J. S. University, Shikohabad

B.Tech

3rd Semester& 4thSemester

(Civil Engineering)

Scheme

&

Syllabus

[Effective from the session 2015-16]

STUDY AND EVALUATION SCHEME FOR

B.Tech (Civil Engineering).

SEMESTER - THIRD

S.No.	Subject Code	Name of Subject	Periods Per Week				Evaluation Scheme			
			L	T	P	D	Sessional	End Exam	Total	Duration
THEORY SUBJECT										
1	BTAS-31	Engg Mathematics-III	4	1	-	-	50	100	150	3
2	BTCE-31	Fluid Mechanics	4	1	-	-	50	100	150	3
3	BTME-31	Mechanics of Solids	4	1	-	-	50	100	150	3
4	BTCE-32	Building Materials & Construction	4	1	-	-	50	100	150	3
5	BTCE-33	Surveying – I	4	1	-	-	25	50	75	2
6	BTIP-31	Industrial Psychology	4	1	-	-	25	50	75	2
7	BTAC-31	Human Value & Professional Ethics*	2	-	-	-	25	50	75	2
PRACTICA/DRAWING SUBJECTS										
8	BTCE-31P	Fluid Mechanics Lab.	-	-	2	-	20	30	50	3
9	BTCE-32P	Buildg. Materials Lab	-	-	2	-	20	30	50	3
10	BTCE-34P	Building Planning & Drawing	-	-	2	-	20	30	50	3
11	BTCE-33P	Surveying-I Lab	-	-	2	-	20	30	50	3
12	BTGD-30	Games//Social and Cultural Activities + Discipline (25 + 25)							50	
								Grand Total	1000	

*Human values & Professional Ethics will be offered as a compulsory audit course for which passing marksare 30% in End Semester Examination and 40% in aggregate.

NOTE:- (1) Each period will be 50 minutes duration.

(2) Each session will be of 16 weeks.

(3) Effective teaching will be at least 14 weeks.

(4) Remaining periods will be utilised for revision etc.

[BTAS-31] Engg Mathematics-III

Unit – I: Function of Complex variable

Analytic function, C-R equations, Harmonic Functions, Cauchy's integral theorem, Cauchy'sintegral formula, Derivatives of analytic functions, Taylor's and Laurent's series, Singularities,Zeroes and Poles, Residue theorem, Evaluation of real integrals of the type

Unit – II: Integral Transforms

Fourier integral, Complex Fourier transform, Inverse Transforms, Convolution Theorems,Fourier sine and cosine transform, Applications of Fourier transform to simple one dimensionalheat transfer equations, wave equations and Laplace equationsZ- transform and its application to solve difference equations.

Unit – III: Statistical Techniques

Moments, Moment generating functions, Skewness, Kurtosis, Curve fitting, Method of leastsquares, Fitting of straight lines, Polynomials, Exponential curves, Correlation, Linear, non –linear and multiple regression analysis, Binomial, Poisson and Normal distributions, Tests ofsignifications: Chi-square test, t-test

Unit – IV: Numerical Techniques – I

Zeroes of transcendental and polynomial equations using Bisection method, Regula-falsi methodand Newton-Raphson method, Rate of convergence of above methods.

Interpolation: Finite differences, Newton's forward and backward interpolation, Lagrange's andNewton's divided difference formula for unequal intervals**.**

Unit – V: Numerical Techniques –II

Solution of system of linear equations, Matrix Decomposition methods, Jacobi method, Gauss-Seidal method.Numerical differentiation, Numerical integration, Trapezoidal rule, Simpson's one third andthree-eight rules,Solution of ordinary differential equations (first order,second order and simultaneous) byEuler's, Picard's and fourth-order Runge- Kutta methods.

Test Books:-

1. Peter V. O'Neil, Advance Engineering Mathematics Thomson (Cengage) Learning, 2007.

2. Jain, Iyenger Jain, Numerical Methods for Scientific and Engineering Computation, New Age International, New Delhi

Reference Books:-

1. R.K. Jain & S.R.K. Iyenger, Advance Engineering Mathematics, Narosa Publication House,.

2. Chandrika Prasad, Advanced Mathematics for Engineers, Prasad Mudralaya, 1996.

[BTCE-31] Fluid Mechanics

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.

Unit - II

Types of fluid flows: Continuum & free molecular flows. Steady and unsteady, uniform and nonuniform, 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.

Dimensional analysis, Buckingham's Pi theorem, important dimensionless numbers and their significance,

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, venturi meter and bend meter, Hot-wire anemometer and LDA, notches and weirs, momentum equation and its application to pipe bends.

Similarity Laws: geometric, kinematics and dynamic similarity, undistorted and distorted model studies.

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, resistance to flow, minor losses, pipe in series and parallel, power transmission through a pipe, siphon, water hammer, three reservoir problems and pipe networks.

Unit - V

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, Drag and lift, drag on a sphere, a two dimensional cylinder, and an aerofoil, Magnus effect.

Introduction to compressible flow

References :

1. Fox & Donald, "Introduction to Fluid Mechanics" John Wiley &Sons Pvt Ltd,
2. Cengel&Cimbala, "Fluid Mechanics" TMH, New Delhi.

BTME-31] Mechanics of Solids

UNIT-I

Compound stress and strains: Introduction, normal stress and strain, shear stress and strain, stresses oninclines sections, strain energy, impact loads and stresses, state of plane stress, principal stress and strain,maximum shear stress, Mohr's stress circle, three dimensional state of stress & strain, equilibriumequations, generalized Hook's law, theories of failure.

UNIT –II

Stresses in Beams: Pure Bending**,** normal stresses in beams, shear stresses in beams due to transverseand axial loads, composite beams.

Deflection of Beams: Equation of elastic curve, cantilever and simply supported beams, Macaulay'smethod, area moment method, fixed and continuous beams

Torsion: Torsion, combined bending & torsion of solid & hollow shafts, torsion of thin walled tubes.

UNIT-III

Helical and Leaf Springs: Deflection of springs by energy method, helical springs under axial load andunder axial twist (respectively for circular and square cross sections) axial load and twisting momentacting simultaneously both for open and closed coiled springs, laminated springs.

Columns and Struts: Buckling and stability, slenderness ratio, combined bending and direct stress,middle third and middle quarter rules, struts with different end conditions, Euler's theory for pin endedcolumns, effect of end conditions on column buckling, Ranking Gordon formulae, examples of columnsin mechanical equipments and machines.

UNIT-IV

Thin cylinders & spheres: Introduction, difference between thin walled and thick walled pressurevessels, Thin walled spheres and cylinders, hoop and axial stresses and strain, volumetric strain.

Thick cylinders:

Radial, axial and circumferential stresses in thick cylinders subjected to internal or external pressures,compound cylinders, stresses in rotating shaft and cylinders, stresses due to interference fits.

UNIT-V

Curved Beams: Bending of beams with large initial curvature, position of neutral axis for rectangular,trapezoidal and circular cross sections, stress in crane hooks, stress in circular rings subjected to tensionor compression.

Unsymmetrical Bending: Properties of beam cross-section, slope of neutral axis, stress and deflection inunsymmetrical bending, determination of shear center and flexural axis (for symmetry about both axisand about one axis) for I-section and channel section.

Books and References :

1. Mechanics of Materials by Hibbeler, Pearson.
2. Mechanics of Materials by.Beer, Jhonston, DEwolf and Mazurek, TMH
3. Strength of Materials by Pytel and Singer, Harper Collins
4. Strength of Materials by Ryder, Macmillan.
5. Strength of Materials by Timoshenko and &Yσungs, East West Press.

[BTCE-32] Building Materials & Construction

Unit-1

Classificationof building materials: buildingmaterialsandtheirperformance,economicsofthebuildingmaterials.

Stones, Requirement of goodbuildingstone,characteristicsofbuildingstonesandtheirtesting.Commonbuildingstones.Methods ofpreservationofstones.

Bricks:Manufacturing processofclaybricks,classification of claybricks.Propertiesofclaybricks,testing methods for clay bricks.Problemsofefflorescence&limeburstinginbricks&tiles.

Gypsum:propertiesofgypsumplaster,buildingproducts madeofgypsumandtheiruses.

Lime:Manufactureoflime,classificationsoflimes,propertiesoflime.

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, Testingof concrete, Methods of Curing of concrete.

Pozzolona: Chemical composition and requirements foruses,NaturalandArtificialflyash,Surkhi(burntclaypozzolona),ricehuskandashpozzolona,propertiesandspecificationsforuseinconstruction.

Timber:Classificationandidentificationoftimber,FundamentalEngineeringProperties of timber,Defectsintimber,Factorsaffectingstrengthoftimber,Methodsofseasoningand preservationoftimber.Woodbasedproducts.

Asphalt,BitumenandTar:Terminology,specificationsanduses,Bituminousmaterials.

Unit– II

ChemistryofPlasticsmanufacturingprocess,classification,advantagesofplastics, Mechanical properties and use of plastic in construction.

Paintsvarnishesanddistempers, Common constituents, types and desirableproperties, Cement paints.

Ferrousmetals,Desirablecharacteristicsofreinforcingsteel.Principlesofcoldworking.Reinforcingstelemechanical and physicalPropertieschemicalcomposition.Briefdiscussiononpropertiesandusesof Aluminumandlead.

Glass:Ingredients,propertiestypesanduseinconstruction.

InsulatingMaterials:Thermalandsoundinsulatingmaterial,desirablepropertiesandtypes of insulating materials.

Unit – III

Componentsofbuilding,areaconsiderations,ConstructionPrincipleandMethodsforlayout,Dampproofing,antitermitetreatment in buildings, Verticalcirculation means:staircases and their types,designandconstruction.Differenttypesoffloors,andflooringmaterials(Groundfloorandupperfloors).Bricksandstonemasonaryconstruction.Cavitywallhollowblockconstruction.

Unit- IV

Doors,WindowsandVentilations,Constructiondetails,types of doors andwindowsand theirrelative advantages&disadvantages.Types of roofand rooftreatments,LintelsandChhajja,FunctionalefficiencyofBuildings.

Unit-V

NaturalVentilation,WaterSupplyandSanitaryfittings(Plumbing),Electricity.HeatingVentilation&Airconditioning,MechanicalLiftsandEscalators,FireFighting,Acoustics.Plasteringdifferenttypes,pointing,Distempering,Colourwashing,Paintingetc. Principles&Methodsofbuildingmaintenance

References

1.SKDuggal:BuildingMaterials,NewAgeInternational
2.P.C.Varghese:BuildingMaterials,PHI

[BTCE-33] Surveying – I

Unit - I

Importance of surveying to engineers, plane and geodetic surveying, principles ofsurveying, classification of surveys, Accuracy and Errors.

Linear Measurements, Measurement of directions: Reference meridians, bearingand azimuths, Compass, Vernier theodolite, Measurements of horizontal and verticalangles, Horizontal Control, Electronic Theodolites and Total Station.

Unit – II

Methods of determining elevations, Direct levelling- basic terms and definitions,principle, booking and reduction of field notes, curvature and refraction correction,Automatic level, Digital Level, Vertical Control.

Contouring: methods and uses, Principles of stadia systems, subtense bar and tangential methods.

Unit – III

Principles of traversing by compass and theodolite, computations of traversecoordinates, Principles and classification of triangulation systems, strength offigures, satellite stations, triangulation field work.

Plane table surveying, equipments, methods, resection by three point problem.

Unit – IV

Elements of simple circular curves, theory and methods of setting out simple circularcurves, transition curves- types and their characteristics, ideal transition curve,equations of various transition curves, Introduction to vertical curves.

References

1. B. C. Punamia et al: Surveying Vol. I, II
2. A. M. Chandra: Plane Surveying, Higher Surveying

[BTCE-31P] Fluid Mechanics Lab

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

1. To verify the momentum equation using the experimental set-up on impact ofjet.
2. To determine the coefficient of discharge of an orifice of a given shape. Also todetermine the coefficient of velocity and the coefficient of contraction of theorifice mouth piece.
3. To calibrate an orifice meter and study the variation of the co-efficient ofdischarge with the Reynolds number.
4. To calibrate a Venturimeter and study the variation of the co-efficient ofdischarge with the Reynolds number.
5. To calibrate a bend meter and study the variation of the co-efficient of dischargewith 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 thelower critical Reynolds number.
8. To study the velocity distribution in a pipe and also to compute the discharge byintegrating 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 determinethe 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.

[BTCE-32P] Buildg. Materials Lab

Testing of various properties of following as per BIS specifications

I.**Cement**

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

II.**Coarse Aggregate**

1.Crushing value of aggregate
2.Impactvalue of aggregate
3.water absorption of aggregate
4.SieveAnalysis of Aggregate
5.Specific gravity &bulk density
6.Grading of aggregates.

III**FineAggregate**:

1.Sieveanalysisofsand
2.Silt content of sand
3.Bulkingofsand

IV **Cement concrete**: Workability tests, compressive strength, Tensile strength

V **Reinforcing Steel :**Tensile and yield strength, Percentage elongation

VI Non destructive testing on concrete

VII Bricks:

1.Waterabsorption.
2.Dimension Tolerances
1Compressive strength
4.Efflorescence

[BTCE-34P] Building Planning & Drawing

Drafting of following Using Any CAD software

1.Symbols used in Civil Engineering drawing , Types of Masonry Bonds

*2.*Doors, Windows and staircases.

*3.*Plumbing& Electrical fitting drawings

*4.*Comprehensive Planning and Drawings of Residential building (Layout, plan,

elevation& sectional elevation) elevation, plumbing & electrical fillings in out.

*5.*Preparation of Layout plans of different types of Civil Engg. Projects.Viz Primary

School, Intermediate college, Hospital building, Industrial Building etc.

[BTCE-33P] Surveying-I Lab

1. To prepare conventional symbol chart based on the study of different types oftopographical maps.
2. To measure bearings of a closed traverse by prismatic compass and to adjust thetraverse 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 verticalangle.
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 levelling by taking observations in single vertical plane.
8. To study various parts of Electronic Theodolite, Total Station and practice formeasurement of distance, horizontal and vertical angles.
9. To set out a simple circular curve by Rankine’s method

[BTIP-31] Industrial Psychology

Unit-I

Introduction to Industrial Psychology – Definitions & Scope. Major influences on industrial Psychology- Scientific management and human relations schools Hawthorne Experiments

Unit-II

Individual in Workplace Motivation and Job satisfaction , stress management. Organizational culture, Leadership & group dynamics.

Unit-III

Work Environment & Engineering Psychology-fatigue. Boredom, accidents and safety.Job Analysis, Recruitment and Selection – Reliability & Validity of recruitment tests.

Unit –IV

Performance Management : Training & Development.

References :

1. Miner J.B. (1992) Industrial/Organizational Psychology. N Y : McGraw Hill.

2. Blum & Naylor (1982) Industrial Psychology. Its Theoretical & Social Foundations CBS Publication.

3. Aamodt, M.G. (2007) Industrial/Organizational Psychology : An Applied Approach (5th edition) Wadsworth/Thompson : Belmont, C.A

. 4. Aswathappa K. (2008). Human Resource Management (fifth edition) New Delhi : Tata McGraw Hill

[BTAC-31] Human Value & Professional Ethics

Module-1

Course introduction, Needs Basic guidelines

1 Understand the need , basic , guidelines content for process value education.
2. Self Exploration what is it? It content and process, Natural Acceptence and experiential Validation as the mechanism for self exploration.
3 Continues happiness and Prosperty- A look at continues human Aspiration.
4 Understanding Happiness and Prosperty correctly- A critical appraisal of the current senerio.

5 Method to fulfilled the human aspiration

Module -2

Understanding Harmony in human Being (Harmony in Myself)

1. Understanding Harmony as a co – existence of the sentient I and the Material Body.
2. Understanding the need of self (I) and body sukh and suvidha.
3. Understanding the body of an instrument of I (being Doar, seer and enjoyer.
4. Understanding the Charactersticks and activities of (I)

Module -3

Understanding harmony in the Family and Society

1. Understanding harmony in the Family and basic unit of Human interaction.
2. Understanding values in human – Human relationship meaning of nayaya and program for the fulfillment of ensure abhay and tripti.
3. Understanding the meaning of Vishvas difference between intension and competence.
4. Understanding the Harmony in the society (society being an Extension of family - samadhan , Samriddi , Abhay,sahastitva and comprehension of Human goals.

Module -4

Understanding the harmony in the Nature and existence – whole Existence as Co- existence.

1 Understanding the harmony in the Nature.
2 Interconnectedness and mutual fulfillment among the four order of Nature –recyclability ,andself regulation in nature.
3 Holistic prception of Harmony at all levels of existence.

Module – 5 Implication of the above Holistic understanding of Harmony on professional ethics.

1 Natural acceptance of human values.
2 Deffinativeness of ethical human conduct.
3 Basic for humanistic education. Humanstick constitution and human universal order.
4 Case studies of typical holistic technologies , Management model and Production system.
5 Strategy for transition from the presnt stage of universal order.
A - At the level of individual : as socialy and ecologically responsible engineers technologist and manager.
B- At the Level of Society as mutually enriching institution and organisations