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PROGRAMME: B. TECH (Common to all Branches) **SEM: I, II**

Subject Title	Subject Code	Credits			Theory		
		L	T	P	Externals (70)	Internals (30)	Total (100)
Engineering Chemistry	BT-101	3	1	-	Min: (D Grade)	Min: Nil	Min: 40 (D Grade)

Duration of Theory (Externals): 3 Hours

Unit	Contents (*Theory*)
I	**A. Lubricants:** Introduction, Mechanism of lubrication, Classification of lubricants, Properties and Testing of lubricating oils, Numerical problems based on testing methods. **B. Cement & Refractories:** Manufacture, IS-code, Setting and hardening of cement, Refractory : Introduction, classification and properties of refractories
II	**Water And Its Industrial Applications:** Sources, Impurities, Hardness & its units, Industrial water characteristics, softening of water by various methods (External & Internal treatment), Boiler trouble causes, effect & remedies, Characteristics of municipal water & its treatment, Numerical problems based on softening methods
III	**A. Water Analysis Techniques:** Alkalinity, hardness (Complexo - metric), Chloride, Free chlorine, DO, BOD and COD, Numerical problems based on above techniques. **B. Instrumental Techniques in Chemical Analysis:** Introduction, Principle, Instrumentation and applications of IR, UV, Gas, Chromatography, Lambert's and Beer's Law
IV	**Fuels & Combustion:** Fossil fuels & classification, Calorific value, Determination of calorific value by Bomb calorimeter Proximate and Ultimate analysis of coal and their significance, calorific value Computation based on ultimate analysis data, Carbonization, Manufacturing of coke & recovery of by products. Cracking of higher Hydrocarbons & mechanism of cracking, Knocking, relationship between' knocking & structure of hydrocarbon, improvement of anti knocking characteristics of IC engine fuels, Diesel engine fuels, Cetane number, combustion and it related numerical problems.
V	**High-Polymer :** Introduction, types and classification of polymerization, Reaction Mechanism, Natural & Synthetic Rubber; Vulcanization of Rubber, Preparation, Properties & uses of the following- Polythene, PVC, PMA, PMMA, Teflon, Polyacrylonitrile, PVA, Nylon, Nylon 6:6, Terylene, Phenol formaldehyde, Urea - Formaldehyde Resin, Glyptal, Polyurethanes; Butyl Rubber, Neoprene, Buna N, Buna S. Flow sheet manufacturing diagram of Nylon 6:6 & Decoran.

REFERENCE BOOKS:

1. Engineering Chemistry – Jain & Jain, Dhanpat - rai Publication.
2. Engineering Chemistry Theory & Practice – Dr. V. W. Bhagwat & Dr. Pranay Guru Vikas Publisher & Distributor
3. Engineering Chemistry - B.K. Sharma, Krishna Publication.
4. A Text Book of Engineering Chemistry - S. S. Dara & A.K. Singh, S. Chand Publication.
5. Engineering Chemistry – Shashi Chawla, Dhanpatrai Publication.
6. Polymer Science – Ghosh, Tata McGraw Hill.

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Subject Title	Subject Code	Credits			Practical		
		L	T	P	Externals (35)	Internals (15)	Total (50)
Engineering Chemistry	BT-101	-	-	2	Min: (D Grade)	Min: Nil	Min: 20 (D Grade)

PRACTICALS:

NOTE: At least 10 of the following core experiments must be performed during the session.

1. Water Testing

(i) Determination of Total hardness by Complexometric titration method.

(ii) Determination of mixed alkalinity

(a) OH -& $C0_3^{-2}$

(b) $C0_3^{-2}$ & HCO_3^-

(iii) Chloride ion estimation by Argentometric method.

2. Fuels & lubricant testing:

(i) Flash & fire points determination by

a) Pensky Martin Apparatus,

b) Abel's Apparatus,

c) Cleveland's open cup Apparatus.

d) Calorific value by bomb calorimeter

(ii) Viscosity and Viscosity index determination by

a) Redwood viscometer No.1

b) Redwood viscometer No.2

(iii) Proximate analysis of coal

a) Moisture content

b) Ash content

c) Volatile matter content

d) Carbon residue

(iv) Steam emulsification No & Anline point determination

(v) Cloud and Pour point determination of lubricating oil

3. Alloy Analysis

(i) Determination of percentage of Fe in an iron alloy by redox titration using N-Phenyl anthranilic acid as internal indicator.

(ii) Determination of Cu and or Cr in alloys by Iodometric Titration

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Subject Title	Subject Code	Credits			Theory		
		L	T	P	Externals (70)	Internals (30)	Total (100)
Engineering Mathematics-I	BT-102	3	1	0	Min: (D Grade)	Min: Nil	Min: 40 (D Grade)

Duration of Theory (Externals): 3 Hours

Unit	Contents (*Theory*)
I	**Differential Calculus:** Successive Differentiation and Leibnitz's Theorem Expansion of functions by Maclaurin's and Taylor's theorem. Partial differentiation maxima and minima for one and two variable Tangents and Normals, curvature : Radius of Curvature, centre of curvature.
II	**Integral Calculus :** Definite Integrals : Definite Integrals as a limit of a sum , its application in Summation of series, Beta and Gamma Functions , Double and Triple Integrals, Change of Order of Integration.
III	**Differential Equations:** Solution of Ordinary Differential Equation of first order and first degree (Equation in which variable are separable, Homogeneous Equation. Non homogeneous equation, Linear equation) Equation of first order and higher degree (Solvable for p, x and y, Clairauts Equation), Linear Differential Equations higher order with Constant Coefficients, Cauchy's, Homogeneous differential Equation, Simultaneous differential Equations, Method of Variation of Parameters
IV	**Matrices:** Rank, Solution of Simultaneous equation of elementary transformation, Consistency of System of Simultaneous Linear Equation, Eigen Values and Eigen Vectors, Cayley-Hamilton theorem and its Application to find the inverse
V	Algebra of Logic, Algebra propositions Boolean Algebra, Boolean expression (function) and their Application. Application of Boolean Algebra to Switching Circuit **Graph Theory :** Graphs, Subgraphs, Degree and Distance, Tree, cycles and Network,

REFERENCE BOOKS:

1. Advance Engineering Mathematics. By Ramana, Tata McGraw hill.
2. Higher Engineering Mathematics by B.S. Grewal Khanna Publication.
3. Advance Engineering Mathematics by D.G.Guffy
4. Engineering Mathematics by S S Sastri. P.H.I.
5. Mathematics for Engineers by S.Arumungam, SCITECH Publuication

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PROGRAMME: B TECH (Common to all Branches) **SEM: I, II**

Subject Title	Subject Code	Credits			Theory		
		L	T	P	Externals (70)	Internals (30)	Total (100)
Communication Skills	BT-103	3	1	-	Min: (D Grade)	Min: Nil	Min: 40 (D Grade)

Duration of Theory (Externals): 3 Hours

Unit	Contents (*Theory*)
I	**Phonetics & Process of Communication:** Communication process, nature of technical communication, different barriers to communication, verbal and nonverbal communication, Linguistic techniques, fundamentals of English grammar, Reading comprehension, Reading Techniques(SQ3R), English phonetic, phonetic transcription
II	**Enhancement of Professional Skills:** Listening -pr cess, types and different barriers, definitions of common technical & scientific terms, Of s, Processes and Principles, dialogue development, Reproduction from business, daily life el, health, buying, selling, company structure, systems etc.
III	**Professional Writing:** Job Applications, Enqui ing quotations, Tenders, Order, Complaint & adjustment
IV	**Study Skills:** The reading process, Precise Writing, ext reviews, Noting and drafting, Technical Description of simple engineering objects ses, precise writing, Note writing, Comment, speech, advertising, Slogan writing
V	**Technical Report Writing and Presentation:** Wri nt Technical reports-observation report, Survey report, Report of trouble, Laboratory Project Report on the subjects of engineering, development of speaking skill- debat sentation, interview, extempore, telephonic conversation, vocabulary enhancement, c s

REFERENCE BOOKS:

1. Communication Skills -Dr. Gajanan Malviya & Pro la, S. Chand & Company Delhi.
2. Professional Communication by R Rizvi, TMH
3. Business Correspondence Letter Writing- Sharma & IH
4. Business Correspondence and Report Writing - By H.
5. Living English Structure – By W.S. Allen; Longma
6. Spoken English for India – By R.K. Bansal and IB nt Longman.
7. New International Business English – by Joans and UP
8. Effective Technical Communication – Rizvi; TMH

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PROGRAMME: B TECH (Common to all Branches) **SEM: I, II**

Subject Title	Subject Code	Credits			Practical		
		L	T	P	Externals (35)	Internals (15)	Total (50)
Communication Skills	BT-103	-	-	2	Min: (D Grade)	Min: Nil	Min: 20 (D Grade)

PRACTICALS:

Communicative Language Lab.

Course objective: The language lab focuses on the production and practice of sounds of English through audio – visual aids and Computer software. It intends to enable the students to speak English correctly with confidence and intends to help them to overcome their inhibitions and self – consciousness while speaking in English.

Topics to be covered in the Language laboratory sessions:

1. **Basic Grammar & Vocabulary** (Synonyms /Antonyms, Analogies, sentence Completion, correctly spelt words, idioms, proverbs, common errors).
2. **Phonetic symbols and pronunciation.**
3. **Listening skills** (Including Listening Comprehension)
4. **Reading Skills** (Including Reading Comprehension)
5. **Writing Skills** (Including structuring resume and cover letter)
6. **Speaking Skills**
7. **Body Language**
8. **Oral Presentation:** Preparation and delivery using audio – visual aids with stress n body language and voice modulation (Topic to be selected by the teacher.)

Final Assessment Should be based on Assignment, presentation and interview.

Prescribed language lab Software- **Globerina /K-van**

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PROGRAMME: B TECH (Common to all Branches) **SEM: I, II**

Subject Title	Subject Code	Credits			Theory		
		L	T	P	Externals (70)	Internals (30)	Total (100)
Electrical & Electronics Engineering	BT-104	3	1	-	Min: (D Grade)	Min: Nil	Min: 40 (D Grade)

Duration of Theory (Externals): 3 Hours

Unit	Contents (*Theory*)
I	**Electrical Circuit Analysis:** Voltage and current sources, dependent and independent sources, sources conversion, Kirchhoff's law (KVL & KCL) ,Ohms law DC circuit analysis using Mesh & Nodal Method, Thevenin's & superposition theorem, Maximum Power transfer theorem for dc source, star-delta Transformation. Introduction of single & Three Phase AC circuit, properties Resistor inductor and capacitor and its characteristics, active, reactive & apparent Power and power factor and its importance, 3- phase balanced and unbalanced supply in star delta connection, measurement of power by two and three wattmeter method.
II	**Transformer:** Review of laws of electromagnetism, mmf , flux , and their relation , analysis of magnetic circuits, Single phase transformer, basic concepts and construction features, voltage, current and impedance transformation, equivalent circuit, phasor diagram, voltage regulation, losses and efficiency, OC and SC Test ,Autotransformer.
III	**Rotating Electric Machines:** Constructional details of DC machine, type of dc machine EMF equation of DC machine, Constructional details of Induction Machine and Synchronous machine working principle of 3-phase induction motor Torque equation of 3-phase induction motor, concept of slip in 3-phase induction motor, Explanation of Torque-slip characteristics of 3-phase induction motor. Working principle Synchronous machine.
IV	**Semiconductor Materials:** Classification of solid materials. Insulators, metal and semiconductor on the basis of band gap. Comparison of conductors, insulators and semiconductors. **Classification of semiconductors**: Intrinsic and Extrinsic. N-type and P-type semiconductors Effect of temperature on extrinsic semiconductors .PN junction diode. Biasing of PN junctio diode. V-I characteristics of diode. effect of temperature on the V-I characteristics. diode as rectifier.
V	**Special diodes and Transistor:** zener diode, Tunnel diode, PIN diode, LED & photodiode. **Transistor**: Transistor symbols, types of transistor and their working. Modes of operation o transistor. Transistor configurations, relation between current gains of different configuratio Comparison of three transistor configuration. Transistor as an Amplifier. **Digital Electronics:** Number systems, Gates, Universal gates, Demorgan's Theorem , SOP an POS.

REFERENCE BOOKS:

1. Vincent Del Toro, Electrical Engineering Fundamentals, PHI Learning, II Edition
2. S.Ghosh, Fundamentals of Electrical and Electronics Engineering, PHI, II Edition.
3. Principles of Electronics by V.K.Mehta , S.Chand & Company.
4. Nagrath & Kothari, Basic Electrical Engineering, III Edition TMH.
5. Hughes, Electrical and Electronic Technology, Pearson Education IX Edition
6. Basic Electronics by Navneet Gupta, Dhanpat rai & company
7. Digital Electronics by R.P.Jain ,TMH Publication
8. Electrical & Electronics Engineering by Natrajan & Ramesh Babu , SCITECH Publication

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Subject Title	Subject Code	Credits			Practical		
		L	T	P	Externals (35)	Internals (15)	Total (50)
Electrical & Electronics Engineering	BT-104	-	-	2	Min: (D Grade)	Min: Nil	Min: 20 (D Grade)

PRACTICALS:

1. Verifications of Thevenin's and Superposition theorems.
2. Study of Transformer, name plate rating, determination of ratio and polarity.
3. Determination of O.C and s.c test of single phase transformer.
4. Determination of ratio and polarity test of single phase transformer.
4. Separation of resistance and inductance of choke coil.
5. Measurement of various line & phase quantities for a 3-phase circuit.
6. Study of various electronic components.
7. Study of V-I characteristics of diodes.
8. Study of Transistors.
9. Study of Zener diodes.
10. Verification of truth table for Gate (AND, OR, NOT, EX-OR, NOR, NAND)

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Subject Title	Subject Code	Credits			Theory			Practical		
		L	T	P	Externals (70)	Internals (30)	Total (100)	Externals (35)	Internals (15)	Total (50)
Engineering Drawing	BT-105	3	1	2	Min: (D Grade)	Min: Nil	Min: 40 (D Grade)	Min: (D Grade)	Min: Nil	Min: 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Unit	Contents (*Theory & Practical both*)
I	**Basic geometrical construction: Scales**: Representative factor, plain scales, diagonal scales, scale of chords.**Conic sections**: Construction of ellipse- General method, Arc of circle method **Parabola:** General method, Tangent method, Rectangle method **Hyperbola** : General method , intersecting arcs method, asymptotes method Normal and Tangent of conic sections **Special Curves**: Cycloid, Epi-cycloid, Hypo-cycloid, Involutes, Archimedean spiral.
II	**Projection**: Types of projection, orthographic projection, first and third angle projection.**Projection of points and lines**, Line inclined to one plane, inclined with both the plane, True Length and True Inclination, Traces of straight lines.
III	**Projection of planes and solids**: Projection of Planes like circle and polygons in different positions; Projection of polyhedrons like prisms, pyramids and solids of revolutions like cylinder, cones in different positions.
IV	**Section of Solids:** Section of right solids by normal and inclined planes. **Development of Surfaces**: Parallel line and radial - line method for right solids-Prisms, pyramids and cone. **Isometric Projections:** Isometric scale, Isometric axes, Isometric Projection from orthographic drawing.
V	**Introduction of engineering drawing Softwares- Computer Aided Drafting (CAD)**: Introduction to Computer Aided Drafting software for 2D and 3D Modeling, benefit, software's basic commands of drafting entities like line, circle, polygon, polyhedron, cylinders; transformations and editing commands like move, rotate, mirror, array. Introduction of Pro-E , CATIA .

REFERENCE BOOKS:

Visvesvaraya Tech. University; A Premier on Computer Aided Engg drawing;
2. Bhatt N.D.; Engineering Drawing, Charotar
3. Venugopal K.;Engineering Graphics; New Age
4. John KC; Engg. Graphics for Degree; PHI.
5. Gill P.S.; Engineering Drawing; kataria
6. Jeyopoovan T.; Engineering drawing & Graphics Using AutoCAD; Vikas
7. Agrawal and Agrawal; Engineering Drawing; TMH

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Subject Title	Subject Code	Credits			Practical		
		L	T	P	Externals (35)	Internals (15)	Total (50)
Workshop	BT-106	-	-	2	Min: (D Grade)	Min: Nil	Min: 20 (D Grade)

Unit	Content (*Practical*)
I	**Introduction:** Manufacturing Processes and its Classification, Casting, Machining, Plastic deformation and metal forming, Joining Processes, Heat treatment process, Assembly process. Powder Metallurgy, introduction to computers in manufacturing. Black Smithy Shop Use of various smithy tools. Forging operations: Upsetting, Drawing down, Fullering, Swaging, Cutting down, Forge welding, Punching and drafting. Suggested Jobs : Forging of chisel., forging of Screw Driver
II	**Carpentry Shop:**Timber : Type, Qualities of timber disease, Timber grains, Structure of timber, Timber, Timber seasoning, Timber preservation .Wood Working tools: Wood working machinery, joints & joinery. Various operations of planning using various carpentry planes sawing & marking of various carpentry joints. Suggested Jobs :Name Plate ,Any of the Carpentry joint like mortise or tennon joint
III	**Fitting Shop:**Study and use of Measuring instruments, Engineer steel rule, Surface gauges caliper, Height gauges, feeler gauges, micro meter. Different types of files, File cuts, File grades, Use of surface plate, Surface gauges drilling tapping Fitting operations: Chipping filling, Drilling and tapping. Suggested Jobs : Preparation of job piece by making use of filling, sawing and chipping , drilling and tapping operations.
IV	**Foundry:** Pattern Making: Study of Pattern materials, pattern allowances and types of patterns. Core box and core print, .Use and care of tools used for making wooden patterns.**Moulding:** Properties of good mould & Core sand, Composition of Green , Dry and Loam sand. Methods used to prepare simple green and bench and pit mould dry sand bench mould using single piece and split patterns.
V	**Welding:** Study and use of tools used for Brazing, Soldering, Gas & Arc welding. Preparing Lap & Butt joints using gas and arc welding methods, Study of TIG & MIG welding processes. Safety precautions.

REFERENCE BOOKS:

1. Bawa HS; Workshop Practice, TMH
2. Rao PN; Manufacturing Technology- Vol.1& 2, TMH
3. John KC; Mechanical workshop practice; PHI
4. Hazara Choudhary; Workshop Practices -, Vol. I & II.
5 Jain. R.K. Production Technology -

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