test, Leibnitz Test for alternating series (10 hrs)

UNIT-II: FOURIER SERIES

Euler's formula, sufficient conditions for a Fourier expansion, functions having points of discontinuity, change of intervals. Odd and even functions, Fourier expansion of Odd and even periodic functions, half range series, typical wave forms, Parseval's formula, complex form of Fourier –series. (10 hrs)

SECTION B

UNIT-III: ORDINARY DIFFERENTIAL EQUATIONS

Differential equations of first order and first degree: Linear and Bernoulli's differential equations, Exact and non-exact differential equations. Higher order linear differential equations: Complementary solution, particular integral and general solution of these equations, variation of parameters technique to find particular integral of second order differential equations. (10 hrs)

UNIT-IV: PARTIAL DIFFERENTIAL EQUATIONS

First order linear p.d.e, Non-Linear p.d.e. of 1st order, solution by Charpit's method, Four Standard forms of non-linear p.d.e with reference to Charpit's technique: $f(p, q) = 0$, $f(z, p, q) = 0$, $f(x, p) = g(y, q)$ and Clairaut's form. Homogeneous and Non-homogeneous higher order linear partial differential equations with constant coefficients, Rules for finding P.I and C.F, Non-Linear equations of 2nd order (12 hrs)

BOOKS RECOMMENDED:

1	Advanced Engineering Mathematics	R.K. Jain, S.R.K Iyenger, 2 nd edition Narosa New Delhi.
2	Differential Equations	G. F. Simmons
3	Partial differential equations	M. D. Raisinghania
4	Engineering Mathematics-I	Dr. Bhopinder Singh
5	Engineering Mathematics-II	Dr. Bhopinder Singh

NOTE: There will be total eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of calculator is allowed.

[Handwritten signatures and marks]

14

Examination to be held in the Year May 2023, 2024, 2025, 2026

BRA CH: MECHANICAL/ CIVIL ENGINEERING

CLASS: B.E. 2nd SEMESTER

COURSE TITLE – UNIVERSAL HUMAN VALUES AND PROFESSIONAL ETHICS

COURSE NO.- HMT1201

DURATION OF EXAM: 3 HOURS

CREDITS: 3

L	T	P	MARKS	
			THEORY	SESSIONAL
2	1	0	100	50

COURSE OUTCOMES: At the end of the course students will be able to:

CO1	Understand the meaning of happiness and prosperity for a human being.
CO2	Comprehend the holistic approach about the family and society.
CO3	Understand the harmony in the nature and self-regulation in nature
CO4	Apply the understanding of harmony in existence in their profession.

SECTION A

- UNIT 1: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education
1. Understanding the need, basic guidelines, content and process for Value Education
 2. Self Exploration-what is it?-its content and process; 'Natural Acceptance' and Experiential Validation-as the mechanism for self exploration
 3. Continuous Happiness and Prosperity-Alookat basic Human Aspirations
- (6 hrs)
- UNIT 2: Understanding Harmony in the Human Being-Harmony in Myself
1. Understanding human being as a co-existence of the sentient 'I' and the material 'Body'
 2. Understanding the needs of Self ('I') and 'Body'– Happiness and physical facility.
 3. Understanding the Bodyas an instrument of 'I' (I being the doer, see randenj oyer).
- (6 hrs)
- UNIT 3: Understanding Harmony in the Family and Society-Harmony in Human-Human Relationship
1. Understanding Harmony in the family – the basic unit of human interaction
 2. Understanding values In human –human relationship ; meaning of justice (Nyaya)and Program for its fulfilment to ensure mutual happiness (Ubhay - tripti); Trust (Vishwas) and Respect (Samman) as the foundational values of relationship
 3. Understanding the meaning of trust (Vishwas); Difference between intentionand competence.
- (8 hrs)

SECTION B

- UNIT 4: Understanding Harmony in the Nature and Existence-Whole existence as Co-existence
1. Understanding the harmony in the Nature
 2. Interconnectednessandmutualfulfillmentamongthefourordersofnaturerecyclabilityandself-regulationinnature.
 3. Understanding existence as co-existence of mutually interacting units in all pervasive space.
- (8 hrs)
- UNIT 5: Implication of the above holistic understanding of harmony on professional ethics
1. Natural acceptance of human values.
 2. Definitiveness of Human value conduct.
 3. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal order.
- (6 hrs)
- UNIT 6: Competence in professional ethics:
1. Ability to utilize the professional competence for augmenting universal human order.
 2. Ability to identify the scope and characteristics of people friendly and eco- friendly production systems.
 3. Ability to identify and develop appropriate technologies and management patterns for above production systems.
- (6 hrs)

NOTE: There shall be total eight questions, four from each section. Each question carries 20 marks. Five questions will have to be attempted, selecting at least two from each section.

Books Recommended:

R.RGaur,RSangal,GPBagaria,A foundation course in Human Values and professional Ethics, Excel books, New Delhi,

Reference Books:

1. B. Mahadevan, Vinayak Rajat Bhat, Nagendra Pavana R.N, Indian Knowledge System, PHI Publisher.
2. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co.,Lucknow.Reprinted 2008.
3. P L Dhar, R RGaur ,Science and Humanism, Common wealth Purblishers.

Handwritten signatures and a circled number 15 are present at the bottom of the page.

Examination to be held in the Year May 2023, 2024, 2025, 2026

BRA CH: MECHANICAL/ ELECTRICAL ENGINEERING
CLASS: B.E. 2nd SEMESTER
COURSE TITLE – ENVIRONMENTAL SCIENCE
COURSE NO.- CET6201
DURATION OF EXAM: 3 HOURS

CREDITS: 3

L	T	P	MARKS	
			THEORY	SESSIONAL
2	1	0	100	50

COURSE OUTCOMES : On completion of the course the students will be able to:

CO1	Understand the eco-systems, biodiversity and its conservation.
CO2	Understand the basic concepts of environmental studies and natural resources.
CO3	Gain knowledge about different types of environmental pollutions and their control measures.
CO4	Understand the fundamentals of social issues, population and the environment.

SECTION- A

Ecosystems: Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem, Carbon and Nitrogen Cycles, Ecological succession, Food chains, food webs and ecological pyramids. Introduction, types, Characteristic features, structures and functions of the following ecosystems: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (river and ocean). **(10 hrs)**

Natural Resources: Renewable and Non-renewable resources.

Forest resources: Use and over Exploitation, deforestation, effects on forest and tribal people.

Water resources: Use and over utilization of surface and ground water and its conservation. **(10 hrs)**

SECTION-B

Environmental Pollution: Definition, Cause, effects and control measures of different types of pollution.

Air pollution- Sources, effects, control, air quality standards, air pollution act, air pollution measurement. Effect of air pollution on human beings, animals and materials.

Water Pollution-Sources and impacts, Soil Pollution-Sources and impacts, disposal of solid waste. Greenhouse gases – effect, acid rain, Ozone layer depletion. **(10 hrs)**

Social Issues and the Environment: Sustainable development and Sustainable use of Resources, Urban problems related to energy, Energy resources: Growing energy needs, renewable and nonrenewable energy sources use of alternate energy sources, Land resources: Land as a resource, land degradation, soil erosion and desertification, Role of an individual in conservation of natural resources.

Environment Protection Acts: Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act and Forest Conservation Act. **(10 hrs)**

Books Recommended:

1. Environmental Engineering By Peavy, Rowe And Tchobanoglous, Mc Graw – Hill International Edition.
2. Elements Of Environmental Science And Engineering, P. Meenakshi, 2nd Edition, Phi Publishers.
3. Environmental Studies By Kaushik And Kaushik, New Age Publisher.
4. A Basic Course In Environmental Studies By Deswal And Deswal, Dhanpat Rai & Co.

NOTE: There shall be total eight questions, four from each section. Each question carries 20 marks. Five questions will have to be attempted, selecting at least two from each section.

Deepshikha

Examination to be held in the Year May 2023, 2024, 2025, 2026

BRANCH: MECHANICAL/ CIVIL ENGINEERING
CLASS: B.E. 2nd SEMESTER
COURSE TITLE- ADVANCED ENGINEERING PHYSICS
COURSE NO.- BST1203
DURATION OF EXAM: 3 HOURS

CREDITS: 3

L	T	P	MARKS	
			THEORY	SESSIONAL
2	1	0	100	50

COURSE OUTCOMES: At the end of the course students will be able to:

CO1	Understand the significance of vector calculus and the importance of Maxwell's equations as the basis of Electromagnetic theory.
CO2	Assimilates the basic principles of Laser Physics, Optical fibers, moment of inertia and their applications in various fields.
CO3	Familiarize with the simple harmonic oscillations, damped oscillations and quantities governing oscillations and understand the importance and generation of ultrasonic waves.
CO4	Acquire the concepts of semiconductors, types of semiconductors and various properties of semiconductor physics and basic concepts of friction, types of friction and its applications.

SECTION-A

UNIT 1: ELECTROMAGNETIC FIELDS AND WAVES

Concepts of Del Operator- gradient, divergence, curl and their physical significances, Displacement Current, Maxwell's equations in integral and differential form, Poynting vector and Poynting theorem, Electromagnetic wave propagation in free space (E M wave equations for electric & magnetic fields for free space) & their solutions (plane wave solution), velocity of E M waves, Relation between E_0 & B_0 .

(8 hrs)

UNIT-II: LASER AND FIBRE OPTICS

Concept and principal of Laser action, Spontaneous and Stimulated emission, Einstein's co-efficient, coherence and characteristics of laser light, Ruby, CO₂ laser, Applications of lasers, Optical Fiber, Physical structure and basic theory, critical angle, Acceptance angle & acceptance cone, Numerical Aperture, characteristics and general applications of optical fibers.

(9 hrs)

UNIT -III: PROPERTIES OF SURFACES, MOMENTS AND PRODUCTS OF INERTIA

Definition Moment of Inertia for areas-Parallel axis theorem-Perpendicular axis theorem-Moment of inertia for composite area-product of inertia form, mass moment of inertia.

(5 hrs)

SECTION - B

UNIT-IV: WAVES & OSCILLATIONS

Simple harmonic oscillations, damped oscillations and differential equations, logarithmic decrement, relaxation time and quality factor, ultrasonic waves and their production, applications of ultrasonic waves.

(5 hrs)

UNIT-V: SEMICONDUCTOR PHYSICS

Structure of Atoms, Energy band diagram, Metal, Insulator and Semiconductor, Intrinsic and Extrinsic semiconductors, Direct & Indirect semiconductors (E-k diagrams), Electron and hole concentration in intrinsic semiconductors, Charge densities in semiconductor, Generation & Recombination of charge carrier, Law of mobility & conductivity, Current densities in semiconductors, Fermi levels, Mass action law, Drift & Diffusion current and Einstein relation for a p-n junction. Hall effect, Hall co-efficient & its applications.

(9 hrs)

UNIT -VI: FRICTION

Laws of coulomb friction -Coefficient of Friction -Dry Friction -sliding Friction -ladder friction -Belt friction -Rolling Resistance.

(6 hrs)

Books Recommended:

1. Fundamentals of Electricity & Magnetism:	Duggal & Chabbra
2. Fibre Optics:	Ghatak, Tyagrajan
3. Lasers:	K.R. Nambiyar
4. Engineering Mechanics:	A. K. Tayal
5. Sound:	Gupta & Gupta
6. Semiconductor Physics and devices:	Donald A. Neamen

NOTE: There shall be total eight questions, four from each section. Each question carries 20 marks. Five questions will have to be attempted, selecting at least two from each section. Use of a Scientific calculator is allowed.

(Handwritten signatures and marks)

Examination to be held in the Year May 2023, 2024, 2025, 2026

BRA CH: MECHANICAL/ CIVIL ENGINEERING
CLASS: B.E. 2nd SEMESTER
COURSE TITLE - ENGINEERING DRAWING
COURSE NO.- MET5202
DURATION OF EXAM: 3 HOURS

CREDITS: 3

L	T	P	MARKS	
			THEORY	SESSIONAL
3	0	0	100	50

COURSE OUTCOMES: At the end of the course students will be able to:				
CO 1	Understand and use engineering scales with accuracy and interpret missing views.			
CO 2	Work with zeal of Industrial practices and standards.			
CO 3	Convert sketches to engineering drawings.			
CO 4	Fundamentally understand and perform Two and Three dimensional drawings.			
CO 5	Draw and understand orthographic projections of sections			

SECTION -A

Lettering, Dimensioning and Curves: Introduction, Lines, types of lines, Lettering, Single stroke Lettering, Dimensioning, placing of dimensions, Aligned and unidirectional. Curves used in Engineering Practice: Cycloidals, Involutcs, Spirals and Hellices. Scale types, plain and diagonal.

Projection of Points: Introduction to quadrant system, Concept of first angle third angle projection, Projection of points in first quadrant, second quadrant, third quadrant and fourth quadrant with conclusions.

Projection of Straight Lines: introduction, projection of lines in various quadrants and with conditions like parallel, perpendicular and inclined cases.

Projection of Planes: Projections of a plane w.r.t. the principle planes in simple and inclined positions. Rotation method and the Auxiliary plane method. (20 hrs.)

SECTION -B

Projection of Solids: Classification and main features -Prisms and Pyramids. Projection of solids inclined to both the reference planes by (I) Rotation Method, and (II) Auxiliary plane method. Projection of solids in combination (Co-axial) in simple and inclined positions.

Sectioning of Solids: Object of sectioning, Types of cutting planes, True shape of section, Auxiliary views of sections of multiple co-axial solids in simple and titled conditions.

Development of Surfaces: Classification of surfaces, Methods of development -Straight line method and Radial line method, Development of solids and hollow sections in full or part development of transition pieces.

Orthographic Projections: Orthographic projection of simple blocks (First & Third angles), to draw the third view from given two views. Missing lines in projection. (21 hrs.)

RECOMMENDED BOOKS:

1. Engineering Drawing
2. Practical Geometry
3. Engineering Graphics
4. Principles of Engineering Graphics
5. Engineering Graphics

P.S Gill
V. Laxminarayan & GEV
K.L. Narayanan & P. Kamaish
P.E Giesecks
Frederic & Michelle.

NOTE: There shall be total eight questions, four from each section. Each question carries 20 marks. Five questions will have to be attempted, selecting at least two from each section. Use of a calculator is allowed.

(18)

Examination to be held in the Year May 2023, 2024, 2025, 2026

BRANCH: E&C/ MECHANICAL ENGINEERING
CLASS: B.E. 2nd SEMESTER
COURSE TITLE- FUNDAMENTALS OF ELECTRONICS ENGINEERING
COURSE NO.- ECT1201
DURATION OF EXAM: 3 HOURS

CREDITS: 3

L	T	P	MARKS	
			THEORY	SESSIONAL
2	1	0	100	50

COURSE OUTCOMES:- After learning this course students will be able to:	
CO.1	To understand the fundamentals of semiconductor physics
CO.2	To introduce the concept of semiconductor devices with applications.
CO.3	To enable the students to understand the working and applications of a transistor.
CO.4	To understand the basics techniques of biasing of JFET & MOSFET

SECTION-A

UNIT-I: Semi-Conductors and Diodes: Introduction, Insulators, Semiconductors and Metals, Mobility and Conductivity, Intrinsic and Extrinsic Semiconductors, Charge Density, Current Components in Semiconductors, Continuity Equation, PN Junction Diode- Volt ampere characteristics, Diode capacitances, Static & dynamic resistances; Types of Diodes- Zener Diode, its breakdown phenomenon and its applications, Photodiodes, LED, Varactor Diode, Tunnel Diodes, Schottky diode.

(9 Hrs)

UNIT-II: Diode Applications: Rectifiers and Filter Circuit: Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, and their Analysis, L,C, and Pi Filters; Series and Shunt Diode Clippers, Clipping at Two Independent Levels, Clamping Operation, Clamping Circuit; Practical Clamping Circuits.

(9 Hrs)

SECTION-B

UNIT-III: Transistor Biasing: Symbol, Construction, and Characteristics of BJT, reach through &avalanche phenomena, Base width modulation, Transistor Configuration: CB, CE, CC Configuration with necessary current equations. Transistor as an amplifier and switch, Derivation related to Transistor Biasing and Bias Compensation Techniques.

(10 Hrs)

UNIT-IV: Symbol, construction, and Characteristics of JFET, parameters of JFET, Analysis and biasing of JFET, Low-frequency model of JFET, MOSFET, and its characteristics.

(10 Hrs)

BOOKS RECOMMENDED:

1. Integrated Electronics by J. Millman and C.C. Halkias, McGraw Hill Education, India.
2. Electronics Devices and Circuit Theory by R. Boylestad and L. Nashelsky, Pearson India.
3. Electronics Devices and Circuits-II by U. A. Bakshi and A. P. Godse, Technical Publications.
4. Electronic principles by L. Malvino, Tata McGraw Hill Education.

NOTE: There shall be total eight questions, four from each section. Each question carries 20 marks. Five questions will have to be attempted, selecting at least two from each section. Use of a calculator is allowed.

[Signature]

[Signature]
(19)

[Signature]

[Signature]

Examination to be held in the Year May 2023, 2024, 2025, 2026

BRANCH: MECHANICAL/ CIVIL ENGINEERING
CLASS: B.E. 2nd SEMESTER
COURSE TITLE - ADVANCED ENGINEERING PHYSICS LAB
COURSE NO.- BSP1213

CREDITS: 1

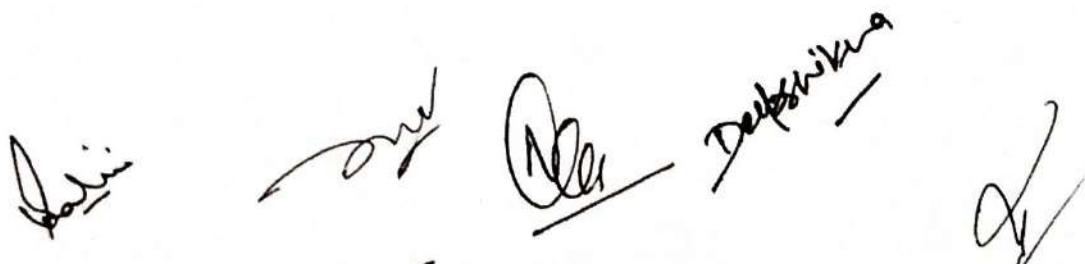

L	T	P	MARKS
			PRACTICAL
0	0	2	50

Course Outcomes (CO): At the end of the course the Student Will be able to -

CO 1	Gain knowledge about the scientific methods of measuring different physical parameters based on the concepts of Physics.
CO 2	Develop experimentation skills by displaying minimized measurement errors.
CO 3	Demonstrate and improve the practical skills to use the appropriate physical concepts to obtain the solutions pertaining to different physics experiments.
CO 4	Acquire the essence of scientific temper infused with innovation and creativity.

Experiment No.	Title of Experiment
EXP-I	To find the frequency of AC mains using a sonometer.
EXP-II	To determine the wavelength of Sodium light using a plane transmission diffraction grating.
EXP-III	To find the co-efficient of self-induction of a coil by Anderson's Bridge using headphones.
EXP-IV	To find the wavelength of monochromatic light using Newton's rings apparatus.
EXP-V	To plot a graph between the distance of knife- edges from the center of gravity and the time period of a compound pendulum. From the graph find (a) the acceleration due to gravity (b) the radius of gyration (c) the moment of inertia of the bar about its axis passing through the center of gravity.
EXP-VI	To determine the plateau and optimal operating voltage of Geiger Muller (GM) Counter
EXP-VII	To study the variation of Magnetic field by using Stewart and Gee's Tangent galvanometer.
EXP-VIII	To find the dispersive power of a given prism using a spectrometer.
EXP-IX	To find the impedance of LCR circuit.
EXP-X	To study the Common base/ common emitter characteristics of PNP/NPN junction transistor.
EXP-XI	To determine the specific rotation of sugar/glucose using Laurent's half shade Polarimeter.

NOTE: A Minimum of Eight Experiments is to be performed covering the Diverse Aspects of Engineering Physics.

Examination to be held in the Year May 2023, 2024, 2025, 2026

BRANCH: E&C/ MECHANICAL ENGINEERING
CLASS: B.E. 2nd SEMESTER
COURSE TITLE – FUNDAMENTALS OF ELECTRONICS
ENGINEERING LAB
COURSE NO.- ECP1211

CREDITS: 1

L	T	P	MARKS
			PRACTICAL
0	0	2	50

COURSE OUTCOMES

After learning this course students will be able to:

CO 1	Plot and understand rectifiers and evaluate their performance parameters.
CO 2	Plot the characteristics of FET using trainer kits.
CO 3	Plot V-I characteristics of transistors for various configurations
CO 4	Design basic electronic circuits using soldering techniques.

LIST OF PRACTICALS: -

1. To study the various active and passive electronic components along with soldering techniques on PCB.
2. To assemble various electronic circuits on Breadboard.
3. To determine and plot the operating characteristics of PN junction diode.
4. To study the characteristics of Zener diode, photodiode, Tunnel diode and LED.
5. To study Half wave and Full wave / Bridge Rectifier.
6. To study the operation characteristics (Input/Output) of PNP/NPN Transistor (Common Emitter/Common Base).
7. To study clipper and clamper circuits using diodes.
8. To study the characteristics of FET and MOSFET.
9. Design of self-Bias circuits using BJT.
10. Design of self-Bias circuits using FET.

Note: Each student has to perform at least eight experiments.

(21)



UNIVERSITY OF JAMMU

(NAAC ACCREDITED A + GRADE UNIVERSITY)
Baba Sahib Ambedkar Road, Jammu-180006 (J&K)

NOTIFICATION

(23/Sept/Adp/ 78)

It is hereby notified for the information of all concerned that the Vice-Chancellor, in anticipation of the approval of the Competent Bodies, has been pleased to authorize the adoption of the revised Syllabi and Courses of Studies in **Bachelor of Technology (B.Tech.) in Mechanical Engineering** for Semester III & IV under the **Credit Based System** as per the new **AICTE Model Curriculum (as given in the Annexure)** for the candidates of **Govt./Pvt. Engineering Colleges affiliated with the University of Jammu** for the Examinations to be held in the years indicated against each Semester as under:-

Branch	Semester	For the Examination to be held in the years
Mechanical	Semester-III	December 2023, 2024, 2025 and 2026
	Semester-IV	May 2024, 2025, 2026 and 2027

The Syllabi of the course are available on the University Website: www.jammuuniversity.in.

Sd/-
DEAN ACADEMIC AFFAIRS

No. F.Acd/III/23/10022-10031

Dated: 13/09/2023

Copy for information & necessary action to:-

- ✓ Dean, Faculty of Engineering
- Principal, GCET/MBSCET/BCET/YCET
- C.A to the Controller of Examinations
- Joint/Assistant Registrar (Exams Prof./Eval Prof./Confidential)
- Incharge University Website



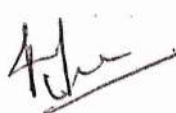

Supriya
13/9/23
Assistant Registrar (Academic)
13/9
13/9/23


**B.Tech. Mechanical Engineering 3rd Semester Examination to be held
in the Year December 2023, 2024, 2025, 2026**

B. Tech. Mechanical Engineering 3rd Semester

Contact Hrs.: 27

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATIONS			MARKS DISTRIBUTION		TOTAL MARKS	CREDITS	% CHANGE
			L	T	P	INTERNAL	EXTERNAL			
MET5301	Professional Core Course	Fluid Mechanics	2	1	0	50	100	150	3	20%
MET5302	Professional Core Course	Thermodynamics	2	1	0	50	100	150	3	25%
MET5303	Professional Core Course	Machine Drawing	3	0	0	50	100	150	3	20%
MET5304	Professional Core Course	Mechanics of Solids	2	1	0	50	100	150	3	27%
MET5305	Professional Core Course	Production Technology-I	2	1	0	50	100	150	3	20%
MEP5311	Professional Core Course	Fluid Mechanics Lab.	0	0	2	50	0	50	1	15%
MEP5312	Professional Core Course	Thermodynamics Lab.	0	0	2	50	0	50	1	10%
MEP5313	Professional Core Course	Mechanics of Solids Lab.	0	0	2	50	0	50	1	15%
MEP5314	Professional Core Course	Production Technology-I Lab	0	0	2	50	0	50	1	100%
MOC5315	Massive open online course	MOOC	0	0	2	50	0	50	1	100%
NCC7301	Non Credit Course	Essence of Indian Traditional knowledge	2	0	0	Satisfactory/Unsatisfactory			Non Credit	100%
TOTAL			13	4	10	500	500	1000	20	



**B. Tech. Mechanical Engineering 4th Semester Examination to be held in the
Year May 2024, 2025, 2026, 2027**

B. Tech. Mechanical Engineering 4th Semester

Contact Hrs: 26

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATIONS			MARKS DISTRIBUTION		TOTAL MARKS	CREDITS	% CHANGE
			L	T	P	INTERNAL	EXTERNAL			
BST8402	Basic Science Course	Probability & Numerical Methods	2	1	0	50	100	150	3	100%
MET5401	Professional Core Course	Heat Transfer	2	1	0	50	100	150	3	20%
MET5402	Professional Core Course	Theory of M/c	2	1	0	50	100	150	3	20%
MET5403	Professional Core Course	Applied Thermodynamics	2	1	0	50	100	150	3	100%
MET5404	Professional Core Course	Production Technology-II	2	1	0	50	100	150	3	100%
MOC5401	Massive Open Online Course	NPTEL/ SWAYAM	3	-	-	100	-	100	3	100%
MEP5411	Professional Core Course	Heat Transfer Lab	0	0	2	50	-	50	1	15%
MEP5412	Professional Core Course	Theory of M/c Lab	0	0	2	50	-	50	1	15%
MEP5413	Professional Core Course	Applied Thermodynamics Lab	0	0	2	50	-	50	1	100%
MEP5414	Professional Core Course	Production Tech.-II Lab	0	0	2	50	-	50	1	100%
TOTAL			13	5	8	550	500	1050	22	






Samer

B.Tech. Mechanical Engineering 3rd Semester Examination to be held in the Year
December 2023,2024,2025,2026

BRANCH: MECHANICAL ENGINEERING
CLASS: 3rd SEMESTER
COURSE TITLE: FLUID MECHANICS
COURSE CODE: MET5301
DURATION OF EXAMINATION: 3 HOURS.

CREDITS: 3

L	T	P	Marks	
			External	Internal
2	1	0	100	50

COURSE OUTCOMES

On completion of the course the students will be able to:

CO1	Identify and calculate the key fluid properties used in the analysis of fluid behavior
CO2	Explain the principles of pressure, buoyancy and floatation.
CO3	Apply the knowledge of fluid statics, kinematics and dynamics while addressing problems of mechanical and chemical engineering.
CO4	Explain the concept of boundary layer in fluid flow
CO5	Developing understanding regarding the concepts of dimensional analysis and Moody's chart.

Detailed Syllabus

SECTION-A

Basics: Introduction, Fluids and their properties, Fluids-shear stress in a moving fluid-difference between solids and fluids-viscosity - Newtonian and Non-Newtonian fluids - viscosity in liquids and gases - density-surface tension - capillarity.

Fluid Statics: Total pressure and centre of pressure for horizontal plane, vertical plane surface and inclined plane surface submerged in static fluid. Buoyancy, centre of buoyancy, metacentre and metacentric height, its application in shipping, stability of floating bodies.

Fluid Dynamics: Eulerian & lagrangian approaches, classification of fluid flow as steady and unsteady flow, uniform and non-uniform flow, laminar and turbulent flow - pathline, stream line, streak line and stream tube - one-, two- and three-dimensional flow - velocity and acceleration in steady and unsteady flow.

Basic hydrodynamics: Ideal fluids - equation of continuity, stream function. Euler's equation for unsteady flow in three dimensions - one dimensional flow along a stream of velocity, Bernoulli's equation and its applications - pitot and pitot-static tubes - venturi meter, flow nozzles. [20Hours]

SECTION-B

Basic equations of Fluid Mechanics: equation of continuity, momentum equation and energy equation for a control volume, adoption of these equation to one dimensional flow - velocity and momentum correlation - application of momentum equation to straight and bent, uniform and reducing conduits, path of trajectory of a free liquid jet.

Steady flow of incompressible fluids in Pipes, Laminar and Turbulent flows, critical Reynold's number - hydraulic radius - general equation for friction, friction in non-circular pipes - Darcy Weisbach equation - development of boundary layer in pipe's flow, smooth and round pipes, Minor losses in pipes

Boundary Layer Theory: Introduction, momentum integral equation, displacement, momentum and energy thickness, separation of boundary layer. Control of flow separation.

Dimensional Analysis: Buckingham Pie theorem, Flow similarity & model studies, friction & brusler drier, Aerodynamic lift, Navier stokes equation. Torriclies theorem.

Moody's Chart: Reynold number, Friction losses, Friction factor and mean wall stress.

[25 Hours]

RECOMMENDED BOOKS:

- | | |
|---|--|
| 1. Fluid Mechanics | VLStreeter |
| 2. FluidMechanics | Roberson & Crowe |
| 3. Fluid Mechanics | RK Bansal |
| 4. Fluid Mechanics and Hydraulic Machines | Domkundwar & Domkundwar, Dhanpatrai & Co |

Notes:

1. There will be 8 questions in all, four from Section-A (each of 20 marks) and four from Section- B (each of 20 marks).
2. Students are required to attempt five questions in all, at least two questions from each section.
3. Use of scientific calculator will be allowed in the examination hall.

B.Tech. Mechanical Engineering 3rd Semester Examination to be held in the Year

December 2023, 2024, 2025, 2026

BRANCH: MECHANICAL ENGINEERING

CLASS: 3rd SEMESTER

COURSE TITLE: THERMODYNAMICS

COURSE CODE: MET5302

DURATION OF EXAMINATION: 3 HOURS

CREDITS: 3

L	T	P	Marks	
			External	Internal
2	1	0	100	50

COURSE OUTCOMES

On completion of the course the students will be able to:

- | | |
|-----|--|
| CO1 | Understanding various thermodynamic systems, properties and other related concepts. |
| CO2 | Evaluate changes in thermodynamic properties of substances. |
| CO3 | Learning the basics of first law and second law equations and related theories with numerical. |
| CO4 | Explain and apply various gas power cycles and IC engine. |
| CO5 | To get conversant with Properties of Steam |

Detailed Syllabus

SECTION-A

Basic Concepts: Definition of thermodynamics, Thermodynamic System, Properties, Types of processes, thermodynamic equilibrium, Zeroth law of thermodynamics, Thermometric property, Temperature scales, Energy and its interaction, Work, Work done in various processes, Ideal gas and characteristic gas equation, representation of various processes on PV diagram.

First Law of Thermodynamics: Concept of First law of thermodynamics, Limitations of First law of thermodynamics, PMM-1, Heat transfer, Mayor's equation, Free expansion, Control volume energy analysis, Steady Flow Energy Equation and its application to various thermodynamic Systems, Throttling.

Second Law of Thermodynamics: Thermal energy reservoir, Kelvin Plank statement, Clausius statement, PMM-2, equivalence of Kelvin plant & Clausius statements, PMMM-3, Carnot cycle, Third law of thermodynamics.

Energy, entropy & Exergy: Clausius inequality, concept of entropy, concept of entropy generation in Closed and Open systems, high grade and low-grade energy, available and unavailable energy; Second law efficiency, Concept of Exergy.

[25 Hours]

SECTION-B

Gas Power Cycles: Air-standard efficiency, Nomenclature of Piston-Cylinder arrangement w.r.t. swept volume; clearance volume, compression ratio and mean effective pressure; Analysis and philosophy of Air-Standard Cycles i.e. Otto Cycle, Diesel Cycle and Dual Cycle.

Classification of IC Engines: Basic operations Actual P-V diagram of four stroke Otto cycle engine and four stroke diesel cycle engines. Engine performance parameters, Measurements of fuel and air consumption, brake power and in-cylinder pressure.

Properties of Steam: Pure Substance; Gibb's phase rule; steam formation at constant pressure; use of steam tables, Basic Rankine & Brayton cycle .

[20 Hours]

RECOMMENDED BOOKS:

- | | | |
|----|---|---------------------------------|
| 1. | Engineering Thermodynamics | R.K Rajput |
| 2. | A Course in Thermodynamics | Joseph Kerstin |
| 3. | Thermodynamics: An Engineering Approach | Yunus A Cengel; Michael A Boles |
| 4. | Engineering Thermodynamics | P.K.Nag |

OTE:

- There will be 8 questions in all, four from Section-A (each of 20 marks) and four from Section-B (each of 20 marks).
- Students are required to attempt five questions in all, at least two questions from each section
- Use of scientific calculator will be allowed in the examination hall.
- Use of Steam tables, Mollier chart and scientific calculator will be allowed in the examination hall.

[Signature]

[Signature]

[Signature]

[Signature]

[Signature]

**B.Tech. Mechanical Engineering 3rd Semester Examination to be held in the Year
December 2023, 2024, 2025, 2026**

BRANCH: MECHANICAL ENGINEERING
CLASS: 3rd SEMESTER
COURSE TITLE: MACHINE DRAWING
COURSE CODE: MET5303
DURATION OF EXAMINATION: 4 HOURS

CREDITS: 3

L	T	P	Marks	
			Theory	Sessional
3	0	0	100	50

COURSE OUTCOMES

On completion of the course the students will be able to:

C01	Read, draw and interpret the machine drawings and related parameters.
C02	Use standards used in machine drawings of machine components and assemblies.
C03	Visualize and generate different views of a component in the assembly.
C04	Learn the concept of limits, fits and tolerances in various mating parts.
C05	Differentiate between different types of coupling, bearing and joints.

Detailed Syllabus

SECTION-A

1. Assembly Drawings of the following machines:

- I.C. Engines Parts:** Piston, Connecting Rod.
- Boiler Mountings:** Feed check valve, Steam stop valve and Blow off Cock.
- Bearings:** Pedestal bearing, Pivot bearing and Swivel bearing
- Miscellaneous:** Screw jack & Tail Stock.

[24 Hours]

SECTION-B

2. Simple assemblies of the following:

Couplings: Muff Coupling, Split muff, Protected and Unprotected Flange Couplings, Universal Coupling.

[7Hours]

3. Different types of Joints: Riveted joints, Threaded fasteners, Knuckle joint, Cotter Joints: Gib and Cotter Joint.

[7 Hours]

4. Practice using Computer Aided Drafting (CAD) tools for- 2D and 3D views of Machine Components and Screw fasteners.

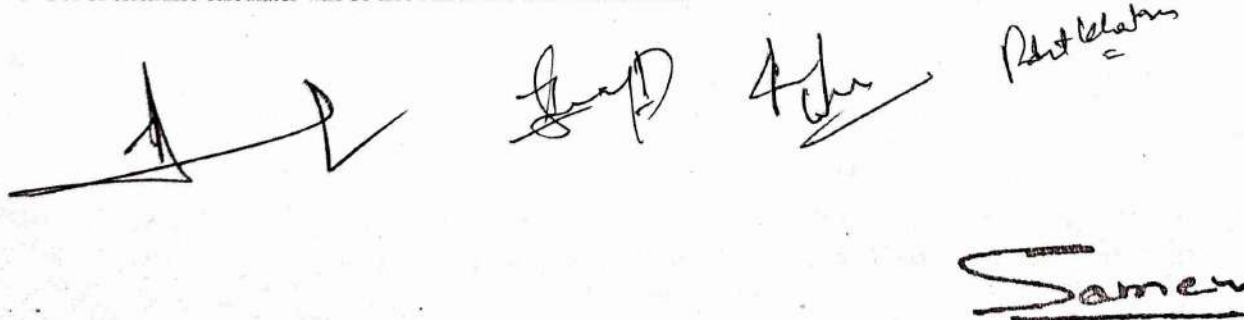
[7 Hours]

RECOMMENDED BOOKS:

- | | |
|--------------------|--------------|
| 1. Machine Drawing | P. S. Gill. |
| 2. Machine Drawing | N. D. Bhatt. |
| 3. Machine Drawing | R. B. Gupta. |

NOTE:

- There will be Six questions in all, five from Section-B (each of 15 marks) and one Compulsory question of 55 marks from Section -A.
- Students are required to attempt four questions in all, three from Section-B and one compulsory question involving assembly from Section A.
- Use of scientific calculator will be allowed in the examination hall.



**B.Tech. Mechanical Engineering 3rd Semester Examination to be held in the Year
December 2023, 2024, 2025, 2026**

BRANCH: MECHANICAL ENGINEERING
CLASS: 3rd SEMESTER
COURSE TITLE: MECHANICS OF SOLIDS
COURSE CODE: MET5304
DURATION OF EXAMINATION: 3 HOURS.

CREDITS: 3

L	T	P	Marks	
			External	Internal
2	1	0	100	50

COURSE OUTCOMES

On completion of the course the students will be able to:	
CO1	Understand simple, compound, thermal stresses and strains their relations and strain energy
CO2	Analyse structural members for stresses, strains and deformations.
CO3	Analyse the structural members subjected to bending and shear loads
CO4	Analyse shafts subjected to twisting loads
CO5	Analyse the short columns for stability.
CO6	Understand the mechanics behind the cylinder design.

Detailed Syllabus

SECTION-A.

Simple Stresses and Strain: Introduction, Definition and concept and of stress and strain. Hooke's law, Stress-Strain diagrams for ferrous and non-ferrous materials, factor of safety, Elongation of tapering bars of circular and rectangular cross sections, Elongation due to self-weight, Elastic constants and their relationship

Compound Stresses: Introduction, state of stress at a point, General two dimensional stress system, Thermal Stresses Principal stresses and principal planes. Mohr's circle of stresses

Shear Force and Bending Moment in Beams: Introduction to types of beams, supports and loadings. Definition of bending moment and shear force, Sign conventions, relationship between load intensity, bending moment and shear force. Shear force and bending moment diagrams for statically determinate beams subjected to point load, uniformly distributed loads, uniformly varying loads, couple and their combinations.

Bending stress in Beam: Axial & eccentric load, effect of eccentricity, axial stress & bending stress, resulting stress intensities, Theory of simple bending – bending stress distribution – Load carrying capacity – Proportioning of sections – Flitched beams – Shear stress distribution.

Torsion in Circular Shaft: Introduction, pure torsion, Assumptions, derivation of torsion equation for circular shafts, torsional rigidity and polar modulus Power transmitted by a shaft, combined bending and torsion [23 Hours]

SECTION-B

Columns and Struts: Introduction, short and long columns. Euler's theory; Assumptions, Derivation for Euler's Buckling load for different end conditions, Limitations of Euler's theory. Rankine-Gordon's formula for columns.

Thin and Thick Cylinders: Introduction, Thin cylinders subjected to internal pressure; Hoop stresses, Longitudinal stress and change in volume. Thick cylinders subjected to both internal and external pressure; Lame's equation, radial and hoop stress distribution.

Deflection of Beams: Double Integration method – Macaulay's method – Area moment method for computation of slopes and deflections in beams.

Theories of Failure: Introduction, maximum principal stress theory (Rankine's theory), Maximum shearing stress theory (Tresca's theory), Strain energy theory (Beltrami and Haigh), and maximum strain theory (St. Venant's theory). Theories of failure as applicable to ductile and brittle materials, their significance and comparison. [22Hours]

RECOMMENDED BOOKS:

- | | |
|--------------------------------------|--------------------|
| 1. Advanced Mechanics of Solids | L.S. Srinath |
| 2. Elements of Strength of Materials | Timoshenko & Young |
| 3. Mechanics of Material | Beer & Johnson |
| 4. Mechanics of Solids | Popov |
| 5. Strength of Materials | R.K Rajput |

NOTE:

- There will be 8 questions in all, four from Section-A (each of 20 marks) and four from Section-B (each of 20 marks).
- Students are required to attempt five questions in all, atleast two questions from each section
- Use of scientific calculator will be allowed in the examination hall.

B.Tech. Mechanical Engineering 3rd Semester Examination to be held in the Year
December 2023, 2024, 2025, 2026

BRANCH: MECHANICAL ENGINEERING
CLASS: 3rd SEMESTER
COURSE TITLE: PRODUCTION TECHNOLOGY-I
COURSE CODE: MET5305
DURATION OF EXAMINATION: 3HOURS.

CREDITS: 3

L	T	P	Marks	
			External	Internal
2	1	0	100	50

COURSE OUTCOMES	
On completion of the course the students will be able to:	
CO1	Describe the casting process and prepare different types of cast products.
CO2	Acquire knowledge on Pattern, Core, Gating, Riser system and to use Jolt, Squeeze, Sand Slinger Moulding machines.
CO3	Compare the Gas fired pit, Resistance, Coreless, Electrical and Cupola Metal Furnaces
CO4	Compare the Gravity, Pressure die, Centrifugal, Squeeze, slush and Continuous Metal mold castings
CO5	Describe the Metal Arc, TIG, MIG, Submerged and Atomic Hydrogen Welding processes

Detailed Syllabus
SECTION-A

Introduction: Definition, primary and secondary processes, criteria for selection of manufacturing processes.

Molding and Pattern making – Molding materials, Properties of molding sand, Testing of molding sand. Types of moldings and their applications. Types of patterns – Materials used for patterns, pattern allowances and their construction.

Casting: Steps involved in making a casting, Casting defects and their remedies, Basic principles and applications of special casting processes - Centrifugal casting, Die casting and Investment casting.

Gating and Rising System-Principles of Gating, and its design. Design criteria for pouring basin, sprue, runner gate and riser, problems on Gating design.

Methods of melting and types of furnaces - Cupola, electric arc, resistance and induction furnace.

[23 HOURS]

SECTION-B

Mechanical working processes: Plastic deformation, Strain Hardening hot and cold working, forming processes. Rolling, drawing, deep drawing, extrusion.

Forging - Types of Forging, Smith forging, Drop Forging, Roll forging, Rotary forging and their applications. Various forging defects and their remedies.

Welding- Classification of welding processes, types of welded joints and their characteristics, Gas welding, Different types of flames and uses, Oxy-Acetylene Gas cutting, Power characteristics, submerged arc welding, TIG & MIG welding.

Special welding processes-Resistance welding, Friction welding, Thermit welding Forge welding, Explosive welding; Resistance welding, Soldering and Brazing, Weld ability of metals, welding defects – causes and remedies.

Sheet Metal processes- Principles and Applications of Blanking, Piercing, Embossing, Coining and Spinning.

[22 HOURS]

RECOMMENDED BOOKS

1. A textbook of Production Technology Vol. I and II
2. Manufacturing Technology Vol. I & II
3. Production Technology
4. Manufacturing Engineering and Technology
5. Workshop Technology Vol. I and II

Sharma, P.C.
P.N. Rao, Tata McGraw Hill Pub. Co. Ltd., New Delhi
HMT
Kalpakjian, Addison Wesley Congmen Pvt. Ltd.
Chapman W. A. J. Arnold Publisher New Delhi

NOTE:

1. There will be 8 questions in all, four from Section-A (each of 20 marks) and four from Section-B (each of 20 marks).
2. Students are required to attempt five questions in all, atleast two questions from each section
3. Use of scientific calculator will be allowed in the examination hall.

[Signature]

[Signature]

[Signature]

Rob. Blaker

Samer

**B.Tech. Mechanical Engineering 3rd Semester Examination to be held in the Year
December 2023, 2024, 2025, 2026**

**BRANCH: MECHANICAL ENGINEERING
CLASS: 3rd SEMESTER
COURSE TITLE: FLUID MECHANICS LAB
COURSE CODE: MEP5311**

CREDITS: 1

L	T	P	Marks
			Internal
0	0	2	50

COURSE OUTCOMES

On completion of the course the students will be able to:


CO1	To calculate fluid properties and characteristics of flow using mathematical knowledge.
CO2	To calculate the coefficient of discharge using different various flow measuring devices.
CO3	To study the impact of momentum variation on vanes and blades
CO4	To predict performance characteristics of turbines

LIST OF EXPERIMENTS:

1. To find out the Metacentric Height of the floating pontoon.
2. To verify the Bernoulli's Equation.
3. To find out the co-efficient of discharge using Venturi meter.
4. To find out the co-efficient of discharge using Orifice meter.
5. To find out the co-efficient of discharge using Pitot tube.
6. Impact of jet of water on Vane.
7. To analyse the regimes of flow using Reynold's Experiment.
8. To find out the viscosity of a fluid using Redwood Viscometer.
9. To find out the Friction factor of a pipe and compare the resistances to flow in various pipes

NOTE:

1. At least six practical's should be performed.
2. Additional lab/experiment can be performed based on course content requirement.
3. Simulation/virtual labs can be used to enhance the practical ability of students.



**B.Tech. Mechanical Engineering 3rd Semester Examination to be held in the Year
December 2023, 2024, 2025, 2026**

BRANCH: MECHANICAL ENGINEERING
CLASS: 3rd SEMESTER
COURSE TITLE: THERMODYNAMICS LAB
COURSE CODE: MEP5312

CREDITS:1

L	T	P	Marks
			Internal
0	0	2	50

COURSE OUTCOMES

On completion of the course the students will be able to:


CO1	Understanding of basic thermodynamics laws and their applications
CO2	Knowledge of different types of boilers, their features and applications
CO3	To gain knowledge about classification and working principle of various types of air compressors.
CO4	To calculate coefficient of performance of refrigerators and air conditioning devices
CO5	Understating of basic cycles on which heat engines works and computing their efficiencies

LIST OF EXPERIMENTS:

1. To verify Second law of thermodynamics with the help of heat engine.
2. To study the P-V-T behavior of real gases in comparison with Ideal gases.
3. To find out the dryness fraction of steam using Throttling Calorimeter.
4. To study the efficiency of Petrol engine.
5. To study the efficiency of Diesel engine.
6. Comparative study of ideal and actual otto cycle
7. Comparative study of Ideal and actual Diesel Cycle
8. Comparative study of Ideal and Real Gases.

NOTE:

1. At least six practical's should be performed.
2. Additional lab/experiment can be performed based on course content requirement.
3. Simulation/virtual labs can be used to enhance the practical ability of students.



Robot checker



**B.Tech. Mechanical Engineering 3rd Semester Examination to be held in the Year
December 2023, 2024, 2025, 2026**

BRANCH: MECHANICAL ENGINEERING
CLASS: 3RD SEMESTER
COURSE TITLE: MECHANICS OF SOLIDS LAB.
COURSE CODE: MEP5313

CREDITS: 1

L	T	P	Marks
			Internal
0	0	2	50

COURSE OUTCOMES

On completion of the course the students will be able to:

CO1	Evaluate the values of yield stress, breaking stress and ultimate stress of the given specimen.
CO2	To measure the hardness of the given specimen using different hardness testing machines.
CO3	To conduct the bending test to determine the modulus of elasticity of given specimen.

LIST OF EXPERIMENTS:

1. To conduct the tensile test on a M.S. specimen and draw the load extension diagram using a UTM.
2. To conduct the compression test on a concrete specimen and draw the load compression diagram using a UTM.
3. To conduct torsion test on mild steel or cast iron specimen to determine modulus of rigidity.
4. To find the hardness of a specimen using Rockwell Hardness Tester.
5. To find the hardness of a specimen using Brinell Hardness Tester.
6. To find the hardness of a specimen using Vickers Hardness Tester.
7. To conduct the Izod and Charpy Tests on a notched M.S. specimen.
8. To conduct simple bending experiments for different types of loading.

NOTE:

1. At least six practical's should be performed.
2. Additional lab/experiment can be performed based on course content requirement.
3. Simulation/virtual labs can be used to enhance the practical ability of students.



Robot lab



**B.Tech. Mechanical Engineering 3rd Semester Examination to be held in the Year
December 2023, 2024, 2025, 2026**

CREDITS: 1

BRANCH: MECHANICAL ENGINEERING
CLASS: 3RD SEMESTER
COURSE TITLE: PRODUCTION TECHNOLOGY-I LAB
COURSE CODE: MEP5314

L	T	P	Marks
			Internal
0	0	2	50

COURSE OUTCOMES

On completion of the course the students will be able to:

CO1	Understanding different manufacturing techniques and their relative advantages/disadvantages with respect to different applications
CO2	To attain practical exposure to different fabrication techniques.
CO3	Creation of simple components using different fabrication techniques.
CO4	Exposure to some of the advanced and latest manufacturing techniques being employed in the industry.

LIST OF EXPERIMENTS:

1. Moulding and Casting of Single Piece Pattern.
2. Moulding and Casting of Split Pattern.
3. To Prepare a cubical block from cylindrical block (MS –round).
4. To make L-shaped hook of Square cross section from MS-round.
5. To make Chisel from MS-round using forging operations.
6. AC arc welding for making corner joint from MS-flat.
7. Single V-Butt joint by using TIG Welding.
8. To make Lap Joint from MS-Sheet using Gas Welding.
9. To make Lap joint using MIG Welding.
10. To make T-joint using AC arc welding.

NOTE:

1. At least six practical's should be performed.
2. Additional lab/experiment can be performed based on course content requirement.
3. Simulation/virtual labs can be used to enhance the practical ability of students.



Print Label

Samer

**B.Tech. Mechanical Engineering 3rd Semester Examination to be held in the Year
December 2023, 2024, 2025, 2026**

BRANCH: MECHANICAL ENGINEERING
CLASS: 3rd SEMESTER
COURSE TITLE: MOOC
COURSE CODE: MOC5315
DURATION OF EXAMINATION: 3 HOURS

CREDITS: 1

L	T	P	Marks
			Internal
0	0	2	50

MooC: A massive open online course (MooC) is a model for delivering learning content to any person who wants to take a course by means of the web. It has been incorporated in the 3rd semester.
The following scheme shall be used to evaluate a MooC course:

Breakup of Marks:

- **Attendance- 10 marks**

Students will have to visit the lab/Computer Centre as per the time table and pursue their respective online course.

- **Report file-15 marks**

A detailed report of about 20-25 pages has to be submitted to the department at the end of the semester. It should contain details about the course that was undertaken by the student. A copy of the assignments with solutions that have been uploaded on the MooC platform should also be included in the final report. A copy of the certificate if awarded should also be appended to the report.

- **Presentation- 15 marks.**

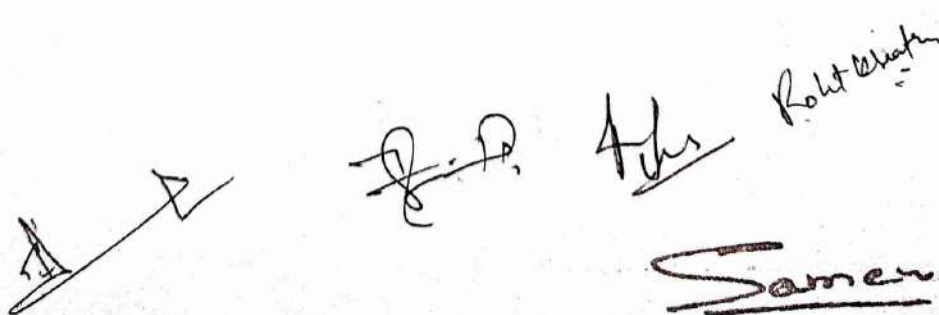
The presentation should be given to the peers/students focusing on the key points of the course with an aim to share the knowledge.

- **Certification- 10 marks**

The students awarded with the certificate will be given 10 marks. (Copy to be attached in the report)

Note:

The students can opt for MooC as per their choice. However, the selected course should not be similar to the regular courses offered as a part of the department curriculum. Also, students have to get approval from the department regarding the opted course.


The block contains three handwritten signatures. From left to right: a signature that appears to be 'A' with a checkmark, a signature that appears to be 'Rohit Singh', and a signature that appears to be 'Samer'.

**B.Tech. Mechanical Engineering 3rd Semester Examination to be held in the Year
December 2023, 2024, 2025, 2026**

CREDITS: 0

BRANCH: MECHANICAL ENGINEERING
CLASS: 3rd SEMESTER
COURSE TITLE: ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE
COURSE CODE: NCC7301
DURATION OF EXAMINATION: 3 HOURS

L	T	P	Marks	
			External	Internal
2	0	0	Satisfactory/Unsatisfactory	

COURSE OUTCOMES

At the end of the course student will be able to:

CO1	Know about the Vedic philosophy in detail and its relevance in present scenario.
CO2	Strengthen their mind and body through the knowledge of yoga.

Detailed Syllabus

SECTION - A

Vedic Philosophy: Concept of Vedas, Ethics & Values, Educational system, Knowledge of science, trade/commerce & medicines as per Vedas, Environmental ethics: Preservation & Purification, Harnessing of natural resources in alienation with nature as per Vedas.

[10 Hours]

SECTION - B

Yoga Philosophy: Parts of Yoga, Importance of Yam and Niyam, Stress management through yoga, Purification of mind and body through yoga.

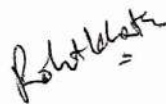
[10 Hours]

Note for Teacher

The course should aim at enlightening students with the importance of ancient traditional knowledge.

Evaluation of the course

There will be internal evaluation based on two internal sessional and viva -voce.



**B. Tech. Mechanical Engineering 4th Semester Examination to be held
in the Year MAY 2024, 2025, 2026, 2027**

BRANCH: MECHANICAL ENGINEERING
CLASS: 4th SEMESTER
**COURSE TITLE: PROBABILITY & NUMERICAL
METHODS**
COURSE CODE: BST8402
DURATION OF EXAM: 3 HOURS

CREDITS: 3

L	T	P	Marks	
			External	Internal
2	1	0	100	50

COURSE OUTCOMES

On completion of the course the students will be able to:

CO1	Understand the concept of random variables.
CO2	To learn about the different distributions and their properties.
CO3	Learn the basics of operators, their types and interpolation.
CO4	Find out the real roots of algebraic, transcendental equations and differential equations

Detailed Syllabus

SECTION-A

PROBABILITY

Random variable and its types, probability mass function and probability density function, distribution function, Bernoulli distribution, Expectation and moment generating function of Discrete Random variables. Binomial distribution, its mean, variance and moment generating function, mode of Binomial Distribution, Poisson distribution, its mean, variance and moment generating function, Poisson distribution as a limiting case of Binomial distribution. (22 hours)

SECTION-B

NUMERICAL METHODS


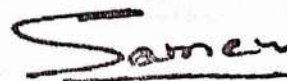
Finite and divided difference, Interpolation using Newton's and Lagrange's formulae. Numerical integration: Trapezoidal rule and Simpson's 1/3rd rule. Solution of polynomial and transcendental equations – Newton-Raphson method, Iteration method and Regula-Falsi method. Taylor's method, Picard's method, Euler and modified Euler's methods. Runge Kutta method of fourth order for solving first and second order equations. (23 hours)

Text/References:

1. Dr. Bhopinder Singh, "A textbook on complex variables and Numerical methods, Kirti Publishers.
2. N.P. Bali and M. Goyal, "A textbook of Engineering Mathematics, Laxmi Publications, 2008.
3. B.S. Grewal, "Higher Engineering Mathematics", Hanna Publishers, 2010.
4. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.

NOTE:

1. There will be 8 questions in all, four from Section-A (each of 20 marks) and four from Section-B (each of 20 marks).
2. Students are required to attempt five questions in all, at least two questions from each section.
3. Use of Calculator is allowed.

 R. Kumar
Rohit Sameer

**B. Tech. Mechanical Engineering 4th Semester Examination to be held
in the Year MAY 2024, 2025, 2026, 2027**

BRANCH: MECHANICAL ENGINEERING

CLASS: 4TH SEMESTER

COURSE TITLE: HEAT TRANSFER

COURSE NO: MET5401

DURATION OF EXAMINATION: 3 HOURS

CREDITS: 3

L	T	P	Marks	
			External	Internal
2	1	0	100	50

COURSE OUTCOMES

On completion of the course the students will be able to:

CO1	To teach students the basic principles of conduction, radiation, and convection heat transfer. Students will demonstrate an understanding of the basic concepts of conduction, radiation, and convection heat transfer
CO2	To extend the basic principle of conservation of energy to systems that involve conduction, radiation, and heat transfer. Students will demonstrate an understanding of the concept of conservation of energy and its application to problems involving conduction, radiation, and/or convection heat transfer
CO3	To train students to identify, formulate, and solve engineering problems involving conduction heat transfer. Students will demonstrate the ability to formulate practical conduction heat transfer problems by transforming the physical system into a mathematical model, selecting an appropriate solution technique, and evaluating the significance of results.
CO4	To train students to identify, formulate, and solve engineering problems involving radiation heat transfer among black surfaces and among diffuse gray surfaces.
CO5	To train students to identify, formulate, and solve engineering problems involving forced convection heat transfer, natural convection heat transfer, and heat exchangers. Students will also demonstrate an ability to analyze the performance of heat exchangers

Detailed Syllabus

SECTION-A

Introduction: Modes and mechanisms of heat transfer, Basic laws of heat transfer, General discussion about applications of heat transfer.

Conduction: General heat conduction equation in Cartesian and Cylindrical co-ordinates, One Dimensional Steady State Conduction Heat Transfer Homogeneous slabs, hollow cylinders and spheres, Composite systems, Critical insulation thickness, Transient Heat transfer and its Numerical analysis by using Heisler Chart, Extended surface heat transfer in case of long fin, fin with insulated tip and short fin.

Radiation: Radiation spectrum, Thermal radiation, Concept of black body, Monochromatic emissive power, Absorptivity, Reflectivity, Transmissivity, Emissivity, Planck's Law, Stephan Boltzmann's Law, Lambert's Law, Kirchhoff's law. Radiation between two real surfaces.

Heat transfer & Fluid flow applications: Thermal insulations, heat transfer controlling air conditioning of electric vehicle. [24 Hours]

SECTION-B

Heat exchangers: Types of heat exchangers, Numerical on parallel and counter flow heat exchangers, Log mean temperature difference, Overall heat transfer coefficient, Fouling and scaling of heat exchangers, N.T.U. method of evaluation of heat exchangers. Heat exchanger effectiveness

Convection: Free and forced convection processes, Newton's Law of cooling and its numerical, Significance of Prandtl number, Boundary layer equations, Flat plate heat transfer solutions by integral method, Laminar and Turbulent flow of heat transfer in tubes, Concepts of hydrodynamic and thermal boundary layer and use of empirical correlations for convective heat transfer in case of flat plates and cylinders, Geometrical factors for simple configuration, Radiation shields and its effect on radiative heat flux.

Heat Transfer with Phase Change: Boiling process, types and its different regimes, Calculations on Nucleate boiling, Critical Heat flux and Film boiling. Condensation and Boiling, Film and Drop wise condensation [21 Hours]

RECOMMENDED BOOKS:

1. Heat Transfer
2. Heat Transfer
3. Engineering Heat Transfer
4. Fundamentals of Heat Transfer
5. Heat Transfer

J.P. Holman
Frank Krieth
Gupta and Prakash.
Frank P.David P.Dewitt
B. Gebhart

NOTE:

1. There will be 8 questions in all, four from Section-A (each of 20 marks) and four from Section- B (each of 20 marks).
2. Students are required to attempt five questions in all, at least two questions from each section.
3. Use of Heat Transfer datebook and a scientific calculator will be allowed in the examination hall.

Boiler books

Samer

**B. Tech. Mechanical Engineering 4th Semester Examination to be held
in the Year MAY 2024, 2025, 2026, 2027**

BRANCH: MECHANICAL ENGINEERING

CREDITS: 3

CLASS: 4th SEMESTER

COURSE TITLE: THEORY OF MACHINES

COURSE CODE: MET5402

DURATION OF EXAMINATION: 3 HOURS.

L	T	P	Marks	
			External	Internal
2	1	0	100	50

COURSE OUTCOMES

On completion of the course the students will be able to:

CO1	Be familiar with common machine elements and analysis of different mechanisms used in various types of machines.
CO2	Be familiar with concepts of gears, cams, governors. Be aware of common machine elements & to solve problems related to motion transmission.
CO3	Dynamically analyze common mechanisms.
CO4	Conceptualize gyroscopic effect & mathematically solve problems of flywheel.
CO5	Conceptualize static and dynamic balancing of rotating and reciprocating engines & identify various types of mechanical vibrations, their causes and solutions.

Detailed Syllabus

SECTION-A

General concepts, Velocity and Acceleration Analysis: Introduction of Simple mechanism, Different types of Kinematics pair, Kutzbach Equation, Grublers Criterion, Grashof's Law, inversions of four bar chain, slider crank chain and double slider crank chain, quick return motion mechanism, Velocity of point in mechanism, relative velocity method, Velocities in four bar mechanism, Instantaneous center method, Acceleration analysis.

Gears & Gear trains: Gear terminology, types of gears, Involute and Cycloid, comparison of characteristics of Involute & cycloid profile, interference, Introduction to gear trains, simple gear trains, Compound gear train, Epicyclical gear train.

Cams: Classification of cams and followers, Terminology, geometry of radial cam, displacement diagram, uniform velocity, simple harmonic, uniform acceleration, cycloid, graphical layout of cam profiles with different followers, follower velocity.

Governors: Function, types of governors. Watt, Porter and Proell governors, Sensitivity, stability, isochronism's and hunting of governors, Governor Effort and power, effect of sleeve friction.

[20Hours]

SECTION-B

Kinematics & Dynamics of reciprocating Engines: Kinematic analysis of reciprocating engine, Inertia forces, Dynamic analysis of reciprocating engine, Equivalent masses for different members.

Turning Moment Diagrams & Flywheels: Turning moment diagrams for reciprocating machines, Fluctuation of Energy, Determination of Maximum Fluctuation of Energy, Coefficient of Fluctuation of Energy, Flywheel, Fluctuations of speed, coefficient of fluctuation of speed, Energy Stored in a Flywheel.

Gyroscope: Gyroscope, Gyroscopic couple, gyroscopic stabilization, Gyroscopic Effects on Aeroplanes and ship, stability of an automobile.

Balancing: Static and Dynamic balancing, balancing of several masses in a plane, balancing of masses rotating in different planes.

[25 Hours]

RECOMMENDED BOOKS:

- | | |
|--|-----------------------------|
| 1. Kinematic Analysis of Mechanisms | JE Shigley |
| 2. Kinematics & Dynamics of Machines | George Hmartin |
| 3. Mechanics of Machinery | CW Ham, EJ Craw & WL Rogers |
| 4. Theory of Machines | SS Rattan |
| 5. Elementary Kinematics of Mechanisms | Zimmerman |
| 6. Theory of Machines | RS Khurmi |
| 7. The Theory of Machines | Malhotra & Gupta. |
| 8. Mechanical Vibrations | G.K. Grover |

NOTE:

1. There will be 8 questions in all, four from Section-A (each of 20 marks) and four from Section-B (each of 20 marks).
2. Students are required to attempt five questions in all, at least two questions from each section
3. Use of scientific calculator will be allowed in the examination hall.

A 2

Shigley

Ham

Rat Rattan

Samen

**B. Tech. Mechanical Engineering 4th Semester Examination to be held
in the Year MAY 2024, 2025, 2026, 2027**

CREDITS: 3

BRANCH: MECHANICAL ENGINEERING
CLASS: 4th SEMESTER
COURSE TITLE: APPLIED THERMODYNAMICS
COURSE CODE: MET5403
DURATION OF EXAMINATION: 3 HOURS.

L	T	P	Marks	
			External	Internal
2	1	0	100	50

COURSE OUTCOMES	
On completion of the course the students will be able to:	
CO1	Define various concepts of thermodynamics and design a thermal system that meets desired specifications and requirements.
CO2	Apply concepts of thermodynamics for evaluating the properties of fluids used in various industrial systems such as Mechanical Power Production by using engines, air conditioning and refrigeration
CO3	Identify, formulate and solve thermal engineering problems and demonstrate and conduct experiments, interpret and analyze data and report results.
CO4	Understand the working principle of Boilers, Steam turbines and their applications
CO5	Understand the working principle of Steam nozzles, compressors and their applications.

Detailed Syllabus

SECTION-A

Thermodynamics of Combustion in Boilers and IC Engines: Principle of Combustion; Stoichio-metric and non-stoichiometric combustion; Combustion Problems in boilers & IC Engines; Calculations of air fuel ratio; Analysis of products of combustion, conversion of volumetric analysis into gravimetric analysis and vice versa, Actual weight of air supplied, Heat of formation; Enthalpy of formation, Various stages of combustion in IC Engines.

Steam generators: Classification, Modern steam generators, boiler mounting and accessories, Boiler performance. Boiler draught and chimneys calculations.

Steam Nozzles: Definition, types and utility of nozzles, Flow of steam through nozzles, Condition for maximum discharge through nozzle, Critical pressure ratio, its significance and its effect on discharge, Areas of throat and at exit for maximum discharge, Effect of friction, Nozzle efficiency, Convergent and Convergent-divergent nozzles. Calculation of Nozzle dimensions (length and diameters of throat and exit), Supersaturated (or metastable) flow through nozzle. [22 Hours]

SECTION-B

Steam Condensers: Elements of condensing unit; Types of condensers, Dalton's law of partial pressures applied to the condenser problems, Condenser and vacuum efficiencies, cooling water calculations, Effect of air leakage, Method to check and prevent air infiltration, Description of air pump and calculation of its capacity, Cooling towers: function, types and their operation.

Vapour Power Cycle: Carnot Cycle and its limitations; Rankine steam power cycle, Ideal and actual; Mean temperature of heat addition; Effect of pressure, temperature and vacuum on Rankine Efficiency; Rankine Cycle Efficiency and methods of improving Rankine efficiency: Reheat cycle, Bleeding(feed-water-heating), Regenerative Cycle, combined reheat-regenerative cycle; Ideal working fluid, Binary vapour cycle, Combined power and heating cycles.

Centrifugal Compressor: Principle, components, complete thermodynamics analysis, isentropic and Isothermal efficiencies, work done and pressure rise, Velocity vector diagrams for centrifugal compressors and power calculation, pre-guide vanes and pre-whirl, slip factor, power input factor, degree of reaction and its derivation, energy transfer in backward, forward and radial vanes. [23 Hours]

RECOMMENDED BOOKS:

1. Thermodynamics
2. Applications of Thermodynamics
3. Thermodynamics
4. Applied Thermodynamics
5. Thermal Engineering
6. Thermodynamics

Rogers & Mayhew
V. Kadambi, T. R. Seetharam, K. B. Subramanya Kumar
Yunus A, Cengel, Michael A Boles
Mathur & Mehta
R.K Rajput
Gupta & Prakash

NOTE

1. There will be 8 questions in all, four from Section-A (each of 20 marks) and four from Section-B (each of 20 marks).
2. Students are required to attempt five questions in all, at least two questions from each section
3. Use of scientific calculator will be allowed in the examination hall.

**B. Tech. Mechanical Engineering 4th Semester Examination to be held
in the Year MAY 2024, 2025, 2026, 2027**

BRANCH: MECHANICAL ENGINEERING
CLASS: 4th SEMESTER
COURSE TITLE: PRODUCTION TECHNOLOGY-II
COURSE CODE: MET5404
DURATION OF EXAMINATION: 3HOURS

CREDITS: 3

L	T	P	Marks	
			External	Internal
2	1	0	100	50

COURSE OUTCOMES	
On completion of the course the students will be able to:	
CO1	Explain the construction & specification of various machine tools.
CO2	Discuss features and applications of reciprocating machine tool like shaper, planer and slotting machine and understand concept of boring and drilling, their difference and grinding of materials.
CO3	Understand construction and working of semiautomatic and fully automatic lathe machine and write a program to control and operate NC and CNC machine. Apply mechanics of machining process to evaluate machining time

Detailed Syllabus

SECTION-A

Introduction to Metal cutting: Orthogonal and oblique cutting. Classification of cutting tools: single, and multipoint; tool signature for single point cutting tool. Mechanics of orthogonal cutting; chip formation, shear angle and its significance, Merchant circle diagram. determination of cutting forces using merchant analysis, Numerical problems, Cutting tool materials and applications, economics.

Introduction to basic metal cutting machine tools: Lathe- Parts of lathe machine, accessories of lathe machine, and various operations carried out on lathe, Turret and Capstan lathe.

Milling: Various Milling operations, classification of milling machines, Vertical & Horizontal milling, up milling & down milling. Indexing: need of indexing, simple, compound & differential indexing. [22 Hours]

SECTION -B

Drilling: Various drilling operations, types of drills, geometry of twist drill, difference between drilling, boring and reaming, boring operations & boring machines, MRR and drilling time.

Shaping, Planning and Slotting machines-machining operations and operating parameters.

Grinding: Grinding Operations, classification of grinding processes: cylindrical, surface & centerless grinding, wheel life and grinding ratio

Semi-automatic lathes: capstan and turret lathe, constructional features, tool layout, indexing of turret, work and tool holding devices, machining operations.

Automatic Lathes: Features of construction and operation of single spindle automatic screw cutting machine, Swiss type screw cutting machine.

Non-Conventional machining: Overview of NCM, Ultra sonic machining, electrical discharge machining, abrasive jet machining, water jet machining. [23 Hours]

RECOMMENDED BOOKS:

1. A textbook of Production Technology Vol.I and II
2. Manufacturing Technology Vol. I & II
3. Production Technology
4. Manufacturing Engineering and Technology
5. Workshop Technology Vol. I and II

Sharma, P.C.
P.N.Rao, Tata McGraw Hill Pub. Co. Ltd., New Delhi
HMT
Kalpakjian, Addison Wesley Congmen Pvt. Ltd.
Chapman W. A. J. Arnold Publisher New Delhi

NOTE:

1. There will be 8 questions in all, four from Section-A(each of 20 marks)and four from Section-B.
2. Students are required to attempt five questions in all, at least two questions from each section.
3. Use of scientific calculator will be allowed in the examination hall.

Re lathe

Samer

**B. Tech. Mechanical Engineering 4th Semester Examination to be held
in the Year MAY 2024, 2025, 2026, 2027**

CREDITS: 3

BRANCH: MECHANICAL ENGINEERING

CLASS: 4th SEMESTER

COURSE TITLE: NPTEL/ SWAYAM

COURSE CODE: MOC-5401

DURATION OF EXAMINATION: 3 HOURS

L	T	P	Marks
			Internal
3	0	0	100

The department shall offer the SWAYAM/ NPTEL course (12 weeks) out of the list of courses offered by the SWAYAM around the time of commencement of the semester. However, the selected NPTEL course should not be similar to the regular courses offered as a part of the department curriculum.

The overall monitoring of the NPTEL course will be under the supervision of the teacher incharge of the department.

The NPTEL/SWAYAM certification course comprises of Assignments (25%) and Proctor Examination (Online examination MCQ's based = 75%) conducted at the end of the semester by IIT Madras as per the schedule.

The marks obtained by the student in the NPTEL/SWAYAM certification course will be tabulated by the concerned department.

Note: In case the student does not pass the certification, exam or remains absent in the proctor examination, no certificate will be given to the candidate by the NPTEL and the student will be deemed to have failed in the course. The examination of the said NPTEL course will be taken by the department concerned in the next semester under the supervision of Examination Cell of GCET Jammu. The paper will be of 75 marks and assignment marks will be carried forward from the previous semester.



**B. Tech. Mechanical Engineering 4th Semester Examination to be held
in the Year MAY 2024, 2025, 2026, 2027**

CREDITS: 1

BRANCH: MECHANICAL ENGINEERING
CLASS: 4TH SEMESTER
COURSE TITLE: HEAT TRANSFER LAB
COURSE NO: MEP5411

L	T	P	Marks
			Internal
0	0	2	50

COURSE OUTCOMES

On completion of the course the students will be able to:

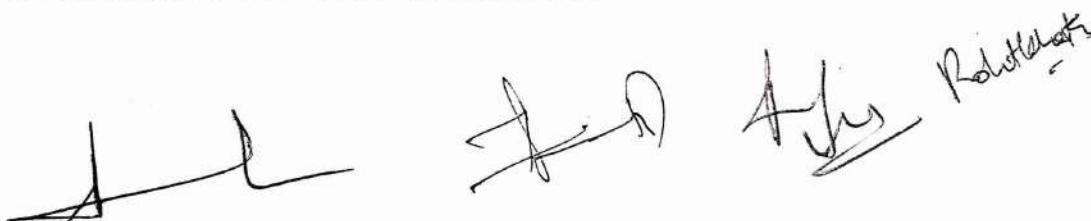

CO1	To determine and analyse heat transfer rates and its characteristics in composite systems and extended surfaces
CO2	To calculate and analyse the temperature distribution, heat transfer coefficient in case of free and forced convection.
CO3	To calculate the effectiveness of parallel and counter flow heat exchanger under different flow conditions.
CO4	To determine and analyze radiation heat transfer between surfaces and its various parameters.

LIST OF EXPERIMENTS:

1. To find the thermal conductivity of a given insulating material.
2. To analyse heat transfer characteristics of horizontal cylindrical fins.
3. To analyse natural heat transfer from a vertical pipe.
4. To study the working of a natural convection solar water heater.
5. To analyse the temperature distribution, heat transfer coefficient and efficiency of a pin fin in natural and forced convection heat transfer.
6. To calculate overall heat transfer coefficient for both parallel/counter flow arrangement type of heat exchanger during the operation of heat transfer from air to air, air to water, water to water.
7. To determine the value of Stefan-Boltzmann constant radiation heat transfer.
8. To find out the heat transfer characteristics of cooling tower.
9. To find out heat transfer characteristics in natural convection.

NOTE:

1. At least six practical's should be performed.
2. Additional labs/experiment can be performed based on course content requirements.

**B. Tech. Mechanical Engineering 4th Semester Examination to be held
in the Year MAY 2024, 2025, 2026, 2027**

CREDITS: 1

BRANCH: MECHANICAL ENGINEERING
CLASS: 4TH SEMESTER
COURSE TITLE: THEORY OF MACHINES LAB
COURSE CODE: MEP5412

L	T	P	Marks
			Internal
0	0	2	50

COURSE OUTCOMES

On completion of the course the students will be able to:

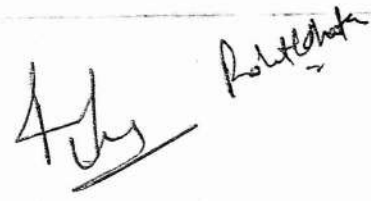
CO1	To understand the kinematics of Quick Return Motion mechanisms
CO2	To understand the basics of balancing of different masses
CO3	To get knowledge about working principles of various types of gear trains, cam and governors
CO4	To have knowledge of construction and working of gear box and braking system

LIST OF EXPERIMENTS:

1. To study the various types of gearboxes.
2. To find out displacement, velocity and acceleration of slider of the Quick-return motion mechanism.
3. To analyse various types of gear trains.
4. To analyse various types of cams and followers.
5. To analyse various types of Governors with the help of stroboscope and to determine sleeve displacement, speed of Governor and Corresponding radius of Governor in case of
(i). Watt Governor (ii). Porter Governor (iii) Proell Governor
6. To analyse static and dynamic balancing apparatus.
7. To analyse the torsional vibration (undamped) of single rotor shaft system.
8. To study the phenomenon of whirling of shafts.
9. To study & analyse the various types of brake systems.

NOTE:

1. At least six practicals should be performed.
2. Additional labs/experiment can be performed based on course content requirements.
3. Simulation/virtual labs can be used to enhance the practical ability of students.



**B. Tech. Mechanical Engineering 4th Semester Examination to be held
in the Year MAY 2024, 2025, 2026, 2027**

BRANCH: MECHANICAL ENGINEERING
CLASS: 4TH SEMESTER
COURSE TITLE: APPLIED THERMODYNAMICS LAB.
COURSE NO: MEP5413

CREDITS: 1

L	T	P	Marks
			Internal
0	0	2	50

COURSE OUTCOMES

On completion of the course the students will be able to:

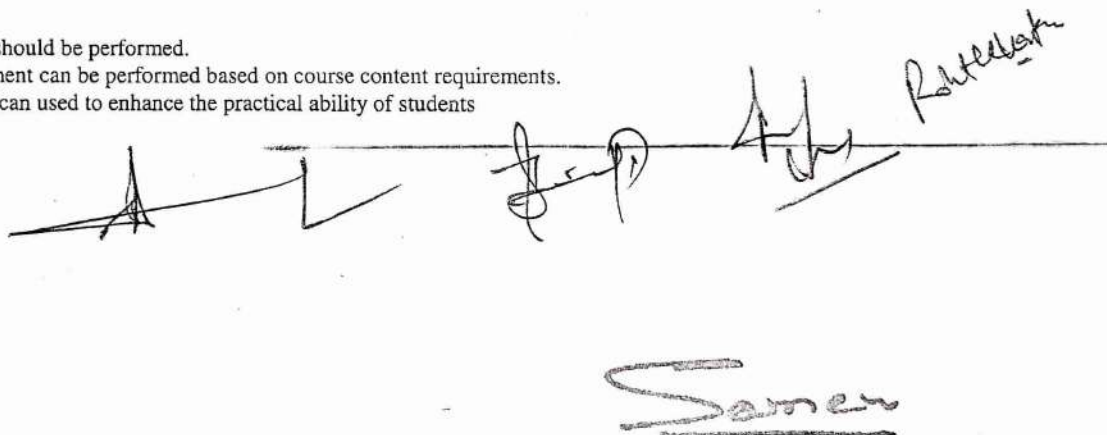
CO1	Explain different boilers and can draw heat balance sheet of the boiler and also were in the position to explain the combustion product of the boiler and also tell about the methods to control harmful product.
CO2	Explain about steam turbine and steam nozzle actual work and the type of losses occur in them with different plots.
CO3	Understand practical work of power plant and communicate with each other more frequently regarding various thermodynamics equipment in industry.

LIST OF EXPERIMENTS:

1. To Study various types of boilers.
2. To study Heat balance in boilers.
3. To find volumetric and isothermal efficiency of reciprocating air compressor.
4. To study Combustion analysis by Orsat Apparatus.
5. To study characteristics of Steam Nozzles.
6. Study the performance parameters of Steam turbine.
7. To study A/F ratio variation with load.
8. To determine Calorific Value of fuel using Bomb Calorimeter.

NOTE:

1. At least six practical's should be performed.
2. Additional labs/experiment can be performed based on course content requirements.
3. Simulation/virtual labs can used to enhance the practical ability of students



**B. Tech. Mechanical Engineering 4th Semester Examination to be held
in the Year MAY 2024, 2025, 2026, 2027**

BRANCH: MECHANICAL ENGINEERING

CLASS: 4TH SEMESTER

COURSE TITLE: PRODUCTION TECHNOLOGY-II Lab

COURSENO: MEP5414

CREDITS: 1

L	T	P	Marks
			Internal
0	0	2	50

COURSE OUTCOMES

On completion of the course the students will be able to:

CO1	To have practical knowledge about various operations which are performed on lathe machine
CO2	To Perform thread cutting operation as per the diagrams and compare with standard thread gauges.
CO3	To fabricate small parts using Capstan and Turret machines
CO4	To Perform grinding operation up to required dimensions using grinding machines
CO5	To have practical knowledge of various drilling operation performed by drilling machines.

LIST OF EXPERIMENTS:

1. To perform simple turning on lathe machine.
2. To perform step turning using lathe machine.
3. To perform taper turning using lathe machine.
4. To perform threading and knurling operation using lathe machine.
5. To make Chuck Key with hand using Lathe machine.
6. To perform Boring operation on MS-Round using lathe machine.
7. To make bush using Capstan and Turret Lathe.
8. To drill holes of different diameter on MS-flat using different size drills on drilling machine.
9. To cut gear teeth on milling machine using dividing head.
10. To perform grinding operation on surface grinder.

NOTE:

1. Atleast six practical's should be performed.
2. Additional labs/experiment can be performed based on course content requirements.

