SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

Grading System

Department of Civil Engineering

Structural Engineering Scheme of Examination as Per AICTE Model Curriculum w.e.f. July 2020

For students admitted in July 2020 Batch onward

Semester-I/Year: I

S. No.	Subject Code	Subject Name	Category	Maximum Marks Allotted					Hours/ Week			Credit	Total Marks
				Theory			Practical						
				End Sem.	Mid Sem	Quiz, Assignment	End Sem	Lab work	L	T	P		
1	MTSTE11	Advanced Structural Analysis	Core	100	30	30			3	1		4	160
2	MTSTE12	Advanced Solid Mechanics	Core	100	30	30			3	1		4	160
3	MTSTE13	Research Methodology and IPR	MLC	100	30	30			3	1		4	160
4	MTSTE14	Elective I	Program Elective	100	30	30			3	1		4	160
5	MTSTE15	Elective II	Program Elective	100	30	30			3	1		4	160
6	MTSTE16	Audit Course -1	Audit						2				0
7	MTSTE17	Concrete Technology Lab.	Core Lab				50	50			4	2	100
8	MTSTE18	Structural Design Lab-I	Core Lab				50	50			4	2	100
TOTAL				**500**	**150**	150	100	100	17	5	8	24	1000

L: Lecture **T:Tutorial** **P:Practical**

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For students admitted in July 2020 Batch onward

Semester-II/Year: I

S. No.	Subject Code	Subject Name	Category	Maximum Marks Allotted					Hours/ Week			Credit	Total Marks
				Theory			Practical						
				End Sem.	Mid Sem	Quiz, Assignment	End Sem	Lab work	L	T	P		
1	MTSTE21	Finite Element Method	Core	100	**30**	**30**			**3**	**1**		**4**	**160**
2	MTSTE22	Structural Dynamics	Core	100	**30**	**30**			**3**	**1**		**4**	**160**
3	MTSTE23	Mini project	Core				100	60	**3**	**1**		**4**	**160**
4	MTSTE24	Elective III	Program Elective	100	**30**	**30**			**3**	**1**		**4**	**160**
5	MTSTE25	Elective IV	Program Elective	100	**30**	**30**			**3**	**1**		**4**	**160**
6	MTSTE26	Audit Course -II	Audit						2				**0**
7	MTSTE27	Model Testing Lab	Core Lab				**50**	**50**			**4**	**2**	**100**
8	MTSTE28	Numerical Analysis Lab	Core Lab				**50**	50			**4**	**2**	**100**
TOTAL				**400**	**120**	**120**	**200**	**160**	**17**	**5**	**8**	**24**	**1000**

L: Lecture **T:Tutorial** **P:Practical**

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For students admitted in July 2020 Batch onward

Semester-III /Year: II

S. No.	Subject Code	Subject Name	Maximum Marks Allotted					Hours/ Week			Credit	Total Marks
			Theory			Practical						
			End Sem.	Mid Sem	Quiz, Assignment	End Sem	Lab work	L	T	P		
1	**MTSTE31**	Elective V	100	30	30			4	1		**5**	**160**
2	**MTSTE32**	Open Elective 1	100	30	30			4	1		**5**	**160**
3	**MTSTE32**	**Dissertation (Phase-1)**				**400**	**280**			**20**	**10**	**680**
TOTAL			200	60	60	**400**	**280**	8	2	**20**	**20**	**1000**

L: Lecture **T:Tutorial** **P:Practical**

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Grading System

Department of Civil Engineering

Structural Engineering Scheme of Examination as Per AICTE Model Curriculum w.e.f. July 2020

For students admitted in July 2020 Batch onward

Semester-IV /Year: II

S. No.	Subject Code	Subject Name	Maximum Marks Allotted					Hours/ Week			Credit	Total Marks
			Theory			Practical						
			End Sem.	Mid Sem	Quiz, Assignment	End Sem	Lab work	L	T	P		
1	MTSTE41	DISSERTATION (Phase-II)				500	500			30	15	1000
TOTAL						500	500	0	0	30	15	1000

L: Lecture **T:Tutorial** **P:Practical**

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

Semester I/ Year I

MTSTE11-Advanced Structural Analysis

Learning Hrs: 60

Objective:

- To provide the concepts and principles of Advanced Structural Analysis.
- To give an ability to Analyze the skeleton structures using stiffness analysis code.
- To give an ability to apply this knowledge on engineering applications and design problems.

Course Content

- Influence Coefficients: Physical Significance, Effects of Settlements, Temperature Change and Lack of Fit, Member Approach and Structure Approach.

(Hours:12)

- Stiffness Method applied to Large Frames: Local Coordinates and Global Coordinates.Stiffness Matrix Assembly of Structures: Stiffness Matrix in GlobalCoordinates, Boundary Conditions,Solution of Stiffness Matrix Equations, Calculation of Reactions and Member Forces.

(Hours:12)

- Applications to Simple Problems: Beams, Plane Trusses, Plane Rigid Jointed Frames and Grids by Structure Approach and Member Approach.

(Hours:12)

- Boundary Value Problems (BVP): Approximate Solution of Boundary Value Problems, Modified GalerkinMethod for One-Dimensional BVP, Matrix Formulation ofthe Modified GalerkinMethod.

(Hours:12)

- Linear Element: Shape Functions, Solution for Poisson's Equation, General OneDimensional Equilibrium Problem.

(Hours:12)

Outcome:

- This course imparts ability to students to apply this knowledge on engineering applications and design problems.

References:

- Matrix Analysis of Framed Structures, Weaver and Gere

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Semester I/ Year I

MTSTE12-Advanced Solid Mechanics

Learning Hrs: 60

Objective:

- To provide the concepts and principles of **Advanced Solid Mechanics**.
- To give an ability to Solve simple problems of elasticity and plasticity understanding the basic concepts.Apply numerical methods to solve continuum problems..
- To give an ability to apply this knowledge on engineering applications and design problems.

Course Content

- Introduction to Elasticity:Displacement, Strain and Stress Fields, Constitutive Relations, Cartesian Tensors and Equations of Elasticity.

(Hours:12)

- Strain and Stress Field:Elementary Concept of Strain, Stain at a Point, Principal Strains and Principal Axes, Compatibility Conditions, Stress at a Point, Stress Components on an Arbitrary Plane, Differential Equations of Equilibrium, Hydrostatic andDeviatoric Components.

(Hours:12)

- Equations of Elasticity: Equations of Equilibrium, Stress- Strain relations, Strain Displacement andCompatibility Relations, Boundary Value Problems, Co-axialityof the Principal Directions.

(Hours:12)

- Two-Dimensional Problems of Elasticity: Plane Stress and Plane Strain Problems, Airy's stress Function, Two-Dimensional Problems in Polar Coordinates.

(Hours:12)

- Torsion of Prismatic Bars: Saint Venant's Method, PrandtPs Membrane Analogy, Torsion of Rectangular Bar, Torsion of Thin Tubes.Plastic Deformation: Strain Hardening, Idealized Stress- Strain curve, Yield Criteria, von Mises Yield Criterion, Tresca Yield Criterion, Plastic Stress-Strain Relations, Principle of Normality and Plastic Potential, Isotropic Hardening.

(Hours:12)

Outcome:

- This course imparts ability to students to apply this knowledge on engineering applications and design problems.

References:

- Theory of Elasticity, Timoshenko S. andGoodierJ. N, McGrawHill, 1961.

Semester I/ Year I

MTSTE13-Research Methodology and IPR

Learning Hrs: 60

Objective:

- To provide the concepts and principles of **Research Methodology and IPR**.
- To give an ability to understand research problem and its formulation. Analyze research related information.Follow research ethics
- To give an ability to apply this knowledge on engineering applications and design problems.

Course Content

- Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem.Approaches of investigation of solutions for research problem, data collection, analysis,interpretation, Necessary instrumentations

(Hours:12)

- Effective literature studies approaches, analysisPlagiarism, Research ethics,Effective technical writing, how to write report, PaperDeveloping a Research Proposal, Format of research proposal, a presentation and assessment by a review committee

(Hours:12)

- Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.

(Hours:12)

- Patent Rights: Scope of Patent Rights. Licensing and transfer of technology.Patent information and databases.Geographical Indications.

(Hours:12)

- New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc.Traditional knowledge Case Studies, IPR and IITs.

(Hours:12)

Outcome:

- This course imparts ability to students to apply this knowledge on engineering applications and design problems.

References:

- Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science & engineering students'"
- Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"

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Semester I/ Year I

MTSTE14 Elective I

MTSTE14 (A)-Theory of Thin Plates and Shells

Learning Hrs: 60

Objective:

- To provide the concepts and principles of analytical methods for the solution of thin plates and shells.
- To give an ability to apply the numerical techniques and tools for the complex problems in thin plates
- To give an ability to apply this knowledge on engineering applications and design problems.

Course Content

- Introduction: Space Curves, Surfaces, Shell Co-ordinates, Strain Displacement Relations, Assumptions in Shell Theory, Displacement Field Approximations, Stress Resultants, Equation ofEquilibrium using Principle ofVirtual Work, Boundary Conditions.

(Hours:12)

- Static Analysis of Plates: Governing Equation for a Rectangular Plate, NavierSolution for Simply- Supported Rectangular Plate under Various Loadings, Levy solution for Rectangular Plate with other Boundary Conditions.

(Hours:12)

- Circular Plates: Analysis under Axi- Symmetric Loading, Governing Differential Equation in Polar Co-ordinates. Approximate Methods of Analysis- Rayleigh-Ritz approach for Simple Cases in Rectangular Plates.

(Hours:12)

- Static Analysis of Shells: Membrane Theory ofShells- Cylindrical, Conical andSpherical Shells,

(Hours:12)

- Shells ofRevolution: with BendingResistance- Cylindrical andConical Shells, Application to Pipes and Pressure Vessels.Thermal Stresses in Plate/ Shell

(Hours:12)

Outcome:

- This course imparts ability to students to apply this knowledge on engineering applications and design problems.

References:

- Theory of Plates and Shells, Timoshenko S. and KriegerW., McGraw Hill.

Semester I/ Year I

MTSTE14 Elective I

MTSTE14 (B)- Theory and Applications of Cement Composites

Learning Hrs: 60

Objective:

- To provide the concepts and principles to formulate constitutive behaviour of composite materials – Ferrocement, SIFCON and Fibre
- Reinforced Concrete - by understanding their strain- stress behaviour.To give an ability to analyze and design structural elements made of cement composites.
- To give an ability to apply this knowledge on engineering applications and design problems.

Course Content

- Introduction: Classification and Characteristics of Composite Materials- Basic Terminology, Advantages. Stress-Strain Relations- Orthotropic and Anisotropic Materials, Engineering Constants for Orthotropic Materials, Restrictions on Elastic Constants, Plane Stress Problem, Biaxial Strength, Theories for an Orthotropic Lamina.

(Hours:12)

- Mechanical Behaviour: Mechanics of Materials Approach to Stiffness- Determination of Relations between Elastic Constants, Elasticity Approach to Stiffness- Bounding Techniques of Elasticity, Exact Solutions - Elasticity Solutions with Continuity, Halpin, Tsai Equations, Comparison of approaches to Stiffness.

(Hours:12)

- Cement Composites: Types of Cement Composites, Terminology, Constituent Materials andtheir Properties, Construction Techniques for Fibre Reinforced Concrete - Ferrocement, SIFCON, Polymer Concretes, Preparation of Reinforcement, Casting and Curing. Analysis and Design of Cement Composite Structural Elements - Ferrocement, SIFCON andFibre Reinforced Concrete.

(Hours:12)

- Mechanical Properties of Cement Composites:BehaviorofFerrocement, Fiber Reinforced Concrete in Tension, Compression, Flexure, Shear, Fatigue and Impact, Durability and Corrosion.

(Hours:12)

- Application of Cement Composites: FRC andFerrocement- Housing, Water Storage, Boats and Miscellaneous Structures. Composite Materials- Orthotropic and Anisotropic behaviour, Constitutive relationship, Elastic Constants.

(Hours:12)

Outcome:

- This course imparts ability to students to apply this knowledge on engineering

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Semester I/ Year I

MTSTE14 Elective I

MTSTE14 (C) - Theory of Structural Stability

Learning Hrs: 60

Objective:

- To provide the concepts and principles of Structural Stability
- Develop understanding to Determine stability of columns ,frames, beams and plates
- Develop skill to use stability criteria and concepts for analysing discrete and continuous systems,
- To give an ability to apply this knowledge on engineering applications and design problems.

Course Content

- Criteria for Design of Structures: Stability, Strength, and Stiffness, Classical Concept of Stability of Discrete and Continuous Systems, Linear and nonlinear behaviour.

(Hours:12)

- Stability of Columns:Axial and Flexural Buckling, Lateral Bracing ofColumns, Combined Axial, Flexural and Torsion Buckling.

(Hours:12)

- Stability of Frames: Member Buckling versus Global Buckling, Slenderness Ratio ofFrame Members.

(Hours:12)

- Stability of Beams: lateraltorsionbuckling.Stability of Plates: axialflexural buckling, shearflexural buckling, buckling under combined loads.

(Hours:12)

- Introduction to Inelastic Buckling and Dynamic Stability.

(Hours:12)

Outcome:

- This course imparts ability to students to apply this knowledge on engineering applications and design problems

Reference Books:

- Theory of elastic stability, Timoshenko and Gere, Tata McGraw Hill, 1981
- Principles of Structural Stability Theory, Alexander Chajes, Prentice Hall, New Jersey.
- Structural Stability of columns and plates, Iyengar, N. G. R., Eastern west press Pvt. Ltd.
- Strength of Metal Structures,Bleich F. Bucking, Tata McGraw Hill, New York.

Semester I/ Year I

MTSTE15 Elective II

MTSTE15(A) Analytical and Numerical Methods for Structural Engineering

Learning Hrs: 60

Objective:

- To provide the concepts and principles of Numerical Methods for Structural Engineering
- Develop understanding to solve ordinary and partial differential equations in structural mechanics using numerical methods.
- Develop skill to write a program to solve a mathematical problem.
- To give an ability to apply this knowledge on engineering applications and design problems.

Course Content

- Fundamentals ofNumerical Methods: Error Analysis, Polynomial Approximations and Interpolations, Curve Fitting; Interpolation and extrapolation.

(Hours:12)

- Solution ofNonlinear Algebraic and Transcendental Equations

(Hours:12)

- Elements of Matrix Algebra: Solution ofSystems of Linear Equations, Eigen Value Problems.

(Hours:12)

- Numerical Differentiation & Integration: Solution ofOrdinary and Partial Differential Equations.

(Hours:12)

- Finite Difference scheme: Implicit & Explicit scheme.Computer Algorithms: Numerical Solutions for Different Structural Problems, Fuzzy Logic and Neural Network.

(Hours:12)

Outcome:

- This course imparts ability to students to apply this knowledge on engineering applications and design problems

Reference Books:

- An Introduction to Numerical Analysis, AtkinsonK.E., J. Wiley and Sons, 1989.
- Theory and Problems ofNumerical Analysis, Scheid F, McGraw Hill Book Company, (Shaum Series), 1988.
- Introductory Methods ofNumerical Analysis, Sastry S. S, Prentice Hall of India, 1998.

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Semester I/ Year I

MTSTE15 Elective II

MTSTE15(B) Structural Health Monitoring

Learning Hrs: 60

Objective:

- To provide the concepts and principles **of Structural Health Monitoring**
- Develop understanding to diagnosis the distress in the structure understanding the causes and factors.
- **Develop skill to** suggest repairs and rehabilitation measures of the structure.
- To give an ability to apply this knowledge on engineering applications and design problems.

Course Content

- Structural Health: Factors affecting Health of Structures, Causes of Distress, Regular Maintenance.

(Hours:12)

- Structural Health Monitoring: Concepts,Various Measures, Structural Safety in Alteration.Structural Audit:AssessmentofHealthofStructure, Collapse and investigation, Investigation Management, SHM Procedures.

(Hours:12)

- Static Field Testing: Types ofStatic Tests, Simulation and Loading Methods, sensor systems and hardware requirements, Static Response Measurement.

(Hours:12)

- Dynamic Field Testing:TypesofDynamic Field Test, Stress History Data, Dynamic Response Methods, Hardware for Remote Data Acquisition Systems, Remote Structural Health Monitoring.

(Hours:12)

- Introduction to Repairs and Rehabilitations ofStructures:Case Studies (Site Visits), piezoelectric materials and other smart materials, electro-mechanical impedance (EMI) technique, adaptations of EMI technique.

(Hours:12)

Outcome:

- This course imparts ability to students to apply this knowledge on engineering applications and design problems

Reference Books:

- Structural Health Monitoring, Daniel Balageas, ClausDPeterFritzen, Alfredo Giiemes, John Wiley and Sons, 2006.
- Health Monitoring of Structural Materials and Components □ Methods with

Semester I/ Year I

MTSTE15 Elective II

MTSTE15(C) Structural Optimization

Learning Hrs: 60

Objective:

- To provide the concepts and principles of Optimization
- Develop understanding to apply optimization techniques to structural steel and concrete members.
- Develop skill to design using frequency constraint.
- To give an ability to apply this knowledge on engineering applications and design problems.

Course Content

- Introduction:Simultaneous Failure Mode andDesign, ClassicalExternalProblems.

(Hours:12)

- Calculus ofVariation: Vibrational Principles withConstraints,

(Hours:12)

- Linear Programming, Integer Programming, Nonlinear Programming, Dynamic Programming,

(Hours:12)

- Geometric Programmingand Stochastic Programming.

(Hours:12)

- Applications Structural Steel andConcrete Members, Trusses andFrames.Design frequency Constraint, Design ofLayouts.

(Hours:12)

Outcome:

- This course imparts ability to students to apply this knowledge on engineering applications and design problems

Reference Books:

- Elements of Structural Optimization, Haftka, Raphael T., Giirdal, Zafer, Springer.
- Variational methods for Structural optimization, Cherkaev Andrej, Springer

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Semester I/ Year I

MTSTE16 Audit Course I

MTSTE16-ENGLISH FOR RESEARCH PAPER WRITING

Learning Hrs: 30

Objective:

- To provide the concepts and principles of Structural Health Monitoring
- Develop understanding to diagnosis the distress in the structure understanding the causes and factors.
- Develop skill to suggest repairs and rehabilitation measures of the structure.
- To give an ability to apply this knowledge on engineering applications and design problems.

Course Content

- Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness

(Hours:12)

- Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticizing, Paraphrasing and Plagiarism, Sections of a Paper,

(Hours:12)

- Abstracts. IntroductionReview of the Literature, Methods, Results, Discussion, Conclusions, The Final Check.

(Hours:12)

- Key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature,

(Hours:12)

- Skills are needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, skills are needed when writing the Conclusionsuseful phrases, how to ensure paper is as good as it could possibly be the first- time submission

(Hours:12)

Outcome:

- This course imparts ability to students to apply this knowledge on engineering applications and design problems

Reference Books:

- Goldbort R (2006) Writing for Science, Yale University Press (available on Google

Semester I/ Year I

MTSTE17-Concrete Technology Lab.

Learning Hrs:

Objective:

- To provide the practical concepts and Understanding toward Concrete Technology
- To give an ability to apply this knowledge on engineering applications and design problems

List of Experiments/Assignments:

- Study of stress-strain curve ofhigh strength concrete, Correlation between cube strength, cylinder strength, split tensile strength and modulus of rupture.
- Effect of cyclic loading on steel.
- Non-Destructive testing ofexisting concrete members.
- Behavior of Beams under flexure, Shear and Torsion.

Outcome:

- This course imparts ability to students to apply this knowledge on engineering applications.

Reference Books:

- Properties of Concrete, Neville A. M., 5th Edition, Prentice Hall, 2012.
- Concrete Technology, Shetty M. S., S. Chand and Co., 2006.

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Semester I/ Year I

MTSTE18- Structural Design Lab

Learning Hrs:

Objective:

- To provide the practical concepts and Understanding toward Structural Design
- To give an ability to apply this knowledge on engineering applications and design problems

Course Content

- Design and detailed drawing of complete Steel and RCC G+ 3,G+5,G+10 structures by individual student using latest relevantIS codes.

Outcome:

- This course imparts ability to students to apply this knowledge on engineering applications.

Semester II/Year I

MTSTE21-Finite Element Method

Learning Hrs: 60

Objective:

- To provide the concepts and principles of Finite Element Method to be used in Structural Engineering.
- Develop understanding use Finite Element Method for structural analysis and able to Execute the Finite Element Program/ Software.
- Develop skill to solve continuum problems using finite element analysis.
- To give an ability to apply this knowledge on engineering applications and design problems.

Course Content

- Introduction: History andApplications. Spring andBar Elements, Minimum Potential Energy Principle, Direct Stiffness Method, Nodal Equilibrium equations, Assembly ofGlobal Stiffness Matrix, Element Strain andStress.

(Hours:12)

- Beam Elements: Flexure Element, Element Stiffness Matrix, Element Load Vector.Method of Weighted Residuals: GalerkinFinite Element Method, Application to Structural Elements, Interpolation Functions, Compatibility andCompleteness Requirements, Polynomial Forms, Applications.

(Hours:12)

- Types:Triangular Elements, Rectangular Elements, Three-Dimensional Elements, Isoparametric Formulation, Axi-Symmetric Elements, Numerical Integration, Gaussian Quadrature.

(Hours:12)

- Application to Solid Mechanics: Plane Stress, CST Element, Plane Strain Rectangular Element, Isoperimetric Formulation of the Plane Quadrilateral Element, Axi-Symmetric Stress Analysis, Strain and Stress Computations.

(Hours:12)

- Computer ImplementationofFEM procedure, Pre-Processing, Solution, Post-Processing, Use of Commercial FEA Software.

(Hours:12)

Outcome:

- This course imparts ability to students to apply this knowledge on engineering applications and design problems

Reference Books:

- Finite Element Analysis, Seshu P., Prentice-Hall of India,2005.
- Concepts and Applications of Finite Element Analysis, Cook R. D., Wiley I., New

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Semester II/Year I

MTSTE22-Structural Dynamics

Learning Hrs: 60

Objective:

- To provide the concepts and principles of Structural Dynamics.
- Analyze and study dynamics response of single degree freedom system using fundamental Theory and Multi degree freedom system using fundamental theory.
- Develop skill to use the available software for dynamic analysis.
- To give an ability to apply this knowledge on engineering applications and design problems.

Course Content

- Introduction: Objectives, Importance ofVibration Analysis, Nature ofExcitingForces,Mathematical Modeling ofDynamic Systems.

(Hours:12)

- Single Degree of Freedom System:FreeandForced Vibration with and without Damping, Response to Harmonic Loading, Response to General Dynamic Loading using Duhamel's Integral, Fourier Analysis for Periodic Loading, State Space Solution for Response.

(Hours:12)

- Numerical Solution to Response using Newmark □ Method and Wilson □ Method, Numerical Solution for State Space Response using Direct Integration.

(Hours:12)

- Multiple Degree of Freedom System (Lumped parameter): Two Degree of Freedom System, Multiple Degree of Freedom System, Inverse Iteration Method for Determination ofNatural Frequencies andMode Shapes, Dynamic Response by Modal Superposition Method, Direct Integration ofEquationofMotion.

(Hours:12)

- Multiple Degree of Freedom System (Distributed Mass and Load): Single Span Beams, Free andForced Vibration, Generalized Single Degree of Freedom System.Special Topics in Structural Dynamics(Concepts only): Dynamic Effects ofWind Loading, Moving Loads, Vibrations caused by Traffic, Blasting andPile Driving, Foundations for Industrial Machinery, Base Isolation

(Hours:12)

Outcome:

- This course imparts ability to students to apply this knowledge on engineering applications and design problems

Reference Books:

- Dynamics of Structures, Clough R. W. and Penzien J., McGraw Hill.

Semester II/Year I

MTSTE23- Mini Project

Learning Hrs:

Objective:

- To impart understanding and develop skill toward practical project development

Course Content

Mini Project will have mid semester presentation and end semester presentation. Mid semester presentation will include identification of the problem based on the literature review on the topic referring to latest literature available.

End semester presentation should be done along with the report on identification of topic for the work and the methodology adopted involving scientific research, collection and analysis of data, determining solutions highlighting individuals' contribution.

Continuous assessment ofMini Project at Mid Sem and End Sem will be monitored by the departmental committee.

Outcome:

- This course imparts skill to students to apply this knowledge on engineering applications.

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Semester II/Year I

MTSTE24 Elective III

MTSTE24 (A) - Advanced Steel Design

Learning Hrs: 60

Objective:

- To provide the concepts and principles of Design steel structures/ components by different design processes.
- To impart knowledge to analyze and design beams and columns for stability and strength, and drift.
- To give an ability to apply this knowledge on engineering applications and design problems.

Course Content

- Properties ofSteel:Mechanical Properties, Hysteresis, Ductility.HotRolled Sections: compactness and non-compactness, slenderness, residual stresses.

(Hours:12)

- Design ofSteel Structures: Inelastic Bending Curvature, Plastic Moments, Design Criteria Stability, Strength, Drift.Stability ofBeams:Local Buckling ofCompression Flange &Web, Lateral Torsional Buckling.

(Hours:12)

- Stability of Columns: Slenderness Ratio, Local Buckling ofFlangesandWeb, Bracing ofColumn about Weak Axis.Method ofDesigns: Allowable Stress Design, Plastic Design, Load andResistance Factor Design;

(Hours:12)

- Strength Criteria:Beams - Flexure, Shear, Torsion, Columns - Moment Magnification Factor, Effective Length,PM Interaction, Biaxial Bending, Joint Panel Zones.Drift Criteria: P Effect, Deformation Based Design;

(Hours:12)

- Connections:Welded, Bolted, Location Beam Column, Column Foundation, Splices.

(Hours:12)

Outcome:

- This course imparts ability to students to apply this knowledge on engineering applications and design problems

Reference Books:

- Design of Steel Structures - Vol. II, Ramchandra. Standard Book House, Delhi.
- Design of Steel Structures - Arya A. S., Ajmani J. L., Nemchand and Bros., Roorkee.
- The Steel Skeleton- Vol. II, Plastic Behaviour and Design - Baker J. F., Home M. R., Heyman J., ELBS.
- Plastic Methods of Structural Analysis, Neal B. G., Chapman and Hall London.

Semester II/Year I

MTSTE24 Elective III

MTSTE24 (B) - Design of Formwork

Learning Hrs: 60

Objective:

- To provide the concepts and principles of design the form work for Beams, Slabs, columns, Walls and Foundations
- To understand the working of flying formwork..
- To give an ability to apply this knowledge on engineering applications and design problems.

Course Content

- Introduction:RequirementsandSelection of Formwork.

(Hours:12)

- Formwork Materials- Timber, Plywood, Steel, Aluminums, Plastic, and Accessories. Horizontal and Vertical Formwork Supports.

(Hours:12)

- Formwork Design: Concepts, Formwork Systems and Design for Foundations, Walls, Columns, Slab andBeams.

(Hours:12)

- Formwork Design for Special Structures: Shells, Domes, Folded Plates, OverheadWaterTanks, Natural Draft Cooling Tower, Bridges.

(Hours:12)

- Flying Formwork: Table Form, Tunnel Form, Slip Form, Formwork for Precast Concrete, Formwork Management Issues -Pre- andPost-Award.Formwork Failures:Causes and Case studies in Formwork Failure, Formwork Issues in Multi-Story Building Construction.

(Hours:12)

Outcome:

- This course imparts ability to students to apply this knowledge on engineering applications and design problems

Reference Books:

- Formwork for Concrete Structures, Peurify, McGraw Hill India, 2015.
- Formwork for Concrete Structures, Kumar NeerajJha, Tata McGraw Hill Education, 2012.
- IS 14687: 1999, Falseworkfor Concrete Structures - Guidelines, BIS.

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Semester II/Year I

MTSTE24 Elective III

MTSTE24 (C) Design of High Rise Structures

Learning Hrs: 60

Objective:

- To provide the concepts and principles of design High rise building
- To analyse, design and detail Transmission/ TV tower, Mast and Trestles with different loading Conditions, RC and Steel Chimney..
- To give an ability to apply this knowledge on engineering applications and design problems.

Course Content

- Design of transmission/ TV tower, Mast and trestles: Configuration, bracing system, analysis and design for vertical transverse and longitudinal loads.

(Hours:12)

- Analysis and Design of RC and Steel Chimney, Foundation design for varied soil strata.

(Hours:12)

- Tall Buildings: Structural Concept, Configurations, various systems, Wind and Seismic loads, Dynamic approach,

(Hours:12)

- structural design considerations and IS code provisions. Firefighting design provisions.

(Hours:12)

- Applicationofsoftware in analysis and design.

(Hours:12)

Outcome:

- This course imparts ability to students to apply this knowledge on engineering applications and design problems

Reference Books:

- Structural Design of Multi-storeyed Buildings, Varyani U. H, 2nd Ed., SouthAsian Publishers, New Delhi, 2002.
- Structural Analysis and Design of Tall Buildings, Taranath B. S., McGraw Hill, 1988.
- Illustrated Design of Reinforced ConcreteBuildings(GF+3storeyed), Shah V. L. &Karve S. R., Structures Publications, Pune, 2013.
- Design of Multi Storeyed Buildings, Vol. 1 & 2, CPWD Publications, 1976.
- Tall Building Structures, Smith Byran S. and Coull Alex, Wiley India. 1991.
- High Rise Building Structures, Wolfgang Schueller, Wiley., 1971.

Semester II/Year I

MTSTE25 Elective IV

MTSTE25 (A) - Design of Advanced Concrete Structures

Learning Hrs: 60

Objective:

- To provide the concepts and principles of design of Advanced Concrete Structures
- To Analyse the special structures by understanding their behavior.
- To give an ability to apply this knowledge on engineering applications and design problems.

Course Content

- Design philosophy, Modeling of Loads, Material Characteristics.

(Hours:12)

- Reinforced Concrete - P-M, M-phi Relationships, Strut-and- Tie Method,

(Hours:12)

- Reinforced Concrete - Design of Deep Beam and Corbel, Design of Shear Walls, Compression Field Theory for Shear Design, Design against Torsion; IS, ACI and Eurocode.

(Hours:12)

- Steel Structures ~ Stability Design, Torsional Buckling - Pure, Flexural and Lateral,

(Hours:12)

- Steel Structures ~ Design ofBeam-Columns, Fatigue Resistant Design, IS code, AISC Standards and Eurocode.

(Hours:12)

Outcome:

- This course imparts ability to students to apply this knowledge on engineering applications and design problems

References Books:

- Reinforced Concrete Design, Pillai S. U. and MenonD., Tata McGraw-Hill, 3rd Ed, 1999.
- Design of Steel Structures, SubramaniamN., Oxford University Press, 2008.
- Reinforced Concrete Structures, Park R.andPaulayT. , John Wiley & Sons, 1995.
- Advanced Reinforced Concrete Design, Varghese P. C, Prentice Hall of India, New Delhi.
- Unified Theory of Concrete Structures, Hsu T. T. C. and Mo Y. L., John Wiley & Sons, 2010.
- Steel Structures Design and Behavior Emphasizing Load and Resistance Factor

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Semester II/Year I

MTSTE25 Elective IV

MTSTE25 (B) - Advanced Design of Foundations

Learning Hrs: 60

Objective:

- To provide the concepts and principles **of Advanced Design of Foundations**
- To Decide the suitability of soil strata for different projects.
- To develop skill to Design foundations deciding the bearing capacityof soil.
- To give an ability to apply this knowledge on engineering applications and design problems.

Course Content

- Planning of Soil ExplorationforDifferent Projects, Methods of Subsurface Exploration, Methods of Borings along with Various Penetration Tests.

(Hours:12)

- Shallow Foundations, Requirements for Satisfactory Performance of Foundations, Methods of Estimating Bearing Capacity, Settlements of Footings and Rafts, Proportioning of Foundations using Field Test Data, Pressure - Settlement Characteristics from Constitutive Laws.

(Hours:12)

- Pile Foundations, Methods of Estimating Load Transfer of Piles, Settlements of Pile Foundations, Pile Group Capacity and Settlement, Laterally Loaded Piles, Pile Load Tests, Analytical Estimation of Load- Settlement Behaviorof Piles, Proportioning of Pile Foundations, Lateral and Uplift Capacity of Piles.

(Hours:12)

- Well Foundation, IS and IRC Code Provisions, Elastic Theory and Ultimate Resistance Methods.Tunnels and Arching in Soils, Pressure Computations around Tunnels.

(Hours:12)

- Open Cuts, Sheeting and Bracing Systems in Shallow and Deep Open Cuts in Different Soil Types.Coffer Dams, Various Types, Analysis and Design, Foundations under uplifting loads, Soil-structure

(Hours:12)

Outcome:

- This course imparts ability to students to apply this knowledge on engineering applications and design problems

Reference Books:

- Design of foundation system, N.P. Kurian, Narosa Publishing House
- Foundation Analysis and Design, J. E. Bowles, Tata McGraw Hill New York
- Analysis and Design of Substructures, Sawmi Saran, Oxford and IBH Publishing Co.

Semester II/Year I

MTSTE25 Elective IV

MTSTE25 (C) - Soil Structure Interaction

Learning Hrs: 60

Objective:

- To provide the concepts and principles of soil structure interaction concept and complexities involved.
- To evaluate soil structure interaction for different types of structure under various conditions of loading and subsoil characteristics.
- To give an ability to apply this knowledge on engineering applications and design problems.

Course Content

- Critical Study of Conventional Methods of Foundation Design, Nature and Complexities of Soil Structure Interaction.Application of Advanced Techniques of Analysis such as FEM and Finite Difference Method.

(Hours:12)

- Relaxation and Interaction for the Evaluation of Soil Structure Interaction for Different Types of Structure under various Conditions of Loading and Subsoil Characteristics.

(Hours:12)

- Preparation of Comprehensive Design Oriented Computer Programs for Specific Problems, Interaction Problems based on Theory of Sub Grade Reaction Such as Beams, Footings, Rafts Etc.

(Hours:12)

- Analysis of Different Types of Frame Structures Founded on Stratified Natural Deposits with Linear and Non-Linear Stress-Strain Characteristics.

(Hours:12)

- Determination of Pile Capacities and Negative Skin Friction, Action ofGroup of PilesConsidering Stress-Strain Characteristics of Real Soils, Anchor Piles and Determination of Pullout Resistance.

(Hours:12)

Outcome:

- This course imparts ability to students to apply this knowledge on engineering applications and design problems

Reference Books:

- Analytical and Computer Methods in Foundation, Bowels J.E.,McGraw Hill Book Co., New York, 1974.
- Numerical Methods in Geotechnical Engineering, Desai C.S. and Christian J.T., McGraw Hill Book Co., New York.

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Semester II/Year I

Audit Course -II

MTSTE26 – Constitution of India

Learning Hrs:

Course Content

Unit 1 - The Constitution – Introduction, The History of the Making of the Indian Constitution

- Preamble and the Basic Structure, and its interpretation
- Fundamental Rights and Duties and their interpretation
- State Policy Principles

Unit 2 - Union Government

- Structure of the Indian Union
- President - Role and Power
- Prime Minister and Council of Ministers
- Lok Sabha and Rajya Sabha

Unit 3 - State Government

- Governor - Role and Power
- Chief Minister and Council of Ministers
- State Secretariat

Unit 4 - Local Administration

- District Administration
- Municipal Corporation
- ZilaPanchayat

Unit 5 - Election Commission

- Role and Functioning
- Chief Election Commissioner
- State Election Commission

Reference Books:

- Ethics and Politics of the Indian Constitution, Rajeev Bhargava, Oxford University Press, New Delhi, 2008
- The Constitution of India, B.L. Fadia,, SahityaBhawan; New edition (2017)
- Introduction to the Constitution of India, DD Basu, Lexis Nexis; Twenty-Third 2018

Semester II/Year I

MTSTE27- Model Testing Lab

Learning Hrs:

Objective:

- To provide the practical concepts and Understanding toward use of Model Testing Lab in Structural Design
- To give an ability to apply this knowledge on engineering applications and design problems

Course Content

- Response of structures and its elements against extreme loading events.
- Model Testing: Static - testing ofplates, shells, and framesmodels.
- Model Testing: Free and forced vibrations, Evaluation of dynamic modulus.
- Beam vibrations, Vibration isolation, Shear wall building model, Time and frequency-domain study, Vibration Characteristics of RC Beams using Piezoelectric Sensors etc.

Outcome:

- This course imparts ability to students to apply this knowledge on engineering applications.

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Semester II/Year I

MTSTE28-Numerical Analysis Lab

Learning Hrs:

Objective:

- To provide the practical concepts and Understanding toward use of Numerical Analysis technique in Structural Design.
- To give an ability to apply this knowledge on engineering applications and design problems

Course Content

- Find the Roots of Non-Linear Equation Using Bisection Method.
- Find the Roots of Non-Linear Equation Using Newton's Method.
- Curve Fitting by Least Square Approximations.
- Solve the System of Linear Equations Using Gauss - Elimination Method.
- Solve the System of Linear Equations Using Gauss - Seidal Iteration Method.
- Solve the System of Linear Equations Using Gauss - Jorden Method.
- Integrate numerically using Trapezoidal Rule.
- Integrate numerically using Simpson's Rules.
- Numerical Solution of Ordinary Differential Equations By Euler's Method.
- Numerical Solution of Ordinary Differential Equations ByRunge- Kutta Method.

Outcome:

- This course imparts ability to students to apply this knowledge on engineering applications.

Semester III/Year II

MTSTE31Elective V

MTSTE31 (A) -Design of Pre-stressed Concrete Structures

Learning Hrs/Week :60

Objective:

- To impart understanding of type and use Pre-stressed Concrete Technology.
- To equip the students with a thorough understanding of the behavior and design of pre-stressed concrete beam, slab and column.
- To develop knowledge of execution of Civil engineering Structure using Pre-stressed Concrete Technology.

Course Content

- Introduction to prestressed concrete: types of prestressing, systems and devices, materials, losses in prestress. Analysis of PSC flexural members: basic concepts, stresses at transfer and service loads, ultimate strength in flexure, code provisions.

(Hours:12)

- Statically determinate PSC beams: design for ultimate and serviceability limit states for flexure, analysis and design for shear and torsion, code provisions.

(Hours:12)

- Transmission of pre-stressin pretensioned members; Anchorage zone stresses for posttensioned members.

(Hours:12)

- Statically indeterminate structures - Analysis and design - continuous beams and frames, choice of cable profile, linear transformation andconcordancy.

(Hours:12)

- Composite construction with precast PSC beams and cast in-situ RC slab - Analysis and design, creep and shrinkage effects. Partial prestressing - principles, analysis and design concepts, crack-width calculations.Analysis and designofprestressed concrete pipes, columns with moments.

(Hours:12)

Outcome:

- Able to understand type and use of Pre-stressed Concrete Technology.
- Develop skill of execution of Civil engineering Structure using Pre-stressed Concrete Technology.
- This course imparts skill to students to apply this knowledge on engineering applications.

References:

- Design of Prestressed Concrete Structures, Lin T.Y., Asia Publishing House, 1955.
- Prestressed Concrete, Krishnaraju N., Tata McGraw Hill, New Delhi, 1981.

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Semester III/Year II

MTSTE31 Elective V

MTSTE31 (B)- Fracture Mechanics of Concrete Structures

Learning Hrs/Week :60

Objective:

- To provide the concepts and principles of Fracture Mechanics of Concrete Structures
- To give an ability identify and classify cracking of concrete structures based on fracture mechanics.
- Able to apply fracture mechanics models to high strength concrete and FRC structures.
- To give an ability to apply this knowledge on engineering applications and design problems.

Course Content

- Introduction:Basic Fracture Mechanics, Crack in a Structure, Mechanisms ofFractureandCrack Growth, Cleavage Fracture, Ductile Fracture, Fatigue Cracking, Environment assisted Cracking, Service Failure Analysis.

(Hours:12)

- Stress at Crack Tip: Stress at Crack Tip, Linear Elastic Fracture Mechanics, Griffith's Criteria, Stress Intensity Factors,

(Hours:12)

- Crack Tip Plastic Zone, Erwin's Plastic Zone Correction, R curves, Compliance, J Integral,

(Hours:12)

- Concept of CTOD and CMD.

(Hours:12)

- Material Models: General Concepts, Crack Models, BandModels, Models based on Continuum Damage Mechanics, Applications to High Strength Concrete, FibreReinforced Concrete, Crack Concepts andNumerical Modeling.

(Hours:12)

Outcome:

- This course imparts ability to students to apply this knowledge on engineering applications and design problems.

Reference Books:

- Fracture Mechanics, Suri C. T. and Jin Z.H., 1st Edition, Elsevier Academic Press, 2012.
- Elementary Engineering Fracture Mechanics, BroekDavid, 3rd Rev. Ed. Springer, 1982.
- Fracture Mechanics of Concrete Structures - Theory and Applications, Elfgreen L., RILEM Report, Chapman and Hall, 1989.

Semester III/Year II

Elective V

MTSTE31 (C) Analysis of Laminated Composite Plates

Learning Hrs/Week :60

Objective:

- To provide the concepts and principles of Fracture Mechanics of Concrete Structures
- To give an ability identify and classify cracking of concrete structures based on fracture mechanics.
- Able to apply fracture mechanics models to high strength concrete and FRC structures.
- To give an ability to apply this knowledge on engineering applications and design problems.

Course Content

- Introduction: Displacement Field Approximations for Classical Laminated Plate Theory (CLPT) and First Order Shear Deformation Theory (FSDT), Analytical Solutions for Bending ofRectangular Laminated Plates using CLPT.

(Hours:12)

- Governing Equations. Navier Solutions of Cross-Ply and Angle-Ply Laminated Simply-Supported Plates, Determination of Stresses. Levy Solutions for Plates with Other Boundary Conditions, Analytical Solutions for Bending ofRectangular Laminated PlatesUsing FSDT.

(Hours:12)

- Finite Element Solutions for BendingofRectangular Laminated Plates using CLPT.

(Hours:12)

- Introduction to Finite Element Method, Rectangular Elements, Formation of Stiffness Matrix, Formation of Load Vector, Numerical Integration, Post Computation of Stresses.

(Hours:12)

- Finite Element Solutions for BendingofRectangular Laminated Plates using FSDT. Finite Element Model, C°Element Formulation, Post Computation of Stresses.Analysis ofRectangular Composite Plates using Analytical Methods.

(Hours:12)

Outcome:

- This course imparts ability to students to apply this knowledge on engineering applications and design problems

References:

• Mechanics of Laminated Composites Plates and Shells, Reddy J. N., CRC Press.

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Semester III/Year II

MTSTE32 OPEN ELECTIVE-I

MTSTE32 (A) -Business Analytics

Learning Hrs/Week :60

Objective:

- Understand the role of business analytics within an organization.
- Analyze data using statistical and data mining techniques and understand relationships between the
- underlying business processes of an organization. To provide the comprehensive understanding of business analytics methods.
- To give an ability to apply this knowledge on engineering applications and design problems.

Course Content

- Business analytics: Overview of Business analytics, Scope of Business analytics, BusinessAnalytics Process, Relationship of Business Analytics Process and organization, competitive advantages of Business Analytics.Statistical Tools: Statistical Notation, Descriptive Statistical methods, Review of probability distribution and data modelling, sampling and estimation methods overview

(Hours:12)

- Trendiness and Regression Analysis: Modelling Relationships and Trends in Data, simple Linear RegressionImportant Resources, Business Analytics Personnel, Data and models for Business analytics, problem solving, Visualizing and Exploring Data, Business Analytics Technology.

(Hours:12)

- Organization Structures of Business analytics, Team management, Management Issues, Designing Information Policy, Outsourcing, Ensuring Data Quality, Measuring contribution of Business analytics, Managing Changes.Descriptive Analytics, predictive analytics, predicative Modelling, Predictive analytics analysis, Data Mining, Data Mining Methodologies, Prescriptive analytics and its step in the business analytics Process, Prescriptive Modelling, nonlinear Optimization.

(Hours:12)

- Forecasting Techniques: Qualitative and Judgmental Forecasting, Statistical Forecasting Models, Forecasting Models for Stationary Time Series, Forecasting Models for Time Series with a Linear Trend, Forecasting Time Series with Seasonality, Regression Forecasting with Casual Variables, Selecting Appropriate Forecasting Models.

(Hours:12)

- Monte Carlo Simulation and Risk Analysis: Monte Carle Simulation Using Analytic Solver Platform, New-Product Development Model, Newsvendor Model, Overbooking Model, Cash budget Model.Decision Analysis: Formulating Decision Problems, Decision Strategies with the without Outcome Probabilities, Decision

- This course imparts ability to students to apply this knowledge on engineering applications and design problems

Reference:

- Business analytics Principles, Concepts, and Applications by Marc J. Schniederjans, Dara G. Schniederjans, Christopher M. Starkey, Pearson FT Press.
- Business Analytics by James Evans, persons Education.

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Semester III/Year II

MTSTE32 OPEN ELECTIVE-I

MTSTE32 (B) -Industrial Safety

Learning Hrs/Week :60

Objective:

- Understand the role and need of Industrial Safety in an organization.
- To give an ability to apply this knowledge on engineering applications and design problems.

Course Content

- Industrial safety: Accident, causes, types, results and control, mechanical and electrical hazards, types, causes and preventive steps/procedure, describe salient points of factories act 1948 for health and safety, wash rooms, drinking water layouts, light, cleanliness, fire, guarding, pressure vessels, etc, Safety color codes. Fire prevention and firefighting, equipment and methods.

(Hours:12)

- Fundamentals of maintenance engineering: Definition and aim of maintenance engineering, Primary and secondary functions and responsibility of maintenance department, Types of maintenance, Types and applications of tools used for maintenance, Maintenance cost & its relation with replacement economy, Service life of equipment.

(Hours:12)

- Wear and Corrosion and their prevention: Wear- types, causes, effects, wear reduction methods, lubricants-types and applications, Lubrication methods, general sketch, working and applications, i. Screw down grease cup, ii. Pressure grease gun, iii. Splash lubrication, iv. Gravity lubrication, v. Wick feed lubrication vi. Side feed lubrication, vii. Ring lubrication, Definition, principle and factors affecting the corrosion. Types of corrosion, corrosion prevention methods.

(Hours:12)

- Fault tracing: Fault tracing-concept and importance, decision treeconcept, need and applications, sequence of fault-finding activities, show as decision tree, draw decision tree for problems in machine tools, hydraulic, pneumatic,automotive, thermal and electrical equipment's like, I. Any one machine tool, ii. Pump iii. Air compressor, iv. Internal combustion engine, v. Boiler, vi. Electrical motors, Types of faults in machine tools and their general causes.

(Hours:12)

- Periodic and preventive maintenance: Periodic inspection-concept and need, degreasing, cleaning and repairing schemes, overhauling of mechanical components, overhauling of electrical motor, common troubles and remedies of electric motor, repair complexities and its use, definition, need, steps and advantages of preventive maintenance. Steps/procedure for periodic and preventive maintenance of: I. Machine

Reference:

- Maintenance Engineering Handbook, Higgins & Morrow, Da Information Services.
- Maintenance Engineering, H. P. Garg, S. Chand and Company.
- Pump-hydraulic Compressors, Audels, Mcgrew Hill Publication.
- Foundation Engineering Handbook, Winterkorn, Hans, Chapman & Hall London.

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Semester III/Year II

MTSTE32 OPEN ELECTIVE-I

MTSTE32 (C)- Cost Management of Engineering Projects

Learning Hrs/Week :60

Objective:

- To impart understanding of type and use of Cost Management in Engineering Projects.
- To equip the students with Cost Management techniques.
- To develop knowledge of execution of Cost Management techniques on Civil engineering Structure.

Course Content

- Introduction and Overview of the Strategic Cost Management Process

(Hours:12)

- Cost concepts in decision-making; Relevant cost, Differential cost, Incremental cost and Opportunity cost. Objectives of a Costing System; Inventory valuation; Creation of a Database for operational control; Provision of data for Decision-Making.

(Hours:12)

- Project: meaning, Different types, why to manage, cost overruns centres, various stages of project execution: conception to commissioning. Project execution as conglomeration of technical and nontechnical activities.Detailed Engineering activities. Pre project execution main clearances and documents Project team: Role of each member. Importance Project site: Data required with significance. Project contracts.Types and contents. Project execution Project cost control. Bar charts and Network diagram. Project commissioning: mechanical and process

(Hours:12)

- Cost Behavior and Profit Planning Marginal Costing; Distinction between Marginal Costing and Absorption Costing; Break-even Analysis, Cost-Volume-Profit Analysis. Various decision-making problems.Standard Costing and Variance Analysis. Pricing strategies: Pareto Analysis. Target costing, Life Cycle Costing. Costing of service sector.Just-in-time approach, Material Requirement Planning, Enterprise Resource Planning, Total Quality Management and Theory of constraints.Activity-Based Cost Management, Bench Marking; Balanced Score Card and Value-Chain Analysis.Budgetary Control; Flexible Budgets; Performance budgets; Zero-based budgets.Measurement of Divisional profitability pricing decisions including transfer pricing.

(Hours:12)

- Quantitative techniques for cost management, Linear Programming, PERT/CPM, Transportation problems, Assignment problems, Simulation, Learning Curve Theory.

(Hours:12)

- Robert S Kaplan Anthony A. Alkinson, Management & Cost Accounting
- Ashish K. Bhattacharya, Principles & Practices of Cost Accounting A. H. Wheeler publisher
- N.D. Vohra, Quantitative Techniques in Management, Tata McGraw Hill Book Co. Ltd.

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Semester III/Year II

Dissertation

MTSTE33- Dissertation I

Learning Hrs/Week :

Objective:

- To impart understanding and develop skill toward practical project development

Course Content

Dissertation-I will have mid semester presentation and end semester presentation. Mid semester presentation will include identification of the problem based on the literature review on the topic referring to latest literature available.

End semester presentation should be done along with the report on identification of topic for the work and the methodology adopted involving scientific research, collection and analysis of data, determining solutions and must bring out individuals'contribution.

Continuous assessment of Dissertation - I and Dissertation - II at Mid Sem and End Sem will be monitored by the departmental committee.

Outcome:

- This course imparts skill to students to apply this knowledge on engineering applications

Semester IV/Year II

Dissertation

MTSTE41- Dissertation II

Learning Hrs:

Objective:

- To impart understanding and develop skill toward practical project development

Course Content

Dissertation - II will be extension of the work on the topic identified in Dissertation - I.

Continuous assessment should be done of the work done by adopting the methodology decided involving numerical analysis/ conduct experiments, collection and analysis of data, etc.There will be pre-submission seminar at the end of academic term. After the approval the student has to submit the detail report and external examiner is called for the viva-voce to assess along with guide.

Outcome:

- This course imparts skill to students to apply this knowledge on engineering applications.