

YBN UNIVERSITY, RANCHI

School Of Engineering and Technology

B.Te	ch. Seme	ster-I							С	omm	on to	all Bran	ches
				Maximu	ım Marl	ks Allot	ted			Credi	ts >d	Total Credits	Remark
			,	Theory Sl	ot	Pra	nctical <mark>Slo</mark> t	T	Su	bject	wise	creates	
			End	Mid	Quiz,	End	Т	erm			R		×
S.No.	Subject Code	Subject Name & Title	Sem.	MST(Tw o tests average)	Assig- nment	Sem	w Lab work & sessional	Assign ment / quiz		ę	2		g in theory, kload per weel
			13						L	Т	Р		teachin our wor
1	YBE101	Engineering Chemistry	70	20	10	30	10	10	3	1	2	06	hour :32 h
2	YBE102	Engineering Mathematics -I	70	20	10				3	1		04	to one ctical. TP
3	YBE 103	Communication Skills	70	20	10	30	10	10	3	1	2	06	refers in pra ıg to L
4	YBE 104	Basic Electricals & Electronics Engg.	70	20	10	30	10	10	3	1	2	06	credit rial and spondir
5	YBE 105	Engineering Graphics	70	20	10	30	10	10	3	1	2	06	: One Tuto: corre
6	YBE 106	Work Shop Practice	-	-	-	30	10	10	-	-	2	02	Total Mark
		Total	350	100	50	150	50	50	15	05	10	30	750
MST:	Mid Seme	ster Tests Taken at Leas	t twice	Per Semes	ster			L:Lectur	·e-	T:Tut	orial -	P: Pra	ctical

L-ZAN



YBN UNIVERSITY, RANCHI

School Of Engineering and Technology

B.Tech. Semester-II

Common to all Branches

			2	Maximum Marks Allotted				-	Cre Sı	dits Allot 1bject wis	ted se	Total Credits	Remark
				Theo	ory Slot	Pra	actical Slo	t		1			
a N	Subject	Subject Name	End Sem.	Mid Sem.	Quiz, <mark>As</mark> sign-	End Se <mark>m.</mark>	Т	erm work					и
S.No.	Code	& Title		MST	ment	-	Lab work	Assignment / quiz					l and i
				P	1		sessional		L	Т	P		Tutoria
1	YBE201	Engineering Physics	70	20	10	30	10	10	3	1	2	06	theory,
2	YBE202	Energy, Environment,	70	20	10				3	1		04	aching in week
	-	Ecology & <mark>S</mark> ociety		1									our tea d per
3	YBE203	Basic Mechanical Engg.	70	20	10	30	10	10	3	1	2	06	to one ho workloa
4	YBE204	Basic Civil Engg. &Engg. Mechanics	70	20	10	30	10	10	3	1	2	06	edit refers :32 hour nding to I
5	YBE205	Basic Computer Engg.	70	20	10	30	10	10	3	1	2	06	: One cr practical correspo
6	YBE206	L <mark>anguage</mark> Lab. & Seminars	-		7	30	10	10		-	2	02	Total Mark
		Total	350	100	50	150	50	50	15	05	10	30	750



Branch	Subject Title	Subject Code	Grade for E	CGPA at the end of every even semester	
B.Tech. Common	Engineering	YBE 101	Theory	Practical	
	Chemistry		Min."D"	Min."D"	5.0

Unit I

WATER AND ITS INDUSTRIAL APPLICATIONS :

Sources, Impurities, Hardness & its units, Industrial water characteristics, softening of water by various methods (External & Internal treatment), Boiler trouble causes, effect &

remedies, Characteristics of municipal water & its treatment, Numerical problems based on softening methods.

Unit II

FUELS & COMBUSTION:

Fossil fuels & classification, Calorific value, Determination of calorific value by Bomb calorimeter Proximate and Ultimate analysis of coal and their significance, calorific value Computation based on ultimate analysis data, Carbonization, Manufacturing of coke & recovery of by products. Knocking, relationship between' knocking & structure of hydrocarbon, improvement of anti knocking characteristics of IC fuels, Diesel engine fuels, Cetane number, combustion and it related numericalproblems.

Unit III

A. LUBRICANTS:

Introduction, Mechanism of lubrication, Classification of lubricants, Properties and Testing of lubricating oils, Numerical problems based on testing methods.

B. CEMENT & REFRACTORIES:

Manufacture, IS-code, Setting and hardening of cement, Refractory : Introduction, classification and properties of refractories.

Unit IV

HIGH-POLYMER :

Introduction, types and classification of polymerization, Reaction. Mechanism, Natural & Synthetic Rubber; Vulcanization of Rubber, Preparation, Properties & uses of the following- Polythene, PVC, PMMA, Teflon, Poly acrylonitrile, PVA, Nylon 6, Nylon 6:6, Terylene, Phenol formaldehyde, Urea - Formaldehyde Resin, Glyptal, Silicone Resin, Polyurethanes; Butyl Rubber, Neoprene, Buna N, Buna S.

Unit V

A. INSTRUMENTAL TECHNIQUES IN CHEMICAL ANALYSIS:

Introduction, Principle, Instrumentation and applications of IR, NMR, UV, Visible, Gas Chromatography, Lambert's and Beer's Law

B. WATER ANALYSIS TECHNIQUES:

Alkalinity, hardness (Complexo-metric), Chloride, Free chlorine, DO, BOD and COD, Numerical problems based on above techniques.

Reference Books:

1. Chemistry for Environmental Engineering &Science- Sawyer, McCarty and Parkin – McGraw Hill, Education Pvt. Ltd., NewDelhi

2. Engineering Chemistry - B.K. Sharma, Krishna Prakashan Media (P) Ltd., Meerut.

3. Basics of Engineering Chemistry - S. S. Dara& A.K. Singh, S. Chand & Company Ltd., Delhi

4. Applied Chemistry - Theory and Practice, O.P. Viramani, A.K. Narula, New Age International

Pvt. Ltd. Publishers, NewDelhi

5. Polymer Science – Ghosh, Tata McGrawHill.

6. Engg. Chemistry – ShashiChawla, DhanpatRai& company pvt. Ltd, Delhi.

7. Engg. Chemistry – Jain & Jain, DhanpatRai& company pvt. Ltd, NewDelhi

8. A Text book of Engg. Chemistry- Agrawal, C.V, Murthy C.P, Naidu, A, BSPublication, Hyderabad.

Engineering Chemistry Practical

NOTE: At least 10 of the following core experiments must be performed during the session.

1. WaterTesting

(i) Determination of Totalhardness by Complexometric titration method.

(ii) Determination of mixedalkalinity

(a) OH &C0 3

(**b**) CO₃ &HCO₃

(iii) Chloride ion estimation by Argentometric method.

2. Fuels &lubricant testing:

- (i) Flash & fire points determination by
- a) Pensky MartinApparatus,
- b) Abel'sApparatus,
- c) Cleveland's open cupApparatus.
- d) Calorific value by bombcalorimeter

(ii) Viscosity and Viscosity index determination by

- a) Redwood viscometerNo.1
- b) Redwood viscometer No.2

(iii) Proximate analysis of coal

- a) Moisture content
- b) Ashcontent
- c) Volatile matter content
- c) Carbon residue

(iv) Steam emulsification No & Anline point determination

(v) Cloud and Pour point determination of lubricating oil

3. AlloyAnalysis

(i) Determination of percentage of Feinanironalloy by redoxt itration using N-Phenyl anthranilic acid as internal indicator.

- (ii) Determination of Cu and or Cr in alloys by IodometricTitration.
- (iii) Determination of % purity of Ferrous Ammonium Sulphate & Copper Sulphate.

Branch	Subject Title	Subject Code	Grade for 1	CGPA at the end of	
B.Tech. Common	Engineering Mathematics - I	YBE102	Theory Practical		every even semester
			Min."D"	-	5.0

Unit I

DIFFERENTIAL CALCULUS :

Expansion of functions by Maclaurin's and Taylor's theorem. Partial differentiation, Euler's theorem and its application in approximation and errors, Maxima and Minima of function of two variables, Curvature : Radius of curvature, centre of curvature.

Unit II

INTEGRAL CALCULUS :

Definite Integrals : Definite Integrals as a limit of a sum , its application in Summation of series, Beta and Gamma Functions , Double and Triple Integrals, Change of Order of Integration, Area, Volume and Surfaces using double and triple Integral.

Unit III

DIFFERENTIAL EQUATIONS :

Solution of Ordinary Differential Equation of first order and first degree for Exact differential Equations, Solution of Ordinary Differential Equation of first order and higher degree (solvable for p, x and y, Clairauts Equation), Linear Differential Equations with Constant Coefficients, Cauchy's Homogeneous differential Equation, Simultaneous differential Equations, Method of Variation of Parameters

Unit IV

MATRICES :

Rank, Solution of Simultaneous equation by elementary transformation, Consistency of System of Simultaneous Linear Equation, Eigen Values and Eigen Vectors, Cayley-Hamilton Theorem and its Application to find the inverse

Unit V

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:

- (i) Advance Engg. Mathematics. By Ramana, Tata McGraw hill.
- (ii) Higher Engineering Mathematics by BS Grewal, KhannaPublication
- (iii) Advance Engineering Mathematics byD.G.Guffy
- (iv) Engineering Mathematics by S SSastri.P.H.I.

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of
B.Tech. Common	Communication Skills	YBE103	Theory	Practical	every even semester
			Min."D"	Min."D"	5.0

Unit I - Languages and skills of communication

Linguistic techniques, Modern usages, Reading comprehension, English phonetic symbols/sings, Oral presentation, Audition Communication, Processes of Communication, Verbal and Non Verbal Communication, Barriers to Communication.

Unit II - Application of linguistic ability

Writing of definitions of Engineering terms, Objects, Processes and Principles (Listening) Topics of General Interest, Reproduction from business, daily life, travel, health, buying and selling, company structure, systems etc.

Unit III - Letter Writing:

Applications, Enquiry, Calling quotations, Tenders, Order and Complaint.

Unit IV

Precise Writing, Noting and drafting, Technical Description of simple engineering objects and processes (writing), Report writing, precise writing, Note writing, Slogan writing comment, Speechadvertising.

Unit V

Writing Technical reports of the type of observation report, Survey report, Report of trouble, Laboratory Report and ProjectReport on the subjects of engineering. (Speaking)Vocabulary, Presentations, Demonstrations, Conversation – Telephone media, socializing, cultural events, debates, speech.

Communicative Language Lab.

<u>Course objective</u>: The language lab focuses on the production and practice of sounds 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. Basic Grammar & Vocabulary (Synonyms /Antonyms, Analogies, sentence completion, correctly spelt words, idioms, proverbs, common errors).
- 2. phonetic symbols and pronunciation.
- 3. Listening skills (Including Listening Comprehension)3
- 4. Reading Skills (Including Reading Comprehension)
- 5. Writing Skills (Including structuring resume and cover letter)
- 6. Speaking Skills
- 7. Body Language
- 8. Oral Presentation : Preparation and delivery using audio visual aids with stress n body language and voice modulation (Topic to be selected by the teacher.)

Final Assessment Should be based on Assignment, presentation and interview.

Reference Books :-

- 1. Business Correspondence and Report Writing By Sharma; TMH.
- 2. Living English Structure By W.S. Allen; Longmans.
- 3. English Grammar Ehrlich, Schaum Series; TMH.
- 4. Spoken Englishfor India By R.K. Bansal and IB Harrison Orient Longman.
- 5. New International Business English by Joans and Alexander; OUP.
- 6. Effective Technical Communication Rizvi; TMH.



Branch	Subject Title	Subject Code	Grade for]	CGPA at the end of	
B.Tech. Common	Electrical & Electronics Engineering	YBE104	Theory	Practical	every even semester
			Min."D"	Min."D"	5.0

Unit I

Electrical circuit analysis- Voltage and current sources, dependent and independent sources, source conversion, DC circuits analysis using mesh & nodal method, Thevenin's& superposition theorem, 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, phasordiagram, voltage regulation, losses and efficiency, OC and SCtest.

<mark>Unit I</mark>II

Rotating Electric machines- Constructional details of DCmachine, induction machine and synchronous machine, Working principle of 3-Phase induction motor, Emfequation of 3-Phase induction motor, Concept of slip in 3- Phase induction motor, Explanation of Torque-slip characteristics of 3-Phase induction motor, Classification of self excited DC motor andgenerator.

Unit IV

Digital Electronics-Number systems used in digital electronics, decimal, binary, octal, hexadecimal, their complements, operation and conversion, floating point and signed numbers, Demorgan's theorem, AND, OR, NOT, NOR, NAND, EX-NOR, EX-OR gates and their representation, truth table, half and full adder circuits, R-S flip flop, J-K flipflop.

Unit V

ELECTRONIC COMPONENTS AND CIRCUITS- Introduction to Semiconductors, Diodes, V-I characteristics, Bipolar junction transistors (BJT) and their working, introduction to CC, CB & CE transistor configurations, different configurations and modes of operation of BJT, DC biasing of BJT.



References:

- 1. Vincent Del Toro, Electrical Engineering Fundamentals, PHI Learning, IIEdition
- $2. \hspace{0.1in} S. Ghosh, Fundamentals of Electrical and Electronics Engineering, PHI, IIE dition.$
- 3. Millman, Halkias& Parikh, Integrated Electronics, McGrawHill, IIEdition
- 4. Nagrath& Kothari, Basic Electrical Engineering, III EditionTMH.
- 5. J.S. Katre, Basic Electronics Engg, Max Pub.Pune.
- 6. Hughes, Electrical and Electronic Technology, Pearson Education IXEdition

List Of Experiments

- 1. Verificatiionsof Thevenin's Superpositiontheorem.
- 2. Study of Transformer, name plate rating, determination of rayioandpolarity.
- 3. Determination of equivalent circuit parameters of a single phase transformer by O.C. and S.C. tests and estimation of voltage regulation and efficiency at various loading conditions and verification by loadtest.
- 4. Seperation of resistance and inductance of chokecoil.
- 5. Measurement of various line & phase quantities for a 3-phasecircuit.
- 6. Identification of different Electronicscomponents.
- 7. Observing input and output waveforms of rectifiers.
- 8. Transistor application as amplifier and switch.
- 9. Verification of truth table for variousgates.



Branch	Subject Title	Subject Code	Grade for 3	CGPA at the endof		
B.Tech. Common	Engineering Graphics	YBE105	Theory	Practical	every even semester	
			Min."D"	Min."D"	5.0	

Unit I

Scales: Representative factor, plain scales, diagonal scales, scale of chords.

Conic sections: Construction of ellipse, parabola, hyperbola by different methods; Normal and Tangent.

Special Curves: Cycloid, Epi-cycloid, Hypo-cycloid, Involutes, Archimedean and logarithmic spirals.

Unit II

Projection: Types of projection, orthographic projection, first and third angle projection, **Projection of points and lines**, Line inclined to one plane, inclined with both the plane, True Length and True Inclination, Traces of straight lines.

Unit III

Projection of planes and solids: Projection of Planes like circle and polygons in different positions; Projection of polyhedrons like prisms, pyramids and solids of revolutions like cylinder, cones in different positions.

Unit IV

Section of Solids: Section of right solids by normal and inclined planes; Intersection of cylinders.

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

Unit V

Isometric Projections: Isometric scale, Isometric axes, Isometric Projection from orthographic drawing.

Computer Aided Drafting (CAD): Introduction, benefit, software's basic commands of drafting entities like line, circle, polygon, polyhedron, cylinders; transformations and editing commands like move, rotate, mirror, array; solution of projection problems on CAD.

References

1. Visvesvaraya Tech. University; A Premier on Computer Aided Engg drawing; VTU Belgaum

- 2. Bhatt N.D.; Engineering Drawing, Charotar
- 3. VenugopalK.;Engineering Graphics; NewAge
- 4. John KC; Engg. Graphics for Degree; PHI.



- 5. Gill P.S.; Engineering Drawing;kataria
- 6. Jeyopoovan T.; Engineering drawing & Graphics Using AutoCAD; Vikas
- 7. Agrawal and Agrawal; EngineeringDrawing; TMH
- 8. Shah MB and Rana BC; Engg.drawing; PearsonEducation
- 9. LuzadderWJand DuffJM;FundamentalofEnggDrawing;PHI
- 10. JolheDA; Engg. Drawing an Introduction; TMH
- 11. Narayana K.L.; Engineering Drawing; Scitech

List of Practical:

Sketching and drawing of geometries and projections based on above syllabus **Term work:** A min. of 30 hand drawn sketches (on size A4 graphic sketch Book) plus 5 CAD-printouts on size A4 sheets plus 10 sheets of size A2 or 6 sheets of size A1, (50% marks to be allotted for this record + 25% marks for attendance +25% marks for Teachers Assessmen



Branch	Subject Title	Subject Code	Grade for	End Sem	CGPA at the end of
B.Tech. Common	Work Shop Practice	YBE 106	Theory	Practical	every even semester
			7.5	Min."D"	5.0

Unit I

Introduction: Manufacturing Processes and its Classification, Casting, Machining, Plastic deformation and metal forming, Joining Processes, Heat treatment process, Assembly nprocess. 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.

Reference Books:

- 1. Bawa HS; Workshop Practice, TMH
- 2. Rao PN; Manufacturing Technology- Vol.1& 2,TMH
- 3. John KC; Mechanical workshop practice; PHI
- 4. HazaraChoudhary; Workshop Practices -, Vol. I &II.



Branch	Subject Title	Subject Code	Grade for]	End Sem	CGPA at the end of
B.Tech. Common	Engineering Physics	YBE 201	Theory	Practical	every even semester
			Min."D"	Min."D"	5.0

Unit I

Quantum Physics

Group and particle velocities & their relationship. Uncertainty principle with elementary proof and applications (determination of position of a particle by a microscope, non existence of electron in nucleus, diffraction of an electron beam by a single slit). Compton scattering. Wave function and its properties, energy and momentum operators, time dependent and time independent Schrödinger wave equation. Application of time independent Schrödinger wave equation to particle trapped in a one dimensional square potential well (derivation of energy eigen values and wave function)

Unit II

Wave Optics

Interference: Fresnel's biprism, Interference in thin films (due to reflected and transmitted lght), interference from a wedge shaped thin film, Newton's rings and Michelson's interferometer experiments and their applications. Diffraction at single slit, double slit and n-slits (diffraction grating).Resolving power of grating and prism. Concept of polarized light, Brewster's laws, Double refraction, Nicol prism, quarter & half wave plate.

Unit III

Nuclear Physics

Nuclear liquid drop model (semi empirical mass formula), nuclear shell model, Linear Particle acceleratos: Cyclotron, general description of Synchrotron, Synchrocyclotron, and Betatron. Geiger- Muller Counter, Motion of charged particles in crossed electric and magnetic fields.Uses ofBainbridge and AustonmassSpectrographs.

Unit IV

Solid State Physics

Qualitative discussion of Kronig Penny model (no derivation), Effective mass, Fermi-Dirac statistical distribution function, Fermi level for Intrinsic and Extrinsic Semiconductors, Zenerdiode, tunnel diode, photodiode, solar-cells, Halleffect. Superconductivity: Meissner effect, Type I and Type II superconductors, Di-electric polarization, Complex permittivity, dielectric losses

UNIT V

Laser and Fiber Optics

Laser: Stimulated and spontaneous processes, Einstein's A & B Coefficients, transition probabilities, active medium, population inversion, pumping, Optical resonators, characteristicsof 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 (Raytheory) pulse dispersion, attenuation, losses &various uses. Applications of lasers and optical fibers.

Reference Books: -

- 1. Optics By Ghatak, TMH
- 2. Engineering Physics- V. S. Yadava, TMH
- 3. Optics by Brijlaland Subhraininyan.
- 4. Engineering physics by M.N. Avadhanuluand. S. Chand &Co.(2004)
- 5. Atomic and Nuclear physics by Brijlal and Subraminiyan.
- 6. Concepts of Modern Physics- Beiser, TMH
- 7. Solid State Physics by Kittel, Wiley India
- 8. Fundamentals of Physics-Halliday, Wiley India

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, polarimeteretc.
- 6. Measurements by LASER-Directionality, Numerical aperture, Distanceetc.
- 7. Uses of Potentiometers and Bridges (Electrical)..
- 8. Experiments connected with diodes and transistor.
- 9. Measurement of energy band gap of semiconductor.
- 10. To study Hall effect.
- 11. Solar cell.
- 12.To find the width of s single slit by f He-Ne Laser.
- 13. To determine the numeral aperture (NA) of a Optical Fibre.
- 14. To determine plank's constant.
- 15. Other conceptual experiments related to theory syllabus.



Branch	Subject Title	Subject Code	Grade for]	CGPA at the end of		
B.Tech.	Energy,	YBE 202	Theory	Practical	every even	
Common	Environment,				semester	
	Ecology & Society		Min."D"	-	5.0	

Unit –I

Energy- Sources of Energy : Renewable & Non Renewable, Fossil fuel, Biomass Geothermal, Hydrogen, Solar, Wind, hydal, nuclear sources.

Unit –II

Ecosystem – Segments of Environment: Atmosphere, hydrosphere, Lithosphere, biosphere. Cycles in Ecosystem – Water, Carbon, Nitrogen. Biodiversity: Threats and conservation,

Unit-III

Air Pollution & Sound Pollution -

Air Pollution: Air pollutants, classification, (Primary & secondary Pollutants) Adverse effects of pollutants. Causes of Air pollution chemical, photochemical, Green house effect, ozone layer depletion, acid Rain. Sound Pollution: Causes, controlling measures, measurement of sound pollution (deciblage), Industrial and non – industrial.

Unit –IV

Water Pollution– Water Pollution: Pollutants in water, adverse effects. Treatment of Domestic & Industrial water effluent.

Soil Pollution – Soil Profile, Pollutants in soil, their adverse effects, controlling measures.

Unit –V

Society, Ethics & Human values– Impact of waste on society. Solid waste management (Nuclear, Thermal, Plastic, medical, Agriculture, domestic and e-waste). Ethics and moral values, ethical situations, objectives of ethics and its study . Preliminary studies regarding Environmental Protection Acts , introduction to value education, self exploration, sanyam & swasthya.

References:

- 1. Harris, CE, Prichard MS, Rabin's MJ, "Engineering Ethics"; Cengage Pub.
- 2. Rana SVS ; "Essentials of Ecology and Environment"; PHI Pub.
- 3. Raynold, GW "Ethics in information Technology"; Ceng age.
- 4. Svakumar; Energy Environment & Ethicsin society; TMH
- 5. AK De "Environmental Chemistry"; New Age Int. Publ.
- 6. BK Sharma, "Environmental Chemistry"; Goel Publ. House.
- 7. Bala Krishna moorthy;"Environmental management"; PHI
- 8. Gerard Kiely, "Environmental Engineering"; TMH
- 9. Miller GT JR; living in the Environment Thomson/cengage



Branch	Subject Title	Subject Code	Grade for l	CGPA at the end of	
B.Tech. Common	Basic Mechanical Engineering	YBE 203	Theory	Practical	every even semester
			Min."D"	Min."D"	5.0

UNIT-1

Materials: Classification of engineering material, composition of cast iron and carbon steels on iron-carbon diagram and their mechanical properties; Alloy steel and their applications; stress-strain diagram, Hooks law and modulus of elasticity. Tensile, shear, hardness and fatigue testing of materials.

UNIT-2

Measurement: Temperature, pressure, velocity, flow, strain, force and torque measurement, concept of measurement error & uncertainly analysis, measurement by Vernier caliper, micrometer, dial gauges, slip gauges, sine-bar and combination set; introduction to lath, drilling, milling and shaping machines.

UNIT-3

Fluids: Fluid properties, pressure, density and viscosity; pressure variation with depth, static and kinetic energy; Bernauli's equation for incompressible fluids, viscous and turbulent flow, working principle of fluidcoupling, pumps, compressors, turbines, positive displacement machines and pneumatic machines. Hydraulic power & pumped storage plants for peak load management as compared to base load plants.

UNIT-4

Thermodynamics: First and second law of thermodynamics; steam properties, steam processes at constant pressure, volume, enthalpy & entropy, classification and working of boilers, efficiency & performance analysis, natural and induced draught, calculation of chimney height. Refrigeration, vapor absorption & compression cycles, coefficient of perform (COP), refrigerant properties & eco friendly refrigerants.

UNIT-5

Reciprocating Machines: Steam engines, hypothetical and actual indicator diagram; Carnot cycle and ideal efficiency; Otto and diesel cycles; working of two stroke & four stroke petrol & diesel IC engines



Reference Books:-

- 1. Narula; Material Science; TMH
- 2. Agrawal B &CM; Basic Mechanical Engg. WileyIndia
- 3. Nag PK, Tripathi et al; Basic Mechanical Engg; TMH
- 4. Rajput; Basic Mechanical Engg;
- 5. Sawhney GS; Fundamentals of Mechanical Engg; PHI
- 6. Nakra and Chaudhary; Instrumentation & measurement; TMH
- 7. Nag PK; Engineering Thermodynamics; TMH
- 8. Ganesan; Combustion Engines; TMH

List of Suggestive core Experiments(Please Expand it)

- 1. Tensile testing of standard mild steel specimen.
- 2. Experiments on Bernoulli's theorem.
- 3. Flow measurements by ventury and orificemeters.

4. Linear and angular measurement using, Vernier; micrometer, slip gauge, dial gauge and sine-bar.

- 5. Study of different types of boilers and mountings.
- 6. Experiment on mini-boiler (50Kg/Hour)
- 7. To find COP of a refrigeration unit.
- 8. Study of different IC engines & measurement of B.H.P. using rope/ belt dynamometer.
- 9. Analysis of exhaust gases on petrol, diesel & bio diesel engines.



Branch	Subject Title	Subject Code	Grade for E	End Sem	CGPA at the end of every	
B.Tech. Common	Basic Civil Engineering & Engineering Mechanics	YBE 204	Theory	Practical	semester	
			Min."D"	Min."D"	5.0	

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

Unit – II Surveying & Positioning:

Introduction to surveying Instruments – levels, thedolites, plane tables and related devices. Electronic surveying instruments etc. Measurement of distances – conventional and EDM methods, measurement of directions by different methods, measurement of elevations by different methods. Reciprocal 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 and its applications.

Engineering Mechanics

Unit - IV

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

Unit – V

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

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

Reference Books:

- 1. S. Ramamrutam & R. Narayanan; Basic Civil Engineering, Dhanpat Rai Pub.
- 2. Prasad I.B., Applied Mechanics, Khanna Publication.
- 3. Punmia, B.C., Surveying, Standard book depot.
- 4. Shesha Prakash and Mogaveer; Elements of Civil Engg & Engg. Mechanics; PHI
- 5. S.P, Timoshenko, Mechanics of stricture, East West press Pvt. Ltd.
- 6. Surveying by Duggal Tata McGraw Hill New Delhi.
- 7. Building Construction by S.C. Rangwala- Charotar publications House, Anand.
- 8. Building Construction by Grucharan Singh- Standard Book House, New Delhi
- 9. Global Positioning System Principles and application- Gopi, TMH
- 10. R.C. Hibbler– Engineering Mechanics: Statics & Dynamics.
- 11. A. Boresi & Schmidt- Engineering Mechines- statics dynamics, Thomson' Books
- 12. R.K. Rajput, Engineering Mechanics S. Chand & Co.

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. Toper form 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 work ability of fresh concrete of given proportions by slump test or compaction factor test.
- 6. To determine the Compressive Strength of brick.
- 7. To determine particle size distribution and fineness modulus of course and fine Aggregate.
- 8. To verify the law of Triangle of forces and Lami's theorem.
- 9. To verify the law of parallelogram of forces.
- 10. To verify law of polygon of forces
- 11. To find the support reactions of a given truss and verify analytically.
- 12. To determine support reaction and shear force at a given section of a simply Supported beam and verify in analytically using parallel beam apparatus.
- 13. To determine the moment of inertia of fly wheel by falling weight method.
- 14. To verify bending moment at a given section of a simply supported beam.



Branch	Subject Title	Subject Code	Grade for]	End Sem	CGPA at the end of every even			
B.Tech. Common	Basic Computer Engineering	YBE 205	Theory	Practical	semester			
			Min."D"	Min."D"	5.0			

UNIT I

Computer: Definition, Classification, Organization i.e. CPU, register, Bus architecture, Instruction set, Memory & Storage Systems, I/O Devices, and System & Application Software. Computer Application in e-Business, Bio-Informatics, health Care, Remote Sensing & GIS, Meteorology and Climatology, Computer Gaming, Multimedia and Animation etc.

Operating System: Definition, Function, Types, Management of File, Process & Memory. Introduction MS word, MS powerpoint, MS Excel

UNIT II

Introduction to Algorithms, Complexities and Flowchart, Introduction to Programming, Categories of Programming Languages, Program Design, Programming Paradigms, Characteristics or Concepts of OOP, Procedure Oriented Programming VS object oriented Programming.

Introduction to C++: Character Set, Tokens, Precedence and Associativity, Program Structure, Data Types, Variables, Operators, Expressions, Statements and control structures, I/O operations, Array, Functions,

UNIT III

Object & Classes, Scope Resolution Operator, Constructors & Destructors, Friend Functions, In heritance, Polymorphism, Overloading Functions & Operators, Types of Inheritance, Virtual functions. Introduction to Data Structures.

UNIT IV

Computer Networking: Introduction, Goals, ISO-OSI Model, Functions of Different Layers. Internetworking Concepts, Devices, TCP/IP Model. Introduction to Internet, World Wide Web, E-commerce **Computer Security Basics:** Introduction to viruses, worms, malware, Trojans, Spyware and Anti-Spyware Software, Different types of attacks like Money Laundering, Information Theft, Cyber Pornography, Email spoofing, Denial of Service (DoS), Cyber Stalking, ,Logic bombs, Hacking Spamming, Cyber Defamation , pharming Security measures Firewall, Computer Ethics & Good Practices, Introduction of Cyber Laws about Internet Fraud, Good Computer Security Habits,

UNIT V

Data base Management System: Introduction, File oriented approach and Database approach, Data Models, Architecture of Database System, Data independence, Data dictionary, DBA, Primary Key, Data definition language and Manipulation Languages.

Cloud computing: definition, cloud infrastructure, cloud segments or service delivery models (IaaS, PaaS and SaaS), cloud deployment models/ types of cloud (public, private, community and hybrid clouds), Pros and Cons of cloud computing

List of Experiment

- 01. Study and practice of Internal & External DOS commands.
- 02. Study and practice of Basic linux Commands ls, cp, mv, rm, chmod, kill, psetc.

03. Study and Practice of MS windows – Folder related operations, My-Computer, window explorer, Control Panel,

- 04. Creation and editing of Text files using MS-word.
- 05. Creation and operating of spreadsheet using MS-Excel.
- 06. Creation and editing power-point slides using MS- power point
- 07. Creation and manipulation of database table using SQL in MS-
- Access. 08.WAP to illustrate Arithmetic expressions
- 09. WAP to illustrate Arrays.
- 10. WAP to illustrate functions.
- 11. WAP to illustrate constructor & Destructor
- 12. WAP to illustrate Object and classes.
- 13. WAP to illustrate Operator over loading
- 14. WAP to illustrate Function over loading
- 15. WAP to illustrate Derived classes & Inheritance
- 16. WAP to insert and delete and element from the Stack
- 17. WAP to insert and delete and element from the Queue
- 18. WAP to insert and delete and element from the Linked List

Recommended Text Books:

- 1. Fundamentals of Computers : E Balagurusamy, TMH
- 2. Basic Computer Engineering: Silakari and Shukla, WileyIndia
- 3. Fundamentals of Computers : V Rajaraman, PHI
- 4. Information Technology Principles and Application: Ajoy Kumar Ray & Tinku Acharya PHI.

Recommended Reference Books:

- 1. Introduction of Computers : Peter Norton, TMH
- 2. Object Oriented Programming with C++ :E.Bala gurusamy, TMH
- 3. Object Oriented Programming in C++: Rajesh K. Shukla, Wiley India
- 4. Concepts in Computing: Kenneth Hoganson, Jones & Bartlett.
- 5. Operating Systems Silbers chatz and Galvin Wiley India
- 6. Computer Networks: And rew Tananbaum, PHI
- 7. Data Base Management Systems, Korth, TMH
- 8. Cloud Computing, Kumar, WileyIndia

Branch	Subject Title Subject Code Grade for End				CGPA at the end of		
B.Tech. Common	Communicative Language	YBE 206	Theory	Practical	every even semester		
			-	Min."D"	5.0		

Course objective:

This course intends to impart practical training in the use of English Language for Communicative purposes and aims to develop students' personality through LanguageLab.

Topics to be covered in the Language laboratory sessions:

- 1. Introducing oneself, family, social roles, personal image design, building relationships, body language, concept of time and space.
- 2. Public Speaking and oral skills with emphasis on conversational practice, Role plays, extempore speech, JAM (Just a minute sessions), describing objects and situations, giving directions, debate, telephonicetiquette.
- 3. Reading Comprehension: Intensive reading skills, rapid reading, and reading aloud (Reading material to be selected by theteacher).
 - 4. Translation from English to Hindi and viceversa.
- 5. Oral Presentation: preparation and delivery (Topic to be selected by the teacher.)



YBN UNIVERSITY, RANCHI, JHARKHAND School of Engineering & Technology

B.Tech. Semester III

Civil Engineering

S No	Cubicot	ubject ode	Maximu m Marks Allotted Theory Slot Practical Slot Total Marks						Credits Allotted Subject wise			Total Credits	Remark	
Code	Code		End Sem	Mid Sem. MST (Two tests average)	Quiz, Assig- nment	End Sem	Tern Lab work & sessi onal	i work Assign ment/ quiz		Per	iod per week	P		
1	YBE301	Mathematics -II	70	20	10	-	-	-	100	3	1		04	-
2	YBCE302	Transportation Bridges and Tunnels	70	20	10	Ś	-	-	100	3	1	-	04	
3	YBCE303	Strength of Materials	70	20	10	30	10	10	150	3	1	2	06	
4	YBCE304	Engineering Geology	70	20	10	30	10	10	150	3	1	2	06	
5	YBCE305	Bldg <mark>.</mark> Design & Drawing	70	20	10	30	10	10	150	3	1	2	06	1
6	YBCE306	Computer Programming	-	-	-	30	10	10	50	0	0	2	02	
7	YBCE307	Self study / Practical of Basic civil (Internal Evaluation)	-	-	-	-	-	50	50	0	0	2	02	Grand Total
8.	YBC <mark>E308</mark>	Seminar / Discussion (Internal Evaluation) etc.			-	-	-	50	50	0	0	2	02	
		Total	350	100	50	120	40	140	800	15	5	12	32	800

MST: Mid Semester Tests Taken at Least twice Per Semester

L:Lecture-

T:Tutorial-

P: Practical

YBE 301 - ENGINEERING MATHEMATICS II

<u>Unit I</u>

Fourier Series: Introduction of Fourier series, Fourier series for Discontinuous functions, Fourier series for even and odd function, Half range series Fourier Transform: Definition and properties of Fourier transform, Sine and Cosine transform.

<u>Unit II</u>

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

<u>Unit III</u>

Second Order linear differential equation with variable coefficients : Methods one integral is known, removal of first derivative, changing of independent variable and variation of parameter, Solution by Series Method

Unit IV

Linear and Non Linear partial differential equation of first order: Formulation of partial differential equations, solution of equation by direct integration, Lagrange's Linear equation, charpit's method. Linear partial differential equation of second and higher order: Linear homogeneous and Non homogeneous partial diff. equation of nth order with constant coefficients. Separation of variable method for the solution of wave and heat equations

Unit V

Vector Calculus: Differentiation of vectors, scalar and vector point function, geometrical meaning of Gradient, unit normal vector and directional derivative, physical interpretation of divergence and Curl. Line integral, surface integral and volume integral, Green's, Stoke's and Gauss divergence theorem

References

- (i) Advanced Engineering Mathematics by Erwin Kreyszig, Wiley India
- (ii) Higher Engineering Mathematics by BS Grewal, Khanna Publication
- (iii) Advance Engineering Mathematics by D.G.Guffy
- (iv) Mathematics for Engineers by S.Arumungam, SCITECH Publuication
- (v) Engineering Mathematics by S S Sastri. P.H.I.

CE- 302 Transportation Bridges and Tunnels

<u>Unit I</u>

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

i) Rails: types, welding of rails, wear and tear of rails, rail creep.

ii) Sleepers: types and comparison, requirement of a good sleeper, sleeper density.

iii) Rail fastenings: types, Fish plates, fish bolts, spikes, bearing plates, chain keys, check and guard rails iv) Ballast: Requirement of good ballast, various materials used as ballast, quantity of ballast, different

methods of plate laying, material trains, calculation of materials required, relaying oftrack

Unit II

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

Unit-III

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

Unit-IV

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

<u>Unit-V</u>

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

<u>References</u>

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

YBCE303 Strength of Materials

<u>Unit 1</u>

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

<u>Unit 2</u>

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

Unit 3

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

Unit 4

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

Unit 5

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

Reference

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

List of Experiments

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

YBCE304 Engineering Geology

<u>Unit 1</u>

Introduction and Physical Geology: Objects and scope of geology. The crust and the interior of the earth, origin and age of the earth, Sub-aerial and sub-terrain weathering, denudation and deposition, wind, river, glacial and marine erosion, volcanoes, soil formation, soil profile, geological classification of soil and concept of earthquake Plate- tectonics.

Unit 2

Mineralogy and Crystallography: Fundamentals of mineralogy, study of common rock forming minerals, ores and minerals of economic importance to civil engineering., elements of crystallography and introduction to crystal systems.

Unit 3

Petrology: Composition of earth's crust, study of igneous, sedimentary and metamorphic rocks and their formation, characteristics classification, Rocks of civil engineeringimportance. (2) Geology of India: Physical features of India, Brief geological history of India, occurrence ofimportant ores and minerals in India.

Unit 4

Structural Geology: Structures related to rocks, Dip, Strike and outcrops, Classification and detailed studies of geological structures i.e. folds, Faults, Joints, Unconformity and their importance in Civil Engineering.

Unit 5

Applied Geology: Introduction to applied geology and its use in civil engg., properties of rocks, selection of sites for roads, bridges, dams, reservoirs and tunnels. Prevention of engineering structures from seismic shocks, stability of hill sides, water bearing structa, artesian wells, Use of remote-sensing techniques in selection of above sites.

Reference:

- 1. Prabin Singh "Engineering and General Geology"
- 2. Gulati ; Geotechnical Engineering; TMH
- 3. P.K. Mukerjee "A text Book of Geology"
- 4. S.K. Garg " A text Book of Physical and Engineering Geology"

List of Experiment (Expandable)

- 1. Identification of simple rock forming minerals and important ores.
- 2. Identification of rock
- 3. Simple map Exercises.
- 4. Field Visit / Geological Excursion

YBCE305 Building Design & Drawing

<u>Unit 1</u>

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

Unit 2

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

Unit 3

vices – Introduction of Building Services like water supply and drainage, electrification, ventilation and lightening and staircases, fire safety, thermal insulation, acoustics of buildings.

<u>Unit 4</u>

Design and Drawing of Building – Design and preparation of detailed drawings of various types of buildings like residential building, institutional buildings and commercial buildings, detailing of doors, windows, ventilators and staircases etc.

Unit 5

Perspective Drawing – Elements of perspective drawing involving simple problems, one point and two point perspectives, energy efficient buildings.

References

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

List of Experiments (Expandable)

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

YBCE306 Computer Programming

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

<u>UNIT–II</u>

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

UN<mark>IT-V</mark>

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
- 4. Peter Norton, "Peter Norton Guide To Java Programming", Techmedia.
- 5. Merlin Hughes, et al; Java Network Programming, Manning Publications/Prentice Hall

List of Program to be perform (Expandable)

- 1. Installation of J2SDK
- 2. Write a program to show Concept of CLASS in JAVA
- 3. Write a program to show Type Casting in JAVA
- 4. Write a program to show How Exception Handling is in JAVA
- 5. Write a Program to show Inheritance
- 6. Write a program to show Polymorphism
- 7. Write a program to show Interfacing between two classes
- 8. Write a program to Add a Class to a Package
- 9. Write a program to demonstrate AWT.
- 10. Write a program to Hide a Class
- 11. Write a Program to show Data Base Connectivity Using JAVA
- 12. Write a Program to show "HELLO JAVA " in Explorer using Applet
- 13. Write a Program to show Connectivity using JDBC
- 14. Write a program to demonstrate multithreading using Java.
- 15. Write a program to demonstrate applet life cycle.

YBCE307 Self Study (Internal Assessment)

Objective of Self Study: is to induce the student to explore and read technical aspects of his area of interest / hobby or new topics suggested by faculty.

Evaluation will be done by assigned faculty based on report/seminar presentation and viva.

YBCE308 Seminar / Group Discussion(Internal Assessment)

Objective of GD and seminar is to improve the MASS COMMUNICATION and CONVINCING/ understanding skills of students and it is to give student an opportunity to exercise their rights to express themselves.

Evaluation will be done by assigned faculty based on group discussion and power point presentation.

YBN UNIVERSITY, RANCHI, JHARKHAND School of Engineering & Technology

B.Tech. Semester IV

Civil Engineering

			Maximum Marks Allotted							Credits Allotted		Total Coolita	Remark	
			Theory Slot			Practical Slot			Total Marks	-Subject wise		Creaits		
S.No.	Subject Code	Subject Name & Title	End Sem	Mid Sem, MST (Two tests avera ge)	Quiz, Assig- nmen t	End Sem	Term wo Lab work & sessional	ork Assig nment / quiz	h di	Per	iod per week	Р		
1	BT-401	Mathematics -III	70	20	10	P	- /	-	100	3	1	-	04	
2	CE-402	Concrete Technol ogy	70	20	10	-	ſ	•	100	3	-	-	04	
3	CE-403	Surveying	70	20	10	30	10	10	150	3	1	2	06	
4	CE-404	Construction Materials & Techniques	70	20	10	30	10	10	150	3	1	2	06	
5	CE-405	Fluid Mechanics	70	20	10	30	10	10	150	3	1	2	06	
6	CE-406	Computer Programming -II	-	-	-	30	10	10	50	0	0	2	02	
7	CE-407	Self study (Internal Assessment)	-	-		-	-	50	50	0	0	2	02	Grand Total
8.	CE-408	Seminar / Group Discussion (Internal Assessment)			-	-	-	50	50	0	0	2	02	
		Total	350	100	50	120	40	140	800	15	5	12	32	800

MST: Mid Semester Tests Taken at Least twice Per Semeste

L:Lecture-

T:Tutorial- P: Practical

1.11400

YBE401 - ENGINEERING MATHEMATICS III

Unit I

Functions of complex variables : Analytic functions, Harmonic Conjugate, Cauchy-Riemann Equations, Line Integral, Cauchy's Theorem, Cauchy's Integral Formula, Singular Points, Poles &Residues,ResidueTheorem,ApplicationofResiduestheoremforevaluationofrealintegrals

<u>Unit II</u>

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

Unit III

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

<u>Unit IV</u>

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 LeastSquare).

<u>Unit V</u>

Concept of Probability : Probability Mass function, Probability density function. Discrete Distribution: Binomial, Poisson's, Continuous Distribution: Normal Distribution, Exponential Distribution ,Gamma Distribution ,Beta Distribution ,Testing of Hypothesis |:Students t-test, Fisher's z-test, Chi-Square Method

Reference:

- (i) Numerical Methods using Matlab by J.H.Mathews and K.D.Fink, P.H.I.
- (ii) Numerical Methods for Scientific and Engg. Computation by MKJain, Iyengar and RK Jain, New Age InternationalPublication
- (iii) Mathematical Methods by KV SuryanarayanRao, SCITECHPubluication
- (iv) Numerical Methods using Matlab by Yang, WileyIndia
- (v) Pobability and Statistics by Ravichandran, Wiley India
- (vi) Mathematical Statistics by George R., Springer

YBCE402 Concrete Technology

<u>Unit I</u>

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

<u>Unit II</u>

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

<u>Unit III</u>

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

Unit IV

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

Unit V

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

References:

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

YBCE403 Surveying

<u>Unit-I</u>

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

<u>Unit-II</u>

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

<u>Unit-III</u>

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

Unit-IV

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

Unit-V

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

Reference

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

List of Experiments/ Field work (Expandable):

- 1. Theodolitetraversing
- 2. Profile leveling, contouring & crosssectioning
- 3. Determination of tachometric constants & uses of tachometer in various fieldworks
- 4. Curve setting by different methods.

YBCE404 Construction Materials & Techniques

A) Construction Materials:

<u>Unit-I</u>

Stones :Occurrence, varieties, Characteristics and their testing, uses, quarring and dressing of stones. Timber : Important timbers, their engineering properties and uses, defects in timber, seasoning and treatment, need for wood substitutes, Alternate materials for shuttering doors/windows, Partitions and structural members etc. Brick and Tiles: Manufacturing , characteristics, Classification and uses, Improved brick from inferior soils, Hand molding brick table, Clay-fly ash brick table, Flooring tiles and other tiles and their characteristics.

Unit-II

Advance Construction Materials : Use of fly ash in mortars, concrete, Fly ash bricks, stabilized mud blocks, non-erodible mud plinth, D.P.C. materials, Building materials made by Industrial & agricultural waste, clay products P.V.C. materials, advance materials for flooring, doors & windows, facia material, interiors materials for plumbing, sanitation & electrification.

(B) Construction Techniques:

Unit-III

Foundation: Type of soils, bearing capacity, soil slablisation and improvement of bearingcapacity, settlementandsafelimits. Spreadfoundations, wallfootings, grillage, foundations well foundation, causes of failure and remedial measures; under reamed piles, foundation on shrinkable soils, black cotton soil, timbering for trenches, dewatering of foundations. Hyperbolic parabolied footing, Brick arch foundation. Simple methods of foundation design, Damp proof courses, Repairs Techniques forfoundations.

Unit-IV

Masonry and Walls :Brick masonry, Bonds, Jointing, Stone masonry, casting and laying, masonry construction, Brick cavity walls, code provisions regarding load bearing and non load bearing walls. Common defects in construction and their effect on strength and performance of walls, designed Brick masonry, precast stone masonry block, Hollow concrete block, plastering and pointing, white and color washing, distempering, dampness and its protection, Designof hollow block masonry walls. Doors, Windows and Ventilators: Types based on material etc., size location, fittings, construction sunshades, sills and jambs, RCC doors/windows frames. Stairs types, rule of proportionality etc., Repairs techniques for masonry, walls, doors & windows.

Unit-V

Floors and Roofs :Types, minimum thickness, construction, floor finishes, Flat roofs, RCC jack arch, reinforced brick concrete, solid slab and timber roofs, pitched roofs, false ceiling, roof coverings, Channel unit, cored unit, Waffle unit, Plank and Joist, Brick panel, L-Panel, Ferrocement roofing units, water proofing .Services : Water supply & Drainage, Electrification, Fire protection, thermal insulation, Air Conditioning, Acoustics & Sound insulation, Repairs to damaged & cracked buildings, techniques and materials for low cost housing., Repairs techniques for floors & roofs
References:

- 1. Mohan Rai& M.P. Jai Singh; Advance in Building Materials & Construction,.
- 2. S.C. Rangwala; Engineering Materials
- 3. Sushil Kumar; BuildingConstruction,
- 4. B.C. Punmia; Building Construction,.
- 5. Building Construction, Metchell
- 6. Construction Technology, ChudleyR.
- 7. Civil Engineering Materials, N. Jackson.
- 8. Engineering Materials, Surendra Singh.

List of Experiments: 1. Tests on Bricks

- 2. Tests on Aggregates
- 3. Tests onCement
- 4. Determination of compressive strength of concrete with different cementgrades.
- 5. Determination of workability of concrete by slumptest
- 6. Determination of workability by compacting factorapparatus.
- 7. Determination of workability by Vee Beeconsistometer.
- 8. Nondestructive testing of concrete by Rebound hammertest
- 9. Nondestructive testing of concrete by ultrasonicMethod.
- 10. Test for the effect of admixtures on the concrete compressivestrength
- 11. Testing of microconcrete
- 12. Design of concretemix.

YBCE405 Fluid Mechanics

<u>Unit-I</u>

Review of Fluid Properties: Engineering units of measurement, mass, density, specific weight, specific volume, specific gravity, surfacetension, capillarity, viscosity, bulk modulus of elasticity, pressure and vapor pressure. Fluid Static's : Pressure at a point, pressure variation in static fluid, Absolute and gauge pressure, manometers, Forces on plane and curved surfaces (Problems on gravity dams and Tainter gates); buoyant force, Stability of floating and submerged bodies, Relative equilibrium.

<u>Unit-II</u>

Kinematics of Flow : Types of flow-ideal & real, steady & unsteady, uniform & nonuniform, one, two and three dimensional flow, path lines, streaklines, streamlines and stream tubes; continuity equation for one and three dimensional flow, rotational & irrotational flow, circulation, stagnation point, separation of flow, sources & sinks, velocity potential, stream function, flow nets- their utility & method of drawing flownets.

<u>Unit-III</u>

Dynamics of Flow: Euler's equation of motion along a streamline and derivation of Bernoulli's equation, application of Bernoulli's equation, energy correction factor, linear momentum equation for steady flow; momentum correction factor. The moment of momentum equation, forces on fixed and moving vanes and other applications. Fluid Measurements: Velocity measurement (Pitot tube, Prandtl tube, current meters etc.); flow measurement

(orifices, nozzles, mouthpieces, orificemeter, nozzlemeter, venturimeter, weirsandnotches).

Unit-IV

Dimensional Analysis and Dynamic Similitude: Dimensional analysis, dimensional homogeneity, use of Buckingham-pi theorem, calculation of dimensionless numbers, similarity laws, specific model investigations (submerged bodies, partially submerged bodies, weirs, spillways, rotodynamic machinesetc.)

Unit-V

Laminar Flow: Introduction to laminar & turbulent flow, Reynolds experiment & Reynolds number, relation between shear & pressure gradient, laminar flow through circular pipes, laminar flow between parallel plates, laminar flow through porous media, Stokes law, lubrication principles.

References: -

- 1. Modi& Seth; Fluid Mechanics; Standard Book House, Delhi
- 2. Som and Biswas; Fluid Mechnics and machinery; TMH
- 3. Cengal; Fluid Mechanics; TMH
- 4. White ; Fluid Mechanics ;TMH
- 5. Essential of Engg Hyd. By JNIK DAKE; Afrikan Network & ScInstt.(ANSTI)
- 6. A Text Book of fluid Mech. for Engg. Student by FranissJRD
- 7. R Mohanty; Fluid Mechanics By; PHI
- 8. Fluid Mechanics; GuptaPearson.

List of Experiment (Expandable):

- 1. To determine the local point pressure with the help of pitottube.
- 2. To find out the terminal velocity of a spherical body inwater.
- 3. Calibration of Venturimeter
- 4. Determination of Cc, Cv, Cd ofOrifices
- 5. Calibration of OrificeMeter
- 6. Calibration of Nozzle meter and MouthPiece
- 7. Reynolds experiment for demonstration of stream lines & turbulentflow

1.1

- 8. Determination of metacentric height
- 9. Determination of Friction Factor of apipe
- 10. To study the characteristics of a centrifugalpump.
- 11. Verification of Impulse momentumprinciple.

IT- 406 Computer Programming -II

<u>UNIT I</u>

Introduction .NET framework, features of .Net framework, architecture and component of .Net, elements of .Net.

<u>UNIT II</u>

Basic Features Of C# Fundamentals, Classes and Objects, Inheritance and Polymorphism, Operator Overloading, Structures. Advanced Features Of C# Interfaces, Arrays, Indexers and Collections; Strings and Regular Expressions, Handling Exceptions, Delegates and Events.

<u>UNIT III</u>

Installing ASP.NET framework, overview of the ASP .net framework, overview of CLR, classlibrary,overviewofASP.netcontrol,understandingHTMLcontrols,studyofstandard controls, validations controls, rich controls. Windows Forms: All about windows form, MDI form, creating windows applications, adding controls to forms, handling Events, and using various Tolls

UNIT IV

Understanding and handling controls events, ADO.NET- Component object model, ODBC, OLEDB, and SQL connected mode, disconnected mode, dataset, data-reader Data base controls: Overview of data access data control, using grid view controls, using details view and frame view controls, ado .net data readers, SQL data source control, object data source control, site map datasource.

UNIT V

XML: Introducing XML, Structure, and syntax of XML, document type definition (DTD), XML Schema, Document object model, Presenting and Handling XML. xml data source, using navigation controls, introduction of web parts, using java script, Web Services

References:

- 1. **C#** for Programmers by Harvey Deitel, Paul Deitel, PearsonEducation
- 2. Balagurusamy; Programming in C#;TMH
- 3. Web Commerce Technology Handbook by Daniel Minoli, Emma Minoli ,TMH
- 4. Web Programming by Chris Bates, Wiley
- 5. XML Bible by Elliotte Rusty Harold,
- 6. ASP .Net Complete Reference by McDonald, TMH.
- 7. ADO .Net Complete Reference by Odey, TMH

List of Experiments/ program (Expandable):

- 1. Working with call backs and delegates inC#
- 2. Code access security withC#.
- **3**. Creating a COM+ component withC#.
- 4. Creating a Windows Service with C#
- 5. Interacting with a Windows Service withC#
- 6. Using Reflection inC#
- 7. Sending Mail and SMTP Mail andC#
- 8. Perform String Manipulation with the String Builder and String Classes and C#:

- 9. Using the System .Net Web Client to Retrieve or Upload Data withC#
- 10. Reading and Writing XML Documents with the XML Text-Reader/-Writer Class andC#11. Working with Page using ASP.Net.12. Working with Forms using ASP .Net

- 13. Data Sources access throughADO.Net,
- 14. Working with Data readers, Transactions
- 15. Creating WebApplication.



YBN UNIVERSITY, RANCHI, JHARKHAND School of Engineering & Technology

B.Tech. Semester-V

Civil Engineering

			Maxir	num Ma	arks Alle	otted	Credits			Total Crodi	Remark			
	Subject	Subject Name &	Tł	neory Sl	ot	Pract	ic <mark>al S</mark> lot		Total	Subj	ect		ts	
									Marks	wise				
S.No.			End	Mid	Quiz,	End	Term work			Per	riod p	er		1
	Code	Title	Sem.	Sem. MST	Assign ment	Sem	Lab work &	Assign ment/			week			
			1	1			sessiona l	quiz		L	Т	Р	h.,	
		T		• •	10		10	10	1.0					
	YBCE501	Engineering	70	20	10	30	10	10	150	3	١	2	06	
2	YBCE502	Advanced Surveying	70	20	10	30	10	10	150	3	1	2	06	
3	YBCE503	Fluid Mech II	<mark>70</mark>	20	10	30	10	10	150	3	1	2	06	
4	YBCE504	Structural Design &Drawing – I (RCC)	70	20	10	30	10	10	150	3	1	2	06	J
5	YBCE505	Theory of Structures -I	70	20	10	-	-	-	100	3	1	-	04	
6	YBCE507	Self study (Internal Assessment)		-	-	-	-	50	50	0	0	2	02	Grand Total
7.	YBCE508	Seminar / Group Discussion	Ī		-	-	-	50	50	0	0	2	02	
		(Intern <mark>al</mark> Assessment)								1				_
		Total	350	100	50	120	40	140	800	15	5	12	32	800

MST: Mid Semester Tests Taken at Least twice Per Semeste

T:Tutorial-

L:Lecture-

P: H



CE 501 – Transportation Engineering - II

<u>Unit - I</u>

High way planning, Alignment & Geometric Design: Principles of highway planning, road planning in India and financing of roads, classification patterns. Requirements, Engg. Surveys for highway location.

<u>Unit – II</u>

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

<u>Unit – III</u>

Low Cost Roads, Drainage of Roads, Traffic Engg. & Transportation Planning: Principles of stabilization, mechanical stabilization, requirements, advantages, disadvantages and uses, quality control, macadam roads-types, specifications, construction, maintenance and causes of failures.

Surface and sub-surface drainage, highway materials: properties and testing etc. Channelised and unchannelised intersections, at grade & grade separated intersections, description, rotary-design elements, advantages and disadvantages, marking, signs and signals, street lighting. Principles of planning, inventories, trip generation, trip distribution, model split, traffic assignment, plan preparation.

Unit - IV

Airport Plaaning, Runway & Taxiway: Airport site selection. air craft characteristicand their effects on runway alignments, windrose diagrams, basic runway length and corrections, classification of airports.

<u>Unit - V</u>

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

List of Experiments:

- 1. Aggregate Crushing Value Test
- 2. Determination of aggregate impact value
- 3. Determination of Los Angeles Abrasion value
- 4. Determination of California Bearing Ratio values
- 5. Determination of penetration value of Bitumen
- 6. Determination of Viscosity of Bituminous Material

- 7. Determination of softening point of bituminous material
- 8. Determination of ductility of the bitumen
- 9. Determination of flash point and fire point of bituminous material
- 10. Determination of Bitumen content by centrifuge extractor
- 11. Determination of stripping value of road aggregate
- 12. Determination of Marshall stability value for Bituminous mix
- 13. Determination of shape tests on aggregate

<u>Reference Books & Study Materials:</u>

- 1. Highway Engineering by Gurucharan Singh
- 2. Principles of Pavement Design by E.J. Yoder & M.W. Witzech
- 3. Highway Engineering by O'Fleherty
- 4. Highway Engineering by S.K. Khanna & C.E.G. Justo
- 5. Airport Planning & Design by S.K. Khanna & M. G. arora
- 6. Foresch, Charles "Airport Planning"
- 7. Horonjeff Robert "The Planning & Design of Airports"
- 8. Sharma & Sharma, Principles and Practice of Highway Engg.
- 9. Haung, Analysis and Design of Pavements
- 10. Relevant IRC & IS codes
- 11. Laboratory Mannual by Dr. S.K. Khanna
- 12. Highway Engg. By Hews & Oglesby
- 13. Highway Material by Walker

YBCE502 Advanced Surveying

UNIT-I

Modern equipments for surveying : Digital levels and theodolites, Electronic Distance measurement(EDM), Total Station and Global Positioning Systems (GPS), Digital Plannimeter

UNIT-II

Surveying Astronomy: Definitions of astronomical terms, coordinate systems for locating heaven ly bodies, geographic, g eodetic, geocentric, Cartesian, local and projected coordinates for earth resources mapping, convergence of meridian, parallel of latitude, shortest distance between two points on the earth, determination of latitude and lon gitude.

UNIT-III

GPS Surveying: Introduction & components of GPS, Space segment, control seg ment and user segment, Elements of Satellite based surveys-Map datums, GPS receivers, GPS observation methods and their advantages over conventional methods. Digital Terrain Model (DTM) : Topographic representation of the terrain and generation of DTM on computers using spot heights and contour maps.

UNIT-IV

Photogrammetry : Principle, definitions and classifications of terrestrial and aerial photogrammentry, flight planning for aerial photography, scale and relief displacements of vertical aerial photographs, stereoscopic vision on vertical photographs, computation of position, length and elevations of objects using photographs and photo mosaic.

UNIT-V

Remote Sensing: Principle, components, classification, remote sensing data acquisition process, different types of remote sensing satellite imagery with special relevance to Indian Remote Sensing Satellites (IRS) and applications. Geographic Information Systems (GIS) : Definition, components and advantages.

Surveying Project - Student will go for one week Surveying Camp to carry out Project Work.

SUGGESTED TEXT BOOKS AND REFERENCES :

1. Surveying and Leveling-Part-I & II by T.P. Kanetkar and S.V. Kulkarini, Pune Vidyarthi Griha Prakashan,

Pune

2. Engineering Surveying : Theory and Examination Problems for Students by W. Schofield, Butterworth,

Heinemann,Oxford.

3. Surveying: Problems Solving with theory and objective type questions by A.M. Chandra, New Age

International Publishers N. Delhi.

4. Advance Surveying by A.M. Chandra, New Age International Publishers N. Delhi.

- 5. Surveying Vol. II by S.K. Duggal, Tata McGraw Hill Publishing Company Ltd. New Delhi.
- 6. Remote Sensing and image interpretation by Lillesand T.M. and Kiefer R.W.

YBCE503 Fluid Mech. - II

<u>Unit-I</u>

Turbulent flow : Laminar and turbulent boundary layers and laminar sublayer, hydrodynamically smooth andrough boundaries, velocity distribution in turbulent flow, resistance of smooth and artificially roughened pipes, commercial pipes, aging of pipes.

Pipe flow problems : Losses due to sudden expansion and contraction, losses in pipe fittings and valves, concepts of equivalent length, hydraulic and energy gradient lines, siphon, pipes in series, pipes in parallel, branching of pipes.

Pipe Network : *Water Hammer (only quick closure case). transmission of power. *HardyCross Method

Unit-II

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

Unit-III

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

Unit-IV

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

Unit-V

Fluid Machines:

Turbines : Classifications, definitions, similarity laws, specific speed and unit quantities, Pelton turbine-their construction and settings, speed regulation, dimensions of various elements, Action of jet, torque, power and efficiency for ideal case, characteristic curves. Reaction turbines: construction & settings, draft tube theory, runaway speed, simple theory of design and characteristic curves, cavitation.

Pumps:

Centrifugal pumps : Various types and their important components, manometric head, total head, net positive suction head, specific speed, shut off head, energy losses, cavitation, principle of working and characteristic curves.

Reciprocating pumps: Principle of working, Coefficient of discharge, slip, single acting and double acting pump, Manometric head, Acceleration head.

List of Experiment

- 1. Study the performances characteristics of Pelton Wheel
- 2. Study the performances characteristics of Francis Turbin
- 3. Study the performances charactristics of Kaplan Turbine
- 4. Caliration of multistage (Two) Pump & Study of characteristic of variable speed pump
- 5. To study the performance & details of operation of Hyd. Ram

6. Determination of coefficient of discharge for a broad crested weir & to plot water surface Profile over weir

7. Study of the characteristic of the Reciprocating pump

Suggested Books & Study Material:

- 1. Fluid Mechanics Modi & Seth Standard Book house, Delhi
- 2. Open Channel Flow by Rangaraju Tata Mc Graw Hill Publishing Comp. Ltd., New Delhi
- 3. Fluid Mechanics A.K. Jain Khanna Publishers, Delhi

4. Fluid Mechanics, Hydraulics & Hydraulic Machanics - K.R. Arora - Standard Publishers Distributors 1705-

- B, Nai Sarak, Delhi-6
- 5. Hyd. of open channels By Bakhmetiff B.A. (McGraw Hill, New York)
- 6. Open Channel Hyd. By Chow V.T. (McGraw Hill, New York)
- 7. Engineering Hydraulics By H. Rouse
- 8. Centrifugal & Axial Flow Pump By Stempanoff A.J. New York
- 9. Relevant IS codes.

YBCE504 Structural Design & Drawing – I (RCC)

<u>Unit - I.</u>

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

Unit - II.

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

Unit-III.

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

<u>Unit -IV.</u>

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

Unit -V.

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

NOTE :- All the designs for strength and serviceability should strictly be as per the latest version of IS:456. Use of SP-16 (Design aids)

Suggested Books: -

- 1. Plain & Reinforced Concrete Vol. I & II O.P. Jain & Jay Krishna
- 2. Limit State Design by P.C. Varghese ; Prentice Hall of India, New Delhi
- 3. Design of Reinforced Concrete Elements by Purushothman; Tata McGraw Hill, New Delhi
- 4. Reinforced Cement Concrete by Gupta & Mallick, Oxford and IBH
- 5. Reinforced Cement Concrete by P. Dayaratnam, Oxford and IBH
- 6. Plain & reinforced concrete Rammuttham
- 7. Plain & reinforced concrete B.C. Punnia
- 8. Structural Design & Drawing by N.K.Raju.

YBCE505 Theory of Structures -I

<u>Unit. I</u>

Virtual work and Energy Principles: Principles of Virtual work applied to deformable bodies, strain energy and complementary energy, Energy theorems, Maxwell's Reciprocal theorem, Analysis of Pin-Jointed frames for static loads.

<u>Unit. II</u>

Indeterminate Structures-I: Static and Kinematics indeterminancy, Analysis of Fixed and continuous beams by theorem of three moments, Effect of sinking and rotation of supports, Moment distribution method (without sway)

<u>Unit.</u> III

Indeterminate Structures - II : Analysis of beams and frames by slope Deflection method, Column Analogy method.

Unit. IV

Arches and Suspension Cables: Three hinged arches of different shapes, Eddy's Theorem, Suspension cable, stiffening girders, Two Hinged and Fixed Arches - Rib shortening and temperature effects.

Unit. V

Rolling loads and Influence Lines: Maximum SF and BM curves for various types of Rolling loads, focallength, EUDL, Influence Lines for Determinate Structures- Beams, Three Hinged Arches.

Reference Books:

1. Ghali A & Neville M., Structural Analysis - A Unified classical and matrix Approach, Chapman and Hall, New York.

2. Wang C.K. Intermediate structural analysis, McGraw Hill, New York.

3. Kinney Streling J. Indeterminate structural Analysis, Addison Wesley.

4. Reddy C.S., Basic Structural Analysis, Tata McGraw Hill Publishing Company, New Delhi.

5. Norris C.H., Wilbur J.B. and Utkys. Elementry Structural Analysis, McGraw Hill International, Tokyo

MST: Mid Semester Tests Taken at Least twice Per Semeste



YBN UNIVERSITY, RANCHI, JHARKHAND **School of Engineering & Technology**

R Tech Semester-VI

3.Tech. Semester-VI											Civil Engineering					
			Maxim	lotte	Credits			Total Cred	Remark							
			<u>Theory</u>	7 Slot		Practical Slot		tical	Total Marks	Subjects Subjects		ea et	Crea its			
S.No.	Subject Code	Subject Name & Title	End Sem.	Mid Sem. MST	Quiz, Assig- nment	End Sem	Term wo Lab work & sessional	rk Assig nm ent/ quiz		Peri wee	od pe k T	er P				
1	YBCE601	Theory of Structures-II	70	20	10	30	10	10	150	3	1	2	06			
2	YBCE602	Water Resources & Irrigation Engineering	70	20	10		Ĵ	-	100	3	1		04			
3	YBCE603	Environmental Engg I	70	20	10	30	10	10	150	3	1	2	06			
4	YBCE604	Geo Tech Engg I	70	20	10	30	10	10	150	3	1	2	06			
5	YBCE605	Structural Design & Drawing – II	70	20	10	30	10	10	150	3	1	2	06			
6	YBCE606	Self study (Internal Assessment)	-	-	-	-	•	50	50	0	0	2	02	Grand Total		
7.	YBCE607	Seminar/ Group Discussion (Internal Assessment)		-	-	-	•	50	50	0	0	2	02			
		Total	350	100	50	120	40	140	800	15	5	12	32	800		

JANGA

YBCE601 – Theory of Structures –II

<u>Unit. I</u>

Moment distribution method in analysis of frames with sway, analysis of box frames, analysis of portals with inclined members, analysis of beams and frames by Kani's method.

<u>Unit. II</u>

Plastic analysis of beams and frames.

Unit. III

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

<u>Unit. IV</u>

Matrix method of structural analysis: force method and displacement method..

<u>Unit. V</u>

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

Reference Books :-

- 1. Wang C.K. Intermediate structural analysis, McGraw Hill, NewYork.
- 2. Kinney Streling J. Indeterminate structural Analysis, AddisonWesley.
- 3. Reddy C.S., Basic Stgructural Analysis, Tata McGraw Hill Publishing Company, NewDelhi.
- 4. Norris C.H., Wilbur J.B. and Utkys. Elementary Structural Analysis, McGraw Hill International, Tokyo.
- 5. Weaver W & Gere JM, Matrix Methods of Framed Structures, CBS Publishers & Distributors, Delhi

YBCE602 – Water Resources and Irrigation Engineering

<u>Unit - I</u>

Irrigation water requirement and Soil-Water-Crop relationship: Irrigation, definition, necessity, advantages and disadvantages, types and methods. Irrigation development.

Soils - types and their occurrence, suitability for irrigation purposes, wilting coefficient and field capacity, optimum water supply, consumptive use and its determination. Irrigation methods-surface and subsurface, sprinkler and drip irrigation.

Duty of water, factors affecting duty and methods to improve duty, suitability of water for irrigation, crops and crop seasons, principal crops and their water requirement, crop ratio and crop rotation, intensity of irrigation.

Unit - II

Ground Water and Well irrigation:

Confined and unconfined aquifers, aquifer properties, hydraulics of wells under steady flow conditions, infiltration galleries.Ground water recharge-necessity and methods of improving ground water storage.Water logging-causes, effects and its prevention.Salt efflorescence- causes and effects.reclamation of water logged and salt affected lands. Types of wells, well construction, yield tests, specific capacity and specific yield, advantages and disadvantages of well irrigation.

<u>Unit-III</u>

Hydrology : Hydrological cycle, precipitation and its measurement, recording and non recording rain gauges, estimating missing rainfall data, rain gauge net works, mean depth of precipitation over a drainage area, mass rainfall curves, intensity-duration curves, depth-area duration curves, Infiltration and infiltration indices, evaporation stream gauging, run off and its estimation, hydrograph analysis, unit hydrograph and its derivation from isolated and complexstorms, S-curve hydrograph, synthetic unit hydrograph.

Unit - IV

Canals and Structures: Types of canals, alignment, design of unlined and lined canals, Kennedy's and Lacey's silt theories, typical canal sections, canal losses, lining-objectives, materials used, economics.Introductions to Hydraulic Structures viz.Dams,Spillways,Weirs, Barrages,Canal Regulation Structures.

<u>Unit-V</u>

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

Suggested Books :-

- 1. Irrigation & Water Power Engg. by Punmia&PandeyB.B.Lal
- 2. Engg. Hydrology by K. Subhramanya Tata McGraw Hills Publ.Co.
- 3. Engg. Hydrology J.NEMEC PrenticeHall
- 4. Hydrology for Engineers Linsley, Kohler, Paulnus Tata Mc.GrawHill.
- 5. Hydrology & Flood Control by Santosh Kumar KhannaPublishers
- 6. Engg. Hydrology by H.M.Raghunath

YBCE603 – Environmental Engg. - I

<u>Unit - I</u>

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

<u>Unit - II</u>

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

<u>Unit - III</u>

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

Unit - IV

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

Unit - V

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

Suggested Books and Reading

Materials:-

- 1. Water Supply Engineering by B.C. Punmia Laxmi Publications (P) Ltd. NewDelhi
- 2. Water Supply & Sanitary Engg. by G.S. Birdi Laxmi Publications (P) Ltd. NewDelhi
- 3. Water & Waste Water Technology by Mark J.Hammer Prentice Hall of India, NewDelhi
- 4. Environmental Engineering H.S. Peavy&D.R.Rowe-McGraw Hill BookCompany, New Delhi
- 5. Water Supply & Sanitary Engg. by S.K.Husain
- 6. Water & Waste Water Technology G.M. Fair & J.C.Geyer
- 7. Relevant ISCodes

List of Experiments:

- 1. To study the various standards forwater
- 2. To study of sampling techniques forwater
- 3. Measurement ofturbidity
- 4. To determine the coagulant dose required to treat the given turbid watersample
- 5. To determine the conc. of chlorides in a given watersamples
- 6. Determination of hardness of the givensample
- 7. Determination of residual chlorine by"Chloroscope"
- 8. Determination of Alkalinity in a watersamples

YBCE604 – Geo Tech Engg. I

<u>Unit I</u>

Basic Definitions & Index Properties: Definition and scope of soil mechanics, Historical development. Formation of soils.Soil composition. Minerals, Influence of clay minerals on engineering behaviour. Soil structure. Three phase system. Index properties and their determination. Consistency limits. Classification systems based on particle size and consistency limits.

<u>Unit - II</u>

Soil Water and Consolidation: Soil water, Permaeability Determination of permeability in laboratory and in field. Seepage and seepage pressure.Flownets, uses of a flownet, Effective, neutral and total stresses.

Compressibility and consolidation, Relationship between pressure and void ratio, Theory of one dimensional consolidation. Consolidation test, Fitting Time curves. Normally and over consolidated clays.Determination of preconsolidation pressure, settlement analysis.Calculation of total settlement.

Unit - III

Stress Distribution in Soils and Shear Strength of Soils: Stress distribution beneath loaded areas by Boussinesq and water gaurd's analysis. Newmark's influence chart. Contact pressure distribution.

Mohr - Coulomb's theory of shear failure of soils, Mohr's stress circle, Measurement of shear strength, Shear box test, Triaxial compression test, unconfined compression test, Value shear test, Measurement of pore pressure, pore pressure parameters, critical void ratio, Liquefaction.

Unit - IV

Stability of Slopes: Infinite and finite slopes. Types of slope failures, Rotational slips. Stability number.Effect of ground water.Selection of shear strength parameters in slope stability analysis.Analytical and graphical methods of stability analysis.Stability of Earth dams.

Unit - V

Lateral Earth Pressure: Active, passive and earth pressure at rest. Rankine, Coulomb, Terzaghi and Culmann's theories. Analytical and graphical methods of determination of earth pressures on cosion-less and cohesive soils. Effect of surcharge, water table and wallfriction. Arching in soils. Reinforced earth retaining walls.

LABORATORY WORK : Laboratory work will be based on the above course as required for soil investigators of engineering projects.

<u>List of Experiments:</u>

- 1. Determination of Hygroscopic watercontent
- 2. Particle sizeanalysis
- 3. Determination of Specific gravity of soilparticles
- 4. Determination of plastic limit
- 5. Determination of liquidlimit
- 6. Determination of shrinkagelimit
- 7. Permeability tests
- 8. Direct sheartest
- 9. Consolidationtest

Suggested Books: -

- 1. Soil Mech. & Found. Engg. by Dr. K.R. Arora Std. Publishers Delhi.
- 2. Soil Mech. & Found. by Dr. B.C.Punmia- Laxmi Publications, Delhi.
- 3. Modern Geotech Engg. By Dr.1 Aram Singh IBT Publishers, Delhi.
- 4. GeotechEngg. by C. Venkatramaiah New Age International Publishers, Delhi
- 5. Soil Mech. & Found. Engg. by S.K. Garg- Khanna Publishers, Delhi.
- 6. Soil Testing for Engg. by T.W. Lambe John Wiley & Soms.Inc. Relevant I.S.Codes



YBCE605 – Structural Design & Drawing – II (Steel)

<u>Unit - I</u>

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

<u>Unit - II</u>

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

<u>Unit-III</u>

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

Unit - IV

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

<u>Unit - V</u>

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

NOTE: - All the designs for strength and serviceability should strictly be as per the latest version of IS:800.

Reference Books :-

i) Design of steel structures by Arya & Azmani Nemchand & Bros, Roorkee

- ii) Design of steel structures by P.Dayaratnam
- iii) Design of steel structures Vol. I & II by Ramchandra
- iv) Design of steel structures by L.S.Negi
- v) Design of steel structures by Ramammutham
- iv) Design of steel structures by Punmia

YBN UNIVERSITY, RANCHI, JHARKHAND School of Engineering & Technology

B .7	B.Tech. Semester-VII Civil Engineering												ng	
			Maxi	imum	Marks					Credits			Total	Remark
			Allot	ted						Allotted			Credits	
			Theo	ry Slo	t	Practical Slot			Total	Subje	ect			
		Subject Name						Marks	wise					
		& Title												
S.No.	Subject	- AL 1	End	Mid	Quiz,	End Term wo		rk	diam'	Perio	d per			
	Code	2 T. I	Sem.	Sem. MST	Assig-	Sem	Lab	Assign	- T	week				
	- A			10101	nment		work &	ment/						
					-		sessional	quiz		L	Т	Р		_
1	YBCE701	Design of	70	20	10	-		-	100	3	1	-	04	k
		Hydraulic					100							
		Structure		• •	10	• •	10	10	1.00					
2	YBCE702	Advanced	70	20	10	30	10	10	150	3	1	2	06	
		Structural												
		Design –II					<u> </u>							
2		(R.C.C.)	70	20	10	20	10	10	150	2	1	2	0.6	-
3	YBCE/03	Environmental	70	20	10	30	10	10	150	3	1	2	06	
4	VDCE704	Engg II	70	20	10	20	10	10	150	2	1	2	06	-
4	IDCE/04	Quantity	70	20	10	30	10	10	150	3	1	2	00	
		Surveying &					_							
5	VBCE705	Elective I	70	20	10				100	3	1		04	-
5	IDCE/05		/0	20	10	-	-	-	100	5	1		04	
6	ARCE./00	Minor Project	-	200	-	60	20	20	100	0	0	4	04	Grand
-	VD OF 707	Tour /Training				20	10	10	50	0	0	2	02	Total
7.	IBCE/0/	(2Week)			-	30	10	10	50	0	U	2	02	
		(Internal												
		Assessment)												
		Total	350	100	50	180	60	60	800	15	5	12	32	800
		- 500				200		30	200		-			

Elective –I

705(A) COMPUTATIONAL METHODS IN STRUCTURAL ENGINEERING

705(B) TRAFFIC ENGINEERING

705(C) INDUSTRIAL WASTE TREATMENT 705(D) COST EFFECTIVE & ECO-FRIENDLYCONSTRUCTION 705(E) ENVIRONMENTAL IMPACT ASSESSMENT

YBCE701 – Design of Hydraulic Structure

<u>Unit - I</u>

Reservoir Planning: Investigations, Capacities, Zones of storage, Mass Inflow and Mass Demand curves, Life of Reservoir.

Earth Dams: Types, causes of failure and design criteria, soils suitability for earth dam construction, construction methods, foundation requirements, typical earth dam sections, estimation of seepage through and below the dam, seepage control, stability of slopes by slip circle method of analysis, pore pressures, sudden draw down, steady seepage and construction pore pressure condition.

<u>Unit - II</u>

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

<u>Unit - III</u>

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

Energy dissipators: Principles of energy dissipation Energy dissipators based on tail water rating curve and jump height curves Spillway crest gates - vertical lift and radial gates, their design principles. Design of canal regulating structures, Design of Channel transitions, Design of Sarda type Falls, Design of cross drainage works vizSyphon aquaduct and Canalsyphon.

<u>Unit – IV</u>

Structures on Pervious formations: Bligh's creep theory,limitations, Khoslas's theory of independent variable,Khosla'scorrections,Design of Weir and Barrages :design of waterways and crest levels,design of impervious floors and protectionworks.

Unit - V

Canal Structures and Hydropower Plants: Design of canal falls, Regulators, Cross drainage works, Introduction of Hydropower development, , general features of hydro-electric schemes, selection of turbines.

<u> Ref<mark>erence Books:</mark> -</u>

- 1. Engineering for Dams (Volumes I, II & III) by Creager, Justin & Hinds
- 2. Hydroelectric Hand Book byCreager
- 3. Hydraulic Structures byVarshney
- 4. Irrigation & Water Power Engg. by Punmia&PandeyB.B.Lal
- 5. Water Power Engineering byDandekar

YBCE702 – Advanced Structural Design – II (RCC)

Unit - I

Design of Multistory Buildings - Sway and nonsway buildings, Shear walls and other bracing elements.

Unit II

Earth Retaining Structures: Cantilever and counter fort types retaining walls.

<u>Unit - III</u>

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

Unit - IV

Silos and Bunkers

Unit - V

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

Suggested Books: -

1. R.C.C. by O.P. Jain Vol.II

- 2. R.C.C. by B.C.Punmia
- 3. Essentials of Bridge engineering D.J. Victor
- 4. Bridge Engineering -Ponnuswamy
- 5. Advanced R.C.C. Design by N.K.RAJU
- 6. N.KrishnaRaju, Prestressed Concrete, Tata McGrawHill, NewDelhi.
- 7. Pre stresses concrete T.Y.Lin

YBCE703 – Environmental Engg. - II

<u>Unit - I</u>

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

<u>Unit -II</u>

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

<u>Unit -III</u>

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

Unit - IV

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

Unit - V

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

Laboratory work shall be based on the topics of environmental engineering I & II and consist of experiments of water and waste water quality as per facility available in theinstitution.

List of Experiment

- 1. To study the various standards for wastewater
- 2. To study the sampling techniques for wastewater
- 3. To determine the alkalinity in watersample
- 4. To determine the acidity in watersample
- 5. Determination of Dissolved Oxygen in the water and waste watersample
- 6. Determination of Biological Oxygen demand of a waste water sample
- 7. Determination of Chemical Oxygen demand of a waste watersample
- 8. Determination of various types of solids in the waste watersample
- 9. Determination of bacterial number by membrane filterTechnique
- 10. Determination of bacterial colonies by standard plat countmethod

<u>Reference Books :-</u>

1. Water Supply & Sanitary Engg. - G.S. Birdie - DhanpatRai PublishingCompany,

2. (P) Ltd. NewDelhi

3. Waste Water Engg. by B.C. Punmia - Laxmi Publication (P) Ltd. NewDelhi

4. Environmental Engg. - M.L. Davis & D.A. Cornwell - McGraw HillCompany

5. Chemistry for Environmental Engg. - Sawyer &Mc Carty - McGraw Hill Book Company NewDelhi

6. Water & Waste Water Technology - Mark J Hammer - Prentice - Hall of India, NewDelhi 7. Waste Water Engineering - Metcalf & Eddy - McGraw Hill Book CompanyNew



YBCE704 – Quantity surveying & Costing

<u>Unit – I</u>

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

<u>Unit – II</u>

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

<u>Unit – III</u>

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

Unit – IV

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

<u>Unit – V</u>

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

Suggested Books:

- 1. Quantity Surveying & Costing B.N.Datta
- 2. Estimating & Costing for Civil Engg. G.S.Birdi
- 3. Quantity surveying & costing –Chakraborty
- 4. Estimating & Costing S.C.Rangawala

Practical & Sessional Works:

- 1. Preparation of detailedestimate.
- 2. Detailed estimate for services of plumbing and water supply or Electrificationwork.
- 3. Detailed estimate for earth work for the road construction or arched culvert.
- 4. Rate analysis for at least 8 items of construction.
- 5. Preparation of DPR of Civil EngineeringProject.

YBCE705 Elective- I

(YBCE705(QA) Computational Methods in Structural Engineering)

<u>Unit - I.</u>

Matrix formulation for the principle of virtual work and energy principles, principle of contragradience, stiffness and flexibility matrices, Degree of Freedom. Axial, bending, shear and torsional deformations. Local and Global Element stiffness matrices for bar, beam, shaft, grid, shear wall, beamcolumn, beam with rigid ends, beam on elastic foundation and elements with special boundary conditions. nonprismatic and curved elements, forces and displacements in general coordinate axes, structure stiffness matrix.

<u>Unit - II.</u>

Basics of the Direct Stiffness method - Analysis of pinjointed frames, rigid jointed structures, plane grids and composite structures for different loads including temperature, shrinkage, prestressing forces. Elastic stability analysis of 2-D rigid jointed frames, (Sway &Nonsway)

<u>Unit - III.</u>

Concepts of Bandwidth, various storage schemes & equation solvers; Reduction in order of stiffness matrix - use of substructures, static condensation method, Exploiting symmetry, skew symmetry and cyclic symmetry in structures, Imposition of Constraints – Lagrange Multiplier and PenaltyMethods.

<u>Unit - IV.</u>

Analysis of continuum structures - Fundamental equations of theory of elasticity (2D), basic concepts of Finite Element Analysis, derivation of generalised element stiffness matrix and load vectors, convergence requirements, stiffness matrices for various elements using shape functions, Triangular and Rectangular elements. (PSPS)

Unit - V.

Two Dimensional Iso parametric elements, shape functions for Simplex.Lagrangian and Serendipidity family elements in natural coordinates, computation of stiffness matrix for isoparametric elements, degrading of elements, plate bending elements.

<u>Reference Books :-</u>

1. Ghali A & Neville M., Structural Analysis - A Unified Classical and Matrix Approach, Chapman and Hall, NewYork.

2. Weaver William & Gere James M., Matrix Analysis of Framed structures, CBS Publishers and Distributors, NewDelhi.

- 3. Cook R.D., Concepts and Applications of Finite Element Analysis, Wiley, NewYork.
- 4. Gallagher R., Finite Element Analysis Fundamentals, Prentice-Hall, Englewood Cliffs,NJ.
- 5. RubensteinM.F., MatrixComputerAnalysisofstructures, PrenticeHall, Englewood Cliffs, N.J.
- 6. Zeinkiewicz O.C & Taylor R.L., The Finite Element Method, McGraw Hill,London

YBCE705 Elective- I (YBCE705(B) Traffic Engineering)

<u>Unit -I.</u>

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

<u>Unit -II.</u>

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

Unit -III.

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

<u>Unit -IV.</u>

Street Lighting : (i) Methods of light distribution. (ii) Design of street lighting system. (iii) Definitions- Luminaire, foot candle, Lumen, utilization and maintenance factors. (iv) Different types of light sources used for street lighting. (v) Fundamental factors of night vision.

<u>Unit -V.</u>

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

Reference Books :-

- 1. Traffic Engineering and Transport Planning by L.R. Kadiyali, Khanna Publishers, Delhi
- 2. Traffic Engineering by Matson, W.S.Smith& F.W.Hurd
- 3. G.J. Pingnataro, Principles of TrafficEngineering
- 4. D.R.Drew, Traffic FlawTheory
- 5. W.R. Mchsne and R.P. Roess "TrafficEngg"
- 6. Wohl& Martin, Traffic System Analysis for Engineering & Planners

YBCE705 Elective- I (YBCE705(C)Industrial Waste Treatment)

<u>Unit - I.</u>

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

<u>Unit - II.</u>

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

<u>Unit - III.</u>

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

<u>Unit - IV.</u>

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

Unit - V.

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

Reference Books :-

1. "Liquid Waste of Industries - Theories, Practice and Treatment" - N.L.Nemerow,

WEsley PublishingCo.

2. Treatment of Industrial Waste - E.B. Besselievre& Max Schwartz - McGrawHill Book Company

3. "Waste Water Engg. - Treatment Disposal & Reuse" - Metcalf & Eddy - Tata McGraw Will, NewDelhi

4. Waste Water Treatment - Arceivala - Tata McGrawWill, NewDelhi

5. Industrial Pollution Control, hand book - Lund H.F. Tata McGrawWill, New Delhi

YBCE705 Elective- I (YBCE705(D) Cost Effective &ECO-Friendly Construction)

<u>UNIT-I</u>

Concepts of energy efficient & environment friendly materials and techniques.

Cost effective materials :-Soil, Fly ash, Ferrocement, Lime, Fibres, Stone Dust, Red mud, Gypsum, Alternate Wood, Polymer. Energy Efficient& Environment friendly building material products :-Walls - Stabilised and sun dried, soil blocks & bricks, Solid & Hollow concrete blocks, stone masonry blocks, Ferrocement partitions. Roofs - Precast R.C. Plank & Joists roof, Precast channel roof, Precast L-panel roof, Precast Funicular shells, Ferrocement shells, Filler Slab, SeasalFibre roof, Improved country tiles, Thatch roof, M.C.R. tile.

UNIT-II

Cost effective construction techniques and equipments :-

Techniques :- Rat trap bond construction, Energy Efficient roofings, Ferrocement technique,Mud Technology.

Equipments :- Brick moulding machine, Stabilised soil block making machine and plants for the manufacturing of concrete blocks, M.C.R. tile making machine, Ferrocement wall panel & Roofing channel making machine, R.C.C. Chaukhat makingm/c.

UNIT-III

Cost effective sanitation :- Waste water disposalsystem, Cost effective sanitation for rural and urbanareas, Ferrocement Drains

UNIT-IV

Low Cost Road Construction :- Cost effective road materials, stabilization, construction techniques tests, equipment used for construction, drainage, maintenance.

UNIT-V

Cost analysis and comparison :- All experimental materials, All experimental techniques

YBCE705 Elective- I

(YBCE705(E) Environmental Impact Assessment)

UNIT-I

Concept of EIA : Introduction of EIA, Utility and scope of EIA, Significant Environmental Impacts, Stage of EIA, Environmental Inventory, Environmental Impact Statement (EIS)

<u>UNIT-II</u>

Methods of Impact Identification :Environmental Indices and indicators for describing the affected environment, matrix methodologies, network, checklist, and other method.

UNIT-III

Impact analysis :Framework, statement predication and assessment of impact of air, water, noise and socio-economic environment.

UNIT-IV

Preparation of written documentation :Initial planning phase, detailed planning phase, writing phase, organizing relevant information, co-ordination of team writing effort.

UNIT-V

Public Participation in Environmental Decision making :Basic definitions, Regulatory requirements, Advantages & disadvantages of Public Participation, Selection of Public participation techniques, Practical considerations for implementation.

YBCE 706 – Minor Project

Each candidate shall work on an approved project of a public building or any other civil engineering work and shall submit design and a set of drawings.

Shall submit a detailed report of experimental work/ software package on any specific problem of importance.



YBN UNIVERSITY, RANCHI, JHARKHAND **School of Engineering & Technology**

B.Tech. Semester-VIII

Civil Engineering

			Maximum Marks									Credits		Remark
			Allott	ed		L	Allotted			Credits				
		Subject Name & Title	Theory Slot Practical Slot Total Marks							Subject wise				
S No	Subject Code		End	nd Mid Quiz, End Term work		Peri	od pe	er						
5.1 10.	Couc		Sem.	Sem.	Assig-	Sem	Lab	Assign		weel	k			
				NIS I	nment		work &	ment/		F				
				-			sessional	quiz		-				
							10	1.1			T	D		
										L	1	Р		
1	VBCE801	Gao Tachnical	70	20	10	30	10	10	150	3	1	2	06	
	IDCLOUI	Engg.II	70	20	10	50	10	10	150	5	1	2	00	
2	YBCE802	Construction	70	20	10	-	-	-	100	3	1	-	04	
		Planning &		1.5		T	_							
		Management												
3	YBCE803	Advanced	70	20	10	30	10	10	150	3	1	2	06	
		Structural Design II	- 11			1	_							_
4	VDCE		70	20	10				100	2	1		04	
4	1 DCE 804	Elective -II	/0	20	10	-	-	-	100	3	1	-	04	
	001	1.00												
5	YBCE805	Major Project	-	-	-	100	100	50	250	2	-	10	10	
														~ .
6	YBCE806	Seminar and Group		-	-	-	-	50	50	-	-	2	02	Grand
		Discussion						h.,						1 otal
		Trefal	200	00	40	160	120	120	800	10	1	16	20	800
		Total	280	80	40	100	120	120	800	12	4	16	32	800
			1						I	1			1	

Elective –II(YBCE804)

- 804(A) Structural Dynamics & Earthquake Engineering

- 804(B) Pavement Design
 804(C) Air Quality Monitoring & Control
 804(D) Energy Efficient & Green Building
 804(E) Design of Prestrassed Conc. Structure
 804(F) Water Power Engineering
 804(G) Advance Water Resources Engg.

YBCE801 – Geo. Technical Engg.II

Unit - I

Shallow Foundations : Type of foundations shallow and deep. Bearing capacity of foundation on cohesion less and cohesive soils. General and local shear failures. Factors effecting B.C. Theories of bearing capacity - Prandle, Terzaghi, Balla, Skempton, Meyerh of and Hansan. I.S. code on B.c. Determination of bearing capacity.Limits of total and differential settlements.Plate load test.

Unit - II

Deep Foundation : Pile foundation, Types of piles, estimation of individual and group capacity of piles in cohesion less and cohesive soils. Static and dynamic formulae.. Pile load test, Settlement of pile group, Negative skin friction, under- reamed piles and their design. Piles under tension, inclined and lateral load Caissons. Well foundation. Equilibrium of wells. Analysis for stability tilts and shifts, remedialmeasures.

Unit - III

Soil Improvement Techniques : Compaction. Field and laboratory methods, Proctor compaction tests, Factors affecting compaction.Properties of soil affected by compaction.Various equipment for field compaction and their suitability.Field compaction control. Lift thickness.

Soil stabilisation : Mechanical, Lime, Cement, Bitumen, Chemical, Thermal, Electricalstabilisation and sabilisation by grouting. Geo-synthetics, types, functions, materials and uses.

Unit - IV

Soil Exploration and Foundations on Expansive and Collapsible soils : Methods of soil exploration. Planning of exploration programme for buildings, highways and earth dams.Disturbed and undisturbed samples and samplers for collecting them.

Characteristics of expansive and collapsible soils, their treatment, Construction techniques on expansive and collapsible soils.CNS layer.

Unit - V

Sheet piles/Bulkheads and Machine foundation : Classification of sheet piles/bulkheads. Cantilever and anchored sheet piles, Cofferdams, materials, types and applications.

Modes of vibration.Mass-spring analogy, Natural frequency.Effect of vibration on soils.Vibration isolation.Criteria for design.Design of block foundation for impact type of machine.

LABORATORY WORK: Laboratory work will be based on the course of Geotech. Engg. I & II as required for soil investigations of engineering projects and not covered in the lab. Work of Geotech.Engg.I.

LIST OF EXPERIMENTS

- 1. Indian Standard Light Compaction Test/Std. ProctorTest
- 2. Indian Standard Heavy Compaction Test/Modified ProctorTest
- 3. Determination of field density by Core CutterMethod
- 4. Determination of field density by Sand ReplacementMethod
- 5. Determination of field density by Water DisplacementMethod
- 6. The corifiled CompressionTest
- 7. Triaxial compressiontest
- 8. Lab. Vane Sheartest

9. CBRTest

10. Demonstration of

Plate LoadTest

SPT & DCPT

Reference Books :--

- 1. Soil Mechanics & Foundation Engg. by Dr. K.R. Arora Std. Publishers Delhi
- 2. Soil Mechanics & Foundation Engg. by B.C. Punmia Laxmi PubliscationsDelhi
- 3. Modern Geotech. Engg. by Dr. Alam Singh-IBT PublishersDelhi.
- 4. Geotech. Engg. by C. Venkatramaiah-New AGE International Publishers, Delhi
- 5. Found. Engg. byGALeonards McGraw Hill Book Co.Inc.
- 6. Relevant ISCode

YBCE802 – Construction Planning & Management

Unit -I

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

Unit -II

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

Unit -III

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

Unit -IV

Specifications & Public Works Accounts: Importance, types of specifications, specifications for various trades of engineering works.

Various forms used in construction works, measurement book, cash book, materials at site account, imprest account, tools and plants, various types of running bills, secured advance, final bill.

Unit-V

Site Organization & Systems Approach to Planning: Accommodation of site staff, contractor's staff, various organization charts and manuals, personnel in construction, welfare facilities, labour laws and human relations, safety engineering.

Problem of equipment management, assignment model, transportation model and waiting line modals with their applications, shovel truck performance with waiting line method.

R<mark>eference B</mark>ooks :-

- 1. Construction Equipment byPeurify
- 2. CPM by L.S.Srinath
- 3. Construction Management by S.Seetharaman
- 4. CPM & PERT by Weist & Levy
- 5. Construction, Management & Accounts by HarpalSingh
- 6. Tendering & Contracts by T.A.Talpasai
YBCE803 – Advanced Structural Design II (Steel)

Unit – I

Plate girder bridges (Riveted and welded)

Unit – II

Trussed girder bridges for railways and highways (IRC & IRS holding).Bearings for bridges.

Unit – III

Water Tanks: Pressed steel tanks, tanks with ordinary plates, square, rectangular, circular with hemispherical bottom and conical bottom.

Unit - IV

Chimneys: Guyed and self supporting steel stacks.

Unit – V

Bunkers, Silos & Towers

Reference Books:-

- 1. Design of Steel Structures –Ramammutham
- 2. Design of Steel Structures –Punia
- 3. Steel Str. by Ramchandra VolII
- 4. Steel Str. by Arya & Ajmani
- 5. Design of steel structures L.S.Negi

YBCE804(A) Structural Dynamics & Earthquake Engineering

Unit - I.

Single DOF systems - Undamped and Damped, Response to Harmonic and periodic excitations, Response to Arbitrary, Step, Ramp and PulseExcitations.

Unit - II.

Numerical Evaluation of Dynamic Response - Time stepping methods, methods based an Interpolation of Excitation, Newmark's and Wilson - q method, Analysis of Nonlinear Response, Introduction to frequency domain analysis.

Unit - III.

Elements of seismology - Definitions of the basic terms related to earthquake (magnitude, intensity, epicenter, focus etc.), seismographs Earthquake Response of structures - Nature of dynamic loading resulting from earthquake, construction of Response spectrum for Elastic and Inelastic systems.

Unit - IV.

Multiple DOF systems : Stiffness and Flexibility matrices for shear buildings, free and forced vibrations-undamped and damped, Modal and Response History Analysis, Systems with distributed mass & elasticity.

Unit - V.

Earthquake Resistant Design of Structures, Design of structures for strength & servicability, Ductility and energy absorption, Provisions of IS : 1893 and IS : 4326 for aseismic design of structures, Code for ductile detailing IS : 13920.

Reference Books:--

1. Chopra A.K., Dynamics of structures - Theory and Applications to Earthquake Engineering, Prentice Hall of India, NewDelhi.

- 2. Berg G.V. Elements of Structural Dynamics, Prentice Hall of India, Englewood Cliffs, NJ
- 3. Paz Mario, Structural Dynamics, CBS Publishers, Delhi
- 4. Clough R.W. & Penzien J., Dynamics of structures McGraw Hill, NewYork.

YBCE804(B) Pavement Design

Unit -I.

Equivalent Single Wheels Load concepts and applications, Relationship between wheel arrangements and loading effects, tyre contact area, Effect of load repetition, Effect of transient loads, Impact of moving loading, Factors to be considered in Design of pavements, Design wheel load, soil, climatic factors, pavement component materials, Environmental factors, Special factors such as frost, Freezing andthawing.

Unit -II.

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

Unit -III.

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

Unit -IV.

Rigid pavement design : IRC method, Fatigue analysis, PCA chart method. AASHTO Method, Reliability analysis.

PAVEMENT JOINTS : Types of joints, contraction and warping joints, dowel bars and tie bars, Temperature reinforcements, filling and sealing of joints.

Unit -V.

Evaluation and Strengthening of Existing Pavements :Benkleman beam method, Serviceability Index Method.

Rigid and flexible overlays and their design procedures.

Re<mark>ference Book</mark>s:--

- 1. Principles of pavement design by E.J.Yoder& M.W.Witczak
- 2. AASHO, "AASHO Interim Guide for Design of Pavement Structures", Washington, D.C.
- 3. Portland Cement Association, Guidlinesfor Design of Rigid Pavements, Washington
- 4. DSIR, Conc. Roads Design & Construction
- 5. SrinivasanM. "Modern PermanentWay"

YBCE804(C) Air Quality Monitoring & Control

Unit - I

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

Unit - II

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

Unit - III

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

Unit - IV

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

Unit - V

Air pollution control legislation, public education pollution standards, status of air pollution control in variouscountries.

Industrial Hygiene: Concept and importance, factory Involved in environmental hazards, industrial ventilation occupational diseases, control methods.

Reference Books:--

1. "Air Pollution" - Faith W.L, John Wiley & Sons

- 2. "Air Pollution" McCabe L.C., Mc. Graw Hill, International
- 3. Air Pollution Stern A.C., Academic Press N.York
- 4. Fundamentals of Air Pollutions Raju BSN Oxford & IBH Publishing Co. Pvt.Ltd.
- 5. "Air Pollution" Rao M.N. & Rao HVN Tata McGrawHill
- 6. Air Pollution Wark and Warner

YBCE804(D) Energy Efficient & Greeen Building

UNIT-I

Energy efficient Green Buildings - The green Building concept, rating systems in India and world, GRIHA, LEED, etc., green building rating agencies and some top green buildings in the world, sustainable practices used in the design and construction phases of Energy Efficient Green Buildings. Green Rating for Integrated Habitat Assessment (GRIHA), Energy Efficient Solar Homes & Buildings, Energy Savings in Homes, IGBCcertification.

UNIT-II

Energy Conscious Buildings - CLIMATE AND BUILDINGS IN INDIA, Introduction ,Factors affecting climate, Climatic zones and their characteristics, Implications of climate on building design ,Urban climate ,Microclimate, Tools for analyzing weather data, Illustrative example, References.

Codes: National Building Code, Energy Conservation Building Codes, Key barriers to 'building green in India, Overcoming the barriers, implementation approach, etc.

UNIT-III

PRINCIPLES OF ENERGY CONSCIOUS DESIGN OF BUILDINGS IN INDIA – Introduction Building Envelope, Site, Orientation, Building Configuration, Building Components, Passive Heating, Direct Gain, Indirect Gain, Thermal storage wall, Roof top collectors, Isolated Gain, Solarium (Attached greenhouse / sunspace), Passive Cooling, Ventilation Cooling, Cross ventilation, Wind tower, Induced ventilation, Nocturnal cooling, Evaporative Cooling, Passive downdraft evaporative cooling (PDEC), Roof surface evaporative cooling (RSEC), Direct

evaporative cooling using drip-type (desert) coolers 3.4.3 Nocturnal ,Radiation Cooling, Desiccant Cooling, Earth Coupling, Earth-air pipe system ,Daylighting ,Basic Principles of Daylighting ,Daylighting Systems, Building Materials ,Embodied Energy of Building Materials ,Alternative Building Materials

UNIT -IV

THERMAL PERFORMANCE OF BUILDINGS - Introduction, Heat Transfer, Solar Radiation, Simplified Method for Performance Estimation ;Example Computer-based Tools

DESIGN GUIDELINES: Description of Buildings, Methodology, General Recommendations, Specific Guidelines.

UNIT-V

Zero Energy Buildings - Opportunities and challenges in designing a Net zero building ,Energy efficient solar homes/buildings, Design aspects ,Climatic zones ,Passive design features and ,. their advantages, Orientation of building, Sunshades, Window design, Double glazed windows Building insulation, Roof treatment ,Evaporative cooling ,Landscaping ,Surface to volume ratio Passive heating ,Earth air tunnel ,Solar chimney, Wind tower, Applicable passive features for various climatic zones, Energy-efficient lighting, Indoor lighting ,Outdoor lighting ,Energy-efficient air conditioners, Selecting the right size, Selecting an efficient AC ,Installing an AC, Renewable energy devices/systems, Solar water heating system Building integrated PV system, Other renewable energydevices/systems.



YBCE804(E) : DESIGN OF PRESTRESSED CONCRETE STRUCTURES

Unit – 1.

Introduction, Principles of prestressing, Different methods of prestressing – post tensioning and pre-tensioning. Prestressed concrete materials. Need for high strength concrete and High concrete tensile steel. Creep and shrinkage of concrete, relaxation of steel.Losses of prestress friction and anchorage of steel.

Unit – 2.

Flexural strength of prestressed concrete section. Analysis of prestress, Resultant stress at a section, Line of Thrust, Load Balancing. Crackingmoments. Shear strength and torsional strength of prestressed concretes section. Principle stresses and principal shear stresses, Ultimate shearresistance.

Unit – 3.

Stress-pattern in anchorage zones. Transmission length. End zone reinforcement. Stress distribution in endblock.

Unit – 4.

Design of members for flexure.Code recommendations.Rectangular and Isection.Working out of section dimensions for concrete and prestressing forces for steel.Application to design of slabs and continuous beams and Bridge girders. Design for concrdant table and tendon profiles.

Unit – 5.

Design of tension and compression members, Design for combined bending and compressive, Different approaches for design, Introduction to design of transmission poles, roof truss members, purlin, railway sleepers.

Books References Recommended:

- 1. Lin T.Y., Design of Prestressed ConcreteStructures.
- 2. Varatnam P., *Prestressed ConcreteStructures*.
- 3. Ramaruthan S., *PrestressedConcrete*.
- 4. Graduate I.I., *PrestressedConcrete*.
- 5. Krishna Raju, *PrestressedConcrete*.
- 6. Evans R.H. and Bennett R.S., *PrestressedConcrete*. 7. *IS-1343*.
- 8. Mullick S.K. and Rangaswamy R.S., The Mechanics of PrestressedConcrteDesign.
- 9. Sinha and Raj, Prestressed Concrete.

YBCE804(F) Advance Water Resources Engg

Unit - 1

Optimal Raingauge Network Design, Adjustment of Precipitation Data, Depth Area-Duration Analysis, Design Storm, Probable Maximum Precipitation, Probable Maximum Flood, Flood Frequency Analysis, Risk Analysis,

Unit - 2

Flood Management, Flood Routing through Reservoirs, Channels Routing Muskingum Method, Introduction to Stochastic Models in Hydrology like AR, ARMA, ARIMA etc. Concept of Correlogram.

Unit - 3

System Analysis: Need, Water Resources Systems, Optimisation Techniques, Linear Programming, Feasible Solutions, Graphical Method, Simplex Method, Use of of LP in Water Resources, Introduction to Reservoir Operation, Rule curves, Linear Decision Rule

Unit - 4

Dynamic Programming, its utility in Resource Allocation and other Decision Making Problems, Optimal Operating, Policies, Use of D. P. in Reservoir, Operation.

Unit-5

Network Methods, Project Optimality Analysis.Updating of Network, Utility in Decision Making.

Book Recommended:

Test Books

- *1*. Subramany K., *Engg.Hydrology*.
- 2. Philiphs&Ravindran: OperationsResearch
- 3. Hire D.S. & Gupta: OperationResearch

Reference Books

- 1. Loucks D.P., Stedinderl.R. & HaithD.A : Water Resources SystemsEngg.
- 2. KottegodaN. T., Stochastic Water ResourcesTechnology.
- 3. Singh V.P. : ElementaryHydrology

YBCE805 – Major Project

Each candidate shall work on an approved Civil Engg. Project and shall submit design and a set of drawings on the project.

