



# R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Common For All Branches)

New Scheme Based On AICTE Flexible Curricula

Semester – I

Course Content

Branch	Subject Title	Subject Code
B.Tech. Common	Engineering Chemistry	BT101

## Unit 1

### Electrochemistry and Water:

Electrochemistry: Law of chemical equilibrium, equilibrium constants and their significance, Weak and strong electrolytes, Conductors, Insulators, Dielectrics, galvanic cells, Standard electrode potential and its application to different kinds of half cells, Batteries and Fuel Cells with examples, Arrhenius Theory of Ionisation, Degree of Ionisation & factors affecting degree of ionization. Ostwald's dilution law, pH, buffer. Numerical problems

Water and corrosion: Sources, Impurities, Hardness & its different units, Degree of Hardness, Softening of water by Zeolite and Ion exchange method, Boiler trouble causes (Sludge and Scale), Characteristics of municipal water & its treatment, Chemical and Electrochemical corrosion, Factors affecting the rate of corrosion, General method of corrosion prevention

## Unit 2

### Periodic Properties and Chemical Bonding:

Periodic properties: Brief introduction to Periodic table, Ionization energy, electron affinity, electro negativity, electronic configurations, atomic and ionic sizes, polarizability

Chemical Bonding: VSEPR theory, oxidation states, coordination numbers and geometries, hard soft acids and bases, Crystal field theory, colour & magnetic properties of coordination complexes. Types of bonds-Ionic bond, Covalent bonds, Metallic Bonds, Hydrogen bond, etc.

## Unit 3

### Spectroscopy and Photochemistry

Spectroscopy: Principles of spectroscopy and selection rules, Electronic spectroscopy- Absorption and emission Spectroscopy, Principles and applications of UV-Visible, Factors influencing for UV-vis spectrum; Rotational and Vibrational spectroscopy, Principle of FT-IR, and NMR spectroscopy. Modern techniques in structural elucidation of compounds by UV-Vis, IR, & NMR Spectroscopy.

Photochemistry: Photochemical reaction, Lambert-Beers Law, Fluorescence and Phosphorescence, Jablonskii diagram, Einstein photochemical reaction

## Unit 4

### Thermochemistry and Fuels

Thermochemistry: Free energy, entropy, Enthalpy, EMF. Hess's law, entropy, enthalpy and combustion calculations, Cell potentials, the Nernst equation and applications. Acid base, oxidation reduction and solubility equilibria.

Fuels: Classification of the fuel and its characteristics, Calorific value, HCV, LCV, Determination of calorific value by Bomb calorimeter, application of fossil fuels, solid fuels (coal), liquid fuels (petrol and diesel), gaseous fuels (water gas, producer gas, coal gas and biogas), carbonization and gasification, refining, reforming, knocking and anti knocking properties, octane and cetane numbers

## Unit 5

### Polymerization and Common Organic Reactions

Polymers: Introduction, Types, classification and properties of polymers, Different methods of synthesis- Addition, condensation. Molecular weights of polymers ( $M_n$ ,  $M_w$ ,  $M_v$ ), glass transition temperature ( $T_g$ ), synthesis of commercially important polymers and their uses (Nylon 6, Nylon 6,6, Polyethylene, PET, PS, PVC), an introduction to green chemistry. and, Synthesis of commercially important polymers and their uses- PVC, Teflon, Nylon 6, Nylon 66, Decoran, Vulcanization of Rubber.

Organic reactions: Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, cyclization and ring openings with examples.

Course	Subject Title	Subject Code
B.Tech.	Engineering Chemistry Lab	BT151

- Determination of Total hardness by EDTA method.
- Determination of mixed alkalinity
  - $\text{OH}^-$  &  $\text{CO}_3^{2-}$
  - $\text{CO}_3^{2-}$  &  $\text{HCO}_3^-$
- Determination of Flash & Fire Points by Pensky Marten Apparatus.
- Determination of Flash & Fire Points by Abel's Apparatus.
- Determination of Flash & Fire Points by Cleveland's Open Cup Apparatus.
- Determination of Calorific Value by Bomb Calorimeter.
- Determination of Viscosity and Viscosity index by Redwood viscometer No.1.
- Determination of Viscosity and Viscosity index by Redwood viscometer No.2.
- Determination of percentage of carbon by Proximate analysis of coal
- To Determine the Strength of NaOH Solution (Standard Oxalic Acid Solution Supplied)
- To Determine the Strength of HCl Solution (Standard NaOH Solution Supplied)
- Salt analysis: Dry Test & Wet Test acid and basic radicals

**Books Suggested:**

- Chemistry in Engineering and Technology - Vol.1 & 2 Kuriacose and Rajaram, McGraw Hill Education
- Fundamental of Molecular Spectroscopy C.N. Banwell , McGraw Hill Education
- Engineering Chemistry – B.K. Sharma, Krishna Prakashan Media (P) Ltd., Meerut.
- Basics of Engineering Chemistry – S.S. Dara & A.K. Singh, S. Chand & Company Ltd., Delhi.
- Applied Chemistry – Theory and Practice, O.P. Viramani, A.K. Narula, New Age International Pvt. Ltd. Publishers, New Delhi.
- Elementary Spectroscopy ,Y .R. Sharma , S. Chand Publishing
- Polymer Science, Vasant R. Gowariker, N. V. Viswanathan, Jayadev Sreedhar, New Age International Pvt. Ltd
- Advanced Inorganic Chemistry, G.R. Chatwal, Goal Publishing house
- Engineering Chemistry (NPTEL Web-book ) B.L. Tembe, Kamaluddin and M.S. Krishna
- Engineering Chemistry Jain & Jain Dhanpat Rai and Sons



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**Semester – I**

**Course Content**

Branch	Subject Title	Subject Code
B.Tech. Common	Engineering Mathematics-I	BT102

**Module 1: Calculus:** Successive Differentiation, Rolle's theorem, Mean Value theorems, Expansion of functions by Mc. Laurin's and Taylor's for one variable; Taylor's theorem for function of two variables, Partial Differentiation, Maxima & Minima (two and three variables), Method of Lagranges Multipliers.

**Module 2: Calculus:** Definite Integral as a limit of a sum and Its application in summation of series; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions. Multiple Integral, Change the order of the integration, Applications of multiple integral for calculating area and volumes of the curves.

**Module 3: Sequences and series:** Convergence of sequence and series, tests for convergence; Power series, Taylor's series, series for exponential, trigonometric and logarithm functions; Fourier series: Half range sine and cosine series, Parseval's theorem.

**Module 4: Matrices:** Rank of a Matrix, Solution of Simultaneous Linear Equations by Elementary Transformation, Consistency of Equation, Eigen Values and Eigen Vectors, Diagonalization of Matrices, Cayley-Hamilton theorem and its applications to find inverse.

**Module 5: Boolean Algebra:** Algebra of Logic, Boolean Algebra, Principle of Duality, Basic Theorems, Boolean Expressions and Functions. Elementary Concept of Fuzzy Logic Graph Theory: Graphs, Subgraphs, Degree and Distance, Tree, cycles and Network.

## References:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
5. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
6. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
7. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.



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**Semester – I**

**Course Content**

Branch	Subject Title	Subject Code
B.Tech. Common	Technical Communication	BT103

## Unit I

Identifying Common errors in writing: Articles, Subject-Verb Agreement, Prepositions, Active and Passive Voice, Reported Speech: Direct and Indirect, Sentence Structure.

## Unit II

Unit-II Vocabulary building and Comprehension: Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives, synonyms, antonyms, Reading comprehension, Paragraph writing, Unseen passage.

## Unit III

Unit-III Communication: Introduction, Meaning and Significance, Process of Communication, Oral and Written Communication, 7 c's of Communication, Barriers to Communication and Ways to overcome them, Importance of Communication for Technical students, nonverbal communication, Types and forms of Communication, Skills of Communication.

## Unit IV

Unit-IV Developing Writing Skills: Planning, Drafting and Editing, Precise Writing, Précis, Technical definition and Technical description. Report Writing: Features of writing a good Report, Structure of a Formal Report, Report of Trouble, Laboratory Report, Progress Report, Note making.

## Unit V

Unit-V Business Correspondence: Importance of Business Letters, Parts and Layout; Application, Contents of good Resume, guidelines for writing Resume, Calling/ Sending Quotation, Order, Complaint, E-mail and Tender.

### **Books Recommended:**

1. 'Technical Communication : Principles and practice', Meenakshi Raman and Sangeeta Sharma (Oxford)
2. 'Effective Business Communication', Krizan and merrier (Cengage learning)
3. 'Communication Skill, Sanjay Kumar and Pushlata, OUP2011
4. "Practical English Usage Michael Swan OUP, 1995.
5. "Exercises in spoken English Parts I-III CIEFL, Hyderabad, Oxford University Press
6. On writing well, William Zinsser, Harper Resource Book 2001.
7. Remedial English Grammar, F.T. Wood, Macmillan 2007.



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B.E. (Common For All Branches)

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**Semester – I**

**Course Content**

Branch	Subject Title	Subject Code
B.Tech. Common	Basic Electrical & Electronics Engineering	BT104

## UNIT I

### **AC & DC CIRCUITS**

Circuit parameters, Ohms law, Kirchhoff's law. Average and RMS values, concept of phasor representation. RLC series circuits and series resonance, RLC parallel circuits (includes simple problems in DC & AC circuits) Introduction to three phase systems – types of connections, relationship between line and phase values. (qualitative treatment only) Voltage and current sources, dependent and independent sources, source conversion, DC circuits analysis using mesh & nodal method, star-delta transformation. 1-phase AC circuits under sinusoidal steady state, active, reactive and apparent power, physical meaning of reactive power, power factor, 3-phase balanced and unbalanced supply, star and delta connections.

## UNIT II

### **TRANSFORMERS**

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 circuits, phasor diagram, voltage regulation, losses and efficiency, OC and SC test.

## UNIT III

### **ROTATING ELECTRIC MACHINES-**

Constructional details of DC machine, induction machine and synchronous machine, Working principle of DC machines, classification of DC machine, EMF equation, armature reaction, characteristic of separately excited and self excited generator. Working principle of DC motor, Importance of back EMF, Starting of DC motor, speed torque characteristic of separately excited and self excited DC motor.

## UNIT IV

### **WIRING & LIGHTING**

Types of wiring, wiring accessories, staircase & corridor wiring, Working and characteristics of incandescent, fluorescent, SV & MV lamps. Basic principles of earthing, simple layout of generation, transmission & distribution of power.

## UNIT V

### **ELECTRONICS**

Binary Number system binary addition, subtraction, multiplication and division, subtraction operation using 1's and 2's complement forms, Octal number system, hexadecimal number system conversion of number system from one number system to another number system, types of Resistor, Inductor and capacitor, color coding of

resistor and capacitor P-type and N-type semiconductor, semiconductor diode its operation in forward and reverse bias, V-I characteristics, half wave and full wave rectification, application.

**References:**

1. Basic Electrical & Electronics Engineering by V.N. Mittle & Arvind Mittle.
2. Vincent Del Toro, Electrical Engineering Fundamentals, PHI Learning, II Edition
3. S.Ghosh, Fundamentals of Electrical and Electronics Engineering, PHI, II Edition.
4. Millman, Halkias & Parikh, Integrated Electronics, Mc Graw Hill, II Edition
5. Nagrath & Kothari, Basic Electrical Engineering, TMH.
6. J.S. Katre, Basic Electronics Engg, Max Pub. Pune.
7. Hughes, Electrical and Electronic Technology, Pearson Education IX Edition



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**Semester – I**

**Course Content**

Branch	Subject Title	Subject Code
B.Tech. Common	Engineering Graphics & Design	BT105

## UNIT - I

**GEOMETRICAL CONSTRUCTION, USE OF INSTRUMENTS, SCALES;** Representative factor, plain scales, diagonal scales, scale of chords. engineering curves; Construction of ellipse, parabola, hyperbola, Cycloid, Epi-cycloid, Hypo-cycloid, Involutés, Archimedean and logarithmic spirals.

## UNIT – II

Projections of points, lines, planes and solids. Section of Solids: Section of right solids by normal and inclined planes.

## UNIT III

**Development of Surfaces:** Parallel line and radial - line method for right solids.

**Isometric Projections:** Isometric scale, Isometric axes, Isometric Projection from orthographic drawing. Intersection of cylinders.

## UNIT IV

**Computer Graphics:** Introduction to general purpose graphics software, plotting techniques, coordinate system transformations, line drawing, polygon and circle generation. Drawing entity commands of Computer drafting. Sectional and dimensional drawing using computer.

## UNIT V

Working in sketcher environment, Drawing sketch, line, circle, rectangle, ellipse, arc, spline etc. Deleting & trimming sketching entities, Dimensioning the sketches, Modifying dimension of sketches, Modifying dimension of sketches, Creating text, Transformation of sketch entities-mirror, scale, rotate, Drawing views, Determining visible area of the view, Creating a cross-section views, Modifying cross-section views, Editing cross-section views, Modify the drawing views, Dimensioning & detailing the drawing views.

### **Text/Reference Books:**

1. Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
2. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
3. Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
4. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers
5. (Corresponding set of) CAD Software Theory and User Manuals



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**Semester – I**

**Course Content**

Branch	Subject Title	Subject Code
B.Tech. Common	Workshop/ Manufacturing Practices	BT156

## Unit 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

## Unit 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

## Unit 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.

## Unit 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.

## Unit 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.





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**Semester – II**

**Course Content**

Branch	Subject Title	Subject Code
B.Tech. Common	Engineering Physics	BT201

## Unit- I

### **Wave Optics**

Interference: Fresnel's biprism, Interference in thin films, Newton's rings and Michelson's interferometer experiments. Diffraction at single slit, double slit and n-slit. Diffraction grating. Rayleigh criterion, resolving power of a telescope, grating and prism. Concept of polarized light, Brewster's laws, Double refraction, Nicol prism, quarter & half wave plate. Idea about circularly & elliptically polarized light.

## Unit- II

### **Nuclear Physics**

Nuclear Structure & Nuclear properties, Quantitative treatment of nuclear models: liquid drop and shell models, Linear Particle accelerator, Cyclotron, Synchrotron, Synchrocyclotron, and Betatron, Nuclear cross section, chain reaction, critical size. Application of  $E = mc^2$ , Q-Value, Nuclear fusion & fission, Nuclear reactors, Geiger-Muller Counter, Bainbridge and Auston mass Spectrograph.

## Unit -III

### **Semiconductors & Nano-Physics**

Free Electron model of solids, Qualitative Analysis of Kronig Penny model, Effective mass, Fermi level for Intrinsic and Extrinsic Semiconductors: p-n junctions, Zener break down, photodiode, solar-cells, Hall effect. Elementary idea about Nano structures and Nano materials.

## UNIT-IV

### **Laser and Fiber Optics**

Laser: Stimulated and spontaneous emission, Einstein's A & B Coefficients, transition probabilities, active medium, population inversion, pumping, Optical resonators, characteristics of laser beam. Coherence, directionality and divergence. Principles and working of Ruby, Nd:YAG, He-Ne & Carbon dioxide Lasers with energy level diagram.. Fundamental idea about optical fiber, types of fibers, acceptance angle & cone, numerical aperture, V-number, propagation of light through step index fiber (Ray theory) pulse dispersion, attenuation, losses & various uses. Engineering uses & applications of laser and Optical Fiber

## Unit- V

### **Quantum Physics**

Origin of Quantum hypothesis, DeBroglie's hypothesis of matter wave & its experimental verification. Group and particle velocities & their relations. Uncertainty principle with elementary proof & its application to

Electron microscope, Compton effect. Wave function and its physical significance, general idea and application of time dependent and time independent Schrodinger wave equation.

**List of suggestive core experiments: -**

1. Biprism, Newton's Rings, Michelsons Interferometer.
2. Resolving Powers –Telescope, Microscope, and Grating.
3. G.M. Counter
4. Spectrometers-R.I., Wavelength, using prism and grating
5. Optical polarization based experiments: Brewster's angle, polarimeter etc.
6. Measurements by LASER-Directionality, Numerical aperture, Distance etc.
7. Uses of Potentiometers and Bridges (Electrical)..
8. Experiments connected with diodes and transistor.
9. Measurement of energy band gap of semiconductor.
10. Other conceptual experiments related to theory syllabus.

**Reference Books: -**

1. Engineering Physics- V. S. Yadava, TMH
2. A T.B. of Optics by Brijlal and Subhraminyan.
3. Optics By Ghatak, TMH
4. Engineering physics by M.N. Avadhanulu and P.G. Kshirsagar. S. Chand & Co.
5. Fundamentals of engineering physics by P. Swarup, Laxmi Publications.
6. Atomic and Nuclear physics by Brijlal and Subraminiyan.



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**Semester – II**

**Course Content**

Branch	Subject Title	Subject Code
B.Tech. Common	Engineering Mathematics-II	BT202

**Module 1: Ordinary Differential Equations I :** Differential Equations of First Order and First Degree (Leibnitz linear, Bernoulli's, Exact), Differential Equations of First Order and Higher Degree, Higher order differential equations with constants coefficients, Homogeneous Linear Differential equations, Simultaneous Differential Equations.

**Module 2: Ordinary differential Equations II:** Second order linear differential equations with variable coefficients, Method of variation of parameters, Power series solutions; Legendre polynomials, Bessel functions of the first kind and their properties.

**Module 3: Partial Differential Equations:** Formulation of Partial Differential equations, Linear and Non-Linear Partial Differential Equations, Homogeneous Linear Partial Differential Equations with Constants Coefficients.

**Module 4: Vector Calculus:** Differentiation of Vectors, Scalar and vector point function, Gradient, Geometrical meaning of gradient, Directional Derivative, Divergence and Curl, Line Integral, Surface Integral and Volume Integral, Gauss Divergence, Stokes and Green theorems.

**Module 5: Functions of Complex Variable:** Functions of Complex Variables: Analytic Functions, Harmonic Conjugate, Cauchy-Riemann Equations (without proof), Line Integral, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (without proof), Singular Points, Poles & Residues, Residue Theorem, Application of Residues theorem for Evaluation of Real Integral (Unit Circle).

## Textbooks/References:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edn., Wiley India, 2009.
4. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
5. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
6. E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.
7. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., McGraw Hill, 2004.
8. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
9. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.



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B.E. (Common For All Branches)

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**Semester – II**

**Course Content**

Branch	Subject Title	Subject Code
B.Tech. Common	Basic Mechanical Engineering	BT203

## Unit I :

**Materials :** Classification of engineering material, Composition of Cast iron and Carbon steels, Iron Carbon diagram. Alloy steels their applications. Mechanical properties like strength, hardness, toughness , ductility, brittleness , malleability etc. of materials , Tensile test- Stress-strain diagram of ductile and brittle materials ,Hooks law and modulus of elasticity, Hardness and Impact testing of materials, BHN etc.

## Unit II:

**Measurement:** Concept of measurements, errors in measurement, Temperature, Pressure, Velocity, Flow strain, Force and torque measurement, Vernier caliper, Micrometer, Dial gauge, Slip gauge, Sine-bar and Combination set.

**Production Engineering:** Elementary theoretical aspects of production processes like casting, carpentry, welding etc Introduction to Lathe and Drilling machines and their various operations.

## Unit III :

**Fluids :** Fluid properties pressure, density and viscosity etc. Types of fluids , Newton's law of viscosity , Pascal's law , Bernoulli's equation for incompressible fluids, Only working principle of Hydraulic machines, pumps, turbines, Reciprocating pumps .

## Unit IV:

**Thermodynamics :** Thermodynamic system, properties, state, process, Zeroth, First and second law of thermodynamics, thermodynamic processes at constant pressure, volume, enthalpy & entropy.

**Steam Engineering :** Classification and working of boilers, mountings and accessories of boilers, Efficiency and performance analysis, natural and artificial draught, steam properties, use of steam tables.

## Unit V:

### Reciprocating Machines :

Working principle of steam Engine, Carnot, Otto, Diesel and Dual cycles P-V & T-S diagrams and its efficiency, working of Two stroke & Four stroke Petrol & Diesel engines. Working principle of compressor.

**Reference Books:**

- 1- Kothandaraman & Rudramoorthy, Fluid Mechanics & Machinery, New Age .
- 2- Nakra & Chaudhary , Instrumentation and Measurements, TMH.
- 3- Nag P.K, Engineering Thermodynamics , TMH .
- 4- Ganesan , Internal Combustion Engines, TMH .
- 5- Agrawal C M, Basic Mechanical Engineering ,Wiley Publication.
- 6- Achuthan M , , Engineering Thermodynamics ,PHI.

**List of Suggestive Core Experiments:**

Theory related Eight to Ten experiments including core experiments as follows:

**S.N.            Title**

- 1 Study of Universal Testing machines.
- 2 Linear and Angular measurement using, Micrometer, Slip Gauges, Dial Gauge and Sine-bar.
- 3 Study of Lathe Machine.
- 4 Study of Drilling Machines.
- 5 Verification of Bernoulli's Theorem.
- 6 Study of various types of Boilers.
- 7 Study of different IC Engines.
- 8 Study of different types of Boilers Mountings and accessories.



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**Semester – II**

**Course Content**

Branch	Subject Title	Subject Code
B.Tech. Common	Basic Civil Engineering & Engineering Mechanics	BT204

## Unit I

### **Building Materials & Construction**

Stones, bricks, cement, lime, timber-types, properties, test & uses, laboratory tests concrete and mortar Materials: Workability, Strength properties of Concrete, Nominal proportion of Concrete preparation of concrete, compaction, curing, Low cost housing building materials.

Elements of Building Construction, Foundations conventional spread footings, RCC footings, brick masonry walls, plastering and pointing, floors, roofs, Doors, windows, lintels, staircases – types and their suitability

## Unit – II

### **Surveying & Positioning:**

Introduction to surveying Instruments – levels, theodolites, plane tables and related devices. Electronic surveying instruments etc. Measurement of distances – conventional and EDM methods, measurement of directions by different methods, measurement of elevations by Different methods and different methods of leveling.

## Unit –III

### **Mapping & Sensing:**

Mapping details and contouring, Profile Cross sectioning and measurement of areas, volumes, application of measurements in quantity computations, Survey stations, Introduction of remote sensing, GIS and GPS and its applications.

### **Engineering Mechanics**

## Unit – IV

Forces and Equilibrium: Graphical and Analytical Treatment of Concurrent and nonconcurring Co- planner forces, free Diagram, Force Diagram and Bow's notations, Application of Equilibrium Concepts: Analysis of plane Trusses: Method of joints, Method of Sections. Frictional force in equilibrium problems

## Unit – V

Centre of Gravity and moment of Inertia: Centroid and Centre of Gravity, Moment Inertia of Area and Mass, Radius of Gyration, Introduction to product of Inertia and Principle Axes.

Support Reactions, Shear force and bending moment Diagram for Cantilever & simply supported beam with concentrated, distributed load and Couple.

**Reference Books:**

1. S. Ramamrutam & R.Narayanan; Basic Civil Engineering, Dhanpat Rai Pub.
2. Prasad I.B., Applied Mechanics, Khanna Publication.
3. Punmia, B.C., Surveying, Standard book depot.
4. Shesha Prakash and Mogaveer; Elements of Civil Engg & Engg. Mechanics; PHI
5. S.P, Timoshenko, Mechanics of structure, East West press Pvt.Ltd.
6. Surveying by Duggal – Tata McGraw Hill New Delhi.
7. Introduction to GIS by Chang
8. Surveying and Leveling by N.M. Basak, McGraw Hill

**List of suggestive core Experiments:**

Students are expected to perform minimum ten experiments from the list suggested below by preferably selecting experiments from each unit of syllabus.

**S. No.****Title**

1. To perform traverse surveying with prismatic compass, check for local attraction and determine corrected bearings and to balance the traverse by Bowditch's rule.
2. To perform leveling exercise by height of instrument of Rise and fall method.
3. To measure horizontal and vertical angles in the field by using Theodolite.
4. To determine (a) normal consistency (b) Initial and Final Setting time of a cement Sample.
5. To determine the workability of fresh concrete of given proportions by slump test or compaction factor test.
6. To determine the Compressive Strength of brick.
7. To determine particle size distribution and fineness modulus of course and fine Aggregate.
8. To verify the law of Triangle of forces and Lami's theorem.
9. To verify the law of parallelogram of forces.
10. To verify law of polygon of forces



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**Semester – II**

**Course Content**

Branch	Subject Title	Subject Code
B.Tech. Common	Programming for Problem Solving	BT205

## UNIT 1

**INTRODUCTION OF COMPUTERS:** Computer System, System Characteristics and capabilities, Types of Computers: Analog, Digital (Micro, Mini, Mainframe & Super Computers), Generation of Computers.

**COMPUTER ORGANISATION:** Block Diagram of Computer and its functional units.

## UNIT 2

**INPUT DEVICES:** KeyBoard, Scanner, Mouse, Light Pen, Bar Code Reader, OMR, OCR, MICR., Track ball, Joystick, Touch Screen etc.

**OUTPUT DEVICES:** Monitors – Classification of Monitors based on Technology (CRT Monitor & Flat panel LCD Monitor), Printers – Dot Matrix Printer, Ink Jet Printer, Laser Printer and Plotters, Types of Plotters – Drum Plotter and Flat Bed Plotters, LCD Projectors.

**STORAGE DEVICES:** Magnetic tapes, Floppy Disks, Hard Disks, Compact Disc – CD-ROM, CD-RW, VCD, DVD, DVD-RW.

**PROGRAMMING LANGUAGES:** History, Classifications – Low Level, Assembly & High Level languages, Advantages & Disadvantages Programming Languages.

## UNIT 3

**INTRODUCTION TO PROGRAMMING:** Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudocode with examples.

From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code.

## UNIT 4

Arithmetic expressions and precedence, Conditional Branching and Loops, Writing and evaluation of conditionals and consequent branching, Iteration and loops.

**PROGRAM PLANNING:** Purpose of Program Planning, Steps in Program Development, Characteristics of a Good Program, Algorithms, Flow Charts through examples.

## UNIT 5

**TYPES OF SOFTWARE:** System Software – Translators (Compilers, Interpreters, Assemblers), Operating System, Linkers, Libraries & Utilities, Application Software – Packaged & Tailored Softwares.

**OPERATING SYSTEMS:** Introduction, Types of O.S. – Single User, Multi User – Multi Programming, Multi Tasking, Real Time, Time Sharing, Batch Processing, Parallel Processing, Distributed Processing.



**TEXT BOOK:**

1. COMPUTER FUNDAMENTALS BY *P.K. SINHA*
2. OPERATING SYSTEM BY *Peterson*
3. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
4. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill

**Reference Books:**

1. EASY APPROACH TO COMPUTER COURSE BY *G.K. IYER*
2. COMPUTER TODAY BY *S.K. BASANDRA*
3. OPERATING SYSTEM BY *Godbole*
4. 'O' LEVEL PROGRAMMING CONCEPTS & SYSTEMS BY *V.K. JAIN*
5. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India



# R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Common For All Branches)

New Scheme Based On AICTE Flexible Curricula

**Semester – II**

**Course Content**

Branch	Subject Title	Subject Code
B.Tech. Common	Language Laboratory	BT206

**Communicative Language Laboratory:** Course objective: The language laboratory focuses on the practice 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. Listening Comprehension
2. Pronunciation, Intonation, Rhythm
3. Practicing everyday dialogues in English
4. Interviews
5. Formal Presentation
6. Public Speaking and oral skills with emphasis on conversational practice, extempore speech, JAM (Just a minute sessions), describing objects and situations, giving directions, debate, telephonic etiquette.

**Suggested Readings:**

- (i) Practical English Usage. Michael Swan. OUP. 1995.
- (ii) Remedial English Grammar. F.T. Wood. Macmillan.2007
- (iii) On Writing Well. William Zinsser. Harper Resource Book. 2001
- (iv) Study Writing. Liz Hamp-Lyons and Ben Heasley. Cambridge University Press.2006.
- (v) Communication Skills. Sanjay Kumar and Pushp Lata. Oxford University Press.2011.
- (vi) Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press