YBN UNIVERSITY, RANCHI, JHARKHAND

School of Engineering & Technology

M.Tech. Semester-*I* *Structural Engg.*

S.No.	Subject Code	Subject Name	Periods per week			Credits	Maximum Marks (Theory Slot)			Maximum Marks (Practical Slot)		Total Marks
			L	T	P		End Sem. Exam.	Tests (Two)	Assignments /Quiz	End Sem. Practical/ Viva	Practical Record/ Assignment/Quiz /Presentation	
1.	YMSE101	Advance Mathematics and Numerical Analysis	3	1	-	4	70	20	10	-	-	100
2.	YMSE102	Strength of material and theory of elasticity	3	1	-	4	70	20	10	-	-	100
3.	YMSE103	Advance Structural Analysis	3	1	-	4	70	20	10	-	-	100
4.	YMSE104	Design of Concrete Structures	3	1	-	4	70	20	10	-	-	100
5.	YMSE105	Computer Aided Design	3	1	-	4	70	20	10	-	-	100
6.	YMSE106	Lab-I Concrete	-	-	6	6	-	-	-	90	60	150
7.	YMSE107	Lab-II Cad	-	-	6	6	-	-	-	90	60	150
		Total	15	5	12	32	350	100	50	180	120	800

L:Lecture- T:Tutorial- P:Practical

YMSE101 Advance Mathematics and Numerical Analysis

Unit 1

Numerical solution of Partial Differential Equation (PDE): Numerical solution of PDE of hyperbolic, parabolic and elliptic types by finite difference method.

Unit 2

Integral transforms: general definition, introduction to Mellin, Hankel and Fourier transforms and fast Fourier transforms, application of transforms to boundary value problems in engineering.

Unit 3

Integral equations: Conversion of Linear Differential equation (LDE) to an integral equation (IE), conversion of boundary value problems to integral equations using Green□s function, solution of Integral equation, IE of convolution type, Abel□s IE, Integral differential equations, IE with separable variable, solution of Fredholm Equation with separable kernels, solution of Fredholm and Volterra equations by method of successive approximations.

Unit 4

Calculus of Variation: Functionals and their Variational, Euler□s equation for function of one and two independent variables, application to engineering problems.

Unit-5

FEM: Variational functionals, Euler Lagrange□s equation, Variational forms, Ritz methods, Galerkin□s method, descretization, finite elements method for one dimensional problems.

Reference Books:

1. CF Froberg, Introduction to numerical analysis.
2. SS Sastry, Introductory methods of numerical analysis
3. Krasnove, Kiselevanded Makarenho, Integral equations
4. Buchanan, Finite element Analysis (schaum Outline S), TMH
5. Krishnamurthy, Finite element analysis, TMH
6. Higher Engineering Mathematics by B.V. Ramana, Tata Mc Hill.
7. Advance Engineering Mathematics by Ervin Kreszig, Wiley Easten Edd.
8. Applied Numerical Methods with MATLAB by Steven C Chapra, TMH
9. Numerical Methods in engineering, Salvadori and Baron
10. Theory and problems of Numeric analysis (Schaum Outline S), Schied, TMH

YMSE102 Strength of material and theory of elasticity

UNIT-I

Plane Stress & Plane Strain: Plane Stress, Plane Strain, Stress and Strain at a points, Differential equations of equilibrium, constitutive relation : ansisotropic materials Linear elasticity; Stress, strain, constitutive relations; Boundary conditions, Compatibility equation, stress function.

UNIT-II

Two Dimensional Problems in Rectangular Co-ordinates: Solutions by Polynomials , Saint-Venant□s Principle, Determination of displacements, bending of beams, solution of two dimensional problem in Fourier series.

UNIT-III

Two Dimensional Problems in Polar Coordinates : General equations in Polar coordinates, Pure bending of curved bars, displacements for symmetrical stress distributions, bending of curved bar, stress distribution in plates with circular holes, stresses in a circular disc general solution.

UNIT-IV

Analysis of stress and strain in Three Dimensions : Principal stress and strain, shearing stress and strains, elementary equation of equilibrium , compatibility conditions, problems of elasticity involving pure bending of prismatic bars.

UNIT-V

Torsion of Prismatic Bars : Torsion of prismatic bars, membrane analogy, torsion of a bar of narrow rectangular cross section, torsion of rectangular bars, solution of torsional problem, torsion of rolled section, torsion of hollow shafts and thin tubes, torsion buckling torsional flexural buckling.

References Books:

1. Timoshenko, S.P. , Theory of Elasticity
2. Timoshenko, S.P., Theory of Elastic Stability
3. Iyenger N.G.R., Structural Stability of Columns & Plates.

YMSE103 Advance Structural Analysis

UNIT1

Matrix Method (Flexibility Method) : Force methods, Basic Concepts, evaluation of flexibility, transformation, analysis of a single member of different types, transformation of single member.

UNIT 2

Applications to plane and space structures with pin joints and rigid joints, energy approach in flexibility method, effect of support displacement and transformation.

UNIT 3

Matrix Method (stiffness Method): Displacement methods, Basic concepts, Evaluation of stiffness coefficients, Direct stiffness method, energy approach in stiffness method. Code No. approach for global stiffness matrix, effect of support displacement and temperature.

UNIT 4

Symmetrical & anti-symmetrical problems, Stiffness of plane & space frames solution of problems, comparison of force and displacement methods of solution.

Reference Books:

1. C.S. Reddy , Basic Structural Analysis ,TMH, Publishers
2. W Wearer Jr. & James M. Gere, Matrix Analysis of Framed Structures, CBS Pub.
3. Rajsekeran, Sankarsubramanian, Computational structural Mechanics, PHI
4. Pandit, Structural Analysis: a matrix approach, TMH

YMSE104 Design of concrete structures

Unit 1

Earthquake and wind effects on structures, loads on structures, reinforced concrete design of flat slabs, grid floors, deep beams, design of building□s load bearing and framed structures, design of foundations, seismic analysis.

Unit 2

Design of ground and elevated water tanks, design of bridge decks.

Unit 3

Pre-stressed concrete: analysis and design of sections under flexure using limit state approach, anchorage zone and end block design, composite construction, introduction to statistically indeterminate pre-stressed concrete structures.

Unit 4

Silos and bunkers, Janseen□s and Airy□s theory, rectangular bunkers with sloping bottoms and with high side walls, battery of bunkers.

Reference Books:

1. Jaikrishna, Chandrasekaran, Elements of earthquake engineering.
2. Shah and Karve, Text book of reinforced concrete
3. Punamia, RCC designs
4. IS-456, -875, -1893, -1984
5. Krishna Raju, Prestressed concrete.
6. Varghese, Advanced RC Designs, PHI
7. Everard, Theory and problems of RC design (Shaum□s Outline S), TMH

YMSE105 Computer aided design

Unit 1

Cpp programming language: Basics of programming, loops, decisions, structures, functions, objects/ classes, arrays.

Unit 2

Overloading, inheritance, virtual functions and pointers, object oriented programming, Turbo Cpp features and programming, structure engineering problems programming.

Unit 3

Computer Aided drafting, 2-D and 3-D drawings, Introduction to CAD software, drawing of buildings.

Unit 4

Introduction to computer graphics, 3-D modeling software and analysis software.

Reference Books:

1. Robert Lafore, Object oriented programming in CPP
2. E. Balaguruswamy, Programming in C
3. Syal and Gupta, Computer programming and engineering analysis.
4. AutoCAD, SolidEdge, Cadlab software and Manuals.

YBN UNIVERSITY, RANCHI, JHARKHAND

School of Engineering & Technology

M.Tech. Semester-II. Structurel Engg.

S.No.	Subject Code	Subject Name	Periods per week			Credits	Maximum Marks (Theory Slot)			Maximum Marks (Practical Slot)		Total Marks
			L	T	P		End Sem. Exam	Tests (Two)	Assignments /Quiz	End Sem. Practical /Viva	Practical Record/ assignment/Quiz /presentation	
1.	YMSE201	Structural Dynamics	3	1	-	4	70	20	10	-	-	100
2.	YMSE202	FEM in Structural Engineering	3	1	-	4	70	20	10	-	-	100
3.	YMSE203	Advance Concrete Technology	3	1	-	4	70	20	10	-	-	100
4.	YMSE204	Experimental Stress Analysis	3	1	-	4	70	20	10	-	-	100
5.	YMSE205	Theory of Plates and Shells	3	1	-	4	70	20	10	-	-	100
6.	YMSE206	Lab-III Instrumentation	-	-	6	6	-	-	-	90	60	150
7.	YMSE207	Lab-IV Structural Software Engg.	-	-	6	6	-	-	-	90	60	150
		Total	15	5	12	32	350	100	50	180	120	800

L:Lecture- T:Tutorial- P:Practical

YMSE201-Structural Dynamics

UNIT 1

Single Degree of Freedom System: Free and forced vibrations, Linear Viscous Damper, Coulomb Damper: Response to harmonic excitation, rotating unbalance and support excitations, Vibration isolation and transmissibility, single degree of freedom system as vibro-meter and accelerometer, response to periodic and arbitrary excitation.

UNIT-II

Duhamel□s integral. Impulse response function, Laplace transform Fourier transform methods. Frequency response function. Phase-Plane Techniques. Critical Speed of rotors. Energy methods, Rayleigh□s method, Equivalent viscous damping.

UNIT-III

Two Degree of Freedom System. Matrix Formulation, Free Vibration, Beat phenomenon. Principle of damped and un-damped vibration absorbers.

UNIT-IV

Multi Degree of Freedom System: Matrix formulation, stiffness and flexibility influence coefficients, eigenvalue problem, normal modes and their properties. Matrix iteration technique for eigenvalue, and eigen vectors, Free and forced vibration by modal analysis.

UNIT-V

Continuous System: Axial vibration of bar, torsion of shafts, transverse vibration of strings and bending vibration beams. Forced vibration. Normal mode method. Lagrangle□s equation. Approximate methods of Rayleigh-Ritz, Galerkin etc.

Reference Books:

1. RW Clough, J Penzien, Dynamics of structures
2. D G Fertia, Dynamics and vibration of Structures
3. J M Biggs, Introduction to structural dynamic

YMSE202 FEM in Structural Engineering

UNIT-I
Introduction to Finite Element Method: General Applicability and Description of Finite Element Method Comparison with other methods.

UNIT 2
Solution of Finite Element Method: Solution of Equilibrium Problems, Eigen value problems, propagation problems, computer implementation of Gaussian eliminations, Choleski□s decomposition, Jocobi□s and Ranga Kutta Method.

UNIT 3
General Procedure of Finite Element Method: Descretization of the domain, Selection of Shapes, Types and Number of elements, node numbering technique, Interpolation Polynomials, their selection and derivation in terms of global and local coordinates, Convergence requirements. Formulation of Element Characteristic matrices and vectors, Variational approach. Assembly of Element matrices and Vectors and Derivation system equations, computation of element resultants.

UNIT-IV
Iso-parametric Formulation: Lagrange and Hermite interpolation functions, Isoparametric Elements, Numerical Integration.

UNIT-V
Static Analysis: Formulation of equilibrium equation, Analysis of truss, Frames, Plane Stress and Plane Strain Problems Plates and Shells.

Reference Books:

1. Weaver, Johnson, Finite element and structural analysis
2. HC Martin, Matrix structural analysis
3. CF Abel, CS Desai, Finite element methods
4. Buchanan, Finite element Analysis (schaum Outline S), TMH
5. Krishnamurthy, Finite element analysis, TMH)

YMSE203 Advance Concrete Technology

UNIT 1
Cement & its properties, properties of fresh concrete compaction of concrete, curing of concrete.

UNIT 2
Properties of hardened concrete, strength characteristic, shrinkage, creep, durability, fattier.

UNIT 3
Permeability & durability of concrete is detail. Special concrete and their properties.

UNIT 4
Concrete at low & high temp. Air entrained concrete, high performance concrete.

UNIT 5
Mix Design, Non destructive Testing of Concrete.

Reference Books:

1. A.M. Nobille, Concrete Technology , ELBS, London
2. M.L. Gambir, Concrete Technology, Tata Mc Graw Hill Book Co.
3. Peurifoy R.L., Construction Planning Equipment & Methods, TMH
4. Verma Mahesh, Construction Equipments and its Planning & Application,Metropoliton Book Company N.Delhi.

YMSE YMSE204 Experimental Stress Analysis

Unit 1

Introduction to stress analysis by strain measurement, mechanical strain gages, Moire fringe method, Brittle coatings for stress indication, circuitry for resistance strain gages, calibrating strain gages, temperature compensation of circuitry, indication and recording equipments, unbalance of bridge systems, balanced bridge systems, reference bridge systems, constant current strain indicators, multichannel recording systems.

Unit 2

Introduction to stress analysis by photo elasticity, optical theory, stress optical relationship, equipment and models, static stress analysis (2-D, 3-D techniques), stress analysis by photo elastic strain gages

Unit 3

Conditions for crack growth, fracture mechanics and strength of solids, stress and displacement fields in the vicinity of crack tip, the Griffith Orowan-Irwin concept, stable and unstable crack growth, the integral variation principle in crack theory, some more model representations, cracks in linearly elastic bodies, stress intensity factor, basic numerical methods for calculating the stress intensity factor, calculation of stress intensity factor for double cantilever beam specimen by FEM, the method of section for an approximate calculation of stress intensity factor, some material characteristics used for evaluation of crack propagation resistance.

Unit 4

Solution of some plane and three dimensional problems, constructional crack arrest, system of cracks, stress intensity factors for some practical important cases, shell with a crack trajectory.

Reference Books:

1. Dove, Adams, Experimental stress analysis and motion
2. Heteny, Experimental stress analysis
3. Dally, Rilay, Experimental stress analysis
4. VZ Panon, M Morozove, Elastic-plastic fracture mechanics

YMSE205 Theory of Plates and Shells

UNIT 1

Theory of Plates: Bearing of long rectangular plates to the cylindrical surface with different edge conditions. Pure bending of plates-Differential equations of equilibrium. Theory of small deflections of laterally loads plates. Boundary conditions, momentcurvature relationship.

UNIT 2

Analysis of rectangular plates, Navier□s and levy solutions, exact theory of plates, symmetrical bending of circular plates, continuous rectangular plates

UNIT 3

Special and approximate methods of theory of plates, singularities, use of influence surfaces, use of infinite integrals and transforms, strain energy methods, experimental methods.

UNIT 4

Theory of Shells: Classification of shells, Gaussian curvature, General theory of cylindrical shells, membrane theory and bending theory for cylindrical shells, long and short shells, shells, shells with and without edge beams, Fourier loading.

UNIT 5

Equation of equilibrium for shells of surface of revolution, Reduction to two differential equations of second order. Spherical shells, membrane theory for shells of double curvature-syn-elastic and anti-elastic. Cylindrical shells, Hyperbolic-parabolic shells, funicular shells.

Reference Books:

1. S Timoshenko, S Woinowasky K, Theory of Plates and Shells

YBN UNIVERSITY, RANCHI, JHARKHAND

School of Engineering & Technology

M.Tech. Semester-III Structurel Engg.

S.No	Subject Code	Subject Name	Periods per week			Credits	Maximum Marks (Theory Slot)			Maximum Marks (Practical Slot)		Total Marks
			L	T	P		End Sem. Exam.	Tests (Two)	Assignments /Quiz	End Sem. Practical /Viva	Practical Record/ Assignment/Quiz /Presentation	
1.	YMSE301	Elective I	3	1	-	4	70	20	10	-	-	100
2.	YMSE302	Elective II	3	1	-	4	70	20	10	-	-	100
3.	YMSE303	Seminar	-	-	4	4	-	-	-	-	100	100
4.	YMSE304	Dissertation Part- I (Literature Review/Problem Formulation/ Synopsis)	-	-	8	8	-	-	-	120	80	200
		Total	6	2	12	20	140	40	20	120	180	500

L:Lecture- T:Tutorial- P:Practical

Elective –I(YMSE301)

(A) Advance FEM and programming
(B) AdvanceFoundationEngineering
(C) Design ofSteelStructures
(D) Design of Earth QuakeRessistantStructures
(E) Rock Mechanics and FoundationEngineering

Elective-II (YMSE302)

A) Stability Theory in Structural Engg.
B) Design of TallStructures
C) Design of OffshoreStructures
D) Reliability Based Civil Engg.Design

YMSE301(A)Advanced FEM and programming

UNIT 1

Iso-parametric formulation for plate and shell elements; various types of elements ; Hybrid elements; .

UNIT 2

FEM in dynamic problems, consistent mass matrix; Vibration of bars, beams and plate elements.

UNIT 3

FEM in buckling problems, geometric matrix, buckling of struts and plate elements.

UNIT 4

Structural modeling by FEM for structures such as shear walls, core walls, bridges and coolingtowers.

UNIT 5

Computational aspects; interpretation of results; comparision with other methods.

YMSE301(B)Advanced Foundation Engineering

UNIT 1

Deep Open Cuts: Introduction, Types of Coffer Dams, Design data for cellular cofferdam, Stability analysis of cofferdam, interlock stresses.
Soil Exploration: Introduction, Methods of exploration, Direct Methods and techniques of exploration, Methods of boring types of samples, Disturbance of soil sample, Soil samplers and sampling techniques, Ground water observations, Boring records, Spacing and depth of bore holes, Indirect methods of soil exploration, Penetration tests, Geophysical methods, Dynamics methods, Sequence of exploration programs

UNIT 2

Shallow Foundations: Introduction, General Requirements, Depth of foundation, Bearing capacity, Eccentric Inclined loads, Bearing capacity of stratified soils, Settlement of footings, Settlement of footings from constitutive laws, Settlement and tilt of eccentrically loaded footings, Allowable settlement, Plate bearing test, Standard penetration test Effect of water table, shallow foundation classification, Modulus of sub-grade reaction, Beams on elastic foundation, Raft foundation.

UNIT 3

Pile Foundation: Introduction, Uses of piles, Types of piles, pile drivers, Bearing capacity of piles, Static analysis, Pile load test, Dynamic methods, Other methods, 24 Negative skin friction, Pile group, Ultimate bearing capacity of pile groups, Settlement of pile group, Influence of pile cap. Laterally loaded piles, Ultimate resistance, Elastic methods, Pile groups under lateral load, batter pile under lateral load, Batter pile groups under inclined loads, pile under dynamic loads.

UNIT 4

Coffer Dams: Introduction, types of Coffer Dams, Design data for cellular cofferdam, Stability analysis of cofferdam, Interlock stresses.

UNIT 5

Machine Foundations : Introduction, Criteria for satisfactory action of a machine foundation, Definitions, Degrees of freedom of a block foundation, Analysis of block foundation, Theory of linear weightless spring, Equivalent soil springs, Vertical vibration, Rocking vibration, Vibration in shear, Simultaneous rocking sliding and vertical vibrations for a foundation, Indian standard on design and construction of foundations for reciprocating machines, Foundations for impact type machines, Indian Standard on design and construction of foundations for impact type machines, Analysis of block foundation based on elastic half spacetheory.

References Books:
Bowles, Foundation: Analysis and Design, McGraw Hill Book CO.Inc.
Peck , R.B. , W.E. Hanson and T.H. Thornburn, Foundation Engineering, Wiley , New

YMSE301(C)DesignofsteelStructures

UNIT 1

Introduction to Limit States: Introduction, Standardization, allowable stress design, limit state design, partial safety factors, concept of section, classification; Plastic, compact semi- compact &slender.

UNIT 2

Columns: Basic concepts, strength curve for an ideal strut, strength of column members in practice effect of eccentricity of applied loading. Effect of residual stresses, concept of effective lengths, no sway columns, torsional and torsion flexural buckling of columns, Robertson's design curve, modification to Robertson approach, design of columns using Robertson approach.

UNIT 3

Laterally Restrained Beams: Flexural & shear behavior, web buckling & web crippling, effect of local buckling in laterally restrained plastic' or 'compact' beams, combined bending & shear, unsymmetrical bending. Unrestrained Beams: Similarity of column buckling of beams, lateral torsional buckling of symmetric section, factors affecting lateral stability, buckling of real beams , design of cantilever beams, continuousbeams.

UNIT 4

Beams Columns: Short & long beam columns, effects of slenderness ratio and axial force on modes of failure, beam column under biaxial bending, strength of beam columns, local section failure & overall memberfailure.

UNIT 5

Beams Subjected to Torsion and Bending: Introduction, pure torsion and warping, combined bending torsion, capacity check, buckling check, design methods for lateral torsional buckling.

Reference Books:

1. Morsis L.J. Plum, D.R., Structural Steel WorkDesign
2. Sinha D.A. , Design of SteelStructures
3. Yu, W.W. , Cold Formed Steel StructuresDesign

YMSE301(D)Design of Earth quake Resistant Structures

UNIT 1

Seismic Strengthening of Existing Buildings: Cases histories-Learning from earthquakes, seismic strengthening procedures.

UNIT 2

Torsion & Rigidity: Rigid Diaphragms, Torsional moment, Center of mass and center of rigidity torsion effects. Lateral Analysis of Building Systems: Lateral load distribution with rigid floor diaphragms, moment resisting frames, shear walls, lateral stiffness of shear walls, shear wall-frame combination, examples.

UNIT 3

Concept of Earthquake Resistant Design: Objectives of seismic design , Ductility, Hysteric response & energy dissipation, response modifications factor, design spectrum, capacity design, classification of structural system, IS code provisions for seismic design of structures, multi-storied buildings, design criteria, P-A effects, storey drift, design examples ductile detailing of RCCstructures.

UNIT 4

Seismic Design of Special Structures: Elevated liquid storage tanks, Hydrodynamic pressure in tanks, stack like structures, IS-1893 code provisions for bridges; Superstructures, sub- structures, submersible bridges, dams; Hydrodynamic effect due to reservoir, concrete gravity dams.

UNIT 5

Engineering Seismology: Basic terms, seismic waves, earthquake magnitude and intensity, ground motion, dynamic response of structures, normalized response spectra, seismic coefficients and seismic zone coefficients.

Reference Books:

1. Chopra A.K., Dynamics of Structures', Theory & Applications to Eqrthquake Engineering , Prentice Hall India, NewDelhi-1995

2. Clough &Penzien, Dynamics of Structures , McGraw Hill Book CO.Inc.

3. Paz M, Structural Dynamics, , Van Nostrand Reinhold, NewYork

4. Paz, M, International Handbook of Earthquake Engineering, Chapman & Hall, New York.

5. IS-1893-1984, Indian Standard Criteria for Earthquake Resistant Design of Structures, B.I.S., NewDelhi.

6. IS-4326-1993, Indian Standard Code of Practice for Earthquake Resistant Design and.

YMSE301(E)Rock Mechanics and Foundation Engineering

Introduction to rock mechanics, geology, rock mechanics and foundation, engineering properties of intact rock, mechanical behavior of joints in rock marks, FEM approach, seismic considerations, measurement of stress and stress in rocks, rock fracturing in compression, stress distribution in rocks and soils, selection of suitable foundation, spread foundation, pile cassion foundation, machinefoundations.

Reference Books:

1. Billings, Structural Geology,PHI
2. E Hock, J Bray, Rock slopeengineering
3. T Schebotarioti, Soil Mechanics,TMH
4. W Dunham, Foundations of structure clearance,TMH

YMSE302 (A)Stability Theory in Structural Engineering

UNIT 1
Concepts of Stability, Euler Buckling Load, Critical Load of Laced, Battened and Tapped columns, Inelastic Buckling of column.

UNIT 2
Torsional Buckling, Torsional Flexural Buckling.

UNIT 3
Lateral Instability of Beams, Beam Columns.

UNIT 4
Local Buckling and post buckling behaviour of plates.

UNIT 5
Application of Energy method and matrix method in stability problems.

Reference Books:

1. Theory of Elastic Stability by Timoshenko, TMH Pub.

YMSE302 (B)DesignofTallStructures

UNIT 1
Behavior of tall structures under static and dynamic loads, model analysis.

UNIT 2
Characteristics of Wind and Earthquake Forces.Gust Factor and Karman Vortices. Approximate and Regorlons Methods of analysis for wind and Earthquake Forces.

UNIT 3
Shear walls, Frame Structures, Coupled shear walls, Tabular Structures, Ductility and reinforcement details at joint.

UNIT 4
Criteria for design of Chimneys, T.V. Towers and other Tall Structure.

UNIT 5
Modeling of tall structures, case studies.

Reference Books:

1. Coull, Smith, Design of tallbuildings
2. Taranath, Design of tallbuildings

YMSE302(C)DesignofOffshoreStructures

UNIT-I
Loads and structural forms of different types of offshore structures; Elements of single d.o.f. system subjected to free and forced vibration.

UNIT-II
Analysis for transient and steady state force; Equivalent damping for nonlinear systems; Dynamics of multi d.o.f. systems; Eigen values and vectors; Iterative and transformation methods.

UNIT-III

Mode superposition.Fourier series and spectral method for response of single d.o.f. systems; Vibrations of bars, beams and cones with reference to soil as half space.

UNIT-IV
Behavior of concrete gravity platform as a rigid body on soil as a continuum; short and long term statistics of wind;

UNIT-V
Static wind load; Effect of size, shape and frequency; Aerodynamic admittance function and gust factor, spectral response due to wind for various typres of structures; Wave loads by Morison□s equation; Static and dynamic analysis of fixed structures; Use of approximatemethods.

Reference Books:
1.Brebbia C.A. Walker, Dynamic Analysis of Offshore Str., Newnes Butterworth 2.Sarpakaya T and Isaacson M., Mechanics of wave forces on offshore structures, Van Nostrand Reinhold New York,
3. Hallam M.G. HeafN.J. and Wootton, L.R., Dynamics of Marine Structures, CIRIA Publications Underwater Engg., Group ,London
4. Graff W.J., Introduction to offshore Structures, Gulf Publishing Co., Houston, Taxas
5. Clough R.W. and Penzine J., Dynamic of Structures - II Ed., McGraw Hill Book CO.
6. Simiu E. and Scanlan R.H., Wind Effects on Structures, Wiley, New York 1978
7. Codes of Practice (latest versions) , Such as API RP-2A ,BureauVeritas etc.
8.Proceedings of Offshore Technology Conference (OTC) Behavior of Offshore Structures (BOSS) and other Conferences on offshore Engineering.

YMSE302(D) Reliability Based Civil Engineering Design

UNIT 1

Probability Theory : Mutually exclusice events, set theory, sample points and sample spece,lawsofprobability,toalprobabilitytheorem,Bayes□rule,randomvariablesdiscreateand continuous, jointlydistributed discrete variables, marginal distribution, conditional distribution, jointly distributed continuous variables functions of random variables, moments and expectations, common probability distribution normal Iognormal, Gamma and Beta distributions, external distributions.

UNIT 2

Resistance Distribution and Parameters: Statics of properties of concrete and steel, statics of strength of bricks and mortal, Characterization of variables, allowable stresses based on specified reliability. Probabilistic Analysis of loads: Load as a stochastic process, dead load, statistical analysis of live loads-maximum sustained load intensity model, maximum total load model, wind load-probability model for wind load.

UNIT 3

Structural Reliability : General expression for reliability , expression for probability of failure: reliability when strength (S) and load (L) follow normal distribution, lognormal distribution, exponential distribution, extreme value distributions, factor of safety corresponding to a given reliability. Monte Carlo Study of Reliability: Monte Carlo Method-Inverse transformation technique, Application to columns beams and frames.

Level 2 Reliability Method: Basic variables and failure surface, first order second moment methods-Hasoferand lind□s method, Non normal distributions; determination of reliability index of structuralelements.

UNIT 4

Reliability Based Design: Determination of partial safety checking formats, development of reliability based criteria, optimal safety factors, calibration of IS 456 and IS 800.

UNIT 5

Reliability of Structural Systems: System reliability, modeling of structural systems, bounds on system reliability, automatic generation of a mechanism, generation of dominant mechanisms , reliability analysis of R.C.C. and SteelFrames.

Reference Books:

1. Ranganathan, R. Reliability Analysis and Design of Structures,TMH
2. Rao. S.S. Reliability Based Design , McGraw Hill Book CO.Inc.
3. Ghosh , D.I., A Primer of Reliability Theory, john Wiley , NewYork
4. Lewis, E.E., Introduction to Reliability Engineering , John Wiley NewY

YBN UNIVERSITY, RANCHI, JHARKHAND

School of Engineering & Technology

M.Tech. Semester -IV Structurel Engg.

S.No.	Subject Code	Subject Name	Periods per week			Credits	Maximum Marks (Theory Slot)			Maximum Marks (Practical Slot)		Total Marks
			L	T	P		End Sem. Exam.	Tests (Two)	Assignments /Quiz	End Sem. Practical/Viva	Practical Record/ Assignment/Quiz /Presentation	
1.	YMSE401	Dissertation Part- II	-	-	20	20	-	-	-	300	200	500
		Total	-	-	20	20	-	-	-	300	200	500

L:Lecture- T:Tutorial- P:Practical