

Mahakaushal University, Jabalpur (M.P.)



Scheme & Syllabus

For

M.Tech

in

Structural Engineering

2021-2022 onwards

Duration of Course: 2 Years

Examination Mode: Semester

Examination System: CBCS

**Mahakaushal University
Village-Aithakheda, Mukunwara Road, Post- Tilwara Jabalpur (M.P.) 482003**

Advanced Engineering Mathematics

Unit 1

MARKS 14

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

Unit 2

MARKS 14

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

MARKS 14

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, Integro 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

MARKS 14

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

Unit-5

MARKS 14

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



MAHAKAUSHAL UNIVERSITY JABALPUR

TEXT BOOKS:

1. Higher Engineering Mathematics by B.V. Ramana, Tata Mc Hill.
2. Advance Engineering Mathematics by Ervin Kreszig, Wiley Eastern Edd.
3. Applied Numerical Methods with MATLAB by Steven C Chapra, TMH

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. Numerical Methods in engineering, Salvadori and Baron
7. Theory and problems of Numeric analysis (Schaum Outline S), Schied, TMH



MAHAKAUSHAL UNIVERSITY JABALPUR

STRENGTH OF MATERIALS & THEORY OF ELASTICITY

Unit 1

MARKS 14

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

Unit 2

MARKS 14

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

Unit 3

MARKS 14

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 4

MARKS 14

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 5

MARKS 14

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.



MAHAKAUSHAL UNIVERSITY JABALPUR

TEXT BOOKS:

1. IYENGER N.G.R., STRUCTURAL STABILITY OF COLUMNS & PLATES "
- 2 . SOM BY R.K.BANSAL.

References :

1. TIMOSHENKO, S.P. , THEORY OF ELASTICITY
2. TIMOSHENKO, S.P., THEORY OF ELASTIC STABILITY



MAHAKAUSHAL UNIVERSITY JABALPUR

Advance Structural Analysis

Unit 1 **MARKS 14**
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 **MARKS 14**
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 **MARKS 14**
Matrix Method (stiffness Method): Displacement methods, Basic concepts, Evaluation of stiffness coefficients, Direct stiffness method.

Unit 4 **MARKS 14**
Energy approach in stiffness method. Code No. approach for global stiffness matrix, effect of support displacement and temperature.

Unit 5 **MARKS 14**
Symmetrical & anti-symmetrical problems, Stiffness of plane & space frames solution of problems, comparison of force and displacement methods of solution

TEXT BOOKS:

1. C.S. Reddy , Basic Structural Analysis ,TMH, Publishers
2. W Wearer Jr. & James M. Gere, Matrix Analysis of Framed Structures,CBS Pub.

REFRNC E BOOKS:

1. Rajsekeran, Sankar subramanian, Computational structural Mechanics, PHI
2. Pandit, Structural Analysis: a matrix approach, TMH



MAHAKAUSHAL UNIVERSITY JABALPUR

Design of Concrete Structures

- Unit 1** **MARKS 14**
Earthquake and wind effects on structures, loads on structures, reinforced concrete design of flat slabs, grid floors, deep beams, design of buildingOs load bearing and framed structures, design of foundations, seismic analysis.
- Unit 2** **MARKS 14**
Design of ground and elevated water tanks, design of bridge decks.
- Unit 3** **MARKS 14**
Pre-stressed concrete: analysis and design of sections under flexure using limit state approach, anchorage zone and end block design,
- Unit 4** **MARKS 14**
Composite construction, introduction to statistically indeterminate pre-stressed concrete structures.
- Unit 5** **MARKS 14**
Silos and bunkers, JanseenOs and AiryOs theory, rectangular bunkers with sloping bottoms and with high side walls, battery of bunkers.

TEXT BOOKS:

1. Jaikrishna, Chandrasekaran, Elements of earthquake engineering.
2. Shah and Karve, Text book of reinforced concrete

REFERENCES:

1. Punamia, RCC designs
2. IS-456, -875, -1893, -1984
3. Krishna Raju, Prestressed concrete.
4. Varghese, Advanced RC Designs, PHI
5. Everard, Theory and problems of RC design (ShaumOs Outline S), TMH



MAHAKAUSHAL UNIVERSITY JABALPUR

Computer Aided Design

Unit 1 **MARKS 14**

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

Unit 2 **MARKS 14**

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

Unit 3 **MARKS 14**

structure engineering problems programming.

Unit 4 **MARKS 14**

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

Unit 5 **MARKS 14**

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

TEXT BOOKS:

1. Robert Lafore, Object oriented programming in CPP
2. E. Balaguruswamy, Programming in C

REFERENCE BOOKS:

1. Syal and Gupta, Computer programming and engineering analysis.
2. AutoCAD, SolidEdge, Cadlab software and Manuals



Concrete Structure Lab – List of Experiments

S. No. Objective / Purpose

- 1 To find the compressive strength using cube or cylinder specimens.
- 2 To measure the ability of a concrete beam to resist bending.
- 3 To determine the tensile strength of concrete indirectly.
- 4 To check the workability of fresh concrete.
- 5 To determine the degree of compaction of concrete.
- 6 To measure the flow and consistency of concrete.
- 7 To find the stress-strain relationship of concrete under compression.
- 8 To estimate the surface hardness and strength of concrete.
- 9 To assess the quality and uniformity of concrete.
- 10 To design a concrete mix as per IS 10262 standards.
- 11 To check the porosity and density of hardened concrete.
- 12 To find the flexural tensile strength of concrete beams.
- 13 To plot and analyze the stress–strain behavior.
- 14 To study long-term deformation properties of concrete.



List of Experiments for CAD Lab

S.No. Experiment Title

- 1 Introduction to CAD software interface and basic commands
- 2 Creating 2D geometric shapes using basic drawing tools
- 3 Editing and modifying 2D drawings (Trim, Extend, Fillet, Offset, etc.)
- 4 Creating Orthographic Projections (Front, Top, Side Views)
- 5 Creating Isometric Drawings from Orthographic Views
- 6 Dimensioning and applying text annotations
- 7 Sectional views and hatching in 2D
- 8 3D Modeling: Creating basic 3D solids (Box, Cylinder, Sphere, etc.)
- 9 3D operations: Extrude, Revolve, Sweep, Loft
- 10 Assembly modeling (combining multiple parts)
- 11 Creating exploded views and assembly drawings
- 12 Generating 2D drawing from 3D model
- 13 Surface modeling and rendering
- 14 Introduction to simulation and motion study
- 15 Printing and plotting of final design sheets



MAHAKAUSHAL UNIVERSITY JABALPUR

STRUCTURAL DYNAMICS

Unit 1

MARKS 14

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 2

MARKS 14

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

Unit 3

MARKS 14

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

Unit 4

MARKS 14

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-5

MARKS 14

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

TEXT BOOKS:

1. J M Biggs, Introduction to structural dynamic

Reference Books:

1. RW Clough, J Penzien, Dynamics of structures
2. D G Fertia, Dynamics and vibration of Structures



MAHAKAUSHAL UNIVERSITY JABALPUR

FEM IN STRUCTURAL ENGINEERING

Unit 1

MARKS 14

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

Unit 2

MARKS 14

Solution of Finite Element Method: Solution of Equilibrium Problems, Eigen value problems, propagation problems, computer implementation of Gaussian eliminations, CholeskiOs decomposition, JocobiOs and Ranga Kutta Method.

Unit 3

MARKS 14

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 4

MARKS 14

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

Unit 5

MARKS 14

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

TEXT BOOKS:-

1. CF Abel, CS Desai, Finite element methods
2. Buchanan, Finite element Analysis (schaumOutline S), TMH



MAHAKAUSHAL UNIVERSITY JABALPUR

ADVANCED CONCRETE TECHNOLOGY

Unit 1	MARKS 14
Cement & its properties, properties of fresh concrete compaction of concrete, curing of concrete.	
Unit 2	MARKS 14
Properties of hardened concrete, strength characteristic, shrinkage, creep, durability, fattier.	
Unit 3	MARKS 14
Permeability& durability of concrete is detail. Special concrete and their properties.	
Unit 4	MARKS 14
Concrete at low & high temp. Air entrained concrete, high performance concrete.	
Unit 5	MARKS 14
Mix Design, Non destructive Testing of Concrete.	

Reference Books:

1. A.M. Nobile, Concrete Technology , ELBS, London
2. M.L. Gambir, Concrete Technology, Tata Mc Graw Hill Book Co.

TEXT BOOKS:-

1. Peurifoy R.L., Construction Planning Equipment & Methods, TMH
2. Verma Mahesh, Construction Equipments and its Planning & Application, Metropolitan Book Company N.Delhi.



EXPERIMENTAL STRESS ANALYSIS

Unit 1

MARKS 14

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

MARKS 14

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

MARKS 14

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.

Unit 4

MARKS 14

Stress intensity factor, basic numerical methods for calculating the stress intensity factor, calculation of stress intensity factor for double cantilever beam specimen by FEM.

Unit 5

MARKS 14

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

TEXT BOOKS:-

1. Dally, Rilay, Experimental stress analysis
2. VZ Panon, M Morozove, Elastic-plastic fracture mechanics



THEORY OF PLATES & SHELLS

Unit 1

MARKS 14

Theory of Plates: Bearing of long rectangular plates to the cylindrical surface with different edge conditions. Pure bending of plates-Differential equations of equilibrium.

Unit 2

MARKS 14

Theory of small deflections of laterally loads plates. Boundary conditions, momentcurvature relationship.

Unit 3

MARKS 14

Analysis of rectangular plates, Napier's and levy solutions, exact theory of plates, symmetrical bending of circular plates, continuous rectangular plates

Unit 4

MARKS 14

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 5

MARKS 14

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.

TEXT BOOKS:

1. S Timoshenko, S WoinowskyK, Theory of Plates and Shells

REFERENCE BOOKS:

1. S Timoshenko, S WoinowskyK, Theory of Plates and Shells

Instrumentation Lab

S.No	Objective / Description
1	To calibrate analog/digital meters using standard sources
2	Measurement of unknown resistance accurately
3	Determining inductance of a coil
4	Determining capacitance and dissipation factor
5	Accurate frequency measurement of a signal
6	To measure strain on a material under load
7	Temperature measurement and comparison of sensors
8	Measurement and calibration of pressure sensors
9	Measurement of linear displacement
10	Measurement of applied force using transducers
11	Measurement of voltage, current, resistance, and continuity
12	Amplification, filtering, and conversion of sensor signals
13	Understanding chemical instrumentation and calibration
14	Measurement of rotational speed of motors
15	Capturing and analyzing sensor data digitally
16	Measurement and visualization of waveforms
17	Comparison of different temperature sensors
18	Measurement and calibration of humidity sensors
19	Understanding optical and non-contact sensors
20	Implementation of control loops in instrumentation



Software Engineering Lab – Experiment List

- 1. Software Development Life Cycle (SDLC)**
 - Study of Waterfall, Iterative, Spiral, and Agile models.
 - Case study analysis of SDLC in real projects.
- 2. Requirements Engineering**
 - Writing Software Requirement Specification (SRS) documents.
 - Functional and non-functional requirements analysis.
- 3. Design Techniques**
 - UML Diagrams:
 - Use Case Diagram
 - Class Diagram
 - Sequence Diagram
 - Activity Diagram
 - Component Diagram
 - Design patterns implementation (Singleton, Factory, Observer, etc.)
- 4. Software Project Planning**
 - Effort estimation using COCOMO model.
 - Gantt chart and network diagram creation.
- 5. Version Control**
 - Using Git: commit, push, pull, branching, merging.
 - Repository management.



Advanced Foundation Engineering

UNIT 1

MARKS 14

Deep Open Cuts: Introduction, Types of Cofferdams, 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

MARKS 14

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

MARKS 14

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

MARKS 14

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



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UNIT 5

MARKS 14

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 space theory

TEXT BOOKS:

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

Reference Books

1. Krishna Raju, Prestressed concrete.
2. Varghese, Advanced RC Designs, PHI

Advanced FEM and Programming

UNIT 1.	MARKS 14
Iso-parametric formulation for plate and shell elements; various types of elements ; Hybrid elements.	
UNIT 2.	MARKS 14
FEM in dynamic problems, consistent mass matrix; Vibration of bars, beams and plate elements.	
UNIT 3.	MARKS 14
FEM in buckling problems, geometric matrix, buckling of struts and plate elements.	
UNIT 4.	MARKS 14
Structural modeling by FEM for structures such as shear walls, core walls, bridges and cooling towers.	
UNIT 5.	MARKS 14
Computational aspects; interpretation of results; comparison with other methods.	

TEXT BOOKS:

1. A first course in Finite Element Method by Daryl L. Logan, 5th Edition, Cengage Learning India Pvt. Ltd.
2. Concepts and applications of Finite Element Analysis by Robert D. Cook et al., Wiley India Pvt. Ltd.
3. Introduction to finite Elements in Engineering by Tirupathi R. Chandrupatla, and Ashok D. Belegundu, Prentice Hall of India

REFERENCE BOOKS:

1. Finite Element Analysis by P. Seshu, PHI Learning Private Limited
2. Applied Finite Element Analysis by G. Ramamurty, I.K. International Publishing House Pvt. Ltd.
3. Introduction to Finite Element Analysis by J.N.Reddy, 3rd edition, Oxford Publications.

Design of Steel Structures

UNIT – I

Materials – Types of structural steel – Mechanical properties of steel – Concepts of plasticity – yield strength - Loads and Stresses – Local buckling behavior of steel.

Concepts of limit State Design –Different Limit States – Load combinations for different Limit states - Design Strengths - deflection limits– serviceability – stability check.

Design of Connections– Different types of connections – Bolted connections – Design strength – efficiency of joint– prying action - Welded connections – Types of welded joints – Design requirements- Design of Beam-column connections - Eccentric connections - Type I and Type II connection – Framed connection– stiffened / seated connection.

UNIT-II

Design of tension members –Simple and built up members - Design strength – Design procedure for splicing - lug angle.

Design of compression members – Buckling class – slenderness ratio – Design of simple compression members - laced – battened columns – splice – column base – slab base.

UNIT – III

Plastic Analysis- Plastic moment – Plastic section modulus - Plastic analysis of continuous beams
Design of Flexural Members – Laterally supported and unsupported Beams – Design of laterally supported beams - Bending and shear strength/buckling – Built-up sections - Beam splice

UNIT – IV

Design of welded plate girders – Elements – Economical depth – Design of main section – Connections between web and flange – Design of stiffeners - Bearing stiffener– Intermediate stiffeners – Design of web splice and flange splice.

UNIT – V

Design of Industrial Structures- Types of roof trusses - Loads on trusses – Wind loads - Purlin design –Truss design. Design of welded Gantry girder, (Introduction to Pre-engineered metal buildings)

TEXT BOOKS:

1. Design of Steel Structures, Subramanian N, Oxford University Press, New Delhi 2008.
2. Design of Steel Structures, Dayaratnam P, S. Chand & Co., New Delhi, 2003.

REFERENCES:

1. Limit state Design of steel structures, S.K. Duggal, Tata McGrawhill
2. Design of Steel Structures, Arya, A.S and Ajmani, A.L., Nemchand and brothers, Roorkee, 1992..
3. Comprehensive Design of Steel Structures, Punmia, B.C., Ashok Kumar Jain and Arun Kumar Jain. Laxmi Publications Pvt. Ltd., New Delhi 2000.
4. IS 800-2007, Code of practice for general construction in steel, Bureau of Indian Standards, New Delhi.

Stability Theory in Structural Engineering

UNIT 1	MARKS 14
Concepts of Stability, Euler Buckling Load, Critical Load of Laced, Battered and Tapped columns, Inelastic Buckling of column.	
UNIT 2	MARKS 14
Torsional Buckling, Torsional Flexural Buckling.	
UNIT 3	MARKS 14
Lateral Instability of Beams, Beam Columns.	
UNIT 4	MARKS 14
Local Buckling and post buckling behaviour of plates.	
UNIT 5	MARKS 14
Application of Energy method and matrix method in stability problems.	

TEXT BOOKS:

1. Highway Material Testing by Khanna S.K., Justo C.E.G, Nem Chand & Bros.
2. Road Material Testing and Pavement Evaluation by Dr. S. Krishna Rao and Dr. P. Sravana, Research India Publication, 2019
3. Highway Material Testing and Quality Control by Rao G. Venkatappa, Rao K. Ramachandra, Pahari Kausik, Rao and D.V. Bhavanna. I.K International Publisher.

IS CODES:

1. IS 1201 -1220 (1978) "Methods for Testing Tars and Bituminous Materials"
2. IRC SP 53 -2010 "Guidelines on use of Modified Bitumen"
3. MS-2 Manual for Marshalls Mix design 2002

Design of Tall Structures

Course code	Title of the paper	Periods Per week				Distribution of Marks								Grand Total (j=e+i)	Duration of Exam	
		L	T	P	C	Theory		MST (c)	TW(d)	Total (e = a+c+d)	Practical		L W (h)			Total (i= f+h)
						Max (a)	Min (b)				Max (f)	Min (g)				
MTCES - 0302(B)	Design of Tall Structures	3	1	-	4	70	28	20	10	100	-	-	-	-	100	3 Hrs

UNIT 1

MARKS 14

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

UNIT 2

MARKS 14

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

UNIT 3

MARKS 14

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

UNIT 4

MARKS 14

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

UNIT 5

MARKS 14

Modeling of tall structures, case studies.

TEXT BOOKS:

- 1 Bowles, Foundation: Analysis and Design, McGraw Hill Book CO. Inc.
- 2 Peck , R.B. , W.E. Hanson and T.H. Thornburn, Foundation Engineering, Wiley , NewYork

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 , New York
- 4 Lewis, E.E., Introduction to Reliability Engineering , John Wiley New Y



Seminar

you should actively participate by contributing to discussions, preparing beforehand by completing readings, and engaging with complex ideas. Be ready to present your work, ask clarifying questions, and build on the points made by others to gain a deeper understanding of the subject.



Dissertation Part- I

In the dissertation part-I you have to select a topic, write a research synopsis including a problem statement and objectives, and present it to a panel. The synopsis will introduce the research area, discuss the literature review, and outline the problem you plan to solve, along with the methodology you will use. This part concludes with a presentation, where your supervisor and a panel of faculty will evaluate your synopsis, which will be graded.

Dissertation Part- II

The objectives of the course 'dissertation part-II' are

- To provide students with a comprehensive experience for applying the knowledge gained so far by studying various courses.
- To develop an inquiring aptitude and build confidence among students by working on solutions of small industrial problems.
- To give students an opportunity to do some thing creative and to assimilate real life work situation in institution.
- To adapt students for latest developments and to handle independently new situations.
- To develop good expressions power and presentation abilities in students.
- The focus of the Major Project is on preparing a working system or some design or understanding of a complex system using system analysis tools and submit it the same in the form of a write-up i.e. detail project report. The student should select some real life problems for their project and maintain proper documentation of different stages of project such as need analysis, market analysis, concept evaluation, requirement specification, objectives, work plan, analysis, design, implementation and test plan. Each student is required to prepare a project report and present the same at the final examination with a demonstration of the working system (if any).
- The faculty and student should work according to following schedule:
 - Each student undertakes substantial and individual project in an approved area of the
- subject and supervised by a member of staff.
 - The student must submit outline and action plan for the project execution (time schedule)
- and the same be approved by the concerned faculty.
 - At all the steps of the project, students must submit a written report of the same.