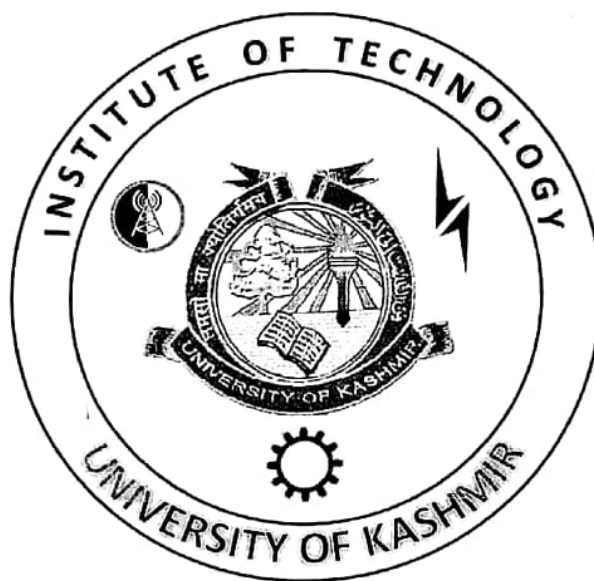


**SYLLABUS  
FOR  
B.TECH. PROGRAMME  
IN  
MECHANICAL ENGINEERING**



**INSTITUTE OF TECHNOLOGY  
ZAKURA CAMPUS  
UNIVERSITY OF KASHMIR  
SRINAGAR J&K, 190006**

**COURSE STRUCTURE**  
**B.Tech I<sup>st</sup> Semester in Mechanical Engineering**  
**Zakura Campus, University of Kashmir**

**B.Tech. I. Year**  
**Semester-I**

Course Code	Course Title	Teaching Classes Per Week			Credits
		L	T	P	
MTH-1117	Engineering Mathematics-I	3	1	0	4
CHM-1217	Engineering Chemistry	3	1	0	4
ELE-1317	Basic Electrical Engineering	3	1	0	4
CSE-1417	Fundamentals of Computer Programming	2	1	0	3
HUM-1517	Communication Skills	2	1	0	3
MEE-1617	Engineering Drawing	3	1	0	4
CHM-1217L	Engineering Chemistry Lab	0	0	2	1
ELE-1317L	Basic Electrical Engineering Lab	0	0	2	1
CSE-1417L	Fundamentals of Computer Programming Lab	0	0	2	1
	<b>Total</b>	<b>16</b>	<b>6</b>	<b>6</b>	<b>25</b>

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**COURSE STRUCTURE**  
**B.Tech 2<sup>nd</sup> Semester in Mechanical Engineering**  
**Zakura Campus, University of Kashmir**

**B.Tech. I. Year**  
**Semester- II**

Course Code	Course Title	Teaching Classes Per Week			Credits
		L	T	P	
MTH-2117	Engineering Mathematics-II	3	1	0	4
PHY-2217	Engineering Physics	3	1	0	4
ECE-2317	Basic Electronics Engineering	3	1	0	4
MEE-2417	Computer Aided Drawing	2	1	2	4
MEE-2517	Fundamentals of Mechanics	3	1	0	4
PHY-2217L	Engineering Physics Lab	0	0	2	1
ECE-2317L	Electronics Engineering-Lab	0	0	2	1
MEE-2617W	Workshop Practice	2	0	2	3
	<b>Total</b>	<b>16</b>	<b>5</b>	<b>8</b>	<b>25</b>

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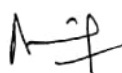
**Course Code: MTH-1117**  
**Engineering Mathematics-I**  
**Course Credits: 04**

S. No:	Topics	No. of Hr:
1.	Calculus: Differential calculus of functions of several variables, Partial differentiation, Homogeneous functions and Euler's theorem,	8
2.	Taylor's and Maclaurin's series, Taylor's theorem and mean value theorem for functions of two variables, Errors and approximations	8
3.	Applications of Differential Calculus: Maxima and minima of several variables, Lagrange's method of multipliers for maxima and minima Curvature of Cartesian curves, Curvature of parametric & polar curves.	9
4.	Applications of Definite Integrals: Application of definite integrals to area, arc length, surface area and volume, Double integrals, Triple integrals.	8
5.	Vector Calculus: Scalar and vector fields, differentiation of vectors, Velocity and acceleration, Vector differential operator, Del, Gradient and Divergence, Physical interpretation of the above operators, Line, surface and volume integrals	9
6.	Application of Vector Calculus: Flux, solenoidal and irrotational vectors, Green's, Gauss' and Stokes' theorems and their applications.	8
<b>Total number of Hours</b>		<b>50</b>

S.No:	Books Recommended	Author	Publisher
1.	Advanced Engineering Mathematics	Kreyszig. E	John Wiley, Singapore.
2.	Advanced Engineering Mathematics	Jain, R. K and Iyengar. S. R.K	Narosa Publishing House.
3.	Differential Calculus	Das & Mukherjee	U.N. Dhur & Sons Pvt. Ltd.
4.	Integral Calculus	Das & Mukherjee	U.N. Dhur & Sons Pvt. Ltd.







**Course Code: CHM-1217**  
**Engineering Chemistry**  
**Course Credits: 04**

S. No:	Topic	No. of Hrs
1.	Electrochemistry: Reduction Potentials, Redox stability in water, The diagrammatic presentation of potential data, The effect of complex formation on potentials. Electrolytes and non-electrolyte solutions, Kinds of Electrodes, Concentration Cells, The Lead Storage Cell and Fuel Cell	7
2.	Laws of Photochemistry, Photo physical processes, Fluorescence and Phosphorescence, Photochemical reactions: photolysis of HI, Photochemical reaction between H <sub>2</sub> and Br <sub>2</sub> , Rotational and Vibrational Spectroscopy-Principles and application to simple molecules, magnetic Resonance	7
3.	UV-visible spectrophotometry: Electronic transitions & electronic spectra, Application to simple systems (Analysis of Fe, Cu, Cr), Beer-lamberts' law & its applications. IR spectroscopy – IR spectrum, Application of IR Spectra (Alcohols, Acids, phenols, Concept of Vibrational Spectra.	7
4.	Environmental Chemistry:- Environmental segments, composition of atmosphere, earth's radiation balance, particles, Ions, & radicals in atmosphere, greenhouse effect, ozone layer in stratosphere –Its significance and consequence of depletion.	6
5.	Pollution: Air Pollution, Natural and man-made pollutants (CoX, NoX, HC, SoX, SpM, Acid rains). Effect of pollutants on human and plant life. Sources and classification of water pollutants (Organic, Inorganic, Sediments, Radioactive materials, heat.)	6
6.	Water and its treatment: Alkalinity of water, Determination of Alkalinity by using phenolphthalein and methyl orange indicators. Hardness of water, its types, methods of estimation. Treatment of water (Municipal treatment, lime soda process, demineralization by ion exchange process.	5
7.	Lubricants: Introduction, surface roughness, concept of friction and wear, lubrication, Mechanism of hydrodynamics, boundary and extreme pressure lubrication. Classification of lubricants, semi-solid & liquid lubricants, blended oils, synthetic lubricants, Lubricating emulsions. Properties of greases, liquid lubricants with special reference to flash point, viscosity and viscosity index. Criteria for selection of lubricants for specific purposes.	6
8.	Inorganic Systems: Transition Metals, fundamental concepts of transition metal complexes, consequences of orbital splitting, color and magnetic properties. Structure and bonding of organo-metallic complexes, the sixteen and eighteen electron rule. Role of trace metals in biological systems, oxygen carrier and electron transfer.	6
<b>Total number of Hours</b>		<b>50</b>

S. No:	Books Recommended	Author	Publisher
1.	Inorganic Chemistry	Shriver. D. FandAtkin. A. W	OxfordPress,Delhi.
2.	Physical Chemistry	Castellan. G.W	Narosa Publications.
3.	Principles ofInstrumentalAnalysis	Skoog. D. AandHolles. F.J	HercaurtAsiaPTELtd.
4.	Chemistry for changing times	Hill. J. W	Macmillan, Canada.
5.	Engineering Chemistry	Jain.P.C	DhanpatRai&Sons.

**Course Code: ELE-1317**  
**Basic Electrical Engineering**  
**Course Credits: 04**

S. No:	Topics	No. of Hrs
1.	Review of basic electrical Signals, Review of electric circuit concepts, Terminology, Electric circuit parameters (Resistance, Conductance, Inductance, Capacitance, Reactance, Impedance), Basic electric circuit terminologies: Nodes, Junctions, Paths, Loops, Branches, Series and Parallel combinations of resistance.	3
2.	Ideal and practical voltage and current sources and their transformation, Dependent Sources, Power and energy relations, Ohm's law: validity of ohms law, Ohmic and non Ohmic conductors, applications of ohms law.	5
3.	Introduction to D.C. voltage & Current and D.C. circuits, Voltage and current Divider Laws, Kirchhoff's current law (KCL) and Kirchhoff's voltage law (KVL), Analysis of series & parallel D.C. Circuits: Loop analysis of D.C. Circuits, Nodal methods of analysis, Mesh analysis, Super node, and Super mesh.	8
4.	Super-position theorem, Thevenin's theorem, Norton's theorems, Maximum power transfer theorem, Reciprocity & Millman's theorem, Delta-Star (Y) Transformations.	7
5.	Introduction to Alternating Voltage & Current and A.C. circuits, Basic terminology and definitions (Signal, Parameters, Generation, Applications, non-sinusoidal A.C.'s, EMF Equations, Mean, Average, RMS, Peak, and Form Factor), Complex number representation of A.C. circuits.	7
6.	Phasor representation of A.C. circuits, Solutions of sinusoidally excited RLC circuits, Power and energy relations in A.C. circuits, Concepts of active & reactive powers.	7
7.	Applications of network theorems to A.C. circuits, Resonance in series and parallel circuits.	6
8.	Single and three phase A.C. systems, Analysis of 3 phase systems, Current and voltage relationships in Y- $\Delta$ & $\Delta$ -Y configurations, Balanced / un-balanced systems.	7
<b>Total number of Hours</b>		<b>50</b>

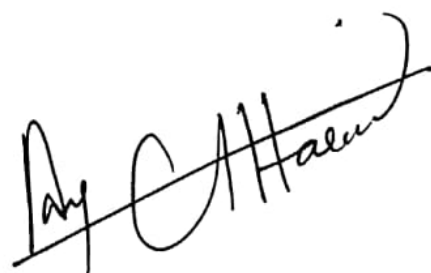
S. No:	Books Recommended	Author	Publisher
1.	Fundamentals of Electric Circuits	Alexander & Sadiku	McGraw-Hill.
2.	Engineering circuit Analysis	Hayt & Kimberly	McGraw-Hill.
3.	Electric Engineering Fundamentals	Vincent Del Toro	PHI.
4.	Introduction to Circuit Analysis & Design	Glisson	Springer.
5.	Basic Electric Circuit Analysis	Johnson, Hilburn, Johnson	Wiley.

**Course Code: CSE-1417**  
**Fundamentals of Computer Programming**  
**Course Credits: 03**

S.No:	Topic	No. of Hrs
1.	Introduction to Programming and Problem Solving – Types of Programming Languages- Machine Level, Assembly level, and High Level language.	2
2.	Introduction to C Language – Brush-up of algorithms and flowcharts. Character set, Variables and Identifiers, Built-in Data Types, Variable Definition, Arithmetic operators and Expressions, Constants and Literals, Simple assignment statement, Basic input/output statement.	5
3.	Simple C programs Conditional Statements and Loops -Decision making within a program, Conditions, Relational Operators, Logical Connectives, if statement, if-else statement.	5
4.	Loops: while loop, do while, for loop, Nested loops, Infinite loops, Switch statement, structured Programming.	4
5.	Arrays - one dimensional array: Array manipulation; Searching, Insertion, Deletion of an element from an array; Finding the largest/smallest element in an array; Two dimensional arrays, Addition/Multiplication of two matrices.	6
6.	Functions- Modular programming and functions, Standard Library of C functions, Prototype of a function: Formal parameter list, Return Type, Function call, Block structure, Passing arguments to a Function: call by reference, call by value, Recursive Functions, arrays as function arguments.	6
7.	Structures and Unions - Structure , nested structure, structures and functions, structures and arrays: arrays of structures, structures containing arrays, unions,	5
8.	Pointers- Address operators, pointer type declaration, pointer assignment, pointer initialization, pointer arithmetic, functions and pointers, Arrays and Pointers, pointer arrays.	6
<b>Total number of Hours</b>		<b>39</b>

S. No:	Books Recommended	Author	Publisher
1.	Programming with C	Byron Gottfried	Pearson Education.
2.	Programming with ANSI & Turbo C	A. Kamthane	Pearson Education.
3.	Programming in C	Pradip Dey, Manas Ghosh	Oxford University Press.
4.	Programming Language Concepts and Constructs	Ravi Sethi	Pearson Education.





**Course Code: HUM-1517****Communication Skills****Course Credits: 03**

S. No:	Topic	No. of Hrs
1.	Communication: Meaning, its types, significance, process, Channels, barriers to Communication, making communication effective, role in society, Communication model.	5
2.	Discussion Meeting and Telephonic Skills: Group discussions, conducting a meeting, attending telephonic calls, oral presentation and role of audio visual aids.	5
3.	Grammar: Transformation of sentences, words used as different parts of speech one word substitution, abbreviations, technical terms etc.	5
4.	Reading Skills: Process of reading, reading purposes, models, strategies, methodologies, reading activities.	4
5.	Writing Skills: Elements of effective writing, writing style, scientific and technical writing.	4
6.	Listening Skills: The process of listening, the barrier to listening, the effective listening skills, feedback skills. Speaking Skills: Speech mechanism, organs of speech, production and classification of speech sound, phonetic transcription, the skills of effective speaking, the components of effective talk.	5
7.	Business Letters: Structure of business letters, language in business letters. Letters of inquiry & their places. Sales Letters, Memorandum, Quotations/tenders, Bank correspondence, Letters of application and appointments,	4
8.	Resume writing, Report Writing,	3
9.	Conducting a Meeting, Minutes of Meeting, Oral Presentation, Group Discussion, CV writing, Purchase order, Job Application Letter.	4
<b>Total number of Hours</b>		<b>39</b>

S. No	Books Recommended	Author	Publisher
1.	Effective Business Communication	Rodrigues M V	Concept Publishing Company.
2.	Handbook of Practical Communication Skills	Wright, Chrissie	Jaico Publishing.
3.	An Approach to Communication Skills	Bhattacharya. Indrajit	Dhanpat Rai Co.
4.	Modern Business Correspondence	Gartside L	Pitman Publishing. London
5.	How to Write and Publish a Scientific Paper	Day, Robert A	Cambridge University.
6.	An Introduction to the Pronunciation of English	Gimson A C	ELBS.

**Course Credits: MEE-1617****Engineering Drawing****Course Credits: 04**

S. No:	Topics	No. of Hrs
1.	Introduction to engineering drawing (equipment, drafting tools, symbols and conventions in drawing), dimensioning, types of lines and their use, dividing a given straight line into any number of equal parts, bisecting a given angle, drawing a regular polygon given one side, special methods of constructing a pentagon and hexagon. Conic sections, ellipse, parabola, hyperbola, cycloid and trochoid.	04
2.	Projection of lines: Line parallel to both the planes, Line parallel to the horizontal plane and perpendicular to the vertical plane, line parallel to HP and inclined to VP, line parallel to HP and inclined to profile plane, line parallel to VP and inclined to HP, line inclined to both the planes.	09
3.	Projection on horizontal and vertical planes, principal views, different system of projections, symbols, notations. Projection of Planes in first and third quadrant. Projection of solids in first and third quadrant, axis parallel to one and perpendicular to other.	09
4.	Section planes perpendicular to one plane and parallel or inclined to other plane.	09
5.	Development of prisms, pyramids and cylindrical & conical surfaces.	09
6.	Isometric projection and isometric views of different planes and simple solids, introduction to perspective projection.	10
<b>Total number of Hours</b>		<b>50</b>

S. No:	Books Recommended	Author	Publisher
1.	Engineering Graphics and drafting	Gill.P.S	Katria and Sons, Delhi.
2.	Elementary Engineering Drawing-Plane and Solid Geometry	Bhat.N.D.	Chartotar Publishing House, Anand.
3.	Fundamentals of Engineering Drawing	Luzzad.W.J.	Prentice Hall of India Private Limited, New Delhi.



**Course Credits: CHM-1217L**  
**Engineering Chemistry LAB**  
**Course Credits: 01**

S. No:	Experiment
1.	To draw the pH-titration curve of strong acid vs. strong base.
2.	Standardization of $\text{KMnO}_4$ using sodium oxalate.
3.	Determination of Ferrous iron in Mohr's salt by potassium permanganate.
4.	Determination of partition coefficients of iodine between benzene and water.
5.	Determination of amount of sodium hydroxide and sodium carbonate in a mixture.
6.	Determination of total hardness of water by EDTA method.
7.	To verify Bear's law for a colored solution and to determine the concentration of a given unknown solution.
8.	Synthesis of some polymers like Crazy ball.



**Course Credits: ELE-1317L**  
**Basic Electrical Engineering LAB**  
**Course Credits: 01**

S. No:	Experiment
1.	To study the colour coding of resistors
2.	Connection of Ammeters, Voltmeters, Wattmeter's and multi-meters in DC and AC circuits and selection of their ranges.
3.	Use of LCRQ meter.
4.	To study the series / parallel operation of resistors and verifying their effective values by LCRQ meter.
5.	To verify the KVL and KCL in DC circuits.
6.	To verify the star delta transformation of networks.
7.	To verify the superposition theorem.
8.	To verify the maximum power transfer theorem
9.	Basic R, L, C circuits excited from A.C
10.	To measure electric power in single-phase AC circuits with resistive load, RL load and RLC load.
11.	To measure the power and power factor in three phase AC circuits.
12.	To study the series resonance.
13.	To study the parallel resonance.
14.	To study the handling of CRO and use it for the study of different voltage waveforms.

*Prof. A. H. Hameed*

*M. A.*

*Prof. A. H. Hameed*

**Course Code: CSE-1417L**  
**Fundamentals of Computer Programming LAB**  
**Course Credits: 01**

S. No:	Experiment
1.	Program to understand basic data types.
2.	Programming on looping and decision statements.
3.	Example of Fibonacci series program.
4.	Finding a factorial for a given number.
5.	Programs using <ol style="list-style-type: none"><li>Library functions.</li><li>Built-in math functions.</li></ol>
6.	Programs on <ol style="list-style-type: none"><li>functions</li><li>arrays</li><li>string manipulations</li><li>Structures and unions.</li><li>Pointers.</li><li>Basic file operations.</li></ol>

*Ang E. Hama*

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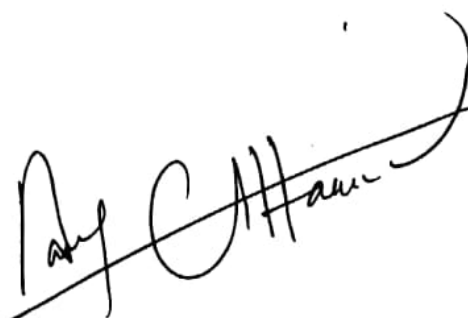
**Course Code: MTH-2117**  
**Engineering Mathematics- II**  
**Course Credits: 04**

S. No:	Topic	No. of Hours
1.	Matrices: Rank of a matrix, Elementary transformations, Consistency and solutions of a system of linear equations by matrix methods, Eigen values & Eigen vectors, Properties, Cayley-Hamilton's theorem	9
2.	Ordinary and Linear Differential Equations: Formation of ordinary differential equations, Solution of first order differential equations by separation of variables	7
3.	Homogeneous equations, Exact differential equations, Equations reducible to exact form by integrating factors, Linear differential equations with constant coefficients, Cauchy's homogeneous linear equations, Legendre's linear equations	8
4.	Partial Differential Equations: Formulation and classification of PDE's, Solution of first order linear equations, Four standard forms of non-linear equations, Separation of variable method for solution of heat, wave and Laplace equation	9
5.	Probability: Basic concepts of probability, Types of probability: Marginal, joint and conditional, probability rules: Addition, Multiplication, complement; Probability tree, probability under conditions of statistical independence and dependence, Bayes' Theorem.	9
6.	Random Variables and Distribution: Random variables, Probability distribution, Probability density function, Discrete and continuous distributions- Binomial, Poisson, Normal distributions, Measures of central tendency and dispersion, Sampling distribution, standard error, Central limit theorem	8
<b>Total number of Hours</b>		<b>50</b>

S. No:	Books Recommended	Author	Publisher
1.	Advanced Engineering Mathematics	Kreyszig.E	John Wiley
2.	Advanced Engineering Mathematics	Jain.R.K & Iyengar.S.R.K	Narosa Publishing House
3.	Matrices	Frank Ayres	McGraw Hills
4.	Advanced Mathematical Analysis	Malik &Arrora	S. Chand &Co



M.T



**Course Code: PHY-2217****Engineering Physics****Course Credits: 04**

S. No:	Topics	No. of Hrs
1.	Vectors and Electrostatics: Work and energy in electrostatics; dielectrics, Polarization, electric displacement, Susceptibility & permittivity, Clausius Mossotti equation. Transformation of vectors. Spherical and cylindrical coordinates system, Gradient of a scalar.	7
2.	Divergence and curl of a vector, Gauss's law and its applications, Electric potential and electric field (in vector form), Potential due to a monopole, Dipole and multipoles (multipole expansion).	7
3.	Magneto-statics: Lorentz Force Law; magnetic field of a steady current (Biot-Savart law), Ampere's law and its applications, Ampere's law in magnetized materials.	6
4.	Electrodynamics Electromotive force, Faraday's law, Maxwell's Equations, Wave Equation. Poynting Vector, Poynting Theorem (Statement only), Propagation of EM-Wave in conducting and non-conducting media. Interference due to division of wave front and division of amplitude. Young's double slit experiment.	7
5.	Interference and Diffraction: Interference and principle of superposition. Theory of biprism, Interferences from parallel thin film, wedge shaped films, Newton's rings, Michelson Interferometer. Fresnel's Diffraction, Diffraction at straight edges, Fraunhofer diffraction due to N-Slits, Diffraction grating, dispersive power of grating, resolving power of prism and grating.	6
6.	Theory of Relativity: Invariance of an equation and concept of ether, Michelson Morley experiment, Einstein's postulates and Lorentz transformation equations, length, time and simultaneity in relativity, addition of velocity, variation of mass with velocity, mass-energy relation, energy- momentum relation.	6
7.	Quantum Theory: The Compton effect, matter waves; group and phase velocities, Uncertainty principle and its application; time independent and time dependent.	5
8.	Schrodinger wave equation, Eigen values and Eigen functions, Born's interpretation and normalization of wave function, orthogonal wave functions, applications of Schrodinger wave equation (particle in a box and harmonic oscillator).	6
<b>Total number of Hours</b>		<b>50</b>

S. No	Books Recommended	Author	Publisher
1.	Introduction to Electrodynamics	Griffiths. D	Prentice Hall of India
2.	Perspective of Modern Physics	Beiser	McGraw-Hill
3.	Elementary Modern Physics	Arya. A.P	Addison- Wesley, Singapore
4.	Introduction to Modern Physics	Mani. H. S. and Mehta. G.K	Affiliated East West Press, New Delhi

**Course Code: ECE-2317**  
**Basic Electronics Engineering**  
**Course Credits: 04**

S. No:	Topic	No. of Hrs
1.	Solid State Physics: Energy bands and charge carriers in semiconductors: energy bands - metals- semiconductors and insulators direct and indirect semiconductors- charge carriers in semiconductors: electrons and holes-intrinsic and extrinsic material: n-material and p-material-carrier concentration.	6
2.	Fermi level- EHPs- temperature dependence- conductivity and mobility- drift and resistance- effect of temperature and doping on mobility, Hall Effect. Diffusion of carriers – derivation of diffusion constant D-Einstein relation-continuity equation.	6
3.	P-N junctions: contact potential-equilibrium Fermi levels- space charge at junctions- current components at a junction: majority and minority carrier currents.	6
4.	Diodes: volt-ampere characteristics-capacitance of p-n junctions. Diode as circuit element. Half wave – full wave, Rectifiers: Centre Tapped and bridge rectifiers-working-analysis and design-C filter analysis.	5
5.	Zener and avalanche breakdown-Zener diodes: volt-ampere characteristics-regulated power supplies - IC based regulated power supplies.	6
6.	Tunnel diodes: tunneling phenomena -volt-ampere characteristics- Varactor diodes- Photo diodes: detection principle- light emitting diodes- volt-ampere characteristics.	6
7.	Transistors: Bi polar junction transistors NPN and PNP transistor action-open circuited transistor- biasing in active region-majority and minority carrier distribution- terminal currents- operation- characteristics.	7
8.	Types of Transistor Configurations:-CE, CB and CC configurations. Transistor as Amplifier. Field effect transistors: operation-pinch off and saturation-pinch off voltage-gate control- volt-ampere characteristics.	4
9.	MOSFETS n-channel& p-channel. Depletion and enhancement modes.	4
<b>Total number of Hours</b>		<b>50</b>

S.No:	Books Recommended	Author	Publisher
1.	Solid State Electronic Devices	Streetman.B.G	Prentice Hall of India
2.	Electronic devices and circuits	Boylsted.R and L. Nashelsky	Prentice Hall Publications
3.	Electronic devices	Floyd	Pearson Education
4.	Electronic Principles	Malvino	Tata McGraw Hill

**Course Code: MEE-2417**  
**Computer Aided Drawing**  
**Course Credits: 04**

S. No:	Topics	No. of Hrs
1.	Thread forms: Thread terminology, sectional views of threads. ISO Metric (Internal & External), BSW (Internal and External), square, Acme and Sellers thread, American Standard thread.	05
2.	Hexagonal headed bolt and nut with washer (assembly), square headed bolt and nut with washer (assembly), Flanged nut, slotted nut.	06
3.	Locking arrangement for nuts: taper and split pin for locking Simple assembly using stud bolts with nut and lock nut, countersunk head screw, grub screw, Allen screw.	04
4.	Eye foundation bolt, Rag foundation bolt, Lewis foundation bolt and Cotter foundation bolt.	02
5.	Riveted joints: Forms and proportions of rivet heads, Different views of different types of riveted Lap and Butt joints.	04
6.	Shaft joints: Cotter joint and Knuckle joint, Socket and Spigot joint.	04
7.	Shaft coupling: Muff, Flanged, Flexible, Universal and Oldham's coupling.	04
8.	Shaft bearing: Solid and bush bearing, Plummer block, Footstep bearing.	06
9.	Spur gear in mesh with approximate construction of tooth profile, Rack and pinion.	05
10.	Assembly and detailed drawings of Engine Parts: Piston, Stuffing box, cross head, Vertical & Horizontal engine, Connecting rod, Crank, Eccentric. Valves: Steam stop valves, Feed check valve, Safety valves, Blow off cock.	10
<b>Total number of Hours</b>		<b>50</b>

S.No:	Books Recommended	Author	Publisher
1.	Machine Drawing	Bhat. N. D	Charotar Publishing house private limited.
2.	Machine Drawing	Gill.P.S.	Katria and Sons, Delhi

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**Course Code: MEE-2517**  
**Fundamental of Mechanics**  
**Course Credits: 04**

S. No:	Topics	No. of Hrs
1.	Equilibrium of a particle, Condition for the Equilibrium of a Particle, The Free-Body Diagram, Coplanar Force Systems, Three-Dimensional Force Systems	02
2.	Force System Resultants Moment of a Force—Scalar Formulation, Cross Product, Moment of a Force—Vector Formulation, Principle of Moments, Moment of a Force about a Specified Axis, Moment of a Couple, Simplification of a Force and Couple System, Further Simplification of a Force and Couple System, Reduction of a Simple Distributed Loading.	06
3.	Moments of Inertia Definition of Moments of Inertia for Areas, Parallel-Axis Theorem for an Area, Radius of Gyration of an Area, Moments of Inertia for Composite Areas, Product of Inertia for an Area, Moments of Inertia for an Area about Inclined Axes.	05
4.	Planar Kinematics of a Rigid Body, Translation: Rotation about a Fixed Axis, Absolute Motion Analysis, Relative-Motion Analysis (velocity), Instantaneous Centre of Zero Velocity, Relative-Motion Analysis (acceleration), Relative-Motion Analysis using Rotating Axes.	05
5.	Planar Kinetics of a Rigid Body, Force and Acceleration: Mass Moment of Inertia, Planar Kinetic Equations of Motion (translation, rotation about a fixed Axis, General Plane Motion).	07
6.	Planar Kinetics of a Rigid Body, Work and Energy: Kinetic Energy, The Work of a Force, The Work of a Couple Moment, Principle of Work and Energy, Conservation of Energy.	07
7.	Planar Kinetics of a Rigid Body, Impulse and Momentum: Linear and Angular Momentum, Principle of Impulse and Momentum, Conservation of Momentum, Eccentric Impact.	06
8.	Three-Dimensional Kinematics of a Rigid Body: Rotation About a Fixed Point, The Time Derivative of a Vector Measured from Either a Fixed or Translating-Rotating System, General Motion, Relative Motion Analysis Using Translating and Rotating Axes.	06
9.	Three-Dimensional Kinetics of a Rigid Body: Moments and Products of Inertia, Angular Momentum, Kinetic Energy, Equations of Motion, Gyroscopic Motion, Torque-Free Motion.	06
<b>Total number of Hours</b>		<b>50</b>

S.No:	Books Recommended	Author	Publisher
1.	Statics and Dynamics	Hibbeler. R.C	Prentice Hall, N. Jersey, USA.
2.	Engineering Mechanics, Vol.1 and Vol. 2	Meriam, J.L. and Kraige, L.G.	John Wiley & Sons Inc

**Course Code: PHY-2217L**  
**Engineering Physics LAB**  
**Course Credits: 01**

S. No:	Experiment
1.	Measurement of Resistance.
2.	Measurement of $c/m$ by Helical method.
3.	Measurement of Numerical Aperture of Optical Fiber.
4.	Determination of Resistivity of a given wire.
5.	Determination of Band Gap of a semiconductor.
6.	Verify Biot-Savart law.
7.	To determine the refractive index of the prism material using spectrometer.
8.	To verify the laws of vibrating strings by Melde's experiments.
9.	To determine the wavelength using Fresnel's biprism/diffraction grating.
10.	To Determine Plank's Constant.

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**Course Code: ECE-2317L**  
**Basic Electronics Engineering LAB**  
**Course Credits: 01**

S. No:	Experiment
1.	Characterize various commercial diodes on the basis of voltage and current ratings. Study/simulation of their I-V characteristics using multi-sim/p-spice.
2.	Characterize various commercial Zener diodes on the basis of voltage and current ratings, Study/simulation of I-V characteristics of Zener Diode.
3.	Study of I-V characteristics of a Light emitting Diode. Design of current limiting resistors for different input voltages.
4.	To assemble/simulate a half wave rectifier using power diodes and LEDs and study their performance.
5.	To assemble/simulate a centre tapped full wave rectifier using power diodes and LEDs and study their performance.
6.	To assemble/simulate a bridge wave rectifier using power diodes and LEDs and study their performance
7.	Study/simulation of diode applications like clippers, clampers, protection circuits.
8.	Study of Zener diodes as voltage regulators.
9.	Design of an IC based Voltage regulator.
10.	Study V-I characteristics of transistor (PNP and NPN). Calculate the performance parameters of transistor.
11.	Use NPN transistor as an inverter switch.



1-1



**Course Code: MEE-2617W****Workshop Practice****Course Credits: 03**

S. No:	Topic	No. of Hrs
1.	<b>Machining section</b> (a) Theoretical instructions: Safety precautions, working principal of milling, shaper, slotter, grinding, power hacksaw and other related metal-cutting machine, basic operations of various machines, introduction of various types of cutting tools (Nomenclature). (b) Practical demonstrations: Demonstration of knurling thread cutting, boring etc. on lathe machine, simple operations on milling, shaper, slotter/planner and grinding machines, simple jobs involved all the basic operations on shaper, milling and grinding machines. Aim: To prepare a cylindrical job on lathe for manufacturing of a gear on milling machine.	06
2.	<b>Sheet Metal and Spray Painting section</b> (a) Theoretical instructions: Safety precautions, soldering, brazing and shearing, fluxes in use and their applications, study of material used for painting, knowledge of different machines such as shearing, bending, wiring and power presses, method of pattern development in detail, study of air compressor and air guns: its use, care, maintenance and operating instructions, advantages of spray painting, knowledge of different sheet metal materials. (b) Practical demonstrations: Exercise in rating, soldering and brazing of making jobs of various materials such as trays, flower vases, photo frame etc., and preparation of surfaces for painting by using a spray gun with the help of air compressor. Aim: To develop a funnel as per the drawing with soldering.	06
3.	<b>Fitting and Bench work section</b> (a) Theoretical instructions: Safety precautions, introduction of common materials using in fitting shop, description and demonstration of various work holding devices such as surface plate and V-block, introduction and use of measuring tools like vernier caliper, micro-meter, height gauge, profile projector, surface roughness tester and other gauges. (b) Practical demonstrations: Demonstration of angular cutting, practice of 450, preparation of stud to cut external threads with the help of dies, drilling, countersinking, counter boring and internal thread cutting with taps, pipe cutting practice and thread cutting on G.I pipe with pipe dies. Demonstration of tap sets and measuring equipment's. Aim: To assemble the mild steel work pieces with radius fitting.	04
4.	<b>Welding Section</b> (a) Theoretical instructions: Safety precautions, introduction of all welding processes like gas welding, MIG welding, TIG welding, submerged arc welding and spot welding, advantages and disadvantages over electric arc welding and their applications, welding techniques like right ward, left ward and over head, various fluxes and electrode used in welding, difference between A.C. and D.C. welding, characteristics, size and class of electrodes. (b) Practical demonstrations: Demonstration of different types of joints by using gas welding and arc welding etc. Aim: To make V-butt joint, out-side corner joint and head tee-joint	06
5.	<b>Foundry and Casting section</b> (a) Theoretical instructions: Safety precautions, introduction to casting processes, basic steps in casting processes, types of pattern, allowances, risers, runners, gates, moldings and its composition and preparation, moulding methods, core sand and core making, mould assembly, casting defects and remedies, introduction of Cupola, various test of moulding sand like, shatter index	06

	test, moisture content test, grain fineness test etc. (b) Practical demonstrations: Demonstration and practice of mould making with the use of split patterns and cores, sand preparation and testing, casting practice of various materials like brass, aluminum, waxes etc. by using different types of patterns. Aim: To prepare a greens and moulds by using split and self cored pattern for casting.	
6.	<b>Smithy and Forging section</b> (a) Theoretical instructions: Safety precautions, introduction of various forging methods like hand forging, drop forging, press forging and machine forging and defects, brief description of metal forming processes, comparison of hot and cold working, introduction of forging machines, such as forging hammer and presses. (b) Practical demonstrations: Demonstration and practice of MS rod into forged MS ring and octagonal cross-section. Aim: To prepare a square headed bolt from MS-round.	06
7.	<b>Carpentry and pattern making Section</b> (a) Theoretical instructions: Safety precautions, introduction of wood, different methods of seasoning, quality of good timber, wood working machines like band saw, circular saw, jig saw, lathe, grinder, thickness planing machine, mortise machine and radial saw. (b) Practical demonstrations: Demonstration and practice of different types of joints, technical terms related to joinery their description, identification and application, polishing, putting and material use, their names, ingredients, methods of preparation and use, joining materials like nuts, screws, dovels, hinges, glue, window and roof trusses. Aim: To prepare scarf joint and pen stand as per the drawing.	05
<b>Total number of Hours</b>		39

S.No:	Books Recommended	Author
1.	Workshop Technology Vol. I	Chapman
2.	Workshop Technology Vol. II	Hajra Chowdhary
3.	Workshop Technology Vol. I	Swarn Singh
4.	Workshop Technology Vol. I	Virender Narula