



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Common For All Branches)

New Scheme Based On AICTE Flexible Curricula

Semester – I

Course Content

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

Unit 1

Electrochemistry and Water:

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

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

Unit 2

Periodic Properties and Chemical Bonding:

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

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

Unit 3

Spectroscopy and Photochemistry

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

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

Unit 4

Thermochemistry and Fuels

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

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

Unit 5

Polymerization and Common Organic Reactions

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

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

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

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

Books Suggested:

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



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Course Content

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

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

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

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

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

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

References:

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



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Semester – I

Course Content

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

Unit I

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

Unit II

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

Unit III

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

Unit IV

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

Unit V

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

Books Recommended:

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



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Semester – I

Course Content

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

UNIT I

AC & DC CIRCUITS

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

UNIT II

TRANSFORMERS

Review of laws of electromagnetism, mmf, flux, and their relation, analysis of magnetic circuits. Single-phase transformer, basic concepts and construction features, voltage, current and impedance transformation, equivalent circuits, phasor diagram, voltage regulation, losses and efficiency, OC and SC test.

UNIT III

ROTATING ELECTRIC MACHINES-

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

UNIT IV

WIRING & LIGHTING

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

UNIT V

ELECTRONICS

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

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

References:

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



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Semester – I

Course Content

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

UNIT - I

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

UNIT – II

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

UNIT III

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

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

UNIT IV

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

UNIT V

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

Text/Reference Books:

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



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Semester – I

Course Content

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

Unit I

Introduction: Manufacturing Processes and its Classification, Casting, Machining, Plastic deformation and metal forming, Joining Processes, Heat treatment process, Assembly process. Powder Metallurgy, introduction to computers in manufacturing. Black Smithy Shop Use of various smithy tools. Forging operations: Upsetting, Drawing down, Fullering, Swaging, Cutting down, Forge welding, Punching and drafting. Suggested Jobs: Forging of chisel., forging of Screw Driver

Unit II

Carpentry Shop: Timber : Type, Qualities of timber disease, Timber grains, Structure of timber, Timber, Timber seasoning, Timber preservation .Wood Working tools: Wood working machinery, joints & joinery. Various operations of planning using various carpentry planes sawing & marking of various carpentry joints. Suggested Jobs : Name Plate ,Any of the Carpentry joint like mortise or tennon joint

Unit III

Fitting Shop: Study and use of Measuring instruments, Engineer steel rule, Surface gauges caliper, Height gauges, feeler gauges, micro meter. Different types of files, File cuts, File grades, Use of surface plate, Surface gauges drilling tapping Fitting operations: Chipping filling, Drilling and tapping. Suggested Jobs: Preparation of job piece by making use of filling, sawing and chipping , drilling and tapping operations.

Unit IV

Foundry: Pattern Making: Study of Pattern materials, pattern allowances and types of patterns. Core box and core print, .Use and care of tools used for making wooden patterns. Moulding: Properties of good mould & Core sand, Composition of Green, Dry and Loam sand. Methods used to prepare simple green and bench and pit mould dry sand bench mould using single piece and split patterns.

Unit V

Welding: Study and use of tools used for Brazing, Soldering, Gas & Arc welding. Preparing Lap & Butt joints using gas and arc welding methods, Study of TIG & MIG welding processes. Safety precautions.



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Semester – II

Course Content

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

Unit- I

Wave Optics

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

Unit- II

Nuclear Physics

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

Unit -III

Semiconductors & Nano-Physics

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

UNIT-IV

Laser and Fiber Optics

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

Unit- V

Quantum Physics

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

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

List of suggestive core experiments: -

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

Reference Books: -

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



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Semester – II

Course Content

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

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

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

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

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

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

Textbooks/References:

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



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Semester – II

Course Content

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

Unit I :

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

Unit II:

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

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

Unit III :

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

Unit IV:

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

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

Unit V:

Reciprocating Machines :

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

Reference Books:

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

List of Suggestive Core Experiments:

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

S.N. Title

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



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Course Content

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

Unit I

Building Materials & Construction

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

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

Unit – II

Surveying & Positioning:

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

Unit –III

Mapping & Sensing:

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

Engineering Mechanics

Unit – IV

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

Unit – V

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

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

Reference Books:

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

List of suggestive core Experiments:

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

S. No.**Title**

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

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

UNIT 1

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

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

UNIT 2

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

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

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

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

UNIT 3

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

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

UNIT 4

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

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

UNIT 5

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

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

TEXT BOOK:

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

Reference Books:

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



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Common For All Branches)

New Scheme Based On AICTE Flexible Curricula

Semester – II

Course Content

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

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

Topics to be covered in the Language laboratory sessions:

1. Listening Comprehension
2. Pronunciation, Intonation, Rhythm
3. Practicing everyday dialogues in English
4. Interviews
5. Formal Presentation
6. Public Speaking and oral skills with emphasis on conversational practice, extempore speech, JAM (Just a minute sessions), describing objects and situations, giving directions, debate, telephonic etiquette.

Suggested Readings:

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



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science and Engineering)

SECOND YEAR

Branch	Subject Title	Subject Code
B.Tech. CSE	Engineering Mathematics-III	BT- 301

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.Tech (Computer Science & Engineering) SECOND YEAR

Semester – III

Course Content & Grade

Branch	Subject Title	Subject Code
CSE	Data Structure and Algorithms	CS- 302

UNIT- I

Introduction: to Notions of data type, abstract data type, and data structures. Relation to the notion of classes and objects in object oriented programming. Importance of algorithms and data structures in programming. Notion of Complexity covering time complexity and space complexity. Worst case complexity, Average case complexity. Big Oh Notation. Examples of simple algorithms and illustration of their complexity. Introduction to recurrence relations. Iteration and Recursion- Problem solving using iteration and recursion with examples such as binary search, Fibonacci numbers, and Hanoi towers. Tradeoffs between iteration and recursion.

UNIT- II

List ADT. Implementation of lists using arrays and pointers. Stack ADT. Queue ADT. Implementation of stacks and queues. Dictionaries, Hash tables: open tables and closed tables. Analysis of hashing. Skip lists and analysis.

UNIT- III

Binary Trees- Definition and traversals: preorder, postorder, inorder. Common types and properties of binary trees. Counting of binary trees. Huffman coding using binary trees. Binary search trees : worst case analysis and average case analysis. AVL trees. Red-Black Trees, Splay trees. Priority Queues -Binary heaps: insert and delete operations and analysis. Binomial queues.

UNIT- IV

Directed Graphs- Data structures for graph representation. Shortest path algorithms: Dijkstra (greedy algorithm) and Bellman-Ford (dynamic programming). Depth- first search and Breadth-first search. Directed acyclic graphs. Undirected Graphs- Depth-first search and breadth-first search. Minimal spanning trees and algorithms (Floyd and Kruskal) and implementation. Application to the travelling salesman problem.

UNIT- V

Sorting- Bubblesort, selection sort, insertion sort, Shell sort; Quicksort; Heapsort; Mergesort; Radix sort; Analysis of the sorting methods. Selecting the top k elements. Lower bound on sorting.

Text Books:

1. **Data Structures and Algorithms** by Alfred V. Aho, Jeffrey D. Ullman and John E. Hopcroft , Addison-Wesley Series (1983)
2. **Data Structures and Algorithm Analysis in Java (3rd Edition)** by Mark Allen Weiss, Addison Wesley, (2011).

Reference Books:

1. T.H. Cormen, C.E. Leiserson, and R.L. Rivest. *Introduction to Algorithms*. The MIT Press and McGraw-Hill Book Company, Cambridge, Massachusetts, 1990 (Available in Indian Edition).
2. Steven S. Skiena. *The Algorithm Design Manual*. Springer, Second Edition, 2008.



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science & Engineering)

SECOND YEAR

Semester – III

Course Content & Grade

Branch	Subject Title	Subject Code
CSE	Computer Organization and Architecture	CS- 303

UNIT I

Basic Structure of Computers

Functional units - Basic operational concepts - Bus structures - Software performance – Memory locations and addresses – Memory operations – Instruction and instruction sequencing – Addressing modes – Assembly language – Basic I/O operations – Stacks and queues.

UNIT II

Arithmetic Unit

Addition and subtraction of signed numbers – Design of fast adders – Multiplication of positive numbers - Signed operand multiplication and fast multiplication – Integer division – Floating point numbers and operations.

UNIT III

Basic Processing Unit

Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Microprogrammed control - Pipelining – Basic concepts – Data hazards – Instruction hazards – Influence on Instruction sets – Data path and control consideration – Superscalar operation.

UNIT IV

Memory System

Basic concepts – Semiconductor RAMs - ROMs – Speed - size and cost – Cache memories - Performance consideration – Virtual memory- Memory Management requirements – Secondary storage.

UNIT V

I/O Organization

Accessing I/O devices – Interrupts – Direct Memory Access – Buses – Interface circuits – Standard I/O Interfaces (PCI, SCSI, USB).

TEXT BOOK :

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, 5th Edition “Computer Organization”, McGraw-Hill, 2002.

REFERENCES :

1. William Stallings, "Computer Organization and Architecture – Designing for Performance", 6th Edition, Pearson Education, 2003.
2. David A.Patterson and John L.Hennessy, "Computer Organization and Design: The hardware / software interface", 2nd Edition, Morgan Kaufmann, 2002.
3. John P.Hayes, "Computer Architecture and Organization", 3rd Edition, McGraw Hill, 1998.



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science and
Engineering) SECOND YEAR

Semester – III

Course Content & Grade

Branch	Subject Title	Subject Code
CSE	Operating Systems	CS- 304

UNIT I

INTRODUCTION

Introduction - Mainframe systems – Desktop Systems – Multiprocessor Systems – Distributed Systems – Clustered Systems – Real Time Systems – Handheld Systems - Hardware Protection - System Components – Operating System Services – System Calls – System Programs - Process Concept – Process Scheduling – Operations on Processes – Cooperating Processes – Inter- process Communication.

UNIT II

SCHEDULING

Threads – Overview – Threading issues - CPU Scheduling – Basic Concepts – Scheduling Criteria– Scheduling Algorithms – Multiple-Processor Scheduling – Real Time Scheduling - The Critical- Section Problem – Synchronization Hardware – Semaphores – Classic problems of Synchronization– Critical regions – Monitors.

UNIT III

DEADLOCKS

System Model – Deadlock Characterization – Methods for handling Deadlocks -Deadlock Prevention– Deadlock avoidance – Deadlock detection – Recovery from Deadlocks - Storage Management– Swapping – Contiguous Memory allocation – Paging – Segmentation – Segmentation with Paging.

UNIT IV

PAGING AND FILE SYSTEM

Virtual Memory – Demand Paging – Process creation – Page Replacement – Allocation of frames– Thrashing - File Concept – Access Methods – Directory Structure – File System Mounting – File Sharing – Protection

UNIT V

FILE MANAGEMENT

File System Structure – File System Implementation – Directory Implementation – Allocation Methods – Free-space Management. Kernel I/O Subsystems - Disk Structure – Disk Scheduling – Disk Management – Swap-Space Management. Case Study: The Linux System, Windows

TEXT BOOK :

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", Sixth Edition, John Wiley & Sons (ASIA) Pvt. Ltd, 2003.

REFERENCES :

1. Harvey M. Deitel, "Operating Systems", Second Edition, Pearson Education Pvt. Ltd, 2002.
2. Andrew S. Tanenbaum, "Modern Operating Systems", Prentice Hall of India Pvt. Ltd, 2003.
3. William Stallings, "Operating System", Prentice Hall of India, 4th Edition, 2003.
4. Pramod Chandra P. Bhatt – "An Introduction to Operating Systems, Concepts and Practice", PHI, 2003.

Operating System

List of Experiment

1. Write a program to implement FCFS CPU scheduling algorithm.
2. Write a program to implement SJF CPU scheduling algorithm.
3. Write a program to implement Priority CPU Scheduling algorithm.
4. Write a program to implement Round Robin CPU scheduling algorithm.
5. Write a program to compare various CPU Scheduling Algorithms over different Scheduling Criteria.
6. Write a program to implement classical inter process communication problem.
7. Write a program to implement classical inter process communication problem.
8. Write a program to implement classical inter process communication problem.
9. Write a program to implement & Compare various page replacement algorithm.
10. Write a program to implement & Compare various Disk & Drum scheduling Algorithms.
11. Write a program to implement Banker's algorithms.
12. Write a program to implement Remote Procedure Call(RPC).
13. Write a Devices Drivers for any Device or peripheral.



RKDF UNIVERSITY, RANCHI

Bachelor of Technology in Computer Science

New Scheme Based on AICTE Flexible Curricula

Semester- III

Course Content

Branch	Subject Title	Subject Code
Computer Science	Environmental Science	CS305

Unit I: Introduction to environmental studies and Ecosystems

Multidisciplinary nature of environmental studies; Scope and importance; Concept of sustainability and sustainable development, What is an 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 of , 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 pollution in Ranchi)



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

B.Tech. IV Semester (Computer Science and Engineering)

S. No.	Subject Code	Subject Name	Internal	External		Total Marks	
			Max. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks
1	CS401	Object-oriented Programming with java	30	70	21	100	35
2	CS402	Database Management Systems	30	70	21	100	35
3	CS403	Software Engineering	30	70	21	100	35
4	CS404	Design and Analysis of Algorithms	30	70	21	100	35
5	CS405	Computer Networks	30	70	21	100	35
Practical							
Total							
			Max			Min	
1	CS451	JAVA LAB	50			25	
2	CS452	DBMS LAB	50			25	
3	CS456	INTERNSHIP((90 Hrs Duration) at the Institute Level)	50			25	

Choice Based Credit System
Branch:-Computer Science
Fourth Semester

S.No.	Subject Code	SUBJECT NAME	PERIODS			Credit
			L	T	P	
1	CS401	Object-oriented Programming with java	4	0	0	4
2	CS402	Database Management Systems	3	1	0	4
3	CS403	Software Engineering	4	0	0	4
4	CS404	Design and Analysis of Algorithms	3	1	0	4
5	CS405	Computer Networks	3	1	0	4
Practicals						
1	CS451	JAVA LAB	0	0	2	1
2	CS452	DBMS LAB	0	0	2	1
3	CS456	INTERNSHIP((90 Hrs Duration) at the Institute Level)	0	0	2	2
Total			16	2	6	24



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science and Engineering)

SECOND YEAR

Semester – IV

Course Content & Grade

Branch	Subject Title	Subject Code
CS	Object-oriented Programming with java	CS401

UNIT-I

Basic Java Features - C++ Vs JAVA, JAVA virtual machine, Constant & Variables, Data Types, Class, Methods, Objects, Strings and Arrays, Type Casting, Operators, Precedence relations, Control Statements, Exception Handling, File and Streams, Visibility, Constructors, Operator and Methods Overloading, Static Members, Inheritance: Polymorphism, Abstract methods and Classes

UNIT-II

Java Collective Frame Work - Data Structures: Introduction, Type-Wrapper Classes for Primitive Types, Dynamic Memory Allocation, Linked List, Stack, Queues, Trees, Generics: Introduction, Overloading Generic Methods, Generic Classes, Collections: Interface Collection and Class Collections, Lists, Array List and Iterator, Linked List, Vector. Collections Algorithms: Algorithm sorts, Algorithm shuffle, Algorithms reverse, fill, copy, max and min Algorithm binary Search, Algorithms add All, Stack Class of Package java. Util, Class Priority Queue and Interface Queue, Maps, Properties Class, Un-modifiable Collections.

UNIT-III

Advance Java Features - Multithreading: Thread States, Priorities and Thread Scheduling, Life Cycle of a Thread, Thread Synchronization, Creating and Executing Threads, Multithreading with GUI, Monitors and Monitor Locks. Networking: Manipulating URLs, Reading a file on a Web Server, Socket programming, Security and the Network, RMI, Networking, Accessing Databases with JDBC: Relational Database, SQL, MySQL, Oracle

UNIT-IV

Advance Java Technologies - Servlets: Overview and Architecture, Setting Up the Apache Tomcat Server, Handling HTTP get Requests, Deploying a web Application, Multitier Applications, Using JDBC from a Servlet, Java Server Pages (JSP): Overview, First JSP Example, Implicit Objects, Scripting, Standard Actions, Directives, Multimedia: Applets and Application: Loading, Displaying and Scaling Images, Animating a Series of Images, Loading and playing Audio clips

UNIT-V

Advance Web/Internet Programming (Overview): J2ME, J2EE, EJB, XML.

References:

1. Deitel & Deitel, "JAVA, How to Program"; PHI, Pearson.
2. E. Balaguruswamy, "Programming In Java"; TMH Publications
3. The Complete Reference: Herbert Schildt, TMH



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science and Engineering)

SECOND YEAR

Semester – IV

Course Content & Grade

Branch	Subject Title	Subject Code
CSE	Database Management Systems	CS402

UNIT I

Introduction And Conceptual Modeling : Introduction to File and Database systems- Database system structure – Data Models – Introduction to Network and Hierarchical Models – ER model – Relational Model – Relational Algebra and Calculus.

UNIT II

Relational Model : SQL – Data definition- Queries in SQL- Updates- Views – Integrity and Security – Relational Database design – Functional dependencies and Normalization for Relational Databases (up to BCNF).

UNIT III

Data Storage And Query Processing : Record storage and Primary file organization- Secondary storage Devices- Operations on Files- Heap File- Sorted Files- Hashing Techniques – Index Structure for files – Different types of Indexes-B-Tree - B+ Tree – Query Processing.

UNIT IV

Transaction Management : Transaction Processing – Introduction- Need for Concurrency control- Desirable properties of Transaction- Schedule and Recoverability- Serializability and Schedules – Concurrency Control – Types of Locks- Two Phases locking- Deadlock- Time stamp based concurrency control – Recovery Techniques – Concepts- Immediate Update- Deferred Update - Shadow Paging.

UNIT V

Current Trends : Object Oriented Databases – Need for Complex Data types- OO data Model- Nested relations- Complex Types- Inheritance Reference Types - Distributed databases- Homogenous and Heterogenous- Distributed data Storage – XML – Structure of XML- Data- XML Document- Schema- Querying and Transformation. – Data Mining and Data Warehousing.

TEXT BOOK :

1. Abraham Silberschatz, Henry F. Korth and S. Sudarshan- “Database System Concepts”, Fourth Edition, McGraw-Hill, 2002.

REFERENCES :

1. Ramez Elmasri and Shamkant B. Navathe, “Fundamental Database Systems”, Third Edition, Pearson Education, 2003.
2. Raghu Ramakrishnan, “Database Management System”, Tata McGraw-Hill Publishing Company, 2003.
3. Hector Garcia–Molina, Jeffrey D.Ullman and Jennifer Widom- “Database System Implementation”- Pearson Education- 2000.
4. Peter Rob and Corlos Coronel- “Database System, Design, Implementation and Management”, Thompson Learning Course Technology- Fifth edition, 2003.

DBMS LAB

LIST OF EXPERIMENTS

1. Data Definition Language (DDL) commands in RDBMS.
2. Data Manipulation Language (DML) and Data Control Language (DCL) commands in RDBMS.
3. High-level language extension with Cursors.
4. High level language extension with Triggers
5. Procedures and Functions.
6. Embedded SQL.
7. Database design using E-R model and Normalization.
8. Design and implementation of Payroll Processing System.
9. Design and implementation of Banking System.
10. Design and implementation of Library Information System.



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science and Engineering)

SECOND YEAR

Semester – IV

Course Content & Grade

Branch	Subject Title	Subject Code
CSE	Software Engineering	CS403

UNIT I

SOFTWARE PROCESS

Introduction –S/W Engineering Paradigm – life cycle models (water fall, incremental, spiral, WINWIN spiral, evolutionary, prototyping, object oriented) - system engineering – computer based system – verification – validation – life cycle process – development process –system engineering hierarchy.

UNIT II

SOFTWARE REQUIREMENTS

Functional and non-functional - user – system –requirement engineering process – feasibility studies– requirements – elicitation – validation and management – software prototyping – prototyping in the software process – rapid prototyping techniques – user interface prototyping -S/W document. Analysis and modeling – data, functional and behavioral models – structured analysis and data dictionary.

UNIT III

DESIGN CONCEPTS AND PRINCIPLES

Design process and concepts – modular design – design heuristic – design model and document. Architectural design – software architecture – data design – architectural design – transform and transaction mapping – user interface design – user interface design principles. Real time systems- Real time software design – system design – real time executives – data acquisition system - monitoring and control system. SCM – Need for SCM – Version control – Introduction to SCM process – Software configuration items.

UNIT IV

TESTING

Taxonomy of software testing – levels – test activities – types of s/w test – black box testing – testing boundary conditions – structural testing – test coverage criteria based on data flow mechanisms– regression testing – testing in the large. S/W testing strategies – strategic approach and issues - unit testing – integration testing – validation testing – system testing and debugging.

UNIT V

SOFTWARE PROJECT MANAGEMENT

Measures and measurements – S/W complexity and science measure – size measure – data and logic structure measure – information flow measure. Software cost estimation – function point models – COCOMO model- Delphi method.- Defining a Task Network – Scheduling – Earned Value Analysis – Error Tracking - Software changes – program evolution dynamics – software maintenance – Architectural evolution. Taxonomy of CASE tools.

TEXT BOOK :

1. Roger S. Pressman, Software engineering- A practitioner's Approach, McGraw-Hill International

Edition, 5th edition, 2001.

REFERENCES :

1. Ian Sommerville, Software engineering, Pearson education Asia, 6th edition, 2000.
2. Pankaj Jalote- An Integrated Approach to Software Engineering, Springer Verlag, 1997.
3. James F Peters and Witold Pedrycz, “Software Engineering – An Engineering Approach”, John Wiley and Sons, New Delhi, 2000.

Practical and Lab work

Lab work should include a running case study problem for which different deliverables at the end of each phase of a software development life cycle are to be developed. This will include modeling the requirements, architecture and detailed design. Subsequently the design models will be coded and tested. For modeling, tools like Rational Rose products. For coding and testing, IDE like Eclipse, Net Beans, and Visual Studio can be used.



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science and Engineering)

SECOND YEAR

Semester – IV

Course Content & Grade

Branch	Subject Title	Subject Code
CSE	Design and Analysis of Algorithms	CS404

UNIT I

BASIC CONCEPTS OF ALGORITHMS

Introduction – Notion of Algorithm – Fundamentals of Algorithmic Solving – Important Problem types – Fundamentals of the Analysis Framework – Asymptotic Notations and Basic Efficiency Classes.

UNIT II

MATHEMATICAL ASPECTS AND ANALYSIS OF ALGORITHMS

Mathematical Analysis of Non-recursive Algorithm – Mathematical Analysis of Recursive Algorithm – Example: Fibonacci Numbers – Empirical Analysis of Algorithms – Algorithm Visualization.

UNIT III

ANALYSIS OF SORTING AND SEARCHING ALGORITHMS

Brute Force – Selection Sort and Bubble Sort – Sequential Search and Brute-force string matching – Divide and conquer – Merge sort – Quick Sort – Binary Search – Binary tree- Traversal and Related Properties – Decrease and Conquer – Insertion Sort – Depth first Search and Breadth First Search.

UNIT IV

ALGORITHMIC TECHNIQUES

Transform and conquer – Presorting – Balanced Search trees – AVL Trees – Heaps and Heap sort – Dynamic Programming – Warshall's and Floyd's Algorithm – Optimal Binary Search trees – Greedy Techniques – Prim's Algorithm – Kruskal's Algorithm – Dijkstra's Algorithm – Huffman trees.

UNIT V

ALGORITHM DESIGN METHODS

Backtracking – n-Queen's Problem – Hamiltonian Circuit problem – Subset-Sum problem – Branch and bound – Assignment problem – Knapsack problem – Traveling salesman problem.

TEXT BOOK :

1. Anany Levitin, "Introduction to the Design and Analysis of Algorithm", Pearson Education Asia, 2003.

REFERENCES :

1. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, "Introduction to Algorithms", PHI Pvt.Ltd., 2001
2. Sara Baase and Allen Van Gelder, "Computer Algorithms - Introduction to Design and Analysis",

Pearson Education Asia, 2003.

3. A.V.Aho, J.E. Hopcroft and J.D.Ullman, "The Design and Analysis of Computer Algorithms", Pearson Education Asia, 2003.



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science and Engineering)

SECOND YEAR

Semester – IV

Course Content & Grade

Branch	Subject Title	Subject Code
CSE	Computer Networks	CS405

UNIT I

DATA COMMUNICATIONS

Components – Direction of Data flow – networks – Components and Categories – types of Connections – Topologies – Protocols and Standards – ISO / OSI model – Transmission Media – Coaxial Cable – Fiber Optics – Line Coding – Modems – RS232 Interfacing sequences.

UNIT II

DATA LINK LAYER

Error – detection and correction – Parity – LRC – CRC – Hamming code – low Control and Error control - stop and wait – go back-N ARQ – selective repeat ARQ- sliding window – HDLC. - LAN - Ethernet IEEE 802.3 - IEEE 802.4 - IEEE 802.5 - IEEE 802.11 – FDDI - SONET – Bridges.

UNIT III

NETWORK LAYER

Internetworks – Packet Switching and Datagram approach – IP addressing methods – Subnetting– Routing – Distance Vector Routing – Link State Routing – Routers.

UNIT IV

TRANSPORT LAYER

Duties of transport layer – Multiplexing – Demultiplexing – Sockets – User Datagram Protocol (UDP) – Transmission Control Protocol (TCP) – Congestion Control – Quality of services (QOS) – Integrated Services.

UNIT V

APPLICATION LAYER

Domain Name Space (DNS) – SMTP – FTP – HTTP - WWW – Security – Cryptography.

TEXT BOOK :

1. Behrouz A. Forouzan, “Data communication and Networking”, Tata McGraw-Hill, 2004.

REFERENCES :

1. James F. Kurose and Keith W. Ross, “Computer Networking: A Top-Down Approach Featuring the Internet”, Pearson Education, 2003.
2. Larry L. Peterson and Peter S. Davie, “Computer Networks”, Harcourt Asia Pvt. Ltd., Second Edition.
3. Andrew S. Tanenbaum, “Computer Networks”, PHI, Fourth Edition, 2003.
4. William Stallings, “Data and Computer Communication”, Sixth Edition, Pearson Education, 2000.
5. Andrew S. Tanenbaum, “Computer Networks”, PHI, Fourth Edition, 2003.

NETWORKING LAB LIST OF EXPERIMENTS

All the programs are to be written using C)

1. Simulation of ARP / RARP.
2. Write a program that takes a binary file as input and performs bit stuffing and CRC Computation.
3. Develop an application for transferring files over RS232.
4. Simulation of Sliding-Window protocol.
5. Simulation of BGP / OSPF routing protocol.
6. Develop a Client – Server application for chat.
7. Develop a Client that contacts a given DNS Server to resolve a given host name.
8. Write a Client to download a file from a HTTP Server.
9. Study of Network Simulators like NS2/Glomosim / OPNET



R.K.D.F. UNIVERSITY, RANCHI

**B.Tech. (Computer Science and
Engineering) SECOND YEAR
Semester – IV
Course Content & Grade**

Branch	Subject Title	Subject Code
CS	Java Lab	CS451

1. WAJP to show the characteristic of a number. {E.g. 24 it has two coefficients 2 in tens position and 4 in units position. It is composed of 2 and 3. It is a positive number. Also show whether it is odd or even.
2. WAJP to take input through command line argument and do the following:
 - a) Check whether the number is prime.
 - b) Generate the reverse a number.
3. Write a menu driven program using switch in Java to perform following:
 - a) For input of 1, check whether the number is prime
 - b) For input of 3, find the factors of the number
 - c) For input of 5, check the number is odd or even.
4. Write a program in Java to generate hexadecimal equivalent of a number without using array.
5. WAJP to take two number inputs through command line argument and do the following:
 - a) Check whether two numbers are prime to each other or not.
 - b) Find LCM of two numbers.
6. WAJP to create a class and exhibit the role of static functions (other than main) by declaring, defining and calling them.
7. WAJP to compute and display the count of occurrence of 4 in a number. E.g. 4564 will compute 2.
8. WAJP to take an angle value in degrees and then compute the equivalent radians and then prove $\sin^2 \theta + \cos^2 \theta = 1$. Note $180^\circ = \pi$.
9. WAJP to sort a list of numbers in ascending order.
10. WAJP to generate Pascal's Triangle using a square matrix.
11. Write a program in Java to take input of two 3×3 matrices through command line argument and then:
 - a) Add them up and display the result
 - b) Subtract them and display the result
 - c) Multiply them and display product
12. WAJP to count the number of words, characters in a sentence.
13. Write a program in Java to take input of a sentence through command line argument and then count the number of words and vowels.

14. WAJP to handle the Exception using try and multiple catch block; the exceptions that you will handle are, number format error, array bound error and divide by zero.
15. WAJP to create a class called **Room** with two data member length and width and then implement constructor overloading in it.
16. Write a program in Java to explain the role of the following:
 - a) Non-parameterized constructor
 - b) Parameterized constructor
 - c) Copy constructor

Take input and display the output.

16. WAJP to create a class called **Fraction** with data member numerator and denominator; take input (through command line argument) of two fractions and then add, subtract, multiply and divide, finally display the result in reduced term.
17. Write a program in Java to create a class for **Employee** having 2 data member code and name. Then create 3 classes **Officer**, **AdminStaff** and **MStaff**. The **Officer** class has data members designation and pay-scale; the **AdminStaff** has data members grade and pay-band; the **MStaff** has data member department and two sub-classes **Regular** and **Casual**. The **Regular** staff has data members level and consolidated-pay and **Casual** has data member daily-wage. Take all inputs through constructors and write appropriate methods for displaying one data for each type of class.
18. WAJP to design a class called **Account** using the inheritance and static that show all function of bank (withdrawal, deposit) and generate account number dynamically.
19. WAJP to design an application *Password.java* that produces and prints a random password depending upon name of an individual. If the input is Abdul Kalam then the password would be *33421LAM*. Note: take the first name A=1, B=2, D=4, U=21 where 2+1=3, and L=12, where 1+2=3; so the number comes to be , so u can find out.

20. WAJP to draw a format like

```

*
***

*****

*****

*****

***

*
```

21. WAJP to take a string count all vowels and then delete the same from the string.
22. Write a **Patient** class which inherits from the **Person** class. Patient can again be of two types, indoor and outdoor. The Patient class requires the following:
 - a) a variable to store the patient ID for the patient
 - b) a variable to store the department of hospital
 - c) a variable to store the ward of hospital
 - d) a variable to store the patient 's date of joining the hospital

- e) a variable to store the patient 's address
- f) a variable to store the medical fees that the patient pays
- g) constructor methods, which initialize the variables
- h) a method to calculate the medical fees (for both indoor and outdoor patient)

23. WJJP to take a string as password and check whether it contains at least two numbers, 3 alphabets and no space in it. If any contrary throw message.
Write a program in Java to create a class called Rational having two data members for numerator and denominator. Take two inputs of rational numbers and perform multiplication

24. and division. Display the result in reduced form.

25. Write a program in Java to print a format like,

```
* * * * *
* * * * *
* * *
*
```

26. Write a class called **Shape** which contains a user-defined interface for **Computation**, which contains methods for calculation of area, perimeter and volume. Write four classes for **circle**, **rectangle**, **sphere** and **rectangular parallelepiped**, and all these classes inherit from Shape. Now take input for the following:

- a) radius of circle and compute its area and perimeter
- b) Length and breadth of rectangle and compute its area and perimeter
- c) Length, breadth and height for **rectangular parallelepiped** and compute its area and volume
- d) Radius of sphere and compute its area and volume

** Area of circle= r^2 , perimeter of circle= $2r$, area of sphere= $4r^2$, volume of sphere= $\frac{4}{3}r^3$, volume

of rectangular parallelepiped = $l \times b \times h$ area of rectangular parallelepiped= $2(l \times b + b \times h + h \times l)$

27. Write a class called Employee, which requires the following:

- a) a variable to store the employee ID
 - a. employee ID should be of format EMPM1234, EMPS1234, EMPA1234, EMPC1234, where M=manager, S=supervisor, A=analyst, C=clerk; number can be any no. but first three characters should be EMP
- b) a variable to store the employee name
- c) a variable to store department
- d) a variable to store city
- e) a variable to store basic salary
- f) a method to calculate the salary of employee
 - a. if the city is metro then the HRA would be 30% else 20%
 - b. if the employee ID contain M then DA would be 120%, if S then DA would be 110%, if A then DA would be 100%, and if C then DA would be 90%
- g) constructor methods, which initialize the variables

28. WJJP to create 4 threads and show exhibit their execution after the call of the “start ()” method. Write a program in Java to create 3 threads and exhibit their behaviour by changing their priorities in the “main” thread. Display the possible output.



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science and Engineering)

SECOND YEAR

Semester – IV

Course Content & Grade

Branch	Subject Title	Subject Code
CS	DBMS Lab	CS452

Consider the following tables:

emp(empno,ename,job,mgr,hiredate,sal,comm,deptno,gr),

dept(deptno,dname,loc)

Write the following queries:

1. List all information about all department from emp table.
2. List all employee names along with their salaries from emp table.
3. List all department numbers, employee numbers and their managers numbers in descending order of deptno from emp table.
4. List department names and locations from the dept table.
5. List the employees belonging to the department 20.
6. List the name and salary of the employees whose salary is more than 1000.
7. List the names of the clerks working in the department 20.
8. List the names of analysts and salesmen.
9. List the details of the employees who have joined before the end of September 81.
10. List the names of employees who are not managers.
11. List the names of employees whose employee number are 7369, 7521, 7839, 7934, 7788.
12. List the employee details not belonging to the department 10, 30, and 40.
13. List the employee name and salary, whose salary is between 1000 and 2000.
14. List the employee names, who are not eligible for commission.(salary having >15,000 eligible for commission)
15. List the employees who are eligible for commission.
16. List the details of employees, whose salary is greater than 2000 and commission is NULL.
17. List the employees whose names start with an "S" (not"s").
18. List the name, salary and PF amount of all the employees(PF is calculated as 10% of salary).
19. List the empno, ename, sal in ascending order of salary.
20. List the employee name, salary, job and Department no descending order of Department No and salary.
21. List the employee details in ascending order of salary.
22. List the employee details in descending order of salary
23. Display name, and sal and commission of all employees whose monthly salary is greater than their commission.
24. Select SMITH HAS WORKED IN THE POSITION OF CLERK IN DEPT 20.Display result in this format.
25. Generate a statement which prompts the user at runtime. The intention is to display employees hired between 2 given dates.
26. Define a variable representing an expression used to calculate total annual remuneration. Use the

variable in a statement which finds all employees who earn \$30000 a year or more.

27. List all the employees name and salaries increased by 15% and expressed as a whole number of dollars.

28. Produce the following

EMPLOYEE AND JOB

SMITH	CLERK
ALLEN	SALESMAN

29. Produce the following output:

SMITH	(Clerk)
ALLEN	(Salesman)

30. Do a case sensitive search for a list of employees with a job that the user enters.

31. It has been discovered that the sales people in dept. 30 are not all male. Please produce the Followingoutput.

ENAME	DEPTNO	JOB
ALLEN	30	Sales Person

32. Display each employees name and hiredate of dept 20.

33. Display each employees name, hiredate and salary review date. Assume salary review date is one year from hiredate. Output should be in ascending review date.

34. Print list of employees displaying just salary, if more than 1500. If exactly 1500 display “ On Target”. If less than 1500 display “ Below 1500”.

35. Write a query which returns DAY of the week (i.e. MONDAY) for any date entered in the format DD/MM/YY.

36. Write a query to calculate length of service of each employee.

37. Find the minimum salary of all employees.

38. Find the maximum, minimum, and average salaries of all employees.

39. List the maximum and minimum salary of each job type.

40. Find how many managers are in each dept.

41. Find the average salary and average total remuneration of each job type. Remember sales man earn commission.

42. Find out the difference between highest and lowest salary.

43. Find all department s which have more than three employees.

44. Check whether all employee nos are unique. (No Duplicate)

45. List lowest paid employee working for each Manager. Exclude any groups where the minimum salary is less than 1000. Sort the output by salary.

46. Produce a list showing employees ‘salary grade’.(> 10000 A, >10000 &<20000 B, >20000 C)

47. Show only employee on Grade C.

48. Show all employee in Dallas.

49. List the employees name, job, salary, grade and department for everyone in the company except clerks. Sort on salary, displaying the highest first.

50. List the following details of employees who earn \$36000 a year or who are clerks.

Ename	Job	Annual Sal	Dept no
Dname		Grade	

51. Display all employees who earn less than their managers.

52. Display all employees by name and eno along with their managers name and number.

53. Modify above spooliation to display KING who has no MANAGER.

54. Find the job that was files in the first half of 1983 and the name job that was filled in the same period in 1984.

55. Find all employees who have joined before their manager.

<u>EMPLOYEE</u>	<u>HIREDATE</u>	<u>MANAGER</u>	<u>HIREDATE</u>
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56. Find the employees who earn the highest salary in each job, type, sort in descending order of salary.
57. Find the employees who earn the minimum salary for their job, Display the result in descending order of salary
58. Find the most recently hired employees in the department. Order by hiredate.
59. Show the details of any employee who earns a salary greater than the average for their department. Sort in department number order.
60. List all department where there are no employees.

RKDF UNIVERSITY, RANCHI

New Scheme of Examination as per AICTE Flexible Curricula

B.Tech. V Semester (Computer Science and Engineering)

S. No.	Subject Code	Subject Name	Internal	External		Total Marks	
			Max. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks
1	BCS501	Object Oriented Programming and Design Pattern	30	70	21	100	35
2	BCS502	Unix/Linux	30	70	21	100	35
3	BCS503	Formal Language and Automata theory	30	70	21	100	35
4	BCS504	Soft Computing	30	70	21	100	35
5	BCS505	Simulation and Modelling	30	70	21	100	35
Practical							
Total							
			Max	Min			
1	BCS551	OOPDP Lab	50	25			
2	BCS554	Soft Computing Lab	50	25			
3	BCS555	Simulation and Modelling Lab	50	25			

Choice Based Credit System

Branch:-Computer Science

Fifth Semester

S.No.	Subject Code	SUBJECT NAME	PERIODS			Credit
			L	T	P	
1	BCS501	Object Oriented Programming and Design Pattern	4	0	0	4
2	BCS502	Unix/Linux	3	1	0	4
3	BCS503	Formal Language and Automata theory	4	0	0	4
4	BCS504	Soft Computing	3	1	0	4
5	BCS505	Simulation and Modelling	3	0	0	0
Practicals						
1	BCS551	OOPDP Lab	0	0	2	1
2	BCS554	Soft Computing Lab	0	0	2	1
3	BCS555	Simulation and Modelling Lab	0	0	2	2
Total			16	2	6	20



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science and Engineering)

THIRD YEAR, V-semester

Branch	Subject Title	Subject Code
B.Tech. CSE	Object Oriented Programming and Design Pattern	CS501

UNIT - I

INTRODUCTION TO UML: Introduction to object oriented concepts like inheritance, Polymorphism, Information hiding, Importance of modelling, Principles of modelling, Object oriented modelling, An overview of UML, Conceptual model of the UML, Architecture, Software development life cycle.

BASIC STRUCTURAL MODELING: Classes: Terms and concepts, Common modelling techniques; Relationships Modelling simple dependencies, Single inheritance and structural relationships; Common mechanisms and diagrams.

ADVANCED STRUCTURAL MODELING: Advance classes, Advance relationships, Interfaces, Types and Roles, Packages, Instances.

UNIT - II

THE OBJECT-ORIENTED DESIGN PROCESS: The object and class Concepts, Identifying classes, Identifying responsibilities, Relationships between Classes, Use Cases, CRC cards, UML class diagrams, Sequence diagrams, State diagrams, Using Java doc for design documentation, Case Study: A voice mail system.

UNIT – III

GUIDELINES FOR CLASS DESIGN: An overview of the date classes in the java library, designing a day class, the importance of encapsulation, analyzing the quality of an interface, programming by contract, unit testing.

INTERFACE TYPES AND POLYMORPHISM: The icon interface type, polymorphism, drawing shapes, the comparable interface type, the comparator interface type, anonymous classes, frames and user interface components, user interface actions, timers, designing an interface type.

UNIT - IV

PATTERNS AND GUI PROGRAMMING: Iterators, the pattern concept, the observer pattern, layout managers and the strategy pattern, components, containers and the composite pattern, scroll bars and the decorator pattern, how to recognize patterns, putting patterns to work.

INHERITANCE AND ABSTRACT CLASSES: The concept of inheritance, graphics programming with inheritance, abstract classes, the template method pattern, protected interfaces, the hierarchy of swing components, the hierarchy of standard geometric shapes, the hierarchy of exception classes, when not to use inheritance.

UNIT - V

FRAMEWORKS: Frameworks, applets as a simple framework, the collections framework, a graph editor framework, enhancing the graph editor framework.

MULTITHREADING: Thread basics, Thread synchronization, Animations.

MORE DESIGN PATTERNS: The Adapter pattern, Actions and the command pattern, the factory method pattern, the proxy pattern, the singleton pattern, the visitor pattern, other design patterns.

TEXT BOOKS:

1. Grady Booch, James Rumbaugh, Ivar Jacobson (2009), The Unified Modeling Language User guide, 2nd edition, Pearson Education, New Delhi, India.
2. Cay Horstmann (2004), Object-Oriented Design and Patterns, Wiley India edition, New Delhi, India.

REFERENCE BOOKS:

1. Meilir Page-Jones (2000), Fundamentals of Object Oriented Design in UML, Pearson Education and NewYork.
2. Craig Larman (2005), An introduction to Object –Oriented Analysis and Design and Unified Process Applying UML and Patterns, 3rdedition, Pearson Education, New Delhi, India.
3. John W. Satzinger, Robert B Jackson, Stephen D Burd (2004), Object-Oriented Analysis and Design with theUnified Process, Cengage learning, India.



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science and Engineering)

THIRD YEAR, V-semester

Branch	Subject Title	Subject Code
B.Tech. CSE	OOPDP Lab	CS551

1. Take input from user a character variable in a program and if the value is alphabet then print "Alphabet" if it's a number then print "Digit" and for other characters print "Special Character"
2. Write a program to add all the values in a given number and check if the sum is prime number or not. Ex: 1234->10, not prime
3. Write a program to find the largest 2 numbers and the smallest 2 numbers in the array initialized by the user.
4. Write a program to print the element of an array that has occurred the highest number of times Eg) Array -> 10,20,10,30,40,100,99 O/P:10
5. Write a program to reverse the elements of a given 2*2 array. Four integer numbers needs to be passed as Command Line arguments Eg: C:\>java Sample 1 2 3 4 O/P Expected : The given array is : 1 2 3 4 The reverse of the array is : 4 3 2 1
6. Write a program to find greatest number in a 3*3 array. The program is supposed to receive 9 integer numbers as command line arguments.
7. Create a class Box that uses a parameterized constructor to initialize the dimensions of a box.(dimensions are width, height, depth of double type). The class should have a method that calculates and returns the volume of the box . Obtain an object and print the corresponding volume in main() function.
8. Write a program in Java with class Rectangle with the data fields width, length, area and color. The length, width and area are of double type and color is of string type. The methods are set_length() , set_width() , set_color(), and find_area(). Create two object ofRectangle and compare their area and color. If area and color same for the objects then display "Matching Rectangles" otherwise display "Non Matching Rectangle".
9. Create a class named 'Animal' which includes methods like eat() and sleep(). Create a child class of Animal named 'Bird' and override the parent class methods. Add a new method named fly(). Create an instance of Animal class and invoke the eat and sleep methods using this object.Create an instance of Bird class and invoke the eat, sleep and fly methods using this object.

10. A HighSchool application has two classes: the Person superclass and the Student subclass. Using inheritance, in this lab you will create two new classes, Teacher and CollegeStudent. A Teacher will be like Person but will have additional properties such as salary (the amount the teacher earns) and subject (e.g. "Computer Science", "Chemistry", "English", "Other"). The CollegeStudent class will extend the Student class by adding a year (current level in college) and major (e.g. "Electrical Engineering", "Communications", "Undeclared").
11. Create a class Account with two overloaded constructors. First constructor is used for initializing, name of account holder, account number and initial amount in account. Second constructor is used for initializing name of account holder, account number, address, type of account and current balance. Account class is having methods Deposit(), WithDraw(), and GetBalance(). Make necessary assumption for data members and return types of the methods. Create objects of Account class and use them.
12. Create a base class Fruit which has name, taste and size as its attributes. A method called eat() is created which describes the name of the fruit and its taste. Inherit the same in 2 other class Apple and Orange and override the eat() method to represent each fruit taste.
13. Reverse the string but not the words. Eg. I/P: Birla institute of technology O/P: technology of institute birla.
14. Find out and print the maximum possible palindrome in a given string. Eg: I/P: nononsense O/P: nonon
15. Given a string and a non-empty word string, return a string made of each char just before and just after every appearance of the word in the string. Ignore cases where there is no char before or after the word, and a char may be included twice if it is between two words. If inputs are "abcXY123XYijk" and "XY", output should be "c13i". If inputs are "XY123XY" and "XY", output should be "13".
16. Create an abstract class Compartment to represent a rail coach. Provide an abstract function notice in this class. Derive FirstClass, Ladies, General, Luggage classes from the compartment class. Override the notice function in each of them to print notice suitable to the type of the compartment. Create a class TestCompartment. Write main function to do the following: Declare an array of Compartment of size 10. Create a compartment of a type as decided by a randomly generated integer in the range 1 to 4. Check the polymorphic behavior of the notice method. Q2. Write a program in java which implement interface Student which has two methods Display_Grade and Attendance for PG_Students and UG_Students (PG_Students and UG_Students are two different classes for Post Graduate and Under Graduate Students respectively).
17. Write a program in Java to display name and roll number of students. Initialize respective array variables for 10 students. Handle ArrayIndexOutOfBoundsException, so that any such problem does not cause illegal termination of program.

18. Write a program to accept name and age of a person from the command prompt(passed as arguments when you execute the class) and ensure that the age entered is ≥ 18 and < 60 . Display proper error messages. The program must exit gracefully after displaying the error message in case the arguments passed are not proper. (Hint : Create a user defined exception class for handling errors.)
19. Write a program to count the number of times a character appears in the File and also copy from one file to another. (Case insensitive... 'a' and 'A' are considered to be the same)
20. 1. Create class of SalesPersons as a thread that will display five sales persons name. 2. Create a class as Days as other Thread that has array of seven days. 3. Call the instance of SalesPersons in Days and start both the threads 4. suspendSalesPersons on Sunday and resume on wednesday Note: use suspend, resume methods from thread
21. Create two threads, one thread to display all even numbers between 1 & 20, another to display odd numbers between 1 & 20. Note: Display all even numbers followed by odd numbers Hint: use join 11.
22. Program to create a calculator with the help of AWT packages in Java.
23. Program to create a unit converter using Swings in Java.
24. APPLETS a) Working with Frames and various controls. b) Working with Dialogs and Menus. c) Working with Panel and Layout. d) Incorporating Graphics. e) Working with colors and fonts.

TEXT BOOKS

1. Krishna P. R., Object Oriented Programming through JAVA, 1st Edition, Universities Press, 2008.
2. Patrick Naghton & H. Schildt – The Complete Reference Java 2, Tata McGraw Hill Publication, New Delhi.
3. Dietel, Dietel - Java How to program , 7th edition; Pearson Education , New Delhi.

REFERENCE BOOKS

1. C. Horstmann, G. Cornell - Core Java 2 Vol I & Vol II ; Pearson Education , New Delhi.
2. Balagurusamy -Programming in Java, 2nd Edition; Tata McGraw Hill Publication; New Delhi.



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science and Engineering)

THIRD YEAR, V-semester

Branch	Subject Title	Subject Code
B.Tech. CSE	Unix/Linux	CS502

UNIT-I

Overview of Unix/Linux: - Concepts, Unix/Linux Installation Process, Hardware Requirements for Unix/Linux ,Advantages of Unix/Linux, Reasons for Popularity and Success of Linux/Unix Operating System, Features of Linux/Unix Operating System, Kernel, Kernel Functions,The Shell Basic Commands, Shell Programming:-Shell Variables, Branching Control Structures, Loop-Control Structure, Continue and break Statements, Sleep Command,Debugging Script. Use of Linux as web-server, file server, directory server, application server, DNS server, SMTP server, Firewall, Proxy server.

UNIT-II

File System: - Definition of File System, Defining Geometry, Disk Controller, Solaris File System, Disk Based File Systems, Network-Based File Systems, Virtual File systems, UFS File System, The Boot Block, The Super Block, The Inode, Tuning File System, Repairing File System.

UNIT-III

Process Control: - Viewing a Process, Command to display Process, Process Attributes, Process States,Process Fields, PS Commands options, PGREP, PRSTAT, CDE Process Manager, Scheduling Process, Scheduling riorities, Changing the Priority of a time-sharing process, Killing Process.

UNIT-IV

System Security: - Physical Security, Controlling System Access, Restricted Shells Controlling File Access, File Access Commands, Access Control List(ACLs), Setting ACL Entries, Modifying ACL entries on a file, Deleting ACL entries on a file, Restricting FTP, Securing Super User Access, Restricting Root Access, Monitoring super user Access, TCP Wrappers.

UNIT-V

Dynamic Host Configuration Protocol: - Introduction, DHCP Leased Time, DHCP Scopes, DHCP IP Address, Allocation Types, Planning DHCP Deployment, DHCP Configuration files, Automatic Startup of DHCP Server, Configuration of DHCP Clients, Manually Configuring the DHCP.

UNIT-VI

Case Study: - Installation of Linux, Customization of Linux, Installation of SAMBA, APACHE, TOMCAT, Send MAIL, Postfix, Implementation of DNS, LDAP services, Firewall, Proxy server

Text Book:

1. Venkatesh Murthy, "Introduction to Unix & Shell", Pearson Edu
2. Forouzan, "Unix & Shell Programming", Cengage Learning
3. Sumitab Das, "Unix Concept & Application", TMH
4. Gopalan, Shivaselvan, "Beginners Guide to Unix " PHI Learning



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science and Engineering)

THIRD YEAR, V-semester

Branch	Subject Title	Subject Code
B.Tech. CSE	Formal Language and Automata theory	CS503

UNIT I

AUTOMATA Introduction to formal proof – Additional forms of proof – Inductive proofs – Finite Automata (FA) – Deterministic Finite Automata (DFA) – Non-deterministic Finite Automata (NFA) – Finite Automata with Epsilon transitions.

UNIT II

REGULAR EXPRESSIONS AND LANGUAGES Regular Expression – FA and Regular Expressions – Proving languages not to be regular – Closure properties of regular languages – Equivalence and minimization of Automata.

UNIT III

CONTEXT-FREE GRAMMAR AND LANGUAGES Context-Free Grammar (CFG) – Parse Trees – Ambiguity in grammars and languages – Definition of the Pushdown automata – Languages of a Pushdown Automata – Equivalence of Pushdown automata and CFG, Deterministic Pushdown Automata.

UNIT IV

PROPERTIES OF CONTEXT-FREE LANGUAGES Normal forms for CFG – Pumping Lemma for CFL - Closure Properties of CFL – Turing Machines– Programming Techniques for TM.

UNIT V

UNDECIDABILITY A language that is not Recursively Enumerable (RE) – An undecidable problem that is RE – Undecidable problems about Turing Machine – Post's Correspondence Problem - The classes P and NP.

TEXT BOOK :

1. J.E.Hopcroft, R.Motwani and J.D Ullman, "Introduction to Automata Theory, Languages and Computations", Second Edition, Pearson Education, 2003.

REFERENCES :

1. H.R.Lewis and C.H.Papadimitriou, "Elements of The theory of Computation", Second Edition, Pearson Education/PHI, 2003
2. J.Martin, "Introduction to Languages and the Theory of Computation", Third Edition, TMH, 2003.
3. Micheal Sipser, "Introduction of the Theory and Computation", Thomson Brokecole, 1997



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science and Engineering)

THIRD YEAR, V-semester

Branch	Subject Title	Subject Code
B.Tech. CSE	Soft Computing	CS504

UNIT I

FUZZY SET THEORY Introduction to Neuro – Fuzzy and Soft Computing – Fuzzy Sets – Basic Definition and Terminology– Settheoretic Operations – Member Function Formulation and Parameterization – Fuzzy Rules and Fuzzy Reasoning –Fuzzy Inference Systems – Input Space Partitioning and Fuzzy Modeling.

UNIT II

OPTIMIZATION Derivative-based Optimization – Descent Methods – The Method of Steepest Descent – Classical Newton’s Method – Step Size Determination – Derivative-free Optimization – Genetic Algorithms – Simulated Annealing – Random Search – Downhill Simplex Search.

UNIT III

NEURAL NETWORKS Supervised Learning Neural Networks – Perceptrons - Adaline – Backpropagation Mutilayer Perceptrons – Radial Basis Function Networks – Unsupervised Learning Neural Networks – Competitive Learning Networks – Kohonen Self-Organizing Networks – Learning Vector Quantization – Hebbian Learning.

UNIT IV

NEURO FUZZY MODELING AND OTHER TECHNIQUES Adaptive Neuro-Fuzzy Inference Systems – Architecture – Support Vector Machines – Independent Component Analysis.

UNIT V

APPLICATIONS OF COMPUTATIONAL INTELLIGENCE Printed Character Recognition – Inverse Kinematics Problems – Automobile Fuel Efficiency Prediction – Soft Computing for Color Recipe Prediction.

TEXT BOOK :

1. J.S.R.Jang, C.T.Sun and E.Mizutani, "Neuro-Fuzzy and Soft Computing", PHI, 2004, Pearson Education 2004.

REFERENCES :

1. Timothy J.Ross, "Fuzzy Logic with Engineering Applications", McGraw-Hill, 1997.
2. Davis E.Goldberg, "Genetic Algorithms: Search, Optimization and Machine Learning", Addison Wesley, N.Y., 1989.
3. S. Rajasekaran and G.A.V.Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithms", PHI, 2003.
4. R.Eberhart, P.Simpson and R.Dobbins, "Computational Intelligence - PC Tools", AP Professional, Boston, 1996.



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science and Engineering)

THIRD YEAR, V-semester

Branch	Subject Title	Subject Code
B.Tech. CSE	Soft Computing Lab	CS554

1. Create a perceptron with appropriate number of inputs and outputs. Train it using fixed increment learning algorithm until no change in weights is required. Output the final weights.
2. Write a program to implement artificial neural network without back propagation. Write a program to implement artificial neural network with back propagation.
3. Implement Union, Intersection, Complement and Difference operations on fuzzy sets. Also create fuzzy relation by Cartesian product of any two fuzzy sets and perform max-min composition on any two fuzzy relations.
4. Implement travelling sales person problem (tsp) using genetic algorithms.
5. Plot the correlation plot on dataset and visualize giving an overview of relationships among data on soya bins data. Analysis of covariance: variance (ANOVA), if data have categorical variables on iris data.
6. Implement linear regression and multi-regression for a set of data points
7. Implement crisp partitions for real-life iris dataset
8. Write a program to implement Hebb's rule Write a program to implement Delta rule.
9. Write a program to implement logic gates.
10. Implement svm classification by fuzzy concepts

Reference Books:

1. D.K Prathikar, —Soft Computing, Narosa Publishing House, New Delhi, 2008.



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science and Engineering)

THIRD YEAR, V-semester

Branch	Subject Title	Subject Code
B.Tech. CSE	Simulation and Modelling	CS505

UNIT I

Introduction- When simulation is appropriate and when not, advantages and disadvantages of simulation, application areas in communication, computer and software design, systems and systems environment, components of a system, discrete and continuous systems, model of a system, types of models, discrete-event simulation, steps in a simulation study. Simulation Examples- Simulation of queueing systems, on-demand and inventory systems, simulation for reliability analysis etc

UNIT II

General Principles- Concepts in discrete event simulation: event scheduling/time advance algorithms, world views. List Processing: properties and operations, data structures and dynamic allocation, techniques;

UNIT III

Simulation Software- Integrated environments. Examples and review of some existing software popular and useful in the industry, e.g., Arena, AutoMod, Extend, Flexsim, Micro Saint, ProModel, Quest, SIMUL8, WITNESS etc. Simulation using languages and environments like C++/Java/GPSS/SSF etc. Experimentation and Statistical-Analysis Tools: common features and relevant current products.

UNIT IV

Statistical Models in Simulation- Terms and concepts. Statistical Models. Review of discrete and continuous distributions. Review of Poisson (stationary and non-stationary) processes. Empirical Distributions; Elementary Queueing Theory- Basic Structure of Queueing Models. Input Source (Calling Population). Queue, Queue Discipline, Service Mechanisms. Notations and relationships between L, W, Lq, and Wq. Little's Formula. Role of Exponential Distribution and Properties. Birth and Death Processes. M/M/s queues. Finite queue variation in M/M/s/K models

with different s values. Finite Calling Population cases. Queueing Models involving Non-Exponential Distributions: $M/G/1$, $M/D/s$, $M/E_k/s$ (involving Erlang distribution), Models without a Poisson Input, Models involving hyperexponential distributions, Priority Discipline Queueing Models: Preemptive and NonPreemptive with results, properties and server number variations, Queueing Networks: Equivalence Property. Infinite Queues in Series and Product Form Solutions. Jackson Networks,

UNIT V

Application of Queueing Models- Review of Characteristics (calling population system capacity, arrival processes, behavior and disciplines, service times and mechanisms etc) and notations, Application of Long-Run Measures of Performance: Time average in system, average time spent per customer, Little's Formula and server utilization, costs. Steady State behaviour of Infinite ($M/G/1$, $M/M/c/infinity$, $M/M/c/N/infinity$) and finite ($M/M/c/K/K$) Calling Population Models, Use of Network of Queues.

UNIT VI

Random Number Generation- Properties. Generation of Pseudo-Random Numbers, Techniques for Generation of Pseudo-Random Numbers: Linear Congruential, Combined Linear Congruential, Random Number Streams. Tests for Random Numbers: Frequency Tests and Tests for Autocorrelation. Random Variate Generation- Inverse Transform Techniques for Exponential, Uniform, Weibull, Triangular and for Empirical Continuous Distributions. Acceptance-Rejection Techniques for Poisson (Stationary and Non-Stationary) Distribution and Gamma Distribution. Special Properties like the Direct Transformation for the Normal and Lognormal Distributions, Convolution Method and others.

UNIT VII

Input Modeling- Data collection, Identifying the Distribution with Data: Histograms, Selection of the Appropriate Family of Distributions, Quantile-Quantile Plots. 100 Parameter Estimation: Sample Mean and Sample Variance and various biased and unbiased Estimators. Goodness of Fit Tests applied to Simulation inputs: Chi-Square and Chi-Square with Equal Probabilities, Kolmogorov-Smirnov Tests, p -Values and Best Fits. Verification and Validation of Simulation Models- Verification and Validation of Simulation Models. Calibration and Validation: Face Validity, Validation of Assumptions, Input-Output Transformation Validation.

UNIT VIII

Output Analysis of a Single Model- Output analysis and types of simulation. Stochastic Nature of the Output Data. Measures of Performance and Estimation: Point Estimation and Confidence-Interval Estimation. Output Analysis for Terminating Simulations and Estimation of

Probabilities. Output Analysis of Steady State Simulations: Initialization Bias, Error Estimation, Replications, Sample Size and Batch Means for Interval Estimation.

UNIT IX

Comparison and Evaluation of Alternative System Designs- Comparison of Two System Designs.; Sampling with Equal and Unequal Variances. Common Random Numbers. Confidence Intervals with Specified Precision. Comparison of Several System Designs: Bonferroni Approaches to Multiple Comparisons and to Screening and to Selection of the Best. MetamodelingL Sample Linear Regression, Testing for Significance, Multiple Linear Regression. Random Number Assignment for Regression. Optimization via Simulation: Robust Heuristics.

UNIT X

Simulation of Computer Systems- Simulation Tools: Process Orientation and Event Orientation. Model Input: Modulated Poisson Process and Virtual-Memory Referencing. High-Level Simulation. CPU and Memory Simulations. Simulation of Computer Networks- Traffic Modeling, Media Access Control: Token-Passing Protocols and Ethernet, Data Link Layer, TCP, Model Construction. Laboratory Component: Programming and/or software usage assignment/exercises to accompany each unit and can be of total 8 hours duration.

Text Books:

1. Jerry Banks, John S. Carson II, Barry L. Nelson and David M. Nicol, Discrete-Event System and Simulation, Prentice Hall of India, New Delhi, 2005
2. Averill M. Law, Simulation modeling and analysis (SIE), Tata McGraw Hill India, 2007
3. David Cloud, Larry Rainey, Applied Modeling and Simulation, Tata McGraw Hill, India.

Reference Books:

1. Gabriel A. Wainer, Discrete-event modeling and simulation: a practitioner's approach, CRC Press, 2009.
2. Bernard P. Zeigler, Herbert Praehofer, Tag Gon Kim, Theory of modeling and simulation: integrating discrete event and continuous complex dynamic systems, Academic Press, 2000.
3. Averill M. Law, W. David Kelton, Simulation modeling and analysis, McGraw Hill, 2000.
4. Walter J. Karplus, George A. Bekey, Boris Yakob Kogan, Modeling and simulation: theory and practice, Springer, 2003.

5. Stanislaw Raczynski, Modeling and simulation: the computer science of illusion, Wiley, 2006.
6. Mohammad Salameh Obaidat, Georgios I. Papadimitriou, Applied system simulation: methodologies and application, Springer, 2003.
7. van Dijk, Nico M.; Boucherie, Richard J. (Eds.) 2011. Queueing Networks: A Fundamental Approach. 798 p. 148 illus. Springer.
8. Bhat, U. Narayan, An Introduction to Queueing Theory: Modeling and Analysis in Applications, Springer 2008 (Birkhäuser Boston).
9. James J. Nutaro, Building software for simulation: theory and algorithms, with applications in C++. Wiley, 2010



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science and Engineering)

THIRD YEAR, V-semester

Branch	Subject Title	Subject Code
B.Tech. CSE	Simulation and Modelling Lab	CS555

List of Programs

1. Computer Generation of Random Numbers. Page 223 of 439
2. Chi-square goodness-of-fit test.
3. One-sample Kolmogorov-Smirnov test
4. Test for Standard Normal Distribution
5. Testing Random Number Generators.
6. Monte-Carlo Simulation.
7. Simulation of Single Server Queuing System.
8. Simulation of Two-Server Queuing System.
9. Simulate and control a conveyor belt system
10. Two-sample Kolmogorov-Smirnov test.

Text books:

1. Gordon Geoffrey, System Simulation, 2nd Edition, Pearson Education, 2007.
2. Banks J., Carson J. S. , Nelson B.L., Nicol D.M., Discrete-Event System Simulation, 4thEdn, Pearson Education, 2007.

RKDF UNIVERSITY, RANCHI

New Scheme of Examination as per AICTE Flexible Curricula

B.Tech. VI Semester (Computer Science and Engineering)

S. No.	Subject Code	Subject Name	Internal	External		Total Marks	
			Max. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks
1	BCS601	Compiler Design	30	70	21	100	35
2	BCS602	Graph Theory	30	70	21	100	35
3	BCS603	Artificial Intelligence	30	70	21	100	35
4	BCS604	Introduction to Python	30	70	21	100	35
Practical							
Total							
			Max	Min			
1	BCS651	Compiler Design Lab	50	25			
3	BCS653	Artificial Intelligence Lab	50	25			
4	BCS655	Internship	50	25			

Choice Based Credit System

Branch:-Computer Science

Sixth Semester

S.No.	Subject Code	SUBJECT NAME	PERIODS			Credit
			L	T	P	
1	BCS601	Compiler Design	3	1	0	4
2	BCS602	Graph Theory	3	1	0	4
3	BCS603	Artificial Intelligence	4	0	0	4
4	BCS604	Introduction to Python	3	1	0	4
Practicals						
1	BCS651	Compiler Design Lab	0	0	2	1
2	BCS653	Artificial Intelligence Lab	0	0	2	1
4	BCS655	Internship	0	0	0	3
Total			13	3	6	22



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science and Engineering)

THIRD YEAR, VI-semester

Branch	Subject Title	Subject Code
B.Tech. CSE	Compiler Design	CS601

UNIT - I

Introduction to Compilers and its Cousins, Structure of a Compiler, Science of building Compiler and its Application, Lexical Analyzer, Input Buffering, Specification and Recognition of Tokens, Introduction to Lex.

UNIT - II

Introduction to Syntax Analysis, Elimination of Ambiguity, Left Recursion and Left Factoring, Recursive and Non-Recursive Top-Down Parsers, Bottom-up Parsers: Shift Reduce Parser techniques and conflicts, all variants of LR Parsers, Handling Ambiguous grammar in BottomUp Parsing, Error handling while parsing, The Parser generator YAAC.

UNIT - III

Syntax-Directed Definition(SDD), Evaluation Order of SDD's and its application, SyntaxDirected Translation Schemes and their Implementation.

UNIT - IV

Intermediate code Generation: Variants of Syntax Tree, Three Address Code, Translation of Expressions, Control flow, Back Patching , Run Time Environment: Storage Organization.

UNIT - V

Code Generation: Issues in its Design, Target Language, Addresses in Target Code, Basic Blocks and Flow Graphs, Optimization of Basic BlocksMachine Independent Optimization: Sources of Optimization, Data Flow analysis.

Text book:

1. Aho A. V., Lam M. S., Sethi R., Ullman J. D., Compilers, Principles, Techniques, and Tool, 2nd Edition, Pearson Education Asia.

Reference books:

1. Fischer C. N., LeBlanc R. J., Crafting a Compiler with C, Pearson Education Asia.
2. Loudon K. C., Compiler Construction, Principles and Practice, Thomson, Brooks/Cole.



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science and Engineering)

THIRD YEAR, VI-semester

Branch	Subject Title	Subject Code
B.Tech. CSE	Compiler Design Lab	CS651

List of Programs as Assignments:

1. C program to count white spaces, numbers, words in a file.
2. C program to design Finite automata to identify different tokens(identifiers, constants, operators, etc.).
3. Count number of a's in given string.
4. Identify different patterns like aa, ab, not containing a, etc. in given string .
5. Lex program to Identify all tokens of C programs.
6. Design and Code individual programming code with all possible tokens in programming language.
7. Starting and ending with 'a'.
8. # a's divisible by 2 or b's divisible by 3.
9. Output code after removing white spaces and comment.
10. Build parsers using yacc for $L(G)=\{a^n b^n \mid n \geq 1\}$ over $\{a,b\}$
11. Build Parser using yacc for L(G) where rule set of G is $\{ S \rightarrow aSb, S \rightarrow bSa, S \rightarrow c\}$ over $\{a,b,c\}$.
12. Build parser using yacc to convert the infix expression to postfix expression.
13. Build a calculator in yacc which takes expression in postfix notation.
14. Build parsers using yacc to convert the prefix expression into the postfix expression.
15. Build parsers using yacc to validate the C statements. E.g int a,b,c;(valid)
16. Build calculator in yacc.

Text books :

lex&yacc (2nd ed.) :O'Reilly & Associates, Inc. Sebastopol, CA, USA ©1992 .

Reference books:

Lex &Yacc:O'Reilly & Associates, Inc. Sebastopol, CA, USA ©1992.



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science and Engineering)

THIRD YEAR, VI-semester

Branch	Subject Title	Subject Code
B.Tech. CSE	Graph Theory	CS602

UNIT I

Introduction: Graphs and its applications, Finite and infinite graphs, incidence and degree, isolated Vertex, pendant Vertex, and Null graph, paths and circuits, isomorphism, sub graphs, walks, paths, and circuits, connected graphs, disconnected graphs and components, Connectivity checking algorithm, Euler graphs, Operations on graphs, more on Euler graphs, Hamiltonian paths and circuits, Travelling Salesman problem.

UNIT II

Trees and Fundamental circuits: Trees and its properties, Distance and centres in a tree, Algorithm for checking if a graph is Tree, Partial k-trees, Dynamic Programming in partial ktrees, Spanning trees, Spanning trees in a Weighted graph, Prim's and Kruskal's algorithms Cut set and cut vertices: Properties of a cut set, Fundamental circuits and cut sets, connectivity and separability, Computing connected components, Menger's theorem, Network flows, 1-Isomorphism, 2-Isomorphism.

UNIT III

Planar and Dual Graphs: Planar graph, Kuratowski's Graphs, Representations of a planar graph, Detection of planarity, Planar Separator Theorem, Geometric Dual, Combinatorial, Dual, Thickness and crossings, Algorithms for finding Clique and maximum clique.

UNIT IV

Matrix Representation of Graphs: Incidence matrix, Adjacency matrix, Adjacency list, Circuits Matrix, Fundamental Circuit Matrix and Rank of B, Cut-set Matrix, Relationships among A, B and C, path Matrix.

UNIT V

Coloring, Covering and partitioning: Chromatic number, Chromatic partitioning, Chromatic polynomial, Coverings, Four colour problem, Algorithm for graph colouring. Directed Graphs: Digraphs and its types, Digraphs and binary Relations, Directed paths and connectedness, Euler Digraphs, Trees with Directed Edges, Fundamental Circuits in Digraphs, Matrices A, B and C of Digraphs, Adjacency Matrix of a Digraph, Paired Comparisons and Tournaments, Acyclic Digraphs and De-cyclization.

Text Books:

1. Deo Narasingh, Graph Theory with Applications to engineering and Computer Science, Prentice Hall of India, 2001.
2. Raman Tulasi and Swamy M.N.S., Graph, Networks and Algorithms, John Wiley, 1981.

Reference Books:

1. West Douglas B., Introduction to Graph theory, Pearson Education, 2002.
2. Harary F., Graph Theory, Addison Wesley/ Narosa, 1998.
3. Reingold E. M., Nievergelt J., Deo N., Combinatorial Algorithms: Theory and Practice, R.



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science and Engineering)

THIRD YEAR, VI-semester

Branch	Subject Title	Subject Code
B.Tech. CSE	Artificial Intelligence	CS603

UNIT I

Introduction: Overview of Artificial Intelligence- Problems of AI, AI Technique, Tic - Tac - Toe Problem. Intelligent Agents: Agents & Environment, Nature Of Environment, Structure Of Agents, Goal Based Agents, Utility Based Agents, Learning Agents. Problem Solving: Problems, Problem Space & Search: Defining The Problem As State Space Search, Production System, Problem Characteristics, Issues In The Design Of Search Programs.

UNIT II

Search Techniques: Solving Problems By Searching, Problem Solving Agents, Searching For Solutions; Uniform Search Strategies: Breadth First Search, Depth First Search, Depth Limited Search, Bi-directional Search, Comparing Uniform Search Strategies. Heuristic Search Strategies: Greedy Best-First Search, A* Search, Memory Bounded Heuristic Search: Local Search Algorithms & Optimization Problems: Hill Climbing Search, Simulated Annealing Search, Local Beam Search, Genetic Algorithms; Constraint Satisfaction Problems, Local Search For Constraint Satisfaction Problems. Adversarial Search: Games, Optimal Decisions & Strategies in Games, The Mini Max Search Procedure, Alpha-Beta Pruning, Additional Refinements, Iterative Deepening.

UNIT III

Knowledge & Reasoning: Knowledge Representation Issues, Representation & Mapping, Approaches to Knowledge Representation, Issues in Knowledge Representation. Using Predicate Logic: Representing Simple Fact in Logic, Representing Instant & ISA Relationship, Computable Functions & Predicates, Resolution, and Natural Deduction. Representing Knowledge Using Rules: Procedural Verses Declarative Knowledge, Logic Programming, Forward Verses Backward Reasoning, Matching, Control Knowledge.

UNIT IV

Probabilistic Reasoning: Representing Knowledge in an Uncertain Domain, Bayesian Networks, Dempster-Shafer Theory. Planning: Overview, Components of A Planning System, Goal Stack Planning, Hierarchical Planning. Learning: Forms Of Learning, Inductive Learning, Explanation Based Learning, Neural Net Learning & Genetic Learning.

UNIT V

Natural Language Processing: Brief introduction to Syntactic Processing, Semantic Analysis, Discourse & Pragmatic Processing. Robotics: Introduction, Robot hardware, robotic perception, planning to move, planning uncertain movements, robotic software architecture, application domains.

Text Books:

1. Russel S. and Norvig P., Artificial Intelligence a Modern Approach, 3rd edition, Pearson Education.
2. Rich E. & Knight K., Artificial Intelligence, 3rd edition, TMH, New Delhi.

Reference books:

1. Patterson Dan W., Introduction to Artificial Intelligence and Expert Systems, PHI, New Delhi, 2006.
2. Rolston D.W., Principles of AI & Expert System Development, TMH, New Delhi.



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science and Engineering)

THIRD YEAR, VI-semester

Branch	Subject Title	Subject Code
B.Tech. CSE	Artificial Intelligence Lab	CS653

1. To solve Tic-Tac-Toe problem such that computer always win. (Min-Max Search)
2. To solve Monkey-Banana Problem
3. To solve Missionaries and Cannabal Problem.
4. To solve Water-Jug problem.
5. To implement Depth First Search (DFS)
6. To implement Breadth First Search (BFS)
7. To solve Hill Climbing
8. To solve Best First Search 19. Lab Assignment
9. To solve A*. 20. Lab Assignment
10. To solve AO*.
11. To implement real world Games. Chess Playing (Computer vs Human)
12. To implement real-world Games. Sudoku Puzzle

TEXT BOOKS

1. Prolog Programming by Bratko, PHI publishing.
2. Dan W. Patterson - Introduction to Artificial Intelligence and Expert Systems, PHI, New Delhi, 2006



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science and Engineering)

THIRD YEAR, VI-semester

Branch	Subject Title	Subject Code
B.Tech. CSE	Introduction to Python	CS604

UNIT I

Problem Analysis-Formal Definition of a Problem, Algorithms, Flowcharts, Examples for Algorithms and Flowcharts Introduction to Python- Variables, Operators, Expressions, Evaluation of Expressions, String Operations, Input and Output functions

UNIT II

Control Statements- Decision making statements, Iterative Statements, Loop Control Statements Strings and Lists- String Operations, Tuples and Dictionaries-Operations and Examples

UNIT III

Functions- Function Definition and Call, Mathematical functions, User defined Functions, Parameters and Arguments, Type Conversion and Coercion

UNIT IV

Files – Different File Operations, File Object Attributes, Directories Exceptions- Except clause, Exception with arguments, Raising an Exception, User Defined Exceptions

UNIT V

Introduction to Classes and Objects- Object Oriented Features, Attributes, Instances, Garbage Collection

Text book:

1. Downey A., How to think like a computer scientist: Learning with Python.

Reference books:

1. Jose Jeeva, Taming Python by Programming, Khanna Publishing House.
2. Jose J. Introduction to Computing and Problem Solving with Python, (ISBN: 978-93-82609-810).

B.Tech. VII Semester (Computer Science and Engineering)

S. No.	Subject Code	Subject Name	Internal	External		Total Marks	
			Max. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks
1	CS701	Professional Practice Law & Ethics	30	70	21	100	35
2	CS702	Cryptography & Network Security	30	70	21	100	35
3	CS703	Internet of Things (IoT)	30	70	21	100	35
4	CS704	Machine Learning,	30	70	21	100	35
5	CS705	.NET Programming	30	70	21	100	35
Practical							
Total							
			Max		Min		
1	CS754	Machine Learning Lab	50		25		
2	CS755	.NET Programming lab	50		25		

Choice Based Credit System

Branch:-Computer Science

Seventh Semester

S.No.	Subject Code	SUBJECT NAME	PERIODS			Credit
			L	T	P	
1	CS701	Professional Practice Law & Ethics	4	0	0	4
2	CS702	Cryptography & Network Security	3	1	0	4
3	CS703	Internet of Things (IoT)	4	0	0	4
4	CS704	Machine Learning,	3	1	0	4
5	CS705	.NET Programming	3	0	0	3
Practicals						
1	CS754	Machine Learning Lab	0	0	2	1
2	CS755	.NET Programming lab	0	0	2	1
Total			16	2	6	21



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science and Engineering)

FOURTH YEAR, VII-semester

Branch	Subject Title	Subject Code
B.Tech. CSE	Professional Practice Law & Ethics	CS701

UNIT I

HUMAN VALUES Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time – Cooperation – Commitment – Empathy – Self confidence – Character – Spirituality – Introduction to Yoga and meditation for professional excellence and stress management.

UNIT II

ENGINEERING ETHICS Senses of ‘Engineering Ethics’ – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg’s theory – Gilligan’s theory – Consensus and Controversy – Models of professional roles - Theories about right action – Self-interest – Customs and Religion – Uses of Ethical Theories

UNIT III

ENGINEERING AS SOCIAL EXPERIMENTATION Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law.

UNIT IV

SAFETY, RESPONSIBILITIES AND RIGHTS Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk - Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination

UNIT V

GLOBAL ISSUES Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership –Code of Conduct – Corporate Social Responsibility

TEXTBOOKS:

1. Mike W. Martin and Roland Schinzinger, “Ethics in Engineering”, Tata McGraw Hill, New Delhi, 2003.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, “Engineering Ethics”, Prentice Hall of India, New Delhi, 2004.

REFERENCES:

1. Charles B. Fleddermann, “Engineering Ethics”, Pearson Prentice Hall, New Jersey, 2004.
2. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, “Engineering Ethics – Concepts and Cases”, Cengage Learning, 2009
3. John R Boatright, “Ethics and the Conduct of Business”, Pearson Education, New Delhi, 2003
4. Edmund G Seebauer and Robert L Barry, “Fundamentals of Ethics for Scientists and Engineers”, Oxford University Press, Oxford, 2001
4. Laura P. Hartman and Joe Desjardins, “Business Ethics: Decision Making for Personal Integrity and Social Responsibility” Mc Graw Hill education, India Pvt. Ltd.,New Delhi 2013.
5. World Community Service Centre, " Value Education", Vethathiri publications, Erode, 2011



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science and Engineering)

FOURTH YEAR, VII-semester

Branch	Subject Title	Subject Code
B.Tech. CSE	Cryptography & Network Security	CS702

UNIT I

Introduction to Cryptography: Computer Security concepts, The OSI Security Architecture, Security Attacks, Security Services, A model for Network Security, Classical Encryption Techniques.

UNIT II

Mathematical Foundations of Cryptography: Modular Arithmetic, Euclidean Algorithm, Groups, Rings, Fields, Finite Fields of the Form $GF(p)$, Polynomial Arithmetic, Finite Fields of the Form $GF(2^n)$, Prime Numbers, Fermat's and Euler's Theorem, The Chinese Remainder Theorem, Quadratic Congruence, Discrete Logarithms.

UNIT III

Symmetric and Asymmetric Cryptography: Difference Between Symmetric and Asymmetric Cryptography, DES, Triple DES, AES, RSA Cryptosystem, Symmetric and Asymmetric Key Cryptography Together, Elgamal Cryptosystem, Elliptic Curve Cryptosystems, Diffie-Hellman Key Exchange, Cryptographic Hash Functions, Message Authentication Codes, Digital Signature.

UNIT IV

Internet Security Protocols : Basic Concepts, Security Socket Layer (SSL), Secure Hyper Text Transfer Protocol (SHTTP), Time stamping Protocol(TSP), Secure Electronic Transaction(SET), SSL Versus SET, 3-D Secure Protocol, Electronic Money, Email Security, Wireless Application Protocol(WAP) Security, Security in GSM.

UNIT V

Network Security: Users, Trusts and Trusted Systems, Buffer Overflow and Malicious Software, Malicious Programs, Worms, Viruses, Intrusion Detection Systems (IDS), Firewalls: Definitions, Constructions and Working Principles.

Text Book:

1. Forouzan B. A., Mukhopadhyay D., “Cryptography and Network Security”, 3rd Edition, Mcgraw Higher Education, 2016.

Reference Books:

1. Stallings W., “Cryptography and Network Security: Principles and Practice”, 7th Edition, Pearson, 2017.
2. Kahate A., “Crptography and Network Security”, 3rd Edition, McGraw Hill Education, New Delhi, 2013.
3. Schneier B., “Applied Cryptogaphy: Protocols, Algorithms And Source Code In C”, 2nd Edition, Wiley, 2007.



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science and Engineering)

FOURTH YEAR, VII-semester

Branch	Subject Title	Subject Code
B.Tech. CSE	Internet of Things (IoT)	CS703

UNIT I

Introduction to IOT The definition of the Internet of Things, main assumptions and perspectives. Platform for IoT devices Device architectures. Conventional and renewable power sources for resourceconstrained devices. Operating systems for resource-constrained devices.

UNIT II

Architecture of IOT Node structure: Sensing, Processing, Communication, Powering IOT networking: Topologies, Layer/Stack architecture, The data link layer for IoT- Wireless communication technologies. Wire communication technologies. Manet Networks.

UNIT III

Communication Technologies Introduction to ZigBee, BLE, WiFi, LTE, IEEE 802.11ah, Discuss data rate, range, power, computations/bandwidth, QoS, Service oriented protocols (COAP). Communication protocols based on the exchange of messages (MQTT). Service discovery protocols.

UNIT IV

M2M and IoT Technology Fundamentals Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service (XaaS), M2M and IoT Analytics, Knowledge Management.

UNIT V

The data processing for IoT Organization of data processing for the Internet of things. Cloud computing. Fog computing. Application case studies: Smart Grid. Home Automation. Smart City.

Text books:

1. Madiseti Vijay and Bahga Arshdeep, Internet of Things (A Hands-on Approach), 1 st Edition, VPT, 2014.
2. Raj Pethuru and Raman Anupama C., The Internet of Things: Enabling Technologies, Platforms, and Use Cases, CRC Press.

Reference books:

1. Vermesan Dr. Ovidiu, Friess Dr. Peter, Internet of Things: Converging Technologies for Smart Environments and Integrated Ecosystems, River Publishers.
2. Holler Jan, Tsiatsis Vlasios, Mulligan Catherine, Avesand Stefan, Karnouskos Stamatis, Boyle David, From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence, 1 st Edition, Academic Press, 2014.



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science and Engineering)

FOURTH YEAR, VII-semester

Branch	Subject Title	Subject Code
B.Tech. CSE	Machine Learning	CS704

UNIT I

Introduction to Machine learning Machine Learning – what and why? Basics of Linear Algebra and Statistics, Overview of target function representations; Linear Regression.

UNIT II

Supervised Learning Basics of Feature Selection and Evaluation, Decision Tree, Overfitting and Pruning, Page 238 of 439 Logistic regression, Support Vector Machine and Kernel; Noise, bias-variance trade-off, under-fitting and over-fitting concepts.

UNIT III

Neural Networks Perceptions: representational limitation and gradient descent training. Multilayer networks and back propagation. Hidden layers and constructing intermediate, distributed representations. Overfitting, learning network structure, recurrent networks.

UNIT IV

Unsupervised and Semi Supervised Learning Learning from unclassified data. Clustering. Hierarchical Agglomerative Clustering. kmeans partitional clustering. Expectation maximization (EM) for soft clustering. Semisupervised learning with EM using labelled and unlabeled data.

UNIT V

Ensemble Committees of multiple hypotheses, bagging, boosting, active learning with ensembles,

Text book:

1. Mitchell Tom, Machine Learning, Latest Edition, Mc-Graw Hill.

Reference books:

1. Shalev-Shwartz Shai and Ben-David Shai, Understanding Machine Learning, Cambridge University Press. 2017.
2. Bishop Christopher, Pattern Recognition and Machine Learning, Springer, 2006.



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science and Engineering)

FOURTH YEAR, VII-semester

Branch	Subject Title	Subject Code
B.Tech. CSE	Machine Learning Lab	CS754

1. Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.
2. For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples.
3. Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
4. Build an Artificial Neural Network by implementing the Back propagation algorithm and test the same using appropriate data sets.
5. Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
6. Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task. Built-in Java classes/API can be used to write the program. Calculate the accuracy, precision, and recall for your data set.
7. Write a program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set. You can use Java/Python ML library classes/API.
8. Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.
9. Write a program to implement k-Nearest Neighbor algorithm to classify the iris data set. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem.

10. Implement the non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs

Text Books:

1. Floreano, D. and Mattiussi, C., "Bio-Inspired Artificial Intelligence", MIT Press, 2008.
2. Neumann, F. and Witt, C., "Bioinspired Computation in combinatorial optimization: Algorithms and their computational complexity", Springer, 2010.
3. Elben, A. E. and Smith, J. E., "Introduction to Evolutionary Computing", Springer, 2010. Goldberg, D. E., "Genetic algorithms in search, optimization, and machine learning", Addison- Wesley, 1989.
4. Haykin, Simon O., "Neural Networks and Learning Machines", Third Edition, Prentice Hall, 2008.

Reference Books:

1. Dorigo, M. and Stutzle, T., "Ant Colony Optimization", A Bradford Book, 2004.
2. Ebelhart, R. C. et al., "Swarm Intelligence", Morgan Kaufmann, 2001.



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science and Engineering)

FOURTH YEAR, VII-semester

Branch	Subject Title	Subject Code
B.Tech. CSE	.NET Programming	CS705

UNIT I

C# basics C# and the .NET framework – C# basics – Objects and types – Inheritance – Arrays – Operators and casts – Indexers.

UNIT II

Advanced C# features Delegates and events – Strings and regular expressions – Generics – Collections–Memory management and pointers – Errors and exceptions.

UNIT III

I/O and network programming Tracing and events - threading and synchronization - .Net security – localization –Manipulating XML - Managing the file system – basic network programming.

UNIT IV

Window and web applications Window based applications – Data access with .NET – basics of ASP .NET -Introduction to web services.

UNIT V

.NET Features Architecture – Assemblies – shared assemblies – CLR hosting – Appdomains –Reflection.

Text Books:

1. Nagel,C. , Evjen,B. , Glynn,J. , Watson,K. , and Skinner,M.,“Professional C# 4 with .NET 4,” Wiley India, 2010.
2. Liberty ,J., and MacDonald ,B., “Learning C# 3.0,” First Edition ,O’Reilly, 2008.

References Book:

1. Troelson ,A., “Pro C# 5.0 and the.NET 4.5 Framework,” Sixth Edition, Apress,2012.



R.K.D.F. UNIVERSITY, RANCHI

B.Tech. (Computer Science and Engineering)

FOURTH YEAR, VII-semester

Branch	Subject Title	Subject Code
B.Tech. CSE	.NET Programming Lab	CS755

List of experiments:

1. Simple application using web controls

a) Finding factorial Value

b) Money Conversion

c) Quadratic Equation

d) Temperature Conversion

e) Login control

2. States of ASP.NET Pages

3. Adrotator Control

4. Calendar control

a) Display messages in a calendar control

b) Display vacation in a calendar control

c) Selected day in a calendar control using style

d) Difference between two calendar dates

5. Treeview control

a) Treeview control and datalist

b) Treeview operations

6. Validation controls

7. Query textbox and Displaying records

8. Display records by using database

Text Books:

1. Nagel,C. , Evjen,B. , Glynn,J. , Watson,K. , and Skinner,M.,“Professional C# 4 with .NET 4,” Wiley India, 2010.
2. Liberty ,J., and MacDonald ,B., “Learning C# 3.0,” First Edition ,O’Reilly, 2008.

B.Tech. VIII Semester (Computer Science and Engineering)

S. No.	Subject Code	Subject Name	Internal	External		Total Marks	
			Max. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks
1	BCS801	Research project / Industry Internship	30	70	21	100	35

Choice Based Credit System

Branch:-Computer Science

Eighth Semester

S.No.	Subject Code	SUBJECT NAME	PERIODS			Credit
			L	T	P	
1	BCS801	Research project / Industry Internship	Not applicable			21
Total						21