

DR. A.P.J ABDUL KALAM TECHNICAL UNIVERSITY, LUCKNOW
STUDY & EVALUATION SCHEME B.TECH. CIVIL ENGINEERING
SECOND YEAR III- SEMESTER

WITH EFFECT SESSION 2017-18

S No.	Subject Code	Subject Name	L-T-P	Th /Lab Marks (ESE)	Sessional		Total	Credit
					CT	TA		
1		Maths-III / Science Based Open Elective	3---1---0	70	20	10	100	4
2		Human Value & Professional Ethics / ENV. & Ecology	3---0---0	70	20	10	100	3
3	RME	Mechanics of Solids	3---0---0	70	20	10	100	3
4	RCE301	Building Materials & Construction	3---0---0	70	20	10	100	3
5	RCE302	Surveying	3---0---0	70	20	10	100	3
6	RCE303	Fluid Mechanics	3---1---0	70	20	10	100	4
7	RCE351	Building Materials Lab	0---0---2	50	30	20	100	1
8	RCE352	Surveying Lab	0---0---2	50	30	20	100	1
9	RCE353	Fluid Mechanics Lab	0---0---2	50	30	20	100	1
10	RCE354	CBNST LAB	0---0---2	50	30	20	100	1
	TOTAL						1000	24

Science Based Open Electives

ROE030/ROE040	Manufacturing Process
ROE031/ROE041	Introduction to soft computing
ROE032/ROE042	Nano Sciences
ROE033/ROE043	Laser Systems and Applications
ROE034/ROE044	Space Sciences
ROE035/ROE045	Polymer Science & Technology
ROE036/ROE046	Nuclear Science
ROE037/ROE047	Material Science
ROE038/ROE048	Discrete Mathematics
ROE039/ROE049	Applied Linear Algebra

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STUDY & EVALUATION SCHEME B.TECH. CIVIL ENGINEERING
SECOND YEAR IV- SEMESTER

WITH EFFECT SESSION 2017-18

S. No.	Subject Code	Subject Name	L-T-P	Th /Lab Marks (ESE)	Sessional		Total	Credit
					CT	TA		
1		Science Based Open Elective /Maths-III	3---1---0	70	20	10	100	4
2		ENV & Ecology/ Human Value & Professional Ethics	3---0---0	70	20	10	100	3
3	RCS	Data Structure	3---0---0	70	20	10	100	3
4	RCE401	Hydraulics & Hydraulic Machines	3---0---0	70	20	10	100	3
5	RCE402	Geoinformatics	3---0---0	70	20	10	100	3
6	RCE403	Structural Analysis	3---1---0	70	20	10	100	4
7	RCE451	Hydraulics & Machine Lab	0---0---2	50	30	20	100	1
8	RCE452	Geoinformatics Lab	0---0---2	50	30	20	100	1
9	RCE453	Structural Analysis Lab	0---0---2	50	30	20	100	1
10	RCE454	Building Planning & Drawing Lab	0---0---2	50	30	20	100	1
	TOTAL						1000	24

Industrial Training:-

Students will go for Industrial Training of 8-10 weeks in total in two parts (Industrial Training-1 & Industrial Training-2) which is to be evaluated in VII semester after submission of separate training report for each part.

Industrial Training-1: Students will go to Industrial Training-1 of 4 weeks after IV semester which will be evaluated in VII semester.

Science Based Open Elective

ROE030/ROE040	Manufacturing Process
ROE031/ROE041	Introduction to soft computing
ROE032/ROE042	Nano Sciences
ROE033/ROE043	Laser Systems and Applications
ROE034/ROE044	Space Sciences
ROE035/ROE045	Polymer Science & Technology
ROE036/ROE046	Nuclear Science
ROE037/ROE047	Material Science
ROE038/ROE048	Discrete Mathematics
ROE039/ROE049	Applied Linear Algebra

Detailed Syllabus of 2nd Year B.Tech Civil Engg. w.e.f. 2017-18

IIIrd Semester

BUILDING MATERIALS & CONSTRUCTION (RCE301)

L T P

3 0 0

Unit-I

Scope of Study of building Materials: building materials and their performance, economics of the building materials.

Stones: Requirement of good building stone, characteristics of building stone and their testing. Common building stones. Methods of preservation of stones.

Bricks: Manufacturing process of clay bricks, classification of clay bricks. Properties of clay bricks, testing methods for clay bricks. Problems of efflorescence & lime bursting in bricks & tiles.

Gypsum: properties of gypsum plaster, building products made of gypsum and their uses.

Lime: Manufacture of lime, classifications of limes, properties of lime.

Cement: Raw materials used, Process of Manufacturing, Chemical composition, compounds formed and their effect on strength, Types of cement, Testing of cement properties, Uses of cement

Cement Concrete: Constituent materials and their properties, Grades of concrete, Factors affecting strength, Properties of concrete at fresh and hardened stage, Testing of concrete, Methods of Curing of concrete.

Pozzolona: Chemical composition and requirements for uses, Natural and Artificial flyash, Surkhi(burnt clay pozzolona), rice husk and ash pozzolona, properties and specifications for use in construction.

Timber: Classification and identification of timber, Fundamental Engineering Properties of timber, Defects in timber, Factor affecting strength of timber, Methods of seasoning and preservation of timber. Wood based products.

Asphalt: Bitumen and Tar: Terminology, specifications and uses, Bituminous materials. [8]

Unit- II

Plastics: classification, advantages of plastics, Mechanical properties and use of plastic in construction.

Paints and varnishes and distempers: Common constituents, types and desirable properties, Cement paints.

Ferrous metals: Desirable characteristics of reinforcing steel. Principles of cold working. Reinforcing telemechanical and physical Properties chemical composition. Brief discussion on properties and uses of Aluminum and lead.

Glass: Ingredients, properties types and use in construction.

Insulating Materials: Thermal and sound insulating material, desirable properties and types of insulating materials. [8]

Unit - III

Buildings: Components of building, area considerations, Construction Principle and Methods for layout, Damp proofing, antitermite treatment in buildings, Vertical circulation means: stair cases and their types, design and construction. Different types of floors, and flooring materials (Ground floor and upper floors). Bricks and stone masonry construction. Cavity wall & hollow block construction. [8]

Unit- IV

Doors and Windows: Construction details, types of doors and windows and their relative advantages & disadvantages. Types of roof and roof treatments, Lintel sand Chhajja, Principles of building Planning. **[8]**

Unit-V

Natural Ventilation, Water Supply and Sanitary fittings (Plumbing), Electric Fittings. Heating Ventilation & Air conditioning (HVAC), Mechanical Lifts and Escalators, Fire Fighting and Fire Protection of Buildings., Acoustics. Plastering and its types, pointing, Distempering, Colour washing, Painting etc. Principles & Methods of building maintenance **[8]**

References

1. S K Duggal "Building Materials" New Age International
2. Purushothama Raj "Building Construction Materials & Techniques" Pearson Edu.
3. P.C.Varghese: "Building Materials" PHI
4. Rangwala "Building Materials" Charotar Publishing House.
5. Sushil Kumar "Building Construction" Standard Publisher.
6. Domone, "Construction Materials" 4/e, CRC Press Taylor & Francis Group.
7. Adams, "Adams' Building Construction Adams" CRC Press Taylor & Francis Group.
8. BC Punmia "Building Construction" Laxmi Publication.
9. Jha & Sinha "Building Construction" Khanna Publishers
10. Sahu, "Building Materials and Construction" Mc Grew Hill Education
11. Deodhar "Civil Engineering Materials" Khanna Publishers
12. Mehta, "Building Construction Principles, Materials & Systems" 2/e, Pearson Education Noida.
13. Sandeep Mantri, "Practical building Construction and its Management" Satya Publisher, New Delhi.

SURVEYING (RCE302)

**L T P
3 0 0**

Unit I

Surveying: definition, divisions, classification and principles of surveying. Scales: plain, vernier, diagonal, plan and map. Accuracy and errors: definitions, sources and kinds of errors, application of probability for computation of errors, laws of weights. **[8]**

Unit II

Linear measurement: chain and tape surveying, types of chain and tape, ranging, obstacles and tape correction. Compass surveying: Measurement of directions, Reference meridians, bearing and azimuths, local attraction. Theodolite survey: Vernier theodolite, Measurements of horizontal and vertical angles, Horizontal Control, working of Electronic Theodolites **[8]**

Unit III

Leveling: Methods of determining elevations, Direct levelling- basic terms and definitions, principle, booking and reduction of field notes, curvature and refraction correction, use of Automatic level, Digital Level, Vertical Control. Contouring: contours, contour interval, horizontal equivalent, characteristics, methods and interpolation, use to prepare profiles. Tachometry: Principles of stadia systems, subtense bar and tangential methods.

[8]

Unit IV

Traversing and triangulation: Principles of traversing by compass and theodolite, computations of traverse coordinates, omitted measurements, Principles and classification of triangulation systems, strength of figures, satellite stations, and triangulation field work. Introduction to modern surveying Instruments /Techniques like total station,

[8]

Unit V

Elements of simple circular curves, theory and methods of setting out simple circular curves, transition curves- types and their characteristics, ideal transition curve, equations of various transition curves, Introduction to vertical curves. Survey Layout for culverts, canals, bridges, road/railway alignment and buildings.

[8]

References

1. Schofield, "Engineering Surveying" 6/e, CRC Press Taylor & Francis Group.
2. B. C. Punamia et al: Surveying Vol. I, II, Laxmi Publication
3. Bannister, "Surveying" 7/e, Pearson Education, Noida.
4. A. M. Chandra: Plane Surveying, Higher Surveying, Narosa Pub.
5. AK Dey Plain Survey, S Chand
6. S K Duggal: Surveying Vol. I, II,
7. R Subramanian : Surveying & Leveling , Oxford University Press
8. C Venkatramaih : Text Book of Surveying , University Press
9. Charles D. Ghilani, Elementary Surveying Pearson Education
10. R. Agor, "Surveying and Levelling" Khanna Publishers.

FLUID MECHANICS (RCE303)

L T P
3 1 0

Unit-I

Fluid and continuum, Physical properties of fluids, Rheology of fluids. Pressure-density-height relationship, manometers, pressure transducers, pressure on plane and curved surfaces, centre of pressure, buoyancy, stability of immersed and floating bodies, fluid masses subjected to linear acceleration and uniform rotation about an axis.

[8]

Unit - II

Types of fluid flows: Continuum & free molecular flows. Steady and unsteady, uniform and non-uniform, laminar and turbulent flows, rotational and irrotational flows, compressible and incompressible flows, subsonic, sonic and supersonic flows, sub-critical, critical and supercritical flows, one, two and three dimensional flows, streamlines, continuity equation for 3D and 1D flows, circulation, stream function and velocity potential.

[8]

Unit - III

Potential Flow: source, sink, doublet and half-body.

Equation of motion along a streamline and its integration, Bernoulli's equation and its applications- Pitot tube, orifice meter, venturimeter and bend meter, notches

and weirs, momentum equation and its application to pipe bends. resistance to flow, Minor losses in pipe in series and parallel, power transmission through a pipe, siphon, water hammer, three reservoir problems and pipe networks, [8]

Unit – IV

Equation of motion for laminar flow through pipes, Stokes' law, transition from laminar to turbulent flow, turbulent flow, types of turbulent flow, isotropic, homogenous turbulence, scale and intensity of turbulence, measurement of turbulence, eddy viscosity, mixing length concept and velocity distribution in turbulent flow over smooth and rough surfaces, Boundary layer thickness, boundary layer over a flat plate, laminar boundary layer, application of momentum equation, turbulent boundary layer, laminar sub-layer, separation and its control. [8]

Unit - V

Drag and lift, drag on a sphere, a two dimensional cylinder, and an aerofoil, Magnus effect. Similarity Laws: geometric, kinematics and dynamic similarity, undistorted and distorted model studies, Dimensional analysis, Buckingham's Pi theorem, important dimensionless numbers and their significance. [8]

References :

1. Hibbler, "Fluid Mechanics in SI Units" 1/e Pearson Education, Noida.
2. Fox & Donald, "Introduction to Fluid Mechanics" John Wiley & Sons Pvt Ltd,
3. Cengel & Cimbala, "Fluid Mechanics" TMH, New Delhi.
4. Katz, "Introductory Fluid Mechanics" Cambridge University Press
5. Pnueli & Gutfinger, "Fluid Mechanics" Cambridge University Press
6. Modi & Seth "Hydraulics & Fluid Mechanics" Standard Publications.
7. Gupta, "Fluid Mechanics & Hydraulic Machines" Pearson Education, Noida
8. Graebel, "Engineering Fluid Mechanics", CRC Press Taylor & Francis Group.
9. Janna, "Introduction to Fluid Mechanics" 4/e, CRC Press Taylor & Francis Group.
10. AK Jain "Fluid Mechanics" Khanna Publication.
11. White, F.M. "Fluid Mechanics" TMH, New Delhi.
12. Munson et al, "Fundamental of Fluid Mechanics" Wiley Newyork Ltd
13. Garde, R.J., " Fluid Mechanics", SciTech Publications Pvt. Ltd
14. I.H. Shames, "Mechanics of Fluids", McGraw Hill, Int. Student.
15. RK Bansal "Fluid Mechanics and Hydraulic Machines" Laxmi Publication
16. Jagdish Lal "Fluid Mechanics"
17. N Narayan Pillai " Principles of Fluid Mechanics & Fluid Machines" Universities Press.
18. Esposito, "Fluid Power & Applications" 7/e Pearson Education, Noida.
19. D.R. Malhotra & Malhotra, "Fluid Mechanics Hydraulics & Hydraulic Machines" Satya Prakashan, New Delhi.

BUILDING MATERIALS LAB (RCE351)

**LTP
002**

Testing of various properties of following materials as per BIS specifications

I. Cement

1. Normal Consistency of cement.
2. Initial & final setting time of cement
3. Compressive strength of cement
4. Fineness of cement by air permeability and Le-chatalier's apparatus.
5. Soundness of cement.
6. Tensile strength

II. Coarse Aggregate

1. Water absorption of aggregate
2. Sieve Analysis of Aggregate
3. Specific gravity & bulk density
4. Grading of aggregates.

III Fine Aggregate:

1. Sieve analysis of sand
2. Silt content of sand
3. Bulking of sand

IV Bricks:

1. Water absorption.
2. Dimension Tolerances
3. Compressive strength
4. Efflorescence

SURVEYING LAB (RCE352)

**L T P
0 0 2**

1. To prepare conventional symbol chart based on the study of different types of topographical maps.
2. To measure bearings of a closed traverse by prismatic compass and to adjust the traverse by graphical method.
3. To find out reduced levels of given points using Auto/dumpy level.
4. To perform fly leveling with Auto/tilting level.
5. To study parts of a Vernier theodolite and measurement of horizontal and vertical angle.
6. To measure horizontal angle between two objects by repetition/reiteration method.

7. To determine the height of a vertical structure (e.g. chimney/ water tank etc.) using trigonometrical leveling by taking observations in single vertical plane.
8. To study various parts of Electronic Theodolite, Total Station and practice for measurement of distance, horizontal and vertical angles.
9. To set out a simple circular curve by Rankine's method.
10. To plot contour map of given area.

FLUID MECHANICS LAB (RCE353)

**L T P
0 0 2**

Note: Ensure to conduct at least 10 experiments from the list:

1. To verify the momentum equation using the experimental set-up on impact of jet.
2. To determine the coefficient of discharge of an orifice of a given shape. Also to determine the coefficient of velocity and the coefficient of contraction of the orifice mouth piece.
3. To calibrate an orifice meter and study the variation of the co-efficient of discharge with the Reynolds number.
4. To calibrate a Venturimeter and study the variation of the co-efficient of discharge with the Reynolds number.
5. To calibrate a bend meter and study the variation of the co-efficient of discharge with the Reynolds number.
6. To draw a flow-net using Electrical Analogy Method.
7. To study the transition from laminar to turbulent flow and to determine the lower critical Reynolds number.
8. To study the velocity distribution in a pipe and also to compute the discharge by integrating the velocity profile.
9. To study the variation of friction factor, 'f' for turbulent flow in commercial pipes.
10. To study the boundary layer velocity profile over a flat plate and to determine the boundary layer thickness.
11. To determine Meta-centric height of a given ship model.
12. To determine the head loss for a sudden enlargement
13. To determine the head loss for a sudden Contraction.

COMPUTER BASED STATISTICAL & NUMERICAL TECHNIQUES LAB (RCE354)

**L T P
0 0 2**

Write a computer program in C/C++ /visual basic for mathematical and engineering solutions.

1. Write a code for finding out the root of the algebraic and transcendental equations using Newton-Raphson's iterative method.
2. Write a computer program for inversion of matrix.
3. Write a computer program for Eigen value solution of matrix.

4. Write a computer program for Runge Kutta fourth order method (RK4) to solve ordinary differential equation.
5. Write a computer program to find the engineering properties of I and channel sections.
6. Write a computer program to solve simultaneous linear equations.
7. Write the program to implement the Gauss forward interpolation formula and back ward interpolation formula.
8. Write code for one dimensional heat equation and one dimensional fluid flow problem (boundary value problem).

Detailed Syllabus of 2nd Year B.Tech Civil Engg. w.e.f. 2017-18

IV Semester

HYDRAULICS & HYDRAULIC MACHINES (RCE401)

L T P
3 0 0

Unit – I

Introduction : Basic concepts of free surface flows, velocity and pressure distribution, Mass, energy and momentum principle for prismatic and non-prismatic channels critical, sub-critical and super-critical type of flows. Critical depth, concepts of specific energy and specific force.

Chezy's and Manning's equations for uniform flow in open channel, Velocity distribution, most efficient channel section, compound sections. [8]

Unit – II

Energy-Depth relationship: Application of specific energy principle for interpretation of open channel phenomena, flow through vertical and horizontal contractions.

Equation of gradually varied flow and its limitations, flow classification and surface profiles, integration of varied flow equation by analytical, graphical and numerical methods. [8]

Unit – III

Rapidly varied flow: hydraulic jump, Evaluation of the jump elements in rectangular and non-rectangular channels on horizontal and sloping beds.

Open channel surge, celerity of the gravity wave, deep and shallow water waves, Rectangular free overfall. [8]

Unit – IV

Impulse momentum equation- Impact of Jets-plane and curved- stationary and moving plates.

Pumps: Positive displacement pumps - reciprocating pumps - operating principles - slip - indicator diagram - separation- air vessels. centrifugal pumps - operation - velocity triangles - performance curves - Cavitation - Multi staging - Selection of pumps. [8]

Unit - V

Rotodynamic Machines, Pelton Turbine, equations for jet and rotor size, efficiency, spear valve, reaction turbines, Francis and Kaplan type, Head on reaction turbine, unit quantities, similarity laws and specific speed, cavitation, characteristic curves. [8]

References :

1. Chow, V.T. "Open Channel hydraulics" McGraw Hill Publication
2. Subramanya, K., Flow through Open Channels, TMH, New Delhi
3. Ranga Raju, K.G., Flow through open channels, T.M.H. New Delhi
4. Rajesh Srivastava, Flow through Open Channels , Oxford University Press
5. Streeter, V.L.& White E.B., "Fluid Mechanics" McGraw Hill Publication
6. Modi & Seth "Hydraulics & Fluid Mechanics" Standard Publications.
7. RK Bansal "Fluid Mechanics and Hydraulic Machines" Laxmi Publication
8. AK Jain "Fluid Mechanics" Khanna Publication.

9. Houghtalen, "Fundamentals of Hydraulics Engineering Systems" 4/e Pearson Education, Noida.

GEOINFORMATICS (RCE402)

L T P
3 0 0

Unit I:

[8]

Photogrammetric Survey, basic principles, elevation of a point, determination of focal length of lens, aerial camera, scale of a vertical photograph, relief displacement of a vertical photograph, height of object from relief displacement, scale of a tilted photograph, tilt distortion, relief displacement of a tilted photograph, combined effects of tilt and relief, flight planning for aerial photography, selection of altitude, interval between exposures, crab and drift, stereoscope parallax, parallax in aerial stereoscopic views, parallax equations. Photogrammetry – analog, analytical and digital photogrammetry.

Unit II:

[8]

Remote Sensing, Introduction, concepts and physical basis of Remote Sensing, Electromagnetic spectrum, radiation laws, atmospheric effects, image characteristics. Remote sensing systems; sources of remote sensing information, spectral quantities spectral signatures and characteristics spectral reflectance curves for rocks, soil, vegetation and water. Introduction to Aerial and space borne platforms. Optical, thermal and microwave sensors and their resolution, salient features of some of operating Remote Sensing satellites.

Unit III:

[8]

Digital image processing: introduction, image rectification and restoration, image enhancement, image transformation, manipulation, image classification, fusion. Applications of remote sensing to civil engineering.

Unit IV:

[8]

GIS system : Definition terminology and data types, basic components of GIS software, data models, data acquisition, both raster based and vector based data input and data processing and management including topology, overlaying and integration and finally data product and report generation. GIS applications in civil engineering.

Unit V:

[8]

Global Navigation Satellite System (GNSS), GPS, GLONASS, GALILEO, GPS: Space segment, Control segment, User segment, GPS satellite signals, Datum, coordinate system and map projection, Static, Kinematic and Differential GPS, GPS Applications.

REFERENCE

1. Sateesh Gopi, R Sathkumar & N Madhu "Advanced Surveying GIS & Remote Sensing" Pearson Education.
2. Kang Tshung Chang "Introduction of Geographic Information Systems" TMH.
3. Campbell, "Introduction to Remote Sensing" 3/e, CRC Press Taylor & Francis Group.
4. Chen, "Signal and Image Processing for Remote Sensing" CRC Press Taylor &

Francis Group.

5. A M Chandra: Higher Surveying Narosa Pub.
6. B C Punamia: Higher Surveying Laxmi Publication
7. T M Lillesand et al: Remote Sensing & Image Interpretation
8. R. Agor, "Advanced Surveying" Khanna Publishers.
9. B. Bhatta: Remote Sensing & GIS TMH.
10. M Anjireddy: Remote Sensing & GIS, BS Publications
11. Narayan Panigrahi "Geographical Information Science" Universities Press.
12. N K Agarwal: Essentials of GPS, Spatial Networks: Hyderabad.
13. George Joseph "Fundamental of Remote Sensing" Universities press.
14. GS Srivastava "An Introduction to Geoinformatics" TMH.
15. Ahmed EI Rabbany, "Introduction to GPS The Global Positioning System" Artech House, Boston.
16. Chor Pang Lo, "Concepts & Techniques of Geographic Information Systems" 2/e, Pearson Education

STRUCTURAL ANALYSIS (RCE403)

L T P
3 1 0

Unit – I

Classification of Structures, Types of structural frameworks and Load transfer Mechanisms, stress resultants, degrees of freedom, Static and Kinematic Indeterminacy for beams, trusses and building frames.

Analysis of cables with concentrated and continuous loadings, Effect of Temperature upon length of cable. **[8]**

Unit -II

Classification of Pin jointed determinate trusses, Analysis of determinate plane trusses (compound and complex). Method of Substitution, Method of tension coefficient for analysis of plane trusses. **[8]**

Unit – III

Strain Energy of deformable systems, Maxwell's reciprocal & Betti's theorem, Castigliano's theorems, Calculations of deflections: Strain Energy Method, unit load method & for statically determinate beams, frames and trusses. Deflection of determinate beams by Conjugate beam method. **[8]**

Unit – IV

Rolling loads and influence line diagrams for determinate beams and trusses, Absolute maximum bending moment and shear force.

Muller-Breslau's principal & its applications for determinate structures **[8]**

Unit – V

Arches, Types of Arches, Analysis of three hinged parabolic and circular Arches. Linear arch, Eddy's theorem, spandrel braced arch, moving load & influence lines for three hinged parabolic arch. **[8]**

References

1. Hibbler, "Structural Analysis", Pearson Education
2. Mau, "Introduction to Structural Analysis" CRC Press Taylor & Francis Group.
3. Ghali, "Structural Analysis: A Unified Classical and Matrix Approach" 5/e, CRC Press Taylor & Francis Group.
4. T S Thandavmorthy, "Analysis of Structures", Oxford University Press
5. Wilbur and Norris, "Elementary Structural Analysis", Tata McGraw Hill.

6. Temoshenko & Young “Theory of Structure” Tata Mc Grew Hill.
7. Reddy, C.S., “Basic Structural Analysis”, Tata McGraw Hill.
8. Jain, O.P. and Jain, B.K., “Theory & Analysis of Structures ”. Vol.I & II Nem Chand.
9. Vazirani & Ratwani et al , “Analysis of Structures” , Khanna Publishers
10. Coates, R.C., Coutie, M.G. & Kong, F.K., “Structural Analysis”, English Language Book Society & Nelson, 1980.
11. SP Gupta & Gupta “Theory of Structure Vol.1 & 2” TMH
12. DS Prakash Rao “Structural Analysis: A Unified Approach” Universities Press.
13. S Ramamurtham “Theory of Structure” Dhanpat Rai.
14. Devdas Menon “Advanced Structural Analysis” Narosa
15. Wang, C.K. “Intermediate Structural Analysis”, Tata Mc-Graw Hill.
16. Hsieh, “Elementary Theory of Structures” 4/e, Pearson Education, Noida.
17. Mckenzie, “Examples in Structural Analysis” 2/e, CRC Press Taylor & Francis Group.
18. Bibek Kumar Mukherjee, “Theory and Analysis of Structures” Satya Prakashan, New Delhi.
19. Jacques Heyman, “Structural Analysis” Cambridge University Press.

HYDRAULICS & MACHINE LAB (RCE451)

L T P
0 0 2

Note: Ensure to conduct at least 10 experiments from the list:

1. To determine the Manning’s coefficient of roughness ‘n’ for the bed of a given flume.
2. To study the velocity distribution in an open channel and to determine the energy and momentum correction factors
3. To study the flow characteristics over a hump placed in an open channel.
4. To study the flow through a horizontal contraction in a rectangular channel.
5. To calibrate a broad-crested weir.
6. To study the characteristics of free hydraulic jump.
7. To study centrifugal pump and their characteristics
8. To study characteristics of Pelton Turbine.
9. To study characteristics Francis Turbine.
10. To study characteristics of Kaplan Turbine.
11. To study the free overfall phenomenon in an open channel and to determine the end depth
12. To determine coefficient of discharge for given rectangular notch.
13. To determine coefficient of disc

GEOINFORMATICS LAB (RCE452)

**L T P
0 0 2**

1. Demonstration and working on Electronic Total Station. Measurement of distances, horizontal & vertical angles and coordinates.
2. Measurement of area of a land parcel using Total Station.
3. To layout a precise traverse in a given area and to compute the adjusted coordinates of survey stations.
4. Demonstration and working with Mirror stereoscopes, Parallax bar and Aerial photographs.
5. Visual Interpretation of standard FCC (False colour composite).
6. Digitization of physical features on a map/image using GIS software.
7. Coordinates measurement using GPS.

STRUCTURAL ANALYSIS LAB (RCE453)

**LTP
002**

Following experiments to be performed

1. To determine Flexural Rigidity (EI) of a given beam
2. To verify Maxwell's Reciprocal theorem.
3. To find horizontal thrust in a three-hinged arch and to draw influence line diagrams for Horizontal Thrust and Bending moment.
4. To find horizontal thrust in a two hinged arch and to draw influence line diagrams for horizontal Thrust and bending moment.
5. To find deflection of curved members.
6. To find bar forces in a three members structural frames with pin jointed bar
7. To find Critical load in Struts with different end conditions.
8. To find deflections in Beam having unsymmetrical bending.

BUILDING PLANNING & DRAWING LAB (RCE454)

**L T P
0 0 2**

Drawing and drafting of following with CAD software

1. Introduction to the tools and commands of drafting software.
2. Working in layers, blocks, x-ref, drawing layout and print setup.
3. 3D drafting and rendering
4. Planning and drafting of elevation and cross section of door and window
5. Planning and drafting of plan and cross section of Dog legged and open well staircase.
6. Planning and Drawings of Residential building of 1 room set (plan and section).

7. Planning and drawing of 3 room residential building with staircase.
8. Preparation of details general arrangement drawing of 4 room duplex house including planning and drafting.