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

Deputy Registrar (Academic)

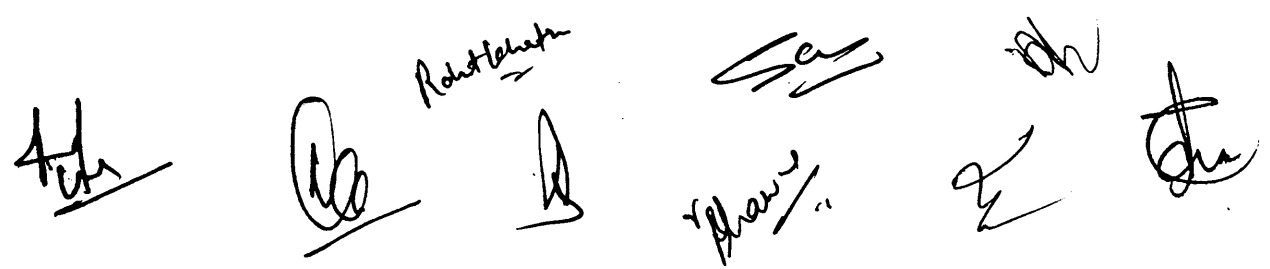## B.E. Mechanical Engineering First Semester Examination to be held in the Year December 2022, 2023, 2024, 2025

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**	

BRANCH: COMMON TO ALL BRANCHES

CLASS: B.E. 1ˢᵗ SEMESTER

COURSE TITLE – ENGINEERING MATHEMATICS-I

COURSE NO.- BST1101

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 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, 9ᵗʰ 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.

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: -
 a)   Tranquilizers
 b)   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.

BRANCH: MECHANICAL/ CIVIL ENGINEERING   CREDITS: 2
CLASS: B.E. 1ˢᵗ SEMESTER
COURSE TITLE –TECHNICAL COMMUNICATION SKILLS
COURSE NO.- HMT1101
DURATION OF EXAM: 3 HOURS

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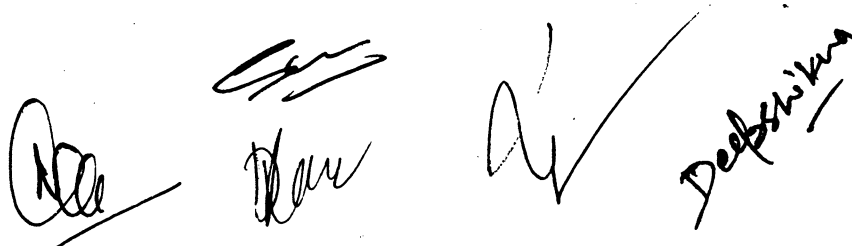
Recommended Books:
- Communication Skills Skills (Second Edition) by Sanjay Kumar & Pushap Lata, Oxford University Press.
- Functional Aspects of Communication Skills by Dr. Prajapati Prasad, Published by S.K Kataria & Sons.

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.

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.

BRANCH: MECHANICAL/ CIVIL ENGINEERING
CLASS: B.E. 1st SEMESTER
COURSE TITLE – APPLIED ENGINEERING CHEMISTRY LAB
COURSE NO.- BSP1112

CREDITS: 1

L	T	P	MARKS
			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.IN $Na_2S_2O_3$.
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.

BRANCH: MECHANICAL/ CIVIL ENGINEERING
CLASS: B.E. 1ˢᵗ SEMESTER
COURSE TITLE– TECHNICAL COMMUNICATION SKILLS LAB
COURSE NO.- HMP1111

CREDITS: 1

L	T	P	MARKS
			PRACTICAL
0	0	2	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 summery, 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. ,

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

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 singe/ 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

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

L	T	P	MARKS
			PRACTICAL
0	0	2	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

BRANCH: MECHANICAL / ELECTRICAL ENGINEERING   **CREDITS: 1.5**
CLASS: B.E. 1st SEMESTER
COURSE TITLE – WORKSHOP TECHNOLOGY
COURSE NO.- MEP5112

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.

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**	

BRANCH: COMMON TO ALL BRANCHES

CLASS: B.E. 2ⁿᵈ SEMESTER

COURSE TITLE – ENGINEERING MATHEMATICS-II
COURSE NO.- BST1201
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 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, 2ⁿᵈ 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.

BRA CH: MECHANICAL/ CIVIL ENGINEERING   CREDITS: 3
CLASS: B.E. 2ⁿᵈ SEMESTER
COURSE TITLE – UNIVERSAL HUMAN VALUES AND PROFESSIONAL ETHICS
COURSE NO.- HMT1201
DURATION OF EXAM: 3 HOURS

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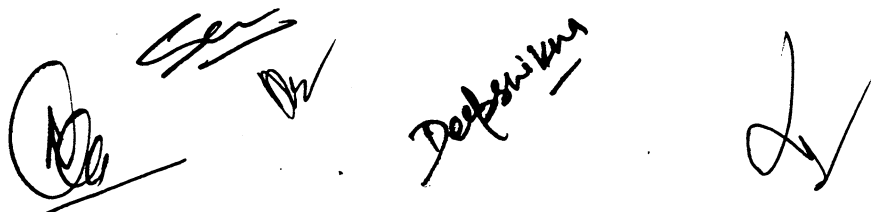
NOTE: There shall be total eight questions, four from each section. Each question carries 20 marks. Five questions will have to be attempted, selecting at least two from each section.

     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.

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

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)**
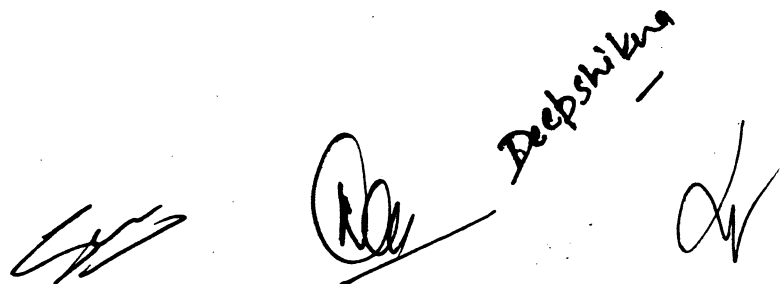
Social Issues and the Environment: Sustainable development and Sustainable use of Resources, Urban problems related to energy, Energy resources: Growing energy needs, renewable and nonrenewable energy sources use of alternate energy sources, Land resources: Land as a resource, land degradation, soil 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.

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

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, CO_2 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)**
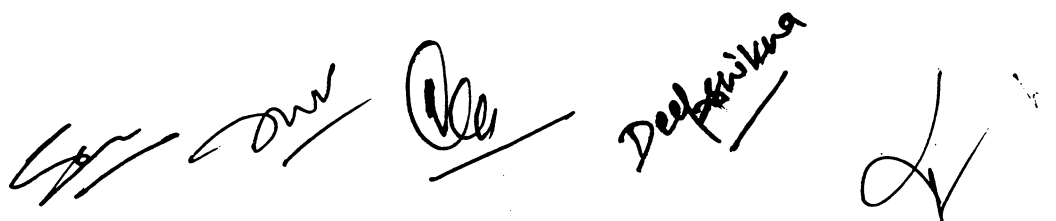
UNIT –VI: FRICTION

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.

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

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, Alligned and unidirectional. Curves used in Engineering Practice: Cycloidals, Involutes, 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 (1) 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   P.S Gill
2. Practical Geometry   V. Laxminarayan & GEV
3. Engineering Graphics   K.L. Narayanan & P. Kamaish
4. Principles of Engineering Graphics   P.E Giesecks
5. Engineering Graphics   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.

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

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.

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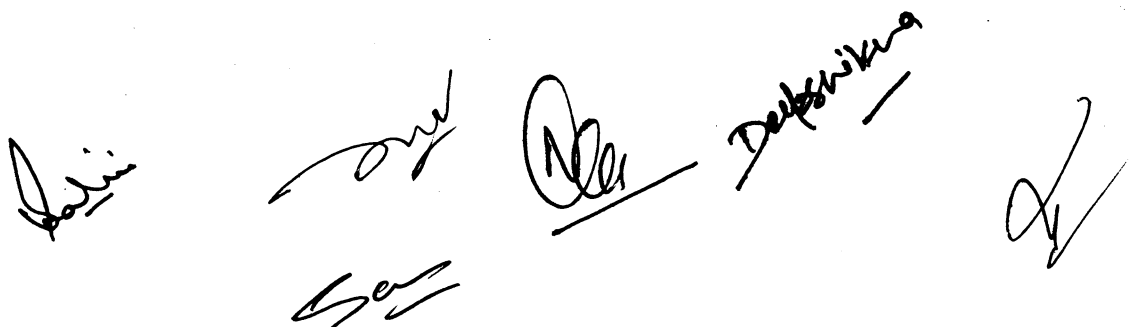**COURSE TITLE – ADVANCED ENGINEERING PHYSICS LAB**
COURSE NO.- BSP1213

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.

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.