

SYLLABUS
FOR
B.TECH. PROGRAMME
IN
ELECTRICAL ENGINEERING



INSTITUTE OF TECHNOLOGY
ZAKURA CAMPUS
UNIVERSITY OF KASHMIR
SRINAGAR J&K, 190006
As Per BOS Held In August 2017

COURSE STRUCTURE
B.Tech 2nd Semester ELE
University of Kashmir, Zakura Campus

Course Code	Course Title	Teaching Periods Per Week			Credits
		L	T	P	
MTH-2117B	Engineering Mathematics-II	3	1	0	4
CHM-2217B	Engineering Chemistry	3	1	0	4
ECE-2317B	Basic Electronics Engineering	3	1	0	4
MEE-2417B	Computer Aided Drawing	2	1	2	4
MEE-2517B	Fundamentals of Mechanics	3	1	0	4
CHM-2217BL	Engineering Chemistry Lab	0	0	2	1
ECE-2317BL	Basic Electronics Engineering-Lab	0	0	2	1
MEE-2617BW	Workshop Practice	2	0	2	3
Total		16	5	8	25

Applicable To Batch 2017 & Onwards

SECOND SEMESTER

COURSE CODE: MTH-2117B**ENGINEERING MATHEMATICS II****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
Total		50

TextBooks:

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

COURSE CODE: CHM-2217B**ENGINEERING CHEMISTRY****Credits: 04**

S. No.	Topic	No. of Hours
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 ₂ and Br ₂ , 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-lambert's 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, colour 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, electron transfer.	6
Total		50

TextBooks:

S. No	Name of Book	Author	Publisher
1.	Inorganic Chemistry	Shriver DFandAtkinAW	OxfordPress,Delhi

2.	Physical Chemistry	Castellan GW	Narosa
3.	Principles of Instrumental Analysis	Skoog DA, and Holles FJ	Hercaurt Asia PTE Ltd
4.	Chemistry for changing times	Hill J W	Macmillan, Canada
5.	Engineering Chemistry	P. C. Jain	Dhanpat Rai & Sons
6.	Chemistry In engineering	L.A. Munro	Prentice Hall

COURSE CODE: ECE-2317B**BASIC ELECTRONICS ENGINEERING****Credits: 03**

S. No.	Topic	No. of Hours
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.	4
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.	4
6.	Tunnel diodes: tunneling phenomena - volt-ampere characteristics- Varactor diodes- Photo diodes: detection principle- light emitting diodes- volt-ampere characteristics.	4
7.	Transistors: Bipolar junction transistors NPN and PNP transistor action- open circuited transistor- biasing in active region- majority and minority carrier distribution- terminal currents- operation characteristics.	5
8.	Types of Transistor Configurations:- CE, CB and CC configurations. Transistor as Amplifier. Field effect transistors: operation-pinchoff and saturation-pinchoff voltage-gate control- volt-ampere characteristics.	3
9.	MOSFETs n-channel & p-channel. Depletion and enhancement modes.	2
Total		39

Text Books:

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

COURSE CODE: MEE-2417B**COMPUTER AIDED DRAWING****Credits: 04**

S. No.	Topic	No. of Hours
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.	5
2.	Hexagonal headed bolt and nut with washer (assembly), square headed bolt and nut with washer (assembly), Flanged nut, slotted nut.	6
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.	4
4.	Eye foundation bolt, Rag foundation bolt, Lewis foundation bolt and Cotter foundation bolt.	2
5.	Riveted joints: Forms and proportions of rivet heads, Different views of different types of riveted Lap and Butt joints.	4
6.	Shaft joints: Cotter joint and Knuckle joint, Socket and Spigot joint.	4
7.	Shaft coupling: Muff, Flanged, Flexible, Universal and Oldham's coupling.	4
8.	Shaft bearing: Solid and bush bearing, Plummer block, Footstep bearing.	6
9.	Spur gear in mesh with approximate construction of tooth profile, Rack and pinion.	5
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
Total		50

TextBooks:

S.No	Name of Book	Author	Publisher
1.	Machine Drawing	Bhat. N. D	Charotar Publishing house
2.	Machine Drawing	GillP, S	Katria and Sons

COURSE CODE: MEE-2517B**FUNDAMENTALS OF MECHANICS****Credits: 04**

S. No.	Topic	No. of Hours
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
Total		50

TextBooks:

S.No	Name of Book	Author	Publisher
1.	Dynamics	Hibbeler, R.C	Prentice Hall
2.	Statics	Hibbeler, R.C	Prentice Hall
3.	Engineering Mechanics: Vol.1, Statics	Meriam, J.L., Kraige, L.G	John Wiley & Sons
4.	Engineering Mechanics: Vol.2, Dynamics	Meriam, J.L., Kraige, L.G	John Wiley & Sons

COURSE CODE: CHM-2217BL

ENGINEERING CHEMISTRY LAB

Credits: 01

S. No.	Experiment
1.	To draw the pH-titration curve of strong acid vs. strong base
2.	Standardization of 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 Beer'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 CODE: ECE-2317BL

BASIC ELECTRONICS ENGINEERING LAB

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 diode sand LED sand study their performance
5.	To assemble/simulate a center tapped full wave rectifier using power diode sand LED sand study their
6.	To assemble/simulate a bridge wave rectifier using power diode sand LED sand 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.

COURSE CODE: MEE-2617BW**WORKSHOP PRACTICE****Credits: 03**

S. No.	Topic	Number of Hours
1.	<p>Machining section (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.</p> <p>Aim: To prepare a cylindrical job on lathe for manufacturing of a gear on milling machine.</p>	06
2.	<p>Sheet Metal and Spray Painting section (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.</p> <p>Aim: To develop a funnel as per the drawing with soldering.</p>	06
3.	<p>Fitting and Bench work section (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 45°, 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.</p> <p>Demonstration of tap sets and measuring equipment's.</p> <p>Aim: To assemble the mild steel work pieces with radius fitting.</p>	04
4.	<p>Welding Section (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 hand, left hand 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</p>	06

	<p>joints by using gas welding and arc welding etc. Aim: To make V-butt joint, out-side corner joint and head tee-joint</p>	
5.	<p>Foundry and Casting section (a) Theoretical instructions: Safety precautions, introduction to casting processes, basic steps in casting processes, types of pattern, allowances, risers, runners, gates, mouldings 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 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.</p>	06
6.	<p>Smithy and Forging section (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.</p>	06
7.	<p>Carpentry and pattern making Section (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.</p>	05
Total		39

TextBooks:

S.No	Name of Book	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