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 & it's 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 Phosphoresence, Jablonskii diagram, Einstein photochemical reaction

Unit 4
Thermochemistry and Fuels
Thermochemistry: Free energy, entropy, Enthaply, 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, Polyethyelene, 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

1. Determination of Total hardness by EDTA method.
2. Determination of mixed alkalinity
   - OH^- & CO_3^{2-}
   - CO_3^{2-} & HCO_3^-
3. Determination of Flash & Fire Points by Pensky Marten Apparatus.
4. Determination of Flash & Fire Points by by Abel's Apparatus.
5. Determination of Flash & Fire Points by Cleveland's Open Cup Apparatus.
6. Determination of Calorific Value by Bomb Calorimeter.
7. Determination of Viscosity and Viscosity index by Redwood viscometer No.1.
8. Determination of Viscosity and Viscosity index by Redwood viscometer No.2.
9. Determination of percentage of carbon by Proximate analysis of coal
10. To Determine the Strength of NaOH Solution (Standard Oxalic Acid Solution Supplied)
11. To Determine the Strength of HCl Solution (Standard NaOH Solution Supplied)
12. Salt analysis: Dry Test &Wet Test acid and basic radicals

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

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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. 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, 11thReprint, 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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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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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 earthling, 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-1 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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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, Involutes, 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 an 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 entiies-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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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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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 Subhraininyan.
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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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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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 ofBoilers.
7 Study of different IC Engines.
8 Study of different types of Boilers Mountings and accessories.

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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, thedolites, 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 stricture, 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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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 Heasly. 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

B.Tech. III Semester (Civil Engineering)

S.No.	Subject Code	Subject Name	Internal Max	External Max	External Min	Total Max	Total Min
1	BT301	Engineering Mathematics – III	30	70	21	100	35
2	CE302	Transportation – Bridges and Tunnels	30	70	21	100	35
3	CE303	Strength of Materials	30	70	21	100	35
4	CE304	Building Design and Drawing	30	70	21	100	35
5	BT305	Environmental Science	30	70	21	100	35

Practical

S.No.	Subject Code	Subject Name	Total Max	Total Min
1	CE353	Strength of Materials Lab	50	25
2	CE354	Building Design and Drawing Lab	50	25
3	BT356	Mini Project	50	25

S.No.	Subject Code	SUBJECT NAME	PERIODS			Credit
			L	T	P	
1	BT301	Engineering Mathematics – III	4	0	0	4
2	CE302	Transportation – Bridges and Tunnels	3	1	0	4
3	CE303	Strength of Materials	4	0	0	4
4	CE304	Building Design and Drawing	3	1	0	4
5	BT305	Environmental Science	3	0	0	0
Practicals						
1	CE353	Strength of Materials Lab	0	0	2	1
2	CE354	Building Design and Drawing Lab	0	0	2	1
3	BT356	Mini Project	0	0	4	2
Total credit						**20**

R.K.D.F. UNIVERSITY, RANCHI

B.Tech.
(Civil Engineering)
SECOND YEAR
Semester – III

Branch	Subject Title	Subject Code
B.Tech. CE	Engineering Mathematics-III	BT301

Unit I

Fourier series: Introduction of Fourier series, Fourier series for Discontinuous functions, and Fourier series for even and odd function. Laplace Transform: Introduction of Laplace Transform, Laplace Transform of elementary functions, properties of Laplace Transform, Change of scale property, second shifting property, Laplace transform of the derivative, Inverse Laplace transform & its properties, Convolution theorem, Applications of L.T. to solve the ordinary differential equations.

Unit II

Difference Operators, Interpolation (Newton Forward & Backward Formulae, Central Interpolation Formulae, Lagrange's and divided difference formulae), Numerical Differentiation and Numerical Integration.

Unit III

Errors & Approximations, Solution of Algebraic & Trancedental Equations (Regula Falsi, Newton-Raphson, Iterative, Secant Method), Solution of simultaneous linear equations by Gauss Elimination, Gauss Jordan, Crout's methods , Jacobi's and Gauss-Siedel Iterative methods.

Unit IV

Solution of Ordinary Differential Equations (Taylor's Series, Picard's Method, Modified Euler's Method, Runge-Kutta Method, Milne's Predictor & Corrector method), Correlation and Regression, Curve Fitting (Method of Least Square).

Unit V

Concept of Probability: Probability: Binomial, Poisson's, Continuous Distribution: Normal Distribution, Testing of Hypothesis |: Students t-test, Fisher's z-test, Chi-Square Method.

References
(i)   Higher Engineering Mathematics by BS Grewal, Khanna Publication
(ii)   Advance Engineering Mathematics by D.G.Guffy
(iii)   Mathematics for Engineers by S.Arumungam, SCITECH Publuication
(iv)   Engineering Mathematics by S S Sastri. P.H.I.
(v)   Numerical Methods for Scientific and Engg. Computation by MKJain, Iyengar and RK Jain, New Age International Publication
(vi)   Mathematical Methods by KV Suryanarayan Rao, SCITECH Publuication
(vii)   Pobability and Statistics by Ravichandran, Wiley India
(viii) Mathematical Statistics by George R., Springer

R.K.D.F. UNIVERSITY, RANCHI

B.E. (CIVIL ENGINEERING)
SECOND YEAR
Semester – III
Course Content & Grade

Branch	Subject Title	Subject Code
CE	**Transportation - Bridges and Tunnels**	**CE302**

Unit I

Introduction, Tractive resistances & Permanent way: Principles of Transportation, transportation by Roads, railways, Airways, Waterways, their importance and limitations, Route surveys and alignment, railway track, development and gauges, Hauling capacity and tractive effort.

i)   Rails: types, welding of rails, wear and tear of rails, rail creep.
ii) Sleepers: types and comparison, requirement of a good sleeper, sleeper density.
iii) Rail fastenings: types, Fish plates, fish bolts, spikes, bearing plates, chain keys, check and guard rails.
iv) Ballast: Requirement of good ballast, various materials used as ballast, quantity of ballast, different methods of plate laying, material trains, calculation of materials required, relaying of track

Unit II

Geometric Design; Station & Yards; Points and Crossings & Signaling and interlocking:Formation, cross sections, Super elevation, Equilibrium, Cant and Cant deficiency, various curves, speed on curves. Types, locations, general equipments, layouts, marshalling yards,
Definition, layout details, design of simple turnouts, Types of signals in stations and yards, principles of signaling and inter-locking.

Unit-III

Bridge Site Investigation and Planning; Loading Standards &Component parts: Selection of site, alignment, collection of bridge design data: essential surveys, hydraulic design, scour, depth of bridge foundation, Economical span, clearance, afflux, type of road & railway bridges. :
Design loads and forces, Impact factor, Indian loading standards for Railways Bridges and Highway Bridges, Bridge super structure and sub-structures, abutments, piers, wing walls, return walls, approaches, floors & flooring system, choice of super structure.

Unit-IV

Bridge Foundations, Construction, Testing and Strengthening of Bridges : Differenttypes of foundation: piles and wells, sinking of wells, coffer-dams. Choice of bridges and choice of materials, details of construction underwater and above water, sheet piles coffer dams, Erection of bridges, girders, equipments and plants. inspection and Data collection,strengthening of bridges, Bridge failure.

Unit-V

Tunnels: 1. Selection of route, Engineering surveys, alignment, shape and size of tunnel, bridge action, pressure relief phenomenon, Tunnel approaches, Shafts, pilot shafts 2,Construction of tunnels in soft soil, hard soil and rock, Different types of lining, methods of lining,

Mucking operation, Drainage and ventilation, Examples of existing important tunnels in India and abroad.

References

1. Chakraborty and Das; Principles of transportation engineering; PHI
2. Rangwala SC; Railway Engineering; Charotar Publication House, Anand
3. Rangwala SC; Bridge Engineering; Charotar Publication House, Anand
4. Ponnuswamy; Bridge Engineering; TMH
5. Railway Engineering by Arora & Saxena - Dhanpat Rai & Sons
6. Railway Track by K.F. Antia
7. Principles and Practice of Bridge Engineering S.P. Bindra - Dhanpat Rai & Sons
8. Bridge Engineering - J.S. Alagia - Charotar Publication House, Anand
9. Railway, Bridges & Tunnels by Dr. S.C. Saxena

R.K.D.F. UNIVERSITY, RANCHI
B.E. (CIVIL ENGINEERING)
SECOND YEAR
Semester – III
Course Content & Grade

Branch	Subject Title	Subject Code
CE	**Strength of Materials**	**CE 303**

Unit I

Simple Stress and Strains: Concept of Elastic body, stress and Strain, Hooke's law, various types of stress and strains, Elastic constants, Stresses in ompound bars, composite and tapering bars, Temperature stresses. Complex Stress and Strains: Two dimensional and three dimensional stress system. Normal and tangential stresses, Principal Planes, Principal Stresses and strains, Mohr's circle of stresses, Combined Bending and Torsion, Theories of failure
.

Unit II

Bending & Deflection: Theory of simple bending: Concept of pure bending and bendingstress, Equation of bending. Neutral axis, Section-Modulus, Determination of bending stressesin simply supported, Cantilever and Overhanging beams subjected to point load and uniformlydistributed loading. Bending & shear stress distribution across a section in Beams. Deflection of
beams: Double Integration Method. Conjugate Beam Method, Macaulay's Method Area Moment Method.

Unit III

Torsion of Shafts: Concept of pure torsion, Torsion equation, Determination of shear stress and angle of twist of shafts of circular section, Hollow shafts, Open and closed coil springs, Leaf Spring, Spiral Spring, Pressure Vessels: Thin and Thick walled cylinders and spheres. Stress due to internal pressure, Change in diameter and volume, Compound cylinders and shrink fittings.

Unit IV

Unsymmetrical Bending: Principal moment of Inertia, Product of Inertia, Bending of a beam in a plane which is not a plane of, symmetry. Shear center; Curved beams: Pure bending of curved beams of rectangular, circular and trapezoidal sections, Stress distribution and position of neutral axis.

Unit V

Columns and Struts: Euler's buckling load for uniform section, various end conditions, slenderness Ratio, Stress in columns, Rankine formulae, Eccentric loading on columns.

Reference
1. Nash; Strength of Materials (Schaum), TMH.
2. Rattan SS; strength of Materials; TMH
3. Negi; Strength of materials; TMH
4. Sadhu Singh; Strength of Materials, ,
5. Ramamrutham; Strength of Materials, ,
6. Subramaniam; Strength of Materials; R; Oxford
7. National Building Code of India, Part-IV

List of Experiments

The experimental work to cover tension, compression, bending and impact test etc. on steel, cast iron, RCC and timber, Fire Resistant Test of Structures and Combustibility of Building Materials Test as per I.S.I. and other experiments based on the syllabus.

R.K.D.F. UNIVERSITY, RANCHI

B.E. (CIVIL ENGINEERING)
Semester – III
Course Content & Grade

Branch	Subject Title	Subject Code
CE	**Building Design & Drawing**	**CE- 304**

Unit I

Drawing of Building Elements – Drawing of various elements of buildings like various types of footing, open foundation, raft, grillage, pile and well foundation, Drawing of frames of doors, window, various types of door, window and ventilator, lintels and arches, stairs and staircase, trusses, flooring, roofs etc.

Unit II

Building Planning – Provisions of National Building Code, Building bye-laws, open area, set backs, FAR terminology, principle of architectural composition (i.e. unity, contrast, etc.), principles of planning, orientation.

Unit III

Building Services – Introduction of Building Services like water supply and drainage, electrification, ventilation and lightening and staircases, fire safety, thermal insulation, acoustics of buildings. Design and Drawing of Building – Design and preparation of detailed drawings of various types of buildings like residential building, institutional buildings and commercial buildings, detailing of doors, windows, ventilators and staircases etc.

Unit IV

Home Vastu

Introduction of Vastu Science : Effect of cosmic energy and its centralization. Vastu Purusuh, directions and use of magnetic compass

Home Vastu Analysis : The source of water, storage of water, exit of water, Boundary wall, Doors, Windows and Ventilators, Stairs, Garage, Room of Master Room of House, Bedroom, Study Room, Dining Room, Drawing Room, Guest Room, Worship Room, Kitchen, Toilets, Bath Rooms, Store, Verandah, Basement, the Brahmasthan.

Home Vastu Decoration : The Vastu of colors, Auspicious Articles of Vastu, Vastu of flowers, climbers and pictures etc.

Unit V

Commercial & Industrial Vastu

Commercial Vastu Analysis : Analysis of Direction of Shop or Office, Directions of door, Cabin of Chief, Reception, Direction of Sales Manager, Direction of Customer, The Worship Room, Room of Employees, Workshop, Store, Seminar Room, Guest Room, Cash Room, Kitchen, Toilets etc.
Industrial Vastu : Selection of land, Inspection of Plot and Surroundings, The Main Gate, The Security Room, Arrangement of Industrial Complex, Roads, Place of worship, Trees and Plants, Environment, Water Supplies, Arrangement of Utilities and Power Supplies, Pollution Control, Workshop, Store, Godown, Tank Areas, Boilers, Laboratory, Canteen , Employees Rest Rooms, Toilets, Bathrooms.
Specific Vastu Analysis : Vastu analysis of Hotel, Restaurant, Hospital, School, Ashram, Temple, Cities etc..

References
1.   Malik & Meo; Building Design and Drawing By
2.   Shah, Kale & Patki; Building Design and Drawing; TMH
3.   Gurucharan Singh & Jgdish Singh Building Planning, Design and Scheduling

List of Experiments (Expandable)

1.   Sketches of various building components.
2.   One drawing sheet of various building components containing doors, windows ventilators, lintels and arches stairs foundations etc.
3.   One drawing sheet each for services and interiors of buildings.
4.   One drawing sheet containing detailed planning of one/two bed room residential building (common to all student)
5.   One drawing sheet each of residential and institutional building (Each student perform different drawing).

R.K.D.F UNIVERSITY, RANCHI
B.Tech(CIVIL ENGINEERIG)
Semester – III
Course Content & Grade

Branch	Subject Title	Subject Code
B.Tech. CE	Environmental Science	BT305

Unit I: Introduction to environmental studies and Ecosystems
Multidisciplinary nature of environmental studies; Scope and importance; Concept of sustainability and sustainable development, ecosystem, Structure and function of ecosystem; Energy flow in an ecosystem: food chains, food webs and ecological succession, Case studies of the following ecosystems:Forest ecosystem ,Grassland ecosystem ,Desert ecosystem Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

Unit II: Natural Resources: Renewable and Non-renewable Resources
Land resources and land use change; Land degradation, soil erosion and desertification, Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations, Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state), Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

Unit III: Biodiversity and Conservation & Environmental Pollution
Levels of biological diversity: genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots, India as a mega-biodiversity nation; Endangered and endemic species of India, Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity: In-situ and Ex-situ conservation , Environmental pollution: types, causes, effects and controls; Air, water, soil and noise pollution ,Nuclear hazards and human health risks ,Solid waste management: Control measures of urban and industrial waste ,Pollution case studies.

Unit IV: Environmental Policies- Practices and Human communities
Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture, Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD), Human population growth: Impacts on environment, human health and welfare, Resettlement and rehabilitation of project affected persons; case studies, Disaster management: floods, earthquake, cyclones and landslides. Case studies (e.g., factory pollutioninRanchi)

RKDF UNIVERSITY, RANCHI

New Scheme of Examination as Per AICTE Flexible Curricula

B.Tech. IV Semester (Civil Engineering)

S.No.	Subject Code	Subject Name	Marks Distribution				
			Internal	External		Total	
			Max	Max	Min	Max	Min
1	BT301	Concrete Technology	30	70	21	100	35
2	CE302	Transportation Engineering-1	30	70	21	100	35
3	CE303	Surveying	30	70	21	100	35
4	CE304	Fluid Mechanics	30	70	21	100	35
5	BT305	Surveying & Geomatics	30	70	21	100	35

Practical

			Total	
			Max	Min
1	CE353	Concrete technology Lab	50	25
2	CE354	surveying	50	25
3	BT356	Fluid Mechanics Lab	50	25

RKDF UNIVERSITY, RANCHI
New Scheme of Examination as per AICTE Flexible Curricula
Choice Based Credit System
Branch:- Civil Engineering
B.Tech Fourth Semester

S.No.	Subject Code	SUBJECT NAME	PERIODS			Credit
			L	T	P	
1	CE- 4021	Concrete Technology	4	0	0	3
2	CE302	Transportation Engineering-1	3	1	0	4
3	CE303	Surveying	4	0	0	4
4	CE304	Fluid Mechanics	4	0	0	3
5	BT305	Surveying & Geomatics	4	0	0	3
Practicals						
1	CE353	Concrete technology Lab	0	0	2	1
2	CE354	Surveying	0	0	2	2
3	BT356	Fluid Mechanics Lab	0	0	2	1
Total credit						**21**

R.K.D.F. UNIVERSITY, RANCHI

B.Tech.
(Civil Engineering)
SECOND YEAR
Semester – IV

Branch	Subject Title	Subject Code
B.Tech. CE	Concrete Technology	CE- 4021

Unit I

Introduction Classification, properties, grades, advantage & disadvantages of concrete, Ingredients of concrete, types of cement, aggregates, water, admixtures, Inspection & testing of materials as per Indian Standard Specifications

Unit II

Properties of Fresh and Hardened Concrete : Introduction, Workability, Testing of concrete, Factors affecting, Rheology of concrete, Compressive & Tensile strength, Stress and strain characteristics, Shrinkage and temperature effects. Creep of concrete, Permeability, durability, thermal properties & micro-cracking of concrete.

Unit III

Design of Concrete Mix : Various classical methods of concrete mix design, I.S. code method, basic considerations and factors influencing the choice of mix design, acceptance criteria for concrete, concrete mixes with Surkhi and other Pozzolanic materials, design of plastic concrete mix, computer aided design of concrete mix.

Unit IV

Production and Quality Control of Concrete: Production of crushed stone aggregate, batching equipments for production and concreting, curing at different temperatures, Concreting underwater, hot & cold weather condition, statistical quality control, field control, non-instructive testing, repair technology for concrete structures, Inspection & Testing of Concrete.

Unit V

Special Concretes : Light weight concrete, Ready mix concrete, Vacuum concrete, Ferrocement, Fiber reinforced concrete, Polymer concrete composites, Shotcrete, Guniting, Rubble concrete, Resin concrete, Prestressed concrete, Heat resistant concrete, Mass concrete, Temperature control of mass concrete.

References
1. Varshney RS; Concrete Technology; Oxford & IBH publishing co.
2. Gambhir ML; Concrete Technology – TMH
3. Sinha SN; Reinforced Concrete Technology; TMH
4. New Building Materials Published by B.M.T.P.C., New Delhi
5. Hand books on Materials & Technology - Published by BMTPC & HUDCO
6. Mohan Rai & M.P. Jai Singh; Advances in Building Materials & Construction
7. Jackson N; Civil Engineering materials.
8. Properties of Concrete - A.M. Neville - Pearson Education

R.K.D.F. UNIVERSITY, RANCHI

B.E. (CIVIL ENGINEERING)
SECOND YEAR
Semester – IV
Course Content &
Grade

Branch	Subject Title	Subject Code
CE	**Surveying and Geomatics**	**CE302**

Unit I

Traversing by theodolite, Field work checks, traverse computations, latitude and departures, adjustments, computations of co-ordinates, plotting & adjusting or traverse, Omitted measurements, Measurement EDM, Trigonometrical leveling.

Unit II

Tachometry: Tachometric systems and principles, stadia system, uses of anallatic lens, tangential system, sublense system, instrument constant, field work reduction, direct-reading tacheometers, use of tacheometry for traversing and contouring.

Unit-III

Curves: Classification and use; elements of circular curves, calculations, setting out curves by offsets and by theodolites, compound curves, reverse curves, transition curves, cubic spiral and lemniscate, vertical curves, setting out.

Unit-IV

Control Surveys: Providing frame work of control points, triangulation principle, co naissance, selection and marking of stations, angle measurements and corrections, baseline measurement and corrections, computation of sides, precise traversing.

Unit-V

Hydrographic Surveying: Soundings, methods of observations, computations and plotting. Principles of photographic surveying: aerial photography, tilt and height distortions,Remote sensing, simple equipments, elements of image interpretation, image-processing systems.

References

1. T.P. Kanetkar, Surveying & Levelling, Vol. I & II.
2. Duggal; Surveying vol I and II; TMH
3. Basak; Surveying and Leveling; TMH
4. R.E.Devis, Surveying theory & Practice, Mc.Graw Hill, New York
5. David Clark & J Clendinning, Plane & Geodetic surveying Vol. I & II, constable & Co. London.
6. S.K. Roy, Fundamentals of surveying, prentice - Hall of India New Delhi
7. B.C. Punmia, Surveying Vol. I, II, III, Laxmi Publications New Delhi 8. K.R. Arora, Surveyhing Vol. I & II, standard book House, New Delhi

List of Experiments/ Field work (Expandable):
1. Theodolite traversing
2. Profile leveling, contouring & cross sectioning
3. Determination of tachometric constants & uses of tachometer in various field works
4. Curve setting by different methods.

R.K.D.F. UNIVERSITY, RANCHI
B.E. (CIVIL ENGINEERING)
SECOND YEAR
Semester – IV
Course Content & Grade

Branch	Subject Title	Subject Code
CE	Fluid Mechanics	**CE 303**

Unit I

Turbulent flow : Laminar and turbulent boundary layers and laminar sublayer, hydrodynamically smooth and rough boundaries, velocity distribution in turbulent flow, resistance of smooth and artificially roughened pipes, commercial pipes, aging of pipes. Pipe flow problems : Losses due to sudden expansion and contraction, losses in pipe fittings andvalves, concepts of equivalent length, hydraulic and energy gradient lines, siphon, pipes in series, pipes in parallel, branching of pipes. Pipe Network : *Water Hammer (only quick closure case). transmission of power. *Hardy Cross Method.

Unit II

Uniform flow in open channels : Channel geometry and elements of channel section, velocity distribution,energy in open channel flow, specific energy, types of flow, critical flow and its computations, uniform flow and its computations, Chezy's and Manning's formulae, determination of normal depth and velocity, Normal and critical slopes, Economical sections, Saint Vegnet equation.

Unit III

Non uniform flow in open channels : Basic assumptions and dynamic equations of gradually varied flow,characteristics analysis and computations of flow profiles, rapidly varied flowhydraulic jump in rectangular channels and its basic characteristics, surges in open channels & channel flow routing, venturi flume.

Unit IV

Forces on immersed bodies: Types of drag, drag on a sphere, a flat plate, a cylinder and an aerofoil development of lift, lifting vanes, magnus effect.

Unit V

Fluid Machines: Turbines : Classifications, definitions, similarity laws, specific speed and unit quantities, Pelton turbine-their construction and settings, speed regulation, dimensions of various elements, Action of jet, torque, power and efficiency for ideal case, characteristic curves. Reaction turbines: construction & settings, draft tube theory, runaway speed, simple theory of design and characteristic curves, cavitation. Pumps: Centrifugal pumps : Various types and their important components, manometric head, total head, net positive suction head, specific speed, shut off head, energy losses, cavitation, principle of working and characteristic curves. Reciprocating pumps: Principle of working, Coefficient of discharge, slip, single acting and double acting pump, Manometric head, Acceleration head.

Reference

1. Fluid Mechanics - Modi & Seth - Standard Book house, Delhi
2. Open Channel Flow by Rangaraju - Tata Mc Graw - Hill Publishing Comp. Ltd., New Delhi
3. Fluid Mechanics - A.K. Jain - Khanna Publishers, Delhi
4. Fluid Mechanics, Hydraulics & Hydraulic Machanics - K.R. Arora - Standard Publishers Distributors 1705- B, Nai Sarak, Delhi.
5. Hyd. of open channels By Bakhmetiff B.A. (McGraw Hill, New York)
6. Open Channel Hyd. By Chow V.T. (McGraw Hill, New York)
7. Engineering Hydraulics By H. Rouse
8. Centrifugal & Axial Flow Pump By Stempanoff A.J. New York
9. Relevant IS codes

R.K.D.F. UNIVERSITY, RANCHI
B.E. (CIVIL ENGINEERING)
Semester – IV
Course Content & Grade

Branch	Subject Title	Subject Code
CE	**Surveying**	**CE- 304**

Unit I

Chain Surveying-Introduction, Types of surveying, types of chain, tapes, Principle of survey, Errors and Obstacles in chain survey; Compass surveying, Bearings, Traversing, Magnetic declination; introduction- plane table survey.

Unit II

Introduction- Leveling,types, Principle of Leveling, Curvature and Refraction corrections, Reciprocal levelling; Contouring; Introduction-Theodolite, Types of Theodolite, Measurement of angles with theodolite

Unit III

Types of curves, Simple curves – Chain & Tape methods, Rankine's method' Obstacles in curve setting, Compound curve, Reverse curve, Introduction to Transition curve and Vertical curve.

Unit IV

Plane Table Surveying: Details surveying and contouring using plane table and micro-optic alidade. Computation of area and volume.

Unit V

Total Station: Principle of electronic measurement of distance and angles; construction and working with Total Station; Errors; Application and recent developments in Total Station. Auto level, GPS.

References
1. Punmia, B.C., Jain, A.K., Jain, A.K. "Surveying" – Vol. 1 and
2. Laxmi Publications (P) Ltd.
3. Kanetkar, T.P., Kulkarni S.V. "Surveying and Levelling." – Part 1 and 2, Pune Vidyarthi Griha Prakashan.
4. Duggal, S.K. "Surveying" – Vol. 1 and 2, The McGraw-Hill Companies, New Delhi.
5. Arora, K.R. "Surveying" – Vol. 1 and 2, Standard Book House, New Delhi.

List of Experiments (Expandable)

1. Sketches of various building components.
2. One drawing sheet of various building components containing doors, windows ventilators, lintels and arches stairs foundations etc.
3. One drawing sheet each for services and interiors of buildings.
4. One drawing sheet containing detailed planning of one/two bed room residential building (common to all student)
5. One drawing sheet each of residential and institutional building (Each student perform different drawing).

R.K.D.F UNIVERSITY, RANCHI
B.Tech(CIVIL ENGINEERIG)
Semester – IV
Course Content & Grade

Branch	Subject Title	Subject Code
B.Tech. CE	Transportation Engg-1	BT305

Unit I

Introduction and Highway Development in India: Different modes of Transportation, Characteristics of Road Transport, Brief history and development of Road Construction, Jayakar Committee Recommendations, Road Classification, Long term Road Plans, Vision – 2021, NHDP, Rural Roads Development Plan Highway Planning: Principles of highway Planning, Road development and financing, privatization of highways, highway alignment requirements, engineering survey for highway location.

Unit II

Geometric Design of Highways: Road Cross-sectional Elements: Width of Carriageway, Formation Width, Right of Way, Camber, Shoulder, Kerb, Road Margins, Design Speed, Sight Distances, Design of Horizontal curves, Super elevation, Extra widening on Horizontal curves, Transition curves, Set back distance at curves, Gradient, Design of Vertical curves –Summit and Valley curves

Unit III

Traffic Characteristics: Traffic Studies, Traffic Volume, Traffic Forecast, Traffic Capacity, Traffic Control Devices, Parking Studies, Accident Studies, Highway Safety, Intersections-At grade and Grade Separated Intersections, Traffic Control Devices, Traffic Signs, Traffic Signal Systems, Traffic Islands, Road Markings, Highway Lighting, Intelligent, Transportation Systems

Unit IV

Highway Materials and Construction Subgrade Soil, Aggregates, Bitumen, Tar, Emulsion, Modified Bitumen, Cement Concrete, Tests on Aggregates, Tests on Bitumen, Bituminous Mix Design, Construction of WBM roads, Soil Stabilized Roads, Different types of Bituminous Constructions, Construction of cement Concrete Pavements, Equipments used in Highway Construction ` Pavement Design: Types of Pavements, Flexible and Rigid, Pavement composition, Unconventional Pavements, Flexible Pavement Design as per IRC, Stresses in Concrete Pavements, Modulus of subgrade reaction, Design of rigid pavements as per IRC, Highway Drainage

RKDF UNIVERSITY, RANCHI
New Scheme of Examination as Per AICTE Flexible Curricula

B.Tech. V Semester (Civil Engineering)

S.No.	Subject Code	Subject Name	Internal Max	External Max	External Min	Total Max	Total Min
1	BT301	Structural Design & Drawing (R.C.C.-I)	30	70	21	100	35
2	CE302	Water Resources and Irrigation Engineering	30	70	21	100	35
3	CE303	Environmental Engineering	30	70	21	100	35
4	CE304	Transportation Road Engineering	30	70	21	100	35
5	BT305	GEOTECHNICAL ENGINEERING	30	70	21	100	35

Practical

S.No.	Subject Code	Subject Name	Total Max	Total Min
1	CE354	Environmental Engineering Lab	50	25
2	BT356	Geotechnical Engineering Lab	50	25

S.No.	Subject Code	SUBJECT NAME	PERIODS			Credit
			L	T	P	
1	CE- 4021	Structural Design & Drawing (R.C.C.-I)	4	0	0	3
2	CE302	Water Resources and Irrigation Engineering	3	1	0	3
3	CE303	Environmental Engineering	4	0	0	4
4	CE304	Transportation Road Engineering	4	0	0	3
5	BT305	GEOTECHNICAL ENGINEERING	4	0	0	4
Practicals						
1	CE353	Environmental Engineering Lab	0	0	2	2
2	CE354	Geotechnical Engineering Lab	0	0	2	2
Total credit						**21**

R.K.D.F. UNIVERSITY, RANCHI

B.Tech.
(Civil Engineering)
SECOND YEAR
Semester – V

Branch	Subject Title	Subject Code
B.Tech. CE	Structural Design & Drawing (R.C.C.-I)	CE- 4021

Unit I

Basic Principles of Structural Design : Assumptions, Mechanism of load transfer, Various properties of concrete and reinforcing steel, Introduction to working stress method and limit state methods of design, partial safety factor for load and material. Calculation of various loads for structural design of singly reinforced beam, Partial load factors

Unit II

Design of Beams: Doubly reinforced rectangular & Flanged Beams, Lintel, Cantilever, simply supported and continuous beams, Beams with compression reinforcement: Redistribution of moments in continuous beams, Circular girders: Deep beams. Design of beam for shear and bond.

Unit III

Design of Slabs: Slabs spanning in one direction. Cantilever, Simply supported and Continous slabs, Slabs spanning in two directions, Circular slabs, Waffle slabs, Flat slabs, Yield line theory.

Unit IV

Columns & Footings: Effective length of columns, Short and long cloumns- Square, Rectangular and Circular columns, Isolated and combined footings, Strap footing, Columns subjected to axial loads and bending moments (sections with no tension), Raft foundation.

Unit V

Staircases: Staircases with waist slab having equal and unequal flights with different support conditions,Slabless tread-riser staircase.

References
1. Varshney RS; Concrete Technology; Oxfored & IBH publishing co.
2. Gambhir ML; Concrete Technology – TMH
3. Sinha SN; Reinforced Concrete Technology; TMH
4. New Building Materials Published by B.M.T.P.C., New Delhi
5. Hand books on Materials & Technology - Published by BMTPC & HUDCO
6. Mohan Rai & M.P. Jai Singh; Advances in Building Materials & Construction
7. Jackson N; Civil Engineering materials.
8. Properties of Concrete - A.M. Neville - Pearson Education

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R.K.D.F. UNIVERSITY, RANCHI
B.E. (CIVIL ENGINEERING)
SECOND YEAR
Semester – V
Course Content & Grade

Branch	Subject Title	Subject Code
CE	Water Resources and Irrigation Engineering	**CE302**

Unit I

Hydrology : Hydrological cycle, precipitation and its measurement, recording and non recordingrain gauges, estimating missing rainfall data, raingauge net works, mean depth of precipitationover a drainage area, mass rainfall curves, intensity-duration curves, depth-area duration curves, Infiltration and infiltration indices, evaporation stream gauging, run off and its estimation, hydrograph analysis, unit hydrograph and its derivation from isolated and complex storms, Scurvehydrograph, synthetic unit hydrograph.

Unit II

Floods and Ground water: Types of floods and their estimation by different methods, probability and frequency analysis, flood routing through reservoirs and channels, flood control measures, economics of flood control, confined and unconfined aquifers, aquifer properties, hydraulics of wells under steady flow conditions, infiltration galleries. Ground water rechargenecessityand methods of improving ground water storage. Water logging-causes, effects and its Prevention. Salt efflorescence-causes and effects. reclamation of water logged and salt affected lands.

Unit-III

Water resources planning and management: Planning of water resources projects, data requirements, economic analysis of water resources projects appraisal of multipurpose projects, optimal operation of projectsintrouduction to linear programming and its application to water Resources projects. Role of water in the

environment, rain water harvesting, impact assessment of water resources development and managerial measures.

Unit-IV

Irrigation water requirement and soil-water-crop relationship: Irrigation, definition, necessity, advantages and disadvantages, types and methods. Irrigation development. Soils - types and their occurrence, suitability for irrigation purposes, wilting coefficient and fieldcapacity, optimum water supply, consumptive use and its determination. Irrigation methods surface And subsurface, sprinkler and drip irrigation. Duty of water, factors affecting duty and methods to improve duty, suitability of water for irrigation, crops and crop seasons, principal crops and their water requirement, crop ratio and crop rotation, intensity of irrigation.

Unit-V

Canal irrigation: Types of canals, alignment, design of unlined and lined canals, Kennedy's and Lacey's silt theories, typical canal sections, canal losses, lininings-objectives, materials used,economics.Canal falls & cross drainage works, - description and design, head and cross regulators. escapes and outlets, canal transitions. Well irrigation: Types of wells, well construction, yield tests, specific capacity level and specific yield, hydraulic design of open wells and tube wells, methods of raising well water,characteristics of pumps and their selection, interference of wells, well losses, advantages anddisadvantages of well irrigation.

References
1. T.P. Kanetkar, Surveying & Levelling, Vol. I & II.
2. Duggal; Surveying vol I and II; TMH
3. Basak; Surveying and Leveling; TMH
4. R.E.Devis, Surveying theory & Practice, Mc.Graw Hill, New York
5. David Clark & J Clendinning, Plane & Geodetic surveying Vol. I & II, constable & Co. London.
6. S.K. Roy, Fundamentals of surveying, prentice - Hall of India New Delhi
7. B.C. Punmia, Surveying Vol. I, II, III, Laxmi Publications New Delhi 8. K.R. Arora, Surveyhing Vol. I & II, standard book House, New Delhi

List of Experiments/ Field work (Expandable):
1. Theodolite traversing
2. Profile leveling, contouring & cross sectioning
3. Determination of tachometric constants & uses of tachometer in various field works
4. Curve setting by different methods.

R.K.D.F. UNIVERSITY, RANCHI
B.E. (CIVIL ENGINEERING)
SECOND YEAR
Semester – V
Course Content & Grade

Branch	Subject Title	Subject Code
CE	Environmental Engineering	**CE 303**

Unit I

Estimation of ground and surface water resources. quality of water from different sources, demand & quantity of water, fire demand, water requirement for various uses, fluctuations in demand, forecast of population.

Unit II

Impurities of water and their significance, water-borne diseases, physical, chemical and bacteriological analysis of water, water standards for different uses. Intake structure, conveyance of water, pipe materials, pumps - operation & pumping stations.

Unit III

Water Treatment methods-theory and design of sedimentation, coagulation, filtration,disinfection, aeration & water softening, modern trends in sedimentation & filtration, miscellaneous methods of treatment.

Unit IV

Layout and hydraulics of different distribution systems, pipe fittings, valves and appurtenances,analysis of distribution system. Hardy cross method, leak detection, maintenance of distributionsystems, service reservoir capacity and height of reservoir

Unit V

Rural water supply schemes, financing and management of water supply project, water pollution control act,conservancy & water carriage system, sanitary appliance and their operation, building drainage system ofplumbing.

Reference
1. Fluid Mechanics - Modi & Seth - Standard Book house, Delhi
2. Open Channel Flow by Rangaraju - Tata Mc Graw - Hill Publishing Comp. Ltd., New Delhi
3. Fluid Mechanics - A.K. Jain - Khanna Publishers, Delhi
4. Fluid Mechanics, Hydraulics & Hydraulic Machanics - K.R. Arora - Standard Publishers Distributors 1705- B, Nai Sarak, Delhi.
5. Hyd. of open channels By Bakhmetiff B.A. (McGraw Hill, New York)

6. Open Channel Hyd. By Chow V.T. (McGraw Hill, New York)
7. Engineering Hydraulics By H. Rouse
8. Centrifugal & Axial Flow Pump By Stempanoff A.J. New York
9. Relevant IS codes

List of Experiments

1. Study the performances characteristics of Pelton Wheel 2.
2. Study the performances characteristics of Francis Turbine 3.
3. Study the performances charactristics of Kaplan Turbine 4.
4. Caliration of multistage (Two) Pump & Study of characteristic of variable speed pump 5.
5. To study the performance & details of operation of Hyd. Ram 6.
6. Determination of coefficient of discharge for a broad crested weir & to plot water surface profile over weir 7.

R.K.D.F. UNIVERSITY, RANCHI
B.E. (CIVIL ENGINEERING)
Semester – V
Course Content & Grade

Branch	Subject Title	Subject Code
CE	Transportation Road Engineering	**CE- 304**

Unit I

High way planning, Alignment & Geometric Design: Principles of highway planning, road planning in India and financing of roads, classification patterns. Requirements, Engg. Surveys for highway location. Cross sectional elements- width, camber, super-elevation, sight distances, extra widening at curves, horizontal and vertical curves, numerical problems.

Unit II

Bituminous & Cement Concrete Payments: Design of flexible pavements, design of mixes and stability, WBM, WMM, BM, IBM, surface dressing, interfacial treatment- seal coat, tack coat, prime coat, wearing coats, grouted macadam, bituminous concrete specification, construction and maintenance. Advantages and disadvantages of rigid pavements, general principles of design, types, construction, maintenance and joints, dowel bars, tie bars. Brief study of recent developments in cement concrete pavement design, fatigue and realiability.

Unit III

Low Cost Roads, Drainage of Roads, Traffic Engg. & Transportation Planning:
Principles of stabilization, mechanical stabilization, requirements, advantages, disadvantages and uses, quality control, macadam roadstypes, specifications, construction, maintenance and causes of failures. Surface and sub-surface drainage, highway materials: properties and testing etc. Channelised and unchannelised intersections, at grade & grade separated intersections, description, rotary-design elements, advantages and disadvantages, marking, signs and signals, street lighting. Principles of planning, inventories, trip generation, trip distribution, model split, traffic assignment, plan preparation.

Unit IV

Airport Plaaning, Runway & Taxiway: Airport site selection. air craft characteristic and their effects on runway alignments, windrose diagrams, basic runway length and corrections, classification of airports. Geometrical elements: taxi ways and runways, pattern of runway capacity.

Unit V

Airport, Obstructions, Lightning & Traffic control: Zoning regulations, approach area, approach surfaceimaginary, conical, horizontal. Rotating beacon, boundary lights, approach lights, runway and taxiway lighting etc. instrumental lending system, precision approach radar, VOR enroute traffic control.

References

1. Punmia, B.C., Jain, A.K., Jain, A.K. "Surveying" – Vol. 1 and
2. Laxmi Publications (P) Ltd.
3. Kanetkar, T.P., Kulkarni S.V. "Surveying and Levelling." – Part 1 and 2, Pune Vidyarthi Griha Prakashan.
4. Duggal, S.K. "Surveying" – Vol. 1 and 2, The McGraw-Hill Companies, New Delhi.
5. Arora, K.R. "Surveying" – Vol. 1 and 2, Standard Book House, New Delhi.

List of Experiments (Expandable)

1. Sketches of various building components.
2. One drawing sheet of various building components containing doors, windows ventilators, lintels and arches stairs foundations etc.
3. One drawing sheet each for services and interiors of buildings.
4. One drawing sheet containing detailed planning of one/two bed room residential building (common to all student)
5. One drawing sheet each of residential and institutional building (Each student perform different drawing).

R.K.D.F UNIVERSITY, RANCHI
B.Tech(CIVIL ENGINEERIG)
Semester – V
Course Content & Grade

Branch	Subject Title	Subject Code
B.Tech. CE	GEOTECHNICAL ENGINEERING	BT305

Unit I
Fundamentals of Soil Mechanics -Introduction: Three-phase system : – soil solids, water and air; Basic definitions and functional relationships : -Specific gravity; Void ratio; Porosity; water content; Unit Weights & Density : -bulk, dry, saturated, submerged and natural; Degree of saturation & Density index ; Structure of soil; soil texture:- Size, range and shapes of individual soil particles; field identification of soils, Particles size distribution: Sieve analysis; distribution curve characteristics; grain size analysis for fine-grained and mixed soils; use of hydrometer; Consistency limits and indices; Activity and Sensitivity of clays. Classification of Soils.

Unit II
Soil Moisture Relationships - Capillarity in soils; Free and adsorbed water; Permeability of soils: Darcy's Law; Determination of coefficient of permeability by constant head & falling head tests, Permeability of stratified soil deposits. Factors affecting permeability; Seepage Analysis: Head, Gradient & Potential, Seepage pressure. Two dimensional flow -Laplace equation; Phreatic line in Earth dams; Graphical method of flow net construction: for flow below sheet piles, earth dams with or without core / filter; Seepage discharge across hydraulic structures; Flow net – electrical analogy; Pore water pressure and the concept of effective stress; Quick sand condition, Difference between Compaction and Consolidation; Compaction tests : Standard and Modified Proctor ; Factors affecting compaction; Field compaction; One-dimensional consolidation –spring analogy; Terzaghi's theory of one-dimensional consolidation; Consolidation of undisturbed & remoulded soils; Laboratory consolidation test – analysis and results; Coefficient of volume change, Coefficient of consolidation, Compression index, Degree of consolidation; Secondary consolidation

Unit III
Shear Strength Measurement of shear strength –Unconfined strength test; Direct shear tests; Vane shear test and Triaxial tests –strain-controlled tests; Concepts of both Unconsolidated and Consolidated specimens subjected to shear without drainage (with or without pore water pressure measurement); drained shear; Mohr strength envelopes for Total and Effective stresses; MohrCoulomb failure theory

Unit IV
Terminology: Ultimate and Safe Bearing Capacities; Allowable Bearing Pressure Gross and Net Bearing Capacities; Net Soil pressure for a specified settlement; Bearing capacity from equations of Terzaghi, Skempton, and Meyerhoff; I. S. Code of Practice; Bearing capacity from N-values; Effect of ground water table, Plate Load test: Procedure& Limitations, determination of permissible bearing capacity for footings in sand and clay soils, .
Eccentrically loaded footings – useful width concept

RKDF UNIVERSITY, RANCHI

New Scheme of Examination as per AICTE Flexible Curricula

Subject wise distribution of marks

B.Tech. VI Semester (Civil Engineering)

S.No.	Subject Code	Subject Name	Marks Distribution				
			Internal	External		Total	
			Max	Max	Min	Max	Min
1	BT301	Structural Design & Drawing – I (Steel)	30	70	21	100	35
2	CE302	Qty. Surveying & Costing	30	70	21	100	35
3	CE303	OPEN CHANNEL FLOW	30	70	21	100	35
4	CE304	AIR POLLUTION AND CONTROL	30	70	21	100	35
5	BT305	ADVANCED GEOTECHNICAL ENGINEERING	30	70	21	100	35

Practical

			Total	
			Max	Min
1	CE354	ADVANCED GEOTECHNICAL ENGINEERING Lab	50	25
2	BT356	Auto cadd lab	50	25

RKDF UNIVERSITY, RANCHI
New Scheme of Examination as per AICTE Flexible Curricula
Choice Based Credit System
Branch:- Civil Engineering
B.Tech Sixth Semester

S.No.	Subject Code	SUBJECT NAME	PERIODS			Credit
			L	T	P	
1	CE- 4021	Structural Design & Drawing – I (Steel)	4	0	0	3
2	CE302	Qty. Surveying & Costing	3	1	0	3
3	CE303	OPEN CHANNEL FLOW	4	0	0	4
4	CE304	AIR POLLUTION AND CONTROL	4	0	0	3
5	BT305	ADVANCED GEOTECHNICAL ENGINEERING	4	0	0	4
Practicals						
1	CE353	Environmental Engineering Lab	0	0	2	2
2	CE354	Geotechnical Engineering Lab	0	0	2	2
Total credit						**21**

R.K.D.F. UNIVERSITY, RANCHI

B.Tech.
(Civil Engineering)
SECOND YEAR
Semester – VI

Branch	Subject Title	Subject Code
B.Tech. CE	Structural Design & Drawing – I (Steel)	CE- 4021

Unit I

Various loads and mechanism of the load transfer, partial load factors, structural properties of steel, Design of structural connections -Bolted, Rivetted and Welded connections.

Unit II

Design of compression members, Tension members, Roof Trusses - Angular & Tubular, Lattice Girders.

Unit III

Design of simple beams, Built-up beams, Plate girders and gantry girders.

Unit IV

Effective length of columns, Design of columns-simple and compound, Lacings & battens. Design of footings for steel structures, Grillage foundation

Unit V

Design of Industrial building frames, multistory frames, Bracings for high rise structures, Design of transmission towers.

References
1. Varshney RS; Concrete Technology; Oxford & IBH publishing co.
2. Gambhir ML; Concrete Technology – TMH
3. Sinha SN; Reinforced Concrete Technology; TMH
4. New Building Materials Published by B.M.T.P.C., New Delhi
5. Hand books on Materials & Technology - Published by BMTPC & HUDCO
6. Mohan Rai & M.P. Jai Singh; Advances in Building Materials & Construction
7. Jackson N; Civil Engineering materials.
8. Properties of Concrete - A.M. Neville - Pearson Education

R.K.D.F. UNIVERSITY, RANCHI

B.E. (CIVIL ENGINEERING)
SECOND YEAR
Semester – VI
Course Content & Grade

Branch	Subject Title	Subject Code
CE	Qty. Surveying & Costing	**CE302**

Unit I

Introduction: Purpose and importance of estimates, principles of estimating. Methods of taking out quantities of items of work. Mode of measurement, measurement sheet and abstract sheet; bill of quantities. Types of estimate, plinth area rate, cubical content rate, preliminary, original, revised and supplementary estimates for different projects.

Unit II

Rate Analysis: Task for average artisan, various factors involved in the rate of an item, material and labour requirement for various trades; preparation for rates of important items of work. Current schedule of rates. (C.S.R.)

Unit-III

Detailed Estimates: Preparing detailed estimates of various types of buildings, R.C.C.works, earth work calculations for roads and estimating of culverts Services for building such as water supply, drainage and electrification.

Unit-IV

Cost of Works: Factors affecting cost of work, overhead charges, Contingencies and work charge establishment, various percentages for different services in building. Preparation of DPR.

Unit-V

Valuation: Purposes, depreciation, sinking fund, scrap value, year's purchase, gross and net income, dual rate interest, methods of valuation, rent fixation of buildings

References
1. T.P. Kanetkar, Surveying & Levelling, Vol. I & II.
2. Duggal; Surveying vol I and II; TMH
3. Basak; Surveying and Leveling; TMH
4. R.E.Devis, Surveying theory & Practice, Mc.Graw Hill, New York
5. David Clark & J Clendinning, Plane & Geodetic surveying Vol. I & II, constable & Co. London.
6. S.K. Roy, Fundamentals of surveying, prentice - Hall of India New Delhi
7. B.C. Punmia, Surveying Vol. I, II, III, Laxmi Publications New Delhi 8. K.R. Arora, Surveyhing Vol. I & II, standard book House, New Delhi

List of Experiments/ Field work (Expandable):
1. Theodolite traversing
2. Profile leveling, contouring & cross sectioning
3. Determination of tachometric constants & uses of tachometer in various field works
4. Curve setting by different methods.

R.K.D.F. UNIVERSITY, RANCHI
B.E. (CIVIL ENGINEERING)
SECOND YEAR
Semester – VI
Course Content & Grade

Branch	Subject Title	Subject Code
CE	OPEN CHANNEL FLOW	**CE 303**

Unit I

Open channel flow, Geometrical parameters of a channel, Classification of open channels, Classification of open channel flow, Velocity distribution, Resistance relationships, Energy depth relationships, Specific energy and specific force, Normal and critical depths, Pressure, velocity and discharge measurements.

Unit II

Continuity equation, Energy and momentum equation, Characteristics of uniform flow, Chezy's formula, Manning's formula, Factors affecting manning's roughness coefficient, Computation of uniform flow, Most efficient channel section

Unit III

Specific energy curve, Discharge curve, Specific force curve, Specific depth, Critical flow, Critical depth, Measurement of discharge and velocity. Gradually varied flow: Equation of gradually varied flow, Classification of channel bottom slopes, Classification of surface profiles, Characteristics of surface profiles, Computation of water surface profiles by graphical, numerical and analytical methods, Direct step method, Standard step method, Graphical integration method and direct integration method.

Unit IV

Layout and hydraulics of different distribution systems, pipe fittings, valves and appurtenances,analysis of distribution system. Hardy cross method, leak detection, maintenance of distributionsystems, service reservoir capacity and height of reservoir
Unit V

Elements and characteristics of hydraulic jump, Classical hydraulic jump, Length, height and location of jump, Types of hydraulic jump, Applications and use of hydraulic jump, Energy dissipation, Evaluation of the jump elements in rectangular and nonrectangular channels, Open channel surge, Positive and negative surges, Celerity of gravity wave, Deep and shallow water waves, Hydraulic jump in channel transitions, Control of hydraulic jump, Momentum principle and its applications.

Reference

1. Fluid Mechanics - Modi & Seth - Standard Book house, Delhi
2. Open Channel Flow by Rangaraju - Tata Mc Graw - Hill Publishing Comp. Ltd., New Delhi
3. Fluid Mechanics - A.K. Jain - Khanna Publishers, Delhi
4. Fluid Mechanics, Hydraulics & Hydraulic Machanics - K.R. Arora - Standard Publishers Distributors 1705- B, Nai Sarak, Delhi.
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6. Open Channel Hyd. By Chow V.T. (McGraw Hill, New York)
7. Engineering Hydraulics By H. Rouse
8. Centrifugal & Axial Flow Pump By Stempanoff A.J. New York
9. Relevant IS codes

List of Experiments

1. Study the performances characteristics of Pelton Wheel 2.
2. Study the performances characteristics of Francis Turbine 3.
3. Study the performances charactristics of Kaplan Turbine 4.
4. Caliration of multistage (Two) Pump & Study of characteristic of variable speed pump 5.
5. To study the performance & details of operation of Hyd. Ram 6.
6. Determination of coefficient of discharge for a broad crested weir & to plot water surface profile over weir 7.

R.K.D.F. UNIVERSITY, RANCHI
B.E. (CIVIL ENGINEERING)
Semester – VI
Course Content & Grade

Branch	Subject Title	Subject Code
CE	AIR POLLUTION AND CONTROL	**CE- 304**

Unit I

Introduction to air pollution and pollutants Sources of ambient and indoor air pollution; types of air pollutants, fate of air pollutants, effects of air pollution in regional and global scale.

Unit II

Sampling and Monitoring of Air Pollutants Objectives, ambient air sampling methods and devices, stack monitoring, and interpretation of air pollution data, air pollution standards and indices.

Unit III

Factors affecting dispersion of air pollutants Temperature lapse rates and atmospheric stability, inversions, wind profiles, wind velocity and turbulence, plume behaviour, estimation of plume rise, dispersion equations, box model, gaussian plume model.

Unit IV

Control technologies for control of air pollution Control methods for air pollution, factors affecting selection of control equipment, working principle, design, operational considerations, process control and monitoring of particulate matter and gaseous pollutant control equipment, legislations, policies and guidelines for air pollution control.

Unit V

Control of vehicular emissions Internal combustion engines, technological improvements of engines for reduction of vehicular emissions, after exhaust treatments, alternative transportation fuels, emission measurement and testing, regulation to control vehicular emission.

References
1. Punmia, B.C., Jain, A.K., Jain, A.K. "Surveying" – Vol. 1 and
2. Laxmi Publications (P) Ltd.
3. Kanetkar, T.P., Kulkarni S.V. "Surveying and Levelling." – Part 1 and 2, Pune Vidyarthi Griha Prakashan.
4. Duggal, S.K. "Surveying" – Vol. 1 and 2, The McGraw-Hill Companies, New Delhi.
5. Arora, K.R. "Surveying" – Vol. 1 and 2, Standard Book House, New Delhi.

List of Experiments (Expandable)

1. Sketches of various building components.
2. One drawing sheet of various building components containing doors, windows ventilators, lintels and arches stairs foundations etc.
3. One drawing sheet each for services and interiors of buildings.
4. One drawing sheet containing detailed planning of one/two bed room residential building (common to all student)
5. One drawing sheet each of residential and institutional building (Each student perform different drawing).

R.K.D.F UNIVERSITY, RANCHI

B.Tech(CIVIL ENGINEERIG)

Semester – VI
Course Content & Grade

Branch	Subject Title	Subject Code
B.Tech. CE	ADVANCED GEOTECHNICAL ENGINEERING	BT305

Unit I

Module I. Site Investigation and subsoil exploration: Methods of soil exploration; Planning a subsoil exploration: Number of boreholes and depths of exploration for various types of works; Field Tests: Standard penetration test; Dynamic and Static cone penetration tests; Vane shear test; Geophysical Exploration; Soil samplers & collection of soil samples

Unit II

Stress Distribution: Boussinesq's and Westergaard's equations, Pressure distribution diagram, Newmark's influence chart; Contact pressure below foundations –Steinbrenner's coefficients; Settlement of foundations : Elastic, Consolidation and Creep settlements; Total and Differential settlements; Rate of settlement, I. S. Code limitations for different structures Settlement calculation from consolidation characteristics and using N-values

Unit III

Plastic equilibrium in soil – active & passive cases. Active earth pressure –Rankine's Theory; Active & passive earth pressure of cohesive & cohesion-less soil; Rankine's active thrust by trial wedge; Coulomb's wedge theory – Rebhann's construction & Culmann's construction

Unit IV

Stability analysis of finite & infinite slopes; Types of slope failures; Methods of analysis for slope stability – method of slices; Bishop's simplified method; Friction circle method; Stability Number; Stability of slopes of Earth dams

Unit-5

. Introduction to Machine Foundations & Well Foundations Soil dynamics, Mass-spring system with & without damping; Machine Foundations: Types of Machines and Machine Foundations, Vibration isolation: Types and Methods of Isolation, Shapes and Types of wells or caissons, their advantages and disadvantages; components of a well foundation;

B.Tech. VII Semester (Civil Engineering)

S.No.	Subject Code	Subject Name	Marks Distribution				
			Internal	External		Total	
			Max	Max	Min	Max	Min
1		Construction Planning & Management	30	70	21	100	35
2		Advanced Structural Design – II (RCC)	30	70	21	100	35
3		Design of Hydraulic Structure	30	70	21	100	35
4		Traffic Engineering	30	70	21	100	35
5		Industrial Waste Treatment	30	70	21	100	35
6		Earthquake Engineering	30	70	21	100	35

Practical

			Total	
			Max	Min
1	CE354	ADVANCED GEOTECHNICAL ENGINEERING Lab	50	25
2	BT356	Auto cadd lab	50	25

S.No.	Subject Code	SUBJECT NAME	PERIODS			Credit
			L	T	P	
1	CE- 4021	Construction Planning & Management	4	0	0	4
2	CE302	Advanced Structural Design – II (RCC)	3	1	0	3
3	CE303	Design of Hydraulic Structure	4	0	0	3
4	CE304	Traffic Engineering	4	0	0	4
5	BT305	Industrial Waste Treatment	4	0	0	4
6		Earthquake Engineering	4	0	0	3
1						
2						
Total credit						**21**

R.K.D.F. UNIVERSITY, RANCHI

B.Tech.
(Civil Engineering)
SECOND YEAR
Semester – VII

Branch	Subject Title	Subject Code
B.Tech. CE	Construction Planning & Management	CE- 4021

Unit I

Preliminary and detailed investigation methods: Methods of construction, form work and centering. Schedule of construction, job layout, principles of construction management, modern management techniques like CPM/PERT with network analysis.

Unit II

Construction equipments:Factors affecting selection, investment and operating cost, output of various equipments, brief study of equipments required for various jobs such as earth work, dredging, conveyance, concreting, hoisting, pile driving, compaction and grouting.

Unit III

Contracts: Different types of controls, notice inviting tenders, contract document, departmental method of construction, rate list, security deposit and earnest money, conditions of contract, arbitration, administrative approval, technical sanction.

Unit IV

Specifications & Public Works Accounts: Importance, types of specifications, specifications for various trades of engineering works.Various forms used in construction works, measurement book, cash book, materials at site account, imprest account, tools and plants, various types of running bills, secured advance, final bill.

Unit V

Site Organization & Systems Approach to Planning: Accommodation of site staff, contractor's staff, various organization charts and manuals, personnel in construction, welfare facilities, labour laws and human relations, safety engineering. Problem of equipment management, assignment model, transportation model and waiting line modals with their applications, shovel truck performance with waiting line method.

References
1. Varshney RS; Concrete Technology; Oxfored & IBH publishing co.
2. Gambhir ML; Concrete Technology – TMH
3. Sinha SN; Reinforced Concrete Technology; TMH
4. New Building Materials Published by B.M.T.P.C., New Delhi
5. Hand books on Materials & Technology - Published by BMTPC & HUDCO
6. Mohan Rai & M.P. Jai Singh; Advances in Building Materials & Construction
7. Jackson N; Civil Engineering materials.
8. Properties of Concrete - A.M. Neville - Pearson Education

R.K.D.F. UNIVERSITY, RANCHI

B.E. (CIVIL ENGINEERING)
SECOND YEAR
Semester – VII
Course Content & Grade

Branch	Subject Title	Subject Code
CE	Advanced Structural Design – II (RCC)	**CE302**

Unit I
Design of Multistory Buildings – Sway and nonsway buildings, Shear walls and other bracing elements

Unit II
Earth Retaining Structures: Cantilever and counter fort type's retaining walls.

Unit-III
Water Tanks: Tanks on ground and underground tanks: Square, rectangular, circular tanks, Overhead tanks: square, rectangular, circular & intze tanks.

Unit-IV
T-beam & Slab bridges- for highway loading (IRC Loads).
Prestressing concepts materials, systems of prestressing & losses
Introduction to working & limit State Design

Unit-5
T-beam & Slab bridges- for highway loading (IRC Loads). Prestressing concepts materials, systems of prestressing & losses Introduction to working & limit State Design.

References
1. T.P. Kanetkar, Surveying & Levelling, Vol. I & II.
2. Duggal; Surveying vol I and II; TMH
3. Basak; Surveying and Leveling; TMH
4. R.E.Devis, Surveying theory & Practice, Mc.Graw Hill, New York

5. David Clark & J Clendinning, Plane & Geodetic surveying Vol. I & II, constable & Co. London.
6. S.K. Roy, Fundamentals of surveying, prentice - Hall of India New Delhi
7. B.C. Punmia, Surveying Vol. I, II, III, Laxmi Publications New Delhi 8. K.R. Arora, Surveyhing Vol. I & II, standard book House, New Delhi

List of Experiments/ Field work (Expandable):
1. Theodolite traversing
2. Profile leveling, contouring & cross sectioning
3. Determination of tachometric constants & uses of tachometer in various field works
4. Curve setting by different methods.

R.K.D.F. UNIVERSITY, RANCHI

B.E. (CIVIL ENGINEERING)
SECOND YEAR
Semester – VII
Course Content & Grade

Branch	Subject Title	Subject Code
CE	Design of Hydraulic Structure	**CE 303**

Unit I

Gravity dams: Design Criteria, forces acting on gravity dams, elementary profile, low and high gravity dams, stability analysis, evaluation of profile by method of zoning, practicalprofile, foundation treatment, construction joints, galleries in gravity dams.

Unit II

Earth Dams: Types, causes of failure and design criteria, soils suitable for earth dam construction, construction methods, foundation requirements, typical earth dam sections, estimation of seepage through and below the dam, seepage control, stability of slopes by slip circle method of analysis, pore pressures, sudden draw down, steady seepage and construction pore pressure condition. Rock fill dams: Types, merits and demerits, conditions favourable for their adoption.

Unit III

Spillways : Ogee spillway and its design, details of syphon, shaft, chute and side channel spillways, emergency spillways.

Unit IV

Energy dissipations and gates: Principles of energy dissipation Energy dissipaters based on tail water rating curve and jump height curves Spillway crest gates - vertical lift and radial gates, their design principles and details. Design of canal regulating structures, Detaild design of Sarda Falls, design of cross drainage works, sphypon aquaduct.

Unit V

Hydropower Plants: Introduction of Hydropower development, assessment of powerpotential, types of hydropower plants, general features of hydro-electric schemes, selection of turbines, draft tubes, surge tanks, penstocks, power house dimensions, development of micro hydel stations, tidal plants, pumped storage plants and their details.

Reference
1. Fluid Mechanics - Modi & Seth - Standard Book house, Delhi
2. Open Channel Flow by Rangaraju - Tata Mc Graw - Hill Publishing Comp. Ltd., New Delhi
3. Fluid Mechanics - A.K. Jain - Khanna Publishers, Delhi
4. Fluid Mechanics, Hydraulics & Hydraulic Machanics - K.R. Arora - Standard Publishers Distributors 1705- B, Nai Sarak, Delhi.
5. Hyd. of open channels By Bakhmetiff B.A. (McGraw Hill, New York)
6. Open Channel Hyd. By Chow V.T. (McGraw Hill, New York)
7. Engineering Hydraulics By H. Rouse
8. Centrifugal & Axial Flow Pump By Stempanoff A.J. New York
9. Relevant IS codes

R.K.D.F. UNIVERSITY, RANCHI
B.E. (CIVIL ENGINEERING)
Semester – VII
Course Content & Grade

Branch	Subject Title	Subject Code
CE	Traffic Engineering	**CE- 304**

Unit I

Traffic Characteristics : (i) Road user's characteristics - general human characteristics, physical, mental and emotional factors, factors affecting reaction time, PIEV theory.
(ii) Vehicular characteristics: Characteristics affecting road design-width, height, length and other dimensions. weight, power, speed and braking capacity of a vehicle.

Unit II

Traffic Studies : (i) Spot Speed Studies and Volume Studies. (ii) Speed and Delay Studies purpose, causes of delay, methods of conducting speed and delay studies. (iii) Origin and Destination Studies (O & D) : Various methods, collection and interpretation of data, planning and sampling. (iv) Traffic Capacity Studies: Volume, density, basic practical and possible capacities, level of service. (v) Parking Studies: Methods of parking studies cordon counts, space inventories, parking practices.

Unit III

Traffic Operations and Control : 1. Traffic regulations and various means of control. 2. One way streets- advantages and limitations. 3. Traffic signals- isolated signals, coordinated signals, simultaneous, alternate, flexible and progressive signal systems. Types of traffic signals, fixed time signals, traffic actuated signals, speed control signals, pedestrian signals, flashing signals, clearance interval and problems on single isolated traffic signal.

Unit IV

Street Lighting : 1. Methods of light distribution. 2. Design of street lighting system. 3. Definitions- Luminaire, foot candle, Lumen, utilization and maintenance factors. 4. Different types of light sources used for street lighting. (v) Fundamental factors of night vision.   ## Unit V

Accident Studies & Mass Transportation: 1. Accident Studies: Causes of accidents, accident studies and records, condition and collision diagram, preventive measures. 2. Expressways and freeways, problems on mass transportation and remedial measures, brief study of mass transportation available in the country.

R.K.D.F UNIVERSITY, RANCHI
B.Tech(CIVIL ENGINEERIG)
Semester – VII
Course Content & Grade

Branch	Subject Title	Subject Code
B.Tech. CE	Industrial Waste Treatment	BT305

Unit I
Problem of Water Pollution: Effects of wastes on streams and sewage treatment plant. Natural purification of streams. oxygen sag curve. allowable organic load on streams classification of stream, stream standards and effluent standards. requirement of water for different purposes.

Unit II
Measurement of Waste Water Volume: Sampling of waste waters, grab and composite samples. analysis of waste water. biochemical oxygen demand. chemical oxygen demand and pH value of waste, toxicity of waste by bioassay method. Pretreatment of Wastes: Volume and strength reduction, salvage of materials, recovery of by products, reuse of waste water.

Unit III
Conventional Methods of Treatment of Waste Water: Removal of suspended solids, removal of inorganic and organic dissolved solids, studge disposal, advance methods of treatment, such as reverse osmosis, ion exchange, electrodialysis, algal harvesting etc. low cost treatment plants. common effluent treatment plant, design and operation.

Unit IV
Combined Treatment of Waste Water Sewage: Energy requirement optimization and bedget, municipal regulation, sewer rental charge, instrumentation in waste water treatment plants, collection of data, operation and maintenance of plants, water pollution control board.

Unit-5
. Brief study of industrial processes and treatment methods of waste water from common industries, such as textile, dairy, paper and pulp, tannery, distillery. Hazardous wastes- Impact handing and disposal.

References
1. Punmia, B.C., Jain, A.K., Jain, A.K. "Surveying" – Vol. 1 and
2. Laxmi Publications (P) Ltd.
3. Kanetkar, T.P., Kulkarni S.V. "Surveying and Levelling." – Part 1 and 2, Pune Vidyarthi Griha Prakashan.
4. Duggal, S.K. "Surveying" – Vol. 1 and 2, The McGraw-Hill Companies, New Delhi.
5. Arora, K.R. "Surveying" – Vol. 1 and 2, Standard Book House, New Delhi

B.Tech. VIII Semester (Civil Engineering)

S.No.	Subject Code	Subject Name	Internal	External		Total	
			Max	Max	Min	Max	Min
1		Steel-II	30	70	21	100	35
2		Theory of Structure	30	70	21	100	35
3		Pavement Design	30	70	21	100	35
4		Air Quality Monitoring & Control	30	70	21	100	35
5		Advance Water Resources Engineering	30	70	21	100	35
6		Environmental Engineering. – II	30	70	21	100	35

Practical

			Total	
			Max	Min
1	CE354	ADVANCED GEOTECHNICAL ENGINEERING Lab	50	25
2	BT356	Auto cadd lab	50	25

RKDF UNIVERSITY, RANCHI
New Scheme of Examination as per AICTE Flexible Curricula
Choice Based Credit System
Branch:- Civil Engineering
B.Tech Eight Semester

S.No.	Subject Code	SUBJECT NAME	PERIODS			Credit
			L	T	P	
1	CE- 4021	Steel-II	4	0	0	4
2	CE302	Theory of Structure	3	1	0	3
3	CE303	Pavement Design	4	0	0	3
4	CE304	Air Quality Monitoring & Control	4	0	0	4
5	BT305	Advance Water Resources Engineering	4	0	0	4
6		Environmental Engineering. – II	4	0	0	3
1		Environmental Engineering. – II				2
2						
		Total credit				**23**

R.K.D.F. UNIVERSITY, RANCHI

B.Tech.
(Civil Engineering)
SECOND YEAR
Semester – VIII

Branch	Subject Title	Subject Code
B.Tech. CE	Steel-II	CE- 4021

Unit I

Plate girder bridges (Riveted and welded)
Unit II
Trussed girder bridges for railways and highways (IRC & IRS holding). Bearings for
bridges.   **Unit III**
        Water Tanks: Pressed steel tanks, tanks with ordinary plates, square,
rectangular, circular with hemispherical bottom and conical bottom.

Unit IV

Chimneys: Guyed and self supporting steel stacks.

Unit V

Bunkers, Silos & Towers

References
 1. Varshney RS; Concrete Technology; Oxfored & IBH publishing co.
 2. Gambhir ML; Concrete Technology – TMH
 3. Sinha SN; Reinforced Concrete Technology; TMH
 4. New Building Materials Published by B.M.T.P.C., New Delhi
 5. Hand books on Materials & Technology - Published by BMTPC & HUDCO
 6. Mohan Rai & M.P. Jai Singh; Advances in Building Materials & Construction
 7. Jackson N; Civil Engineering materials.
 8. Properties of Concrete - A.M. Neville - Pearson Education

R.K.D.F. UNIVERSITY, RANCHI

B.E. (CIVIL ENGINEERING)
SECOND YEAR
Semester – VIII
Course Content &
Grade

Branch	Subject Title	Subject Code
CE	Theory of Structure	**CE302**

Unit I

Virtual work and Energy Principles: Principles of Virtual work applied to deformable bodies, strain energy and complementary energy, Energy theorems, Maxwell's Reciprocal theorem, Analysis of Pin-Jointed frames for static loads. Indeterminate Structures-I : Static and Kinematics indeterminacy, Analysis of Fixed and continuous beams by theorem of three moments, Effect of sinking and rotation of supports, Moment distribution method (without sway)

Unit II

Indeterminate Structures - II: Analysis of beams and frames by slope Deflection method, Column Analogy method. Arches and Suspension Cables: Three hinged arches of different shapes, Eddy's Theorem, Suspension cable, stiffening girders, Two Hinged and Fixed Arches - Rib shortening andTemperature effects.

Unit-III

Rolling loads and Influence Lines: Maximum SF and BM curves for various types of rolling loads, focal length, EUDL, Influence Lines for Determinate Structures- Beams, Three Hinged Arches. Moment distribution method in analysis of frames with sway, analysis of box frames, analysis of portals with inclined members, analysis of beams and frames by Kani's method

Unit-IV

Plastic analysis of beams and frames. Analysis of tall frames, wind and earthquake loads, codal provisions for lateral loads. Approximate analysis of multistory frames for vertical and lateral loads.

Unit-5

Matrix method of structural analysis: force method and displacement method.. Influence lines for

intermediate structures, Muller Breslau principle, Analysis of Beam-Columns.

References
1. T.P. Kanetkar, Surveying & Levelling, Vol. I & II.
2. Duggal; Surveying vol I and II; TMH
3. Basak; Surveying and Leveling; TMH
4. R.E.Devis, Surveying theory & Practice, Mc.Graw Hill, New York
5. David Clark & J Clendinning, Plane & Geodetic surveying Vol. I & II, constable & Co. London.
6. S.K. Roy, Fundamentals of surveying, prentice - Hall of India New Delhi
7. B.C. Punmia, Surveying Vol. I, II, III, Laxmi Publications New Delhi 8. K.R. Arora, Surveyhing Vol. I & II, standard book House, New Delhi

List of Experiments/ Field work (Expandable):
1. Theodolite traversing
2. Profile leveling, contouring & cross sectioning
3. Determination of tachometric constants & uses of tachometer in various field works
4. Curve setting by different methods.

Branch	Subject Title	Subject Code
CE	Pavement Design	**CE 303**

Unit I

Equivalent Single Wheel Load (ESWL) : Definition, calculation of ESWL, repetition of loads and their effects on the pavement structures.

Unit II

Flexible Pavements : Component parts of the pavement structures and their functions, stresses in flexible pavements, Stress distribution through various layers, Boussinesque's theory , Burmister's two layered theory, methods of design, group index method, CBR method, Burmister's method and North Dakota cone method.

Unit III

Rigid Pavements : Evaluation of subgrade, Modulus-K by plate bearing test and the test details, Westergaard's stress theory stresses in rigid pavements, Temperature stresses, warping stresses, frictional stresses, critical combination of stresses, critical loading positions.

Unit IV

Rigid pavement design : IRC method, Fatigue analysis, PCA chart method, joints, design and construction & types, AASHTO Method, Reliability analysis.

Unit V

Evaluation and Strengthening of Existing Pavements : Benkleman beam method, Serviceability Index Method. Rigid and flexible overlays and their design procedures.

Reference
1. Fluid Mechanics - Modi & Seth - Standard Book house, Delhi
2. Open Channel Flow by Rangaraju - Tata Mc Graw - Hill Publishing Comp. Ltd., New Delhi
3. Fluid Mechanics - A.K. Jain - Khanna Publishers, Delhi
4. Fluid Mechanics, Hydraulics & Hydraulic Machanics - K.R. Arora - Standard Publishers Distributors 1705- B, Nai Sarak, Delhi.
5. Hyd. of open channels By Bakhmetiff B.A. (McGraw Hill, New York)
6. Open Channel Hyd. By Chow V.T. (McGraw Hill, New York)
7. Engineering Hydraulics By H. Rouse
8. Centrifugal & Axial Flow Pump By Stempanoff A.J. New York
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R.K.D.F. UNIVERSITY, RANCHI
B.E. (CIVIL ENGINEERING)
Semester – VIII
Course Content & Grade

Branch	Subject Title	Subject Code
CE	Air Quality Monitoring & Control	**CE- 304**

Unit I

Air pollution problem: Economics and social aspects, historical episodes of air pollution. Sources of Air pollution, effects of air pollution on health, animal, plants and materials

Unit II

Role of meteorological condition, properties of typical air pollutants, air diffusion and concentration pollutants. general diseases caused by air pollutants. toxicity of various pollutants. Plums patterns and height of chimneys.

Unit III

Atmospheric chemistry, formation of secondary pollutants – PNN, PBN, Photolytic cycles, general diseases and toxicity of pollutants

Unit IV

Sampling and Analyzing of Air Pollutants: Instruments pollution survey, standards of air pollution.Principle of air pollution control, site selection and zoning, various control methods, process and equipment changes, design and operation of various air pollution control equipments.

Unit V

Air pollution control legislation, public education pollution standards, status of air pollution control in various countries. Industrial Hygiene: Concept and importance, factory Involved in environmental hazards, industrial ventilation occupational diseases, control methods.

R.K.D.F UNIVERSITY, RANCHI
B.Tech(CIVIL ENGINEERIG)
Semester – VIII
Course Content & Grade

Branch	Subject Title	Subject Code
B.Tech. CE	Advance Water Resources Engineering	**BT305**

Unit I

Hydrology : Hydrological cycle, precipitation and its measurement, recording and non recording rain gauges, estimating missing rainfall data, rain gauge net works, mean depth of precipitation over a drainage area, mass rainfall curves, intensity-duration curves, depth-area duration curves,

Unit II

Hydrology :Infiltration and infiltration indices, evaporation stream gauging, run off and its estimation, hydrograph analysis, unit hydrograph and its derivation from isolated and complex storms, S-curve hydrograph, synthetic unit hydrograph.

Unit III

Floods : Types of floods and their estimation by different methods, probability and frequency analysis, flood routing through reservoirs and channels, flood control measures, economics of flood control.

Unit IV

Ground water : Occurrence, confined and unconfined aquifers, aquifer properties, hydraulics of wells under steady flow conditions, infiltration galleries. Ground water recharge-necessity and methods of improving ground water storage. Water logging and salt efflorescence : Water logging-causes, effects and its prevention. Salt efflorescencecauses and effects. reclamation of water logged and salt affected lands.

Unit-5

Water resources planning and management : Planning of water resources projects, data requirements, economic analysis of water resources projects appraisal of multipurpose projects, optimal operation of projectsintroduction to linear programming and its application to water resources projects. Role of water in the environment, rain water harvesting, impact assessment of water resources development and managerial measures.

References

1. Punmia, B.C., Jain, A.K., Jain, A.K. "Surveying" – Vol. 1 and
2. Laxmi Publications (P) Ltd.
3. Kanetkar, T.P., Kulkarni S.V. "Surveying and Levelling." – Part 1 and 2, Pune Vidyarthi Griha Prakashan.
4. Duggal, S.K. "Surveying" – Vol. 1 and 2, The McGraw-Hill Companies, New Delhi.
5. Arora, K.R. "Surveying" – Vol. 1 and 2, Standard Book House, New Delhi

R.K.D.F UNIVERSITY, RANCHI

6. B.Tech(CIVIL ENGINEERIG)

7. Semester – VIII

8. Course Content & Grade

9.

Branch	Subject Title	Subject Code
B.Tech. CE	Environmental Engineering. – II	BT305

Unit I

10. Sewerage schemes and their importance, collection & conveyance of sewage, storm water quantity, fluctuation in sewage flow, flow through sewer, design of sewer, construction & maintenance of sewer, sewer appurtenances, pumps & pumping stations.

11. ### Unit II

12. Characteristics and analysis of waste wate, rcycles of decomposition, physical, chemical & biological parameters. Oxygen demand i.e. BOD & COD, TOC, TOD, Th OD, Relative Stability, population equivalent, instrumentation involved in analysis, natural methods of waste water disposal i.e. by land treatment & by dilution, self purification capacity of stream, Oxygen sag analysis.

Unit III

Unit operations for waste water treatment, preliminary treatment such as screens, grit chamber, floatation tank, sedimentation and chemical clarification, role of micro-organism in biological treatment, Sewage filtrationtheory & design.

Unit IV

Methods of Biological Treatment (Theory & Design) - Activated Sludge process, Oxidation ditch, stabilization ponds, aerated lagoon, anaerobic lagoons, septic tank & imhoff tank, sources & treatment of sludge, sludge thickening and digestion sludge drying beds, sludge disposal.

Unit-5

Advanced Waste Water treatment - Diatomaceous earth filters, ultra filtration, Adsorption by activated carbon, Phosphorus removal, Nitrogen removal, Physico chemical waste water treatment, and Solid waste disposal - classification, composition, collection, & disposal methods. Rural sanitation - collection & disposal of refuse, sullage & night soil