SONA COLLEGE OF TECHNOLOGY, SALEM-5

(An Autonomous Institution)

M.E-Civil Engineering

(Structural Engineering)

CURRICULUM and SYLLABI

[For students admitted in 2018-2019]

M.E / M.Tech Regulation 2015

Approved by BOS and Academic Council meetings

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for ME I Semester under Regulations 2015
Civil Engineering
Branch: Structural Engineering

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
Theory						
1	P15STR101	Applied Mathematics	3	2	0	4
2	P15STR102	Advanced Design of Concrete Structures	3	2	0	4
3	P15STR103	Structural Dynamics	3	2	0	4
4	P15STR104	Theory of Elasticity and Plasticity	3	2	0	4
5	P15STR105	Design of Sub Structures	3	2	0	4
6	P15STR106	Stability of Structures	3	2	0	4
Practical						
7	P15STR107	Structural Engineering Laboratory	0	0	4	2
					Total Credits	**26**

Approved by

Chairperson, Civil Engineering BOS
Dr.R.Malathy

Member Secretary, Academic Council
Dr.R.Shivakumar

Chairperson, Academic Council & Principal
Dr.S.R.R.Senthil Kumar

Copy to:-
HOD/Civil, First Semester ME STR Students and Staff, COE

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for ME II Semester under Regulations 2015
Civil Engineering
Branch: Structural Engineering

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
Theory						
1	P15STR201	Finite Element Methods of Structural Analysis	3	2	0	4
2	P15STR202	Advanced Design of Steel Structures	3	2	0	4
3	P15STR203	Experimental Techniques and Instrumentation	3	0	0	3
4	P15STR505	**Elective -** Design of Steel Concrete Composite Structures	3	0	0	3
5	P15STR504	**Elective -** Design of Bridges	3	0	0	3
	P15STR509	**Elective -** Maintenance and Rehabilitation of Structures				
6	P15STR604	**Open Elective -** Total Quality Management	3	0	0	3
Practical						
7	P15STR204	Structural Engineering Software Laboratory	0	0	4	2
					Total Credits	**22**

Approved by

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Sona College of Technology, Salem
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Courses of Study for ME III Semester under Regulations 2015
Civil Engineering
Branch: Structural Engineering

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
Theory						
1	P15STR501	**Elective** – Form work Engineering	3	0	0	3
2	P15STR512	**Elective** –Design of Tall Building	3	0	0	3
3	P15STR613	**Open Elective –** Human Resource Management	3	0	0	3
Practical						
4	P15STR301	Practical Training	0	0	0	1
5	P15STR302	Technical Seminar	0	0	4	2
6	P15STR303	Project Work Phase – I	0	0	12	6
					Total Credits	**18**

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Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for ME IV Semester under Regulations 2015
Civil Engineering
Branch: Structural Engineering

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
Practical						
1	P15STR401	Project Work Phase – II	0	0	24	12
					Total Credits	**12**

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Copy to:-
HOD/Civil, Fourth Semester ME STR Students and Staff, COE

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for ME I Semester under Regulations 2015
Civil Engineering
Branch: Structural Engineering

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
Theory						
1	P15STR101	Applied Mathematics	3	2	0	4
2	P15STR102	Advanced Design of Concrete Structures	3	2	0	4
3	P15STR103	Structural Dynamics	3	2	0	4
4	P15STR104	Theory of Elasticity and Plasticity	3	2	0	4
5	P15STR105	Design of Sub Structures	3	2	0	4
6	P15STR106	Stability of Structures	3	2	0	4
Practical						
7	P15STR107	Structural Engineering Laboratory	0	0	4	2
					Total Credits	**26**

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P15STR101 APPLIED MATHEMATICS L T P C 3 2 0 4 100

Course Outcomes

At the end of the course, the student will be able to

- solve boundary value problem of hyperbolic and parabolic equations using Laplace transform and Fourier transform.
- solve boundary value problem of Laplace and Poisson equations using transforms techniques.
- describe the concepts in calculus of variation, state different types of Euler's equation and solve variational problems using Ritz and Kantorovich methods.
- explain the various algorithm of characteristic equation using Feddeev-Leverrier method, eigen value and eigen vector using Power method and Rayleigh-Ritz method.
- explain the various numerical integration techniques and its applications using Gauss Hermite Quadrature and mapping function when the function in the analytic form is too complicated.

UNIT – I ONE DIMENSIONAL WAVE AND HEAT EQUATIONS 9 + 6

Laplace transform methods for one-dimensional wave equation – displacements in a long string – longitudinal vibration of an elastic bar – Fourier transform methods for one-dimensional heat conduction problems in infinite and semi-infinite rods.

UNIT – II ELLIPTIC EQUATION 9 + 6

Laplace equation – Properties of harmonic functions – Solution of Laplace's equation by means of Fourier transforms in a half plane, in an infinite strip and in a semi-infinite strip. Solution of poisson equation by Fourier transform method.

UNIT – III CALCULUS OF VARIATIONS 9 + 6

Concept of variation and its properties – Euler's equation – Functional dependant on first and higher order derivatives – Functionals dependent on functions of several independent variables – Variational problems with moving boundaries –direct methods- Ritz and Kantorovich methods.

UNIT – IV EIGEN VALUE PROBLEMS 9 + 6

Method of solution:Faddeev – Leverrier Method, Power Method with deflation – Approximate Methods: Rayleigh – Ritz Method.

UNIT – V NUMERICAL INTEGRATION 9 + 6

Gaussian Quadrature – One and Two Dimensions – Gauss Hermite Quadrature – Monte Carlo Method-multiple integration using mapping function.

Total: (L:45+T:30) = 75 Hours

(In all units derivations are not included)

References:

1. 1.Sankara Rao, K., "Introduction to Partial Differential Equations", Prentice Hall of India Pvt. Ltd., New Delhi, 2011.
2. Rajasekaran.S, "Numerical Methods in Science and Engineering A Practical Approach",
3. A.H.Wheeler and Company Private Limited, 1999.
4. 3.Gupta, A.S., "Calculus of Variations with Applications", Prentice Hall of India Pvt. Ltd., New Delhi, 2004.
5. Andrews, L.C. and Shivamoggi, B.K., "Integral Transforms for Engineers",Prentice Hall of India Pvt. Ltd., New Delhi, 2003.

P15STR102 Advanced Design of Concrete Structures L T P C 3 2 0 4 100

(Use of IS 456-2000, SP 16, SP 34, IS 5525, IS 13920 and other relevant codes are permitted)

Course Outcomes

At the end of the course, the student will be able to

- familiarize in the Design of Corbels, shear walls, flat slab and grid floors
- explain the concepts of ductile detailing of R.C. members as per IS Codes
- exposure about the the Inelastic behaviour of R.C. beams
- design of R.C.C. Beams and columns using limit state method
- exposure about the concepts of ductile detailing of R.C. members as per IS Codes

UNIT – I Review of limit State Design 9+6

Design for limit state of collapse-Design of beams for combined effect of shear, bending moment and torsion-Design of slabs- Design of short and slender columns including biaxial bending -Design for limit state of serviceability-Calculation of deflection and crack width according to IS and ACI codes

UNIT – II Design of special R.C. Elements 9+6

Design of R.C. walls - Shear walls- Classification and design principles-Rectangular and Flanged shear walls-Design of corbels- Design of deep beams

UNIT – III Design of Flat slabs and Grid floors 9+6

Yield line analysis of slabs-Hillerberg's strip method of design of slab-Design of flat slab-Equivalent frame method of design-Approximate analysis and Design of grid floors

UNIT – VI Inelastic behaviour of R.C. beams 9+6

Inelastic behaviour of concrete beams – Moment Rotation curves – Moment redistribution – Baker's method of analysis and design – Design of cast in situ joints in frame.

UNIT – V Detailing Requirements 9+6

Design and detailing of structural members using seismic design - Reinforcement detailing of structural members as per SP:34 & IS:5525 – Earth quake Resistant Design – Detailing requirements for Ductility as per IS:13920 - Fire resistance of buildings.

Lecture : 45, Tutorial : 30 , Total : 75 Hours

References

1. Varghese, P.C. " Advanced Reinforced Concrete Design" Prentice Hall of India,2010
2. KrishnaRaju .N. "Advanced Reinforced Concrete Design", CBS Publishers and Distributors 2003.
3. Park..R and Pauly.T. "Reinforced Concrete Structures", John wiley & Sons,1975.

P15STR103 Structural Dynamics L T P C 3 2 0 4 100

Course Outcomes

At the end of the course, the student will be able to

- solve to the problems related to the principal of dynamics.
- exposure the Multi Degree of Freedom System.
- solve real time problems related to the Dynamic Response of Multi Degree of Freedom Systems.
- familiarize in explaining concepts in Continuous Systems.
- exposure to the Design of Structures Subjected to Dynamic Loads.

UNIT – I Principles of Dynamics 9+6

Formulation of Equations of Motion by different methods-Problems on Formulation of Equation of motion-Single degree of freedom systems-Free and Forced response- Effect of Damping-Simple Problems on beams and frames.

UNIT – II Multi Degree of Freedom System 9+6

Formulation of Structure, property matrices-Eigen value problems-methods- Dunkerly's method-Holzer method (concept) - Stodola method-Rayleigh's method- Rayleigh- Ritz method-Mode shapes-orthonormality of modes.

UNIT – III Dynamic Response of Multi Degree of Freedom Systems 9+6

Mode superposition Techniques-Problems on two degree of freedom for building frames-Numerical Integration Techniques-New marks method-Linear Acceleration method-Problems-Numerical Evaluation of Duhamel's Integral.

UNIT – IV Continuous Systems 9+6

Modelling- Free and forced vibrations of bars- Flexural vibration of simply supported beams- Modes and frequencies-Orthogonality properties of normal modes of continuous systems.

UNIT – V Design of Structures Subjected to Dynamic Loads 9+6

Machine foundations analysis for blast loading-Earthquake response-elastic rebound theory-deterministic analysis of earthquake response-lumped SDOF system-Design of earthquake response-Design of earthquake resistant structures-IS code provisions.

Lecture : 45, Tutorial : 30 , Total : 75 Hours

References

1. Clough R.W. and Penzien J., Dynamics of Structures, McGraw Hill, 2015
2. Anil Chopra, Dynamics of Structures, Prentice Hall of India, EEE Edition, 2011
3. V. K. Manickaselvam, Elementary Structural Dynamics, Dhanpat Rai & Sons, 2001.
4. Rao S.S., Mechanical Vibrations, Prentice hall, Third Edition, 2010
5. Damodarasamy S.R and Kavitha S, Basics of Structural Dynamics and Aseismic Design, PHI publishers, 2009.

P15STR104 Theory of Elasticity and Plasticity L T P C 3 2 0 4 100

Course Outcomes

At the end of the course, the student will be able to

- familiar with the elastic and plastic stage by the more general theory of elasticity and plasticity
- familiarize the Stress and Strain behavior in Cartesian Coordinates
- exposure to Two Dimensional Problems in Cartesian Coordinates
- able to solve Two Dimensional Problems in Polar Coordinates
- capable of solving problems related to Torsion of prismatic hollow sections

UNIT – I Analysis of Stress and Strain in Cartesian Coordinates 9 + 6

Analysis of stress (two and three dimension)- Body force, surface force - Uniform state of stress – Principal stresses - stress transformation laws - Differential equations of equilibrium. Analysis of strain (two and three dimension) Strain displacement relations - Compatibility equations - state of strain at a point – strain transformation - principal strain - principle of superposition. Stress - strain relations - generalized Hooke's law - Lame's constants - methods of formulation of elasticity problems - Equilibrium equations in terms of displacements - compatibility equations in terms of stresses - Boundary value problems.

UNIT – II Two Dimensional Problems in Cartesian Coordinates 9 + 6

Introduction: Plane stress and Plane strain problems - Airy's stress function - polynomials – Direct method of determining Airy's polynomial stress function - solution of Biharmonic equation by fourier series - St. Venant principle.

UNIT – III Two Dimensional Problems in Polar Coordinates 9 + 6

General equations in polar coordinates - stress distribution symmetrical about an axis - pure bending of curved bars - strain components in polar coordinates - displacements for symmetrical stress distribution - Rotating Disc - Bending of a curved bar by force at the end - Effect of circular hole on stress distribution - concentrated force at a point of a straight boundary - Forces on wedges - A circular disc with diametric loading.

UNIT – IV Torsion of Prismatic Bars 9 + 6

General solutions of the problem by displacement (St. Venant's warping function) and force (Prandtl's stress function) approaches - Membrane analogy-Torsion of shafts of circular and noncircular (elliptic, triangular and rectangular) cross sectional shapes. Torsion of thin rectangular section and hollow thin walled single and multicelled sections.

UNIT – V Introduction to Plasticity 9 + 6

Introduction to stress-strain curve - Ideal plastic body - criterion of yielding - Rankine's theory - St.Venant's theory - Tresca's criterion - Beltramis theory - Von-mises criterion - Mohr's theory of yielding - yield surface - Flow rule (plastic stress- strain relation) Prandtl Reuss equations - Plastic work - Plastic potential - uniqueness of stress distribution - Elastoplastic problems of beams in bending – thick hollow spheres and cylinders subjected to internal pressure - General relations - plastic torsion – perfect plasticity - bar of circular cross section - Nadai's sand heap analogy.

Lecture : 45, Tutorial : 30 , Total : 75 Hours

References

1. Sadhu Singh, Theory of Plasticity, Khanna Publishers, N.Delhi, 2008.
2. P. C. Chow and N. J. Pagano, Elasticity, Tensor, Dyadic and Engg. Approaches, D. Vannostrard Co., New York, 1992
3. S. Timoshenko and J. N. Goodier, Theory of Elasticity, Mc Graw Hill Book Co., 2007
4. T. Chakrabarthy, Theory of Plasticity, Mc Graw Hill Book Co., New Delhi, 2006

P15STR105 Design of Sub structures LTPC 3 2 0 4 100

Course Outcomes

At the end of the course, the student will be able to

- describe the concept of Shallow foundation
- analysis and design of retaining structures
- study the types and design of Pile foundations
- study the design of Well foundations
- study the design of Machine foundations

Unit-I Shallow Foundations 9 + 6

Bearing capacity and settlement – Spread footing – Contact pressure – Structural design of individual footings, pedestals, combined footings (Rectangular and trapezoidal), Strap footings – Eccentrically loaded footings – Mat foundation.

Unit-II Retaining structures 9 + 6

Stability of walls – Design of cantilever and counter fort walls – Design of gravity walls – cantilever sheet pile walls – Anchored bulkhead – Cofferdams – Braced cofferdams – Stability of bottom excavation – Anchorages – Walls and Tie rods.

Unit-III Pile Foundations 9 + 6

Types of Piles- Static and dynamic pile formula – Pile load tests – Negative skin friction – Pile groups – Efficiency of pile group – Settlement of piles – Batter piles – Analysis of pile groups – Structural design of piles and pile caps- Floating foundation

Unit-IV Well foundation 9 + 6

Types of wells or caissons – Components – Shapes of wells – Forces acting – Construction and sinking – Design of drilled caissons.

Unit-V Machine foundations and foundations on expansive 9 + 6

Introduction to vibrations – Design criteria for satisfactory action of a machine foundation – Soil spring constants – Determination – Types of foundations – Design on block foundation – Identification of swelling – Field conditions – Consequences of swelling – Design.

Lecture : 45, Tutorial : 30 , Total : 75 Hours

References:

1. P.C.Varghese, Foundation Engineering , PHI Learning Private Limited , New Delhi ,2004
2. Gopal Ranjan and ASR Rao. “Basic and Applied Soil Mechanics”, Wiley eastern Ltd., 2006.
3. Teng, “Foundation Analysis and Design”, Prentice Hall of India, 2014
4. Shenbaga R.Kniraj, “Design Aids in Soil Mechanics and Foundation Engineering”, Tata McGraw Hill (1988).

P15STR106 Stability of Structures L T P C 3 2 0 4 100

Course Outcomes

At the end of the course, the student will be able to

- discuss the concept, analytical approaches and characteristics of stability
- identify various buckling modes column with various approaches
- analysis of columns under approximate methods and numerical methods
- analyse the buckling of frames under classical, stiffness methods and use of Wood's charts
- describe lateral buckling of beams under energy method and torsional buckling of beams under Equilibrium and energy approach

UNIT – I Stability of Columns 9 + 6

Concepts of Elastic Structural stability- Analytical approaches to stability - characteristics of stability analysis- Elastic Buckling of columns- Equilibrium; Energy and Imperfection approaches – Non-prismatic columns- Built up columns- Buckling modes- Effect of shear on buckling load - Large deflection theory.

UNIT – II Methods of Analysis and In Elastic Buckling 9 + 6

Approximate methods – Rayleigh and Galerkin methods – numerical methods – Finite difference and finite Element - analysis of columns – Experimental study of column behaviour – South well plot - Column curves - Derivation of Column design formula - Effective length of Columns - Inelastic behaviour- Tangent modulus and Double modulus theory

UNIT – III Beam Columns and Frames 9 + 6

Beam column behaviour- standard cases- Continuous columns and beam columns – Columns on elastic foundation – Buckling of frames – Single storey portal frames with and without side sway – Classical and stiffness methods – Use of Wood's charts.

UNIT – IV Buckling of Beams 9 + 6

Lateral buckling of beams – Energy method- Application to Symmetric and single symmetric I beams – simply supported and Cantilever beams - Narrow rectangular cross sections – Numerical solutions – Torsional buckling – Uniform and non uniform Torsion on open cross section - Flexural torsional buckling – Equilibrium and energy approach.

UNIT – V Buckling of Thin Plates 9 + 6

Isotropic rectangular plates - Governing Differential equations - Simply Supported on all edges – Use of Energy methods –Numerical Techniques.

Lecture : 45, Tutorial : 30 , Total : 75 Hours

References

1. Timoshenko, S., and Gere, Theory of Elastic Stability, McGraw Hill Book Company, 2009.
2. Chajes, A, Principles of Structures Stability Theory, Prentice Hall, 1974.
3. Ashwini Kumar, Stability of Structures, Allied Publishers LTD, New Delhi, 2003.
4. Gambhir, Stability Analysis and Design of Structures, Springer, New York, 2004.

P15STR107 Structural Engineering Laboratory L T P C 0 0 4 2 100

Course Outcomes

At the end of the course, the student will be able to

- design concrete mixes
- They will acquire practical knowledge about the testing of fresh and hardened concrete
- Students will get a practical knowledge about the non destructive tests, measuring devices and their their field applications

List of Experiments

1. Concrete Mix Design- I.S. code Method
2. Fresh properties of Self Compacting Concrete using slump flow, L Box and V Funnel Tests
3. Determination of modulus of Elasticity of Concrete using Compressometer
4. Strength and Deflection Characteristics of simply supported R.C. Beams
5. Strength and Deflection Characteristics of simply supported steel Beams
6. Testing of R.C. Columns subjected to Concentric Loading
7. Determination of in-situ strength and quality of concrete using(a) Rebound hammer and (b) Ultrasonic Pulse Velocity Tester
8. Determination of Impact Resistance of concrete
9. Determination of Permeability of concrete
10. Measurement of Cracks
11. Study of Measuring devices such as

- Beggs Deformeter
- Mechanical Strain Gauge
- Optical strain gauge

Total : 60 Hours

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S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
Theory						
1	P15STR201	Finite Element Methods of Structural Analysis	3	2	0	4
2	P15STR202	Advanced Design of Steel Structures	3	2	0	4
3	P15STR203	Experimental Techniques and Instrumentation	3	0	0	3
4	P15STR505	**Elective -** Design of Steel Concrete Composite Structures	3	0	0	3
5	P15STR504	**Elective -** Design of Bridges	3	0	0	3
	P15STR509	**Elective -** Maintenance and Rehabilitation of Structures				
6	P15STR604	**Open Elective -** Total Quality Management	3	0	0	3
Practical						
7	P15STR204	Structural Engineering Software Laboratory	0	0	4	2
					Total Credits	**22**

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P15STR201 Finite Element Methods of Structural analysis 3 2 0 4

COURSE OUTCOMES

Upon completion of this course the student will be able to,

- **CO1** Explain and analyze various types of structures by matrix flexibility and matrix stiffness methods
- **CO2** Describe and discuss about the basic concepts of finite element method
- **CO3** Explain and derive the shape functions of various 1D and 2D elements
- **CO4** Discuss the displacement formulations for various 1D and 2D elements and analyse for structures.
- **CO5** Apply FEM for simple problems like beams, pin jointed frames and plate problems

Review of Matrix Methods 9+6

Flexibility Method-Equilibrium and compatibility – Determinate Vs Indeterminate structures – Indeterminacy - Primary structure – Compatibility conditions – Analysis of indeterminate pin-jointed plane frames, continuous beams, rigid jointed plane frames. Stiffness Method – Degree of freedom or Kinematic indeterminacy –Analysis procedure-Stiffness co-efficient- – Analysis of continuous beams – Analysis of pin-jointed plane frames and rigid frames.

Introduction to FEM 9+6

Introduction – General description of the method - Analysis procedure- Stress and strain vectors- strain displacement equations-linear Constitutive equations-Plane stress, plane strain and axisymmetric cases of elasticity-Energy principles- Variational methods- Rayleigh Ritz Method- Galerkins method –Concept of piecewise approximation.

Element Types and Properties 9+6

Concept of an element - Various element shapes- Approximating displacements by polynomials-Convergence and Compatibility Requirements-Pascal's Triangle- Node numbering procedure – Natural coordinate system – Generalized coordinates – shape function – Lagrange, Serendipity and Hermitian elements – stiffness matrix – Nodal load vector –Condensation of internal degrees of freedom- Degrading Technique.

Stress Analysis 9+6

Displacement formulation for axial element, beam bending element, Constant linear strain triangular elements- Linear Isoparametric quadrilateral and hexahedral elements, plate bending element and axisymmetric elements

Applications of FEM 9+6

Discretisation of a body or structure- Minimization of bandwidth- Selection of proper displacement or interpolation model- Derivation of element stiffness matrices and load vectors-Assemblage of element equation to obtain the overall equilibrium equation-Theory of direct stiffness method- solution for unknown nodal displacements-computation of element strains and stresses-Application of displacement finite elements to the analysis of simple problems like beams, pin jointed plane frames and plate problems

Lecture : 45, Tutorial : 30 , Total :75 Hours

References

1. Weaver, J.R and Gere,J.M., Matrix analysis of framed structures,CBS Publishers,newDelhi,1986.
2. Rao, S.S., The Finite Element Method in Engineering, Pergamon Press, 1999.
3. Bathe, K.J., Finite Element Procedures in Engineering Analysis, Prentice Hall, 1995.
4. Chandrakant S Desai and John F Abel., introduction to Finite Element Method, Affiliated East-West Press private Limited,1987
5. Krishnamoorthy C.S, Finite Element Analysis – Theory and programming, Second edition, Tata McGraw Hill Publishing Co.. 1994
6. Tirupathi R. Chandrupatla and Ashok D. Belegundu, Introduction to Finite Elements in Engineering, Prentice Hall of India Pvt.Ltd., New Delhi, 2002
7. Structural Analysis – A Matrix Approach – G.S. Pandit & S.P. Gupta, Tata McGraw Hill 2004.

P15STR202 Advanced Design of Steel Structures 3 2 0 4

(Use of IS 800-2007 and other relevant codes are permitted)

COURSE OUTCOMES

Upon completion of this course the student will be able to,

- **CO1** Discuss about the concept of Limit state design of steel members
- **CO2** Explain the various types of steel in eccentric connections.
- **CO3** Design Industrial building components
- **CO4** Explain about the design of various types of light gauge sections
- **CO5** Design of Steel water tanks and Transmission towers

Limit State Design 9+6

Limit states design of steel members-Behaviour and design of steel members under tension, compression, bending and combined forces (shear-bending and axial force-bending)

Structural Connections 9+6

Design of high strength function grip bolts - Design of riveted and bolted connections at the junctions of beams and columns in frames - Design of un-stiffened & stiffened seat connections - Welded connections - eccentric connections - Beam end connections - Direct web fillet welded connections - Direct web Butt welded connection - Double plate web connection - Double angle web connection - Un-stiffened and stiffened seat connection - Moment resistant connection - Behaviour of welded connections – problems

Industrial Buildings 9+6

Review of loads on structures – Analysis and design of Industrial buildings and Bents- Sway and non sway frames –Design of purlins , louver Rails ,gable column and Gable wind girder – Analysis and Design of gable frame.

Light Gauge Sections 9+6

Design of cold formed sections - concepts - effective width - stiffened sections - multiple stiffened sections - design for flexure – design of two span continuous beams - design of light gauge columns – Torsional – Flexural buckling – Tension Members - beam column - connections.

Special Structures 9+6

Design and detailing of guyed steel chimneys-Analysis and Design of Steel Water Tanks-Transmission line towers - Introduction, Types of towers - Tower configuration, load analysis and design of members.

Lecture : 45, Tutorial : 30 , Total : 75 Hours

References

1. P. Dayaratnam, Design of Steel Structures, A.H. Wheeler & Co., Ltd, Allahabad, 2008
2. B. C. Punmia, Ashok Kumar Jain and Arunkumar Jain, Design of Steel Structures, Vol. I & II, Arhant Publications, Bombay, 2004
3. Arya and Ajmani, Design of Steel Structures, Nemchand Brothers, Roorkee, 1994
4. Alexander Newman, Metal Building Systems – Design and Specifications, Mc Graw Hill, New Delhi, 2004.
5. IS 800-2007 Indian Standard General Construction in Steel – code of practice (3rd Revision).
6.N.Subramanian, Design of steel structures, Oxford University Press, 2008
7. S.S.Bhavikatti., Limit state Design of steel structures.

P15STR203 EXPERIMENTAL TECHNIQUES AND INSTRUMENTATION 3 0 0 3

COURSE OUTCOMES

Upon completion of this course the student will be able to,

- **CO1** Discuss the measurement of strain
- **CO2** Describe the measurement of vibration and wind flow
- **CO3** Elucidate the distress measurement and precautions
- **CO4** Deliberate the NDT testing methods of structures
- **CO5** Explain the model analysis and studies

Unit 1 Strain Measurements 9

Methods of Measurement -Calibration-Load calibration of testing machines-I.S. Code provisions - Measurement system-Strain measurement-Strain gauges- Principle, Types, Performance, Uses- Strain Rosettes - Wheatstone Bridge- Photo elasticity- Principle, Application-Moire fringe- Electronic load cells- Proving rings.

Unit 2 Measurement of Vibration & Wind Flow 9

Measurement of vibration - Vibration galvanometers- Vibrometer - Characteristics of Structural vibration- Pressure gauges -Velocity transducers- Seismic transducers – Linear Variable Differential Transformer- Cathode ray oscilloscope – X Y Plotter- Wind TunnelsFlow meters-Venturimeter - Digital Data Acquisition systems.

Unit 3 Distress Measurement & Control 9

Diagnosis of distress in structures-Cracks in structures-Formation of cracks- Types of cracks Causes of cracks- Crack measurement- Monitoring and measurement of crack movement Corrosion of reinforcement in RCC- Half-cell-Construction and use-Damage assessment Controlled blasting for demolition.

Unit 4 Non Destructive Testing Methods 9

Load testing on structures-In situ load testing-Ultimate load testing-Rebound hammer, Principle and Applications-Limitations-Ultrasonic testing- Principles and Applications. Brittle coating- Principle and Applications-Stress coat- All Temp- Comparison of brittle coatings- Evaluation of the coating.

Unit 5 Model Analysis 9

Model laws- Laws of similitude-Model materials- Model testing- Necessity for Model analysis-Advantages-Applications- Types of similitude- Scale effect in Models- Indirect model study- Direct model study- Limitations of model investigations- Structural problems that may demand model studies- Usage of influence lines in model studies.

Total: 45 Hours

References

1. Sadhu Singh, Experimental Stress Analysis, Khanna Publishers, New Delhi, 2006.
2. J. W. Dally and W. F. Riley, Experimental Stress Analysis, McGraw-Hill, Inc. New York, 1965
3. L. S. Srinath, Experimental Stress Analysis, Tata McGraw-Hill Publishing Co. Ltd., New Delhi, 1984.
4. C. S. Rangan, Instrumentation – Devices and Systems, Tata McGraw-Hill Publishing Co. Ltd., New Delhi, 1983.

P15STR504 Design of Bridges 3 0 0 3

(Use of IS 456-2000, SP 16, IS 800-2007, IS 1343, IRC Standards and other relevant codes are permitted)

COURSE OUTCOMES

Upon completion of this course the student will be able to,

- **CO1** Illustrate & classify the types of bridges based on choice and also list the standard loads acting on the bridge as per IRC standards
- **CO2** State the load distribution theories and describe the design procedure for slab culverts and Tee beam bridges
- **CO3** Describe the design principles of long span bridge types in a continuous span conditions
- **CO4** Describe the design parameters of prestressed concrete bridges including the check for serviceability
- **CO5** Ilustrate the design procedure for riveted and welded plate girder bridge for highway and railway loadings

Introduction 9

Classification- Investigation and planning- Choice of type- I.R.C. Specifications for road bridges- Standard live loads-Other forces acting on bridges- General design considerations

Short Span Bridges 9

Load distribution theories- Analysis and design of slab culverts- Tee beam and slab bridges

Long Span Girder Bridges 9

Design principles of continuous bridges - Box girder bridges -Balanced cantilever bridges- Bow string girder bridges – Suspension and cable stayed bridges

Prestressed Concrete Bridges 9

Design of prestressed Concrete Bridges- Preliminary Discussions – Flexural and torsional parameters – Design of Girder Section- Cable layout – Check for stresses at various sections – Check for diagonal tension – Diaphrams – End Blocks – Short term and Long term Deflections

Design of Plate Girder Bridges 9

Design of riveted and welded plate girder bridges for highway and railway loading – Wind effects – Main section – Splicing –Curtailment- Stiffeners

Total: 45 Hours

References

1. Krishnaraju, N., "Design of Bridges", Oxford and IBH Publishing Co., Bombay, Calcutta, New Delhi, 1988.
2. Jagadeesh .T.R, Jayaram. M.A , " Design of Bridge Structures " Prentice – Hall India , New Delhi , 2004.
3. . Ponnuswamy, S., "Bridge Engineering", Tata McGraw-Hill, 1989
4.Johnson Victor, D. "Essentials of Bridge Engineering", Oxford and IBH Publishing Co. New Delhi, 1990
5. I.S. 456-2000, Plain and Reinforced Concrete-Code of Practice
6. I.S. 800-2007, Indian Standard Code of Practice for General Construction in Steel
7. SP: 16 Design Aids to I.S.456
8. RC 5-1970: Standard Specification and code of practice for road bridges, Section I General, Features of Design, 1975.
9. IRC 6-1966: Standard Specification and code of practice for road bridges, Section II General, Load and Stresses, 1974**.**
10. IRC 21-1987: Standard Specification and code of practice for road bridges, Section III Cement Concrete (Plain and Reinforced) 1996.

P15STR505 Design of Steel Concrete Composite Structures 3 0 0 3

COURSE OUTCOMES

Upon completion of this course the student will be able to,

- **CO1** Discuss and impart the behaviour and concept of steel - Concrete composite construction.
- **CO2** Explain the various components Design of composite Structures
- **CO3** Discuss Design of Connections for composite structural Elements
- **CO4** Explain the behaviour of box girder bridge.
- **CO5** Describe about seismic behavior of composite structures

Introduction **9**

Introduction to steel -Concrete composite construction - Theory of composite structures - construction.

Design of Composite Members **9**

Design of composite beams - slabs - columns, beam – columns - Design of composite trusses.

Design of Connections **9**

Types of connections - Design of connections in the composite structures – Shear connections - Degree of shear connection – Partial shear interaction

Composite Box Girder Bridges **9**

Introduction - Behaviour of box girder bridges - Design concepts.

General **9**

Case studies on steel - concrete composite construction in buildings - seismic behaviour of composite structures.

Total: 45 Hours

References

1. Johnson R.P., “Composite Structures of Steel and Concrete”, Blackwell Scientific Publications, UK, 2004.
2. Oehlers D.J. and Bradford M.A., “Composite Steel and Concrete Structural Members, Fundamental behaviour”, Pergamon press, Oxford, 1995.
3. Proceedings of Workshop on “Steel Concrete Composite Structures”, Anna University, 2007.

P15STR509 Maintenance and Rehabilitation of Structures L T P C 3 0 0 3 100

COURSE OUTCOMES

Upon completion of this course the student will be able to,

CO1 Study the Distresses monitoring and Causes of distresses of Structures

CO2 Explain the Causes, diagnosis, remedial measures for various types of cracks

CO3 Describe the various Sources of dampness and their remedial measures

CO4 Study the Distresses and remedial measures of concrete buildings

CO5 Explain the various Techniques in Strengthening of structures

UNIT I **9**

MAINTENANCE AND DIAGNOSIS OF FAILURE: Maintenance-facets of maintenance-importance of maintenance-various aspects of maintenance-diagnosing the cause of damage- identification of different types of structural and non structural cracks-assessment procedure for evaluating a damaged structure-corrosion damage in reinforced concrete-diagnosis of construction failures.

UNIT II **9**

MATERIALS AND TECHNIQUES OF REPAIR: Special concrete and mortar-concrete chemicals-expansive cement-polymer concrete sulphur infiltrated concrete-ferrocement-fibre reinforced concrete-new materials in practice for crack repair-corrosion inhibitors-protective coatings for embedded steel-cathodic protection.

UNIT III **9**

RETROFIT OF BUILDINGS: Introduction-strengthening of roofs, floors, pillars, foundations-stress relieving techniques-global retrofitting techniques-Deficiencies and retrofit strategies of single storey building and multi-storey building.

UNIT IV **9**

RETROFIT OF HISTORICAL BUILDINGS: Introduction-recommendation of the International council on monuments and sites (ICOMOS)-condition assessment-Strengthening of masonry walls, arches, vaults, domes, towers-archeological reconstruction.

UNIT V **9**

SPECIAL TOPICS: Case study on retrofit of single storey building, multi-storey building, historical buildings-Lessons learnt from failures.

Total: 45 Hours

REFERENCES

1. S. M. Johnson, Deterioration, Maintenance and Repair of Structures, McGraw-Hill Book Company, Newyork, 1965.
2. B. A. Richardson, Remedial Treatment of Buildings, Construction Press, London, 1980.
3. Dension, C. Alien and H. Roper, Concrete Structures, Materials, Maintenance and Repair, Longman Scientific and Technical, UK, 1991.
4. R. T. Alien and S. C. Edwards, Repair of Concrete Structures, Blakie and Sons, UK, 1987.
5. R. K. Guha, Maintenance and Repairs of Buildings, New Central Book Agency (P) Ltd, Calcutta, 1985.
6. R. N. Raikar, Learning from failures - Deficiencies in Design, Construction and Service, - R & D Centre (SDCPL), Raikar Bhavan, Bombay, 1987.
7. SP25-84 – Hand Book on Causes and Prevention of Cracks on Buildings, Indian Standards Institution, New Delhi, 1984.
8. Lecture notes of workshop on "Repair and Rehabilitation of structures", Anna University, 1999
9.Lecture notes on " Health monitoring of structures- A proactive strategy, SRM Engineering College, 2003

P15STR604 **TOTAL QUALITY MANAGEMENT** **3 0 0 3**

COURSE OUTCOMES

Upon completion of this course,the student will be able to

- **CO1** Expose the importance and benefits of Total Quality Management
- **CO2** Discuss about the various process control tools
- **CO3** Discuss about Total Quality Management implementation
- **CO4** Explain about various tools to enhance quality
- **CO5** Discuss about cost of failures

Unit -I **Introduction to Quality** **9**

Defining Quality - Quality as a Management framework - Quality & Competitive advantage - Three levels of Quality - Quality Philosophies - Deming Philosophy - Juran Philosophy - Crossby Philosophy - Comparison of Quality Philosophies - Other Quality Philosophers - A.V. Feigenbaum - Kaoru Ishikawa - Genichi Taguchi

Unit –II **Quality Systems** **9**

Quality Management Systems - ISO 9000:2000 - Six Sigma

Unit –III **Total Quality Management** **9**

Evolution of TQM - Definition of TQM - TQM Framework - Stages in TQM Implementation - TQM Roadmap

Unit –IV **Quality Tools** **9**

Deming Wheel - Zero Defect Concept – Benchmarking - Seven QC Tools – FMEA - Poka Yoke - Five S - Quality Circle - Quality Function Deployment - Taguchi's Robust Design - Total Productive Maintenance - Force Field analysis - Tree & Matrix Diagram

Unit –V **Cost of Quality** **9**

Classification of failure cost - Juran's Model of optimum quality costs - Analysis of External & Internal Failure costs

Total: 45 hours

TEXT BOOKS

1. Srinivasa Gupta, Valarmathi, Total Quality Management, II Edition, Tata Mc.Graw Hill
2. Janaki Raman, Gopal, Total Quality Management, II Edition, PHI

REFERENCES

1. James R.Evans William M.Lindsay The Management and control of Quality Thomson Learning2005
2. Subbraj Ramasamy Total Quality Management Tata McGraw Hill 2005
3. P.N Mukherjee Total Quality Management Prentice Hall 2006 Adrian Wilkinson , Tom Redman, Ed Snape andn Mick Marching ton Managing with Total Quality Management: Theory and Practice Palgrave Macmillan 2006
4. Kanishka Bedi Quality Management Oxford University Press 2006
5. Hubert K.Rampersad Managing Total Quality Tata McGraw Hill 2005
6. Sid Kemp,PMP Quality Management Demystified Tata McGraw Hill 2006

P15STR204 Structural Engineering Software Laboratory L T P C 0 0 4 2 100

COURSE OUTCOMES

Upon completion of this course the student will be able to,

- **CO1** Application of Analysis package for the design of Earthquake Resistant Structures.
- **CO2** Application of FEM software to know about the behaviour of various structural elements.
- **CO3** Development of Excel Software package for the design of structural elements.
- **CO4** Application of Analysis software for the industrial structures.
- **CO5** Development of Excel Software package for the concrete mix design.

List of Experiments

1. Analysis and design of multi storied building in earthquake prone zone using analysis software
2. Application of FEM software to find the stresses , strains and failure pattern of slab, beam ,column and foundation members.
3. Development of Excel package for the analysis and design of slab, beam ,column and foundation members.
4. Development of Excel software package for concrete mix design ACI method, IS method.
5. Application of Analysis software for the analysis and design of industrial structural components- trusses, wind bracings , runners , vertical bracings , gantry girder and foundation.

Total: 60 Hours

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for ME III Semester under Regulations 2015
Civil Engineering
Branch: Structural Engineering

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
Theory						
1	P15STR501	**Elective** – Form work Engineering	3	0	0	3
2	P15STR512	**Elective** –Design of Tall Building	3	0	0	3
3	P15STR613	**Open Elective –** Human Resource Management	3	0	0	3
Practical						
4	P15STR301	Practical Training	0	0	0	1
5	P15STR302	Technical Seminar	0	0	4	2
6	P15STR303	Project Work Phase – I	0	0	12	6
					Total Credits	**18**

Approved by

Chairperson, Civil Engineering BOS
Dr.R.Malathy

Member Secretary, Academic Council
Dr.R.Shivakumar

Chairperson, Academic Council & Principal
Dr.S.R.R.Senthil Kumar

Copy to:-
HOD/Civil, Third Semester ME STR Students and Staff, COE

P15STR501 Formwork Engineering L T P C 3 0 0 3 100

COURSE OUTCOMES

Upon completion of this course the student will be able to,

CO1 Explain materials and behaviour of formwork

CO2 Discuss the design of foundation, wall and column formwork

CO3 Describe the design the formwork for beam, slab, bridges and special structures

CO4 Demonstrate the design of Flying Formwork slip form techniques

CO5 Discuss the design of formwork for supports – Scaffolds and precast concrete

Unit 1 Introduction 9

Introduction-Formwork as a temporary structure-requirements for Formwork-selection of Formwork-Classification of Formwork- Formwork Materials-Timber-Plywood-Steel-Aluminium Form-Plastic Forms-other Material-Form Coating and Mould Linings-Form Anchors-Tie System-Spreaders, Spacers-Form Linings Materials.

Unit 2 Formwork Design Concepts & Foundation Formwork 9

Loads on Formwork-Dead or Permanent Loads-Imposed Loads-Environmental Loads-Design Basis (Assumption Made In Formwork Design)-Estimating Permissible Stress-Maximum Bending Moment, Shear Force, and Deflection-Formwork for Foundation-Conventional Formwork for Foundation-Foundation Formwork (All Steel)-Foundation Formwork Design-Illustration on Foundation Wall Design.

Unit 3 Wall & Column Formwork 9

Wall Formwork-Conventional Wall Formwork-Proprietary Wall Formwork System-Large Area Wall Forms-Climbing Formwork Wall Formwork- Climbing Formwork- L & T wall formwork – PERI climbing Formwork – Doka climbing Formwork -Wall Form Design- Illustration of Wall Formwork Design Using Plywood and H-16 Beams-Column Formwork-Conventional Column Formwork-Proprietary Column Formwork- L & T Column Formwork System- Doka form work system- PERI Column Formwork-Disposable Column Formwork-All Metal Column Formwork-Achieving Formwork Economy In Column Construction-Design For Column Formwork-Illustration of Column Formwork Design-Example For Computation of Force In Diagonal Tie Rod of Column.

Unit 4 Slab and Beam Formwork 9

Traditional Slab and Beam Formwork-Slab and Beam Formwork Solutions offered by L & T-Beam And Slab Formwork Solution by PERI and Mivan - achieving Economy In Slab Construction-Design Of Slab And Beam Construction-Illustration of Slab and Beam Formwork Design-Illustration Of Proprietary Slab Formwork Design-Another Illustration of Slab Formwork Design-Formwork For Bridge Structures-Formwork Arrangement For Caissons-Formwork For Piers And Pier Caps-Bridge Superstructures-Formwork For Bridge Railing/Parapets/Edge Beams-Cases Temporary Support Structures of Bridges.

Unit 5 Flying Formwork 9

Some Examples Of Flying Formwork-Flying Formwork Cycle-Advantages And Limitation Of Flying Formwork-Design Issues In Flying Forms-Safety Issues In Flying Forms-Table Forms-Tunnel Formwork System-Column Mounted Shoring System-Gang Forms-Slipform-Vertical Slipform-Horizontal Slipform-Types Of Slipform-Functions Of Varies Slipform Components-Assembly, Sliding And Dismantling Of Slipform-Slipform Design Issues-Some Cases In Slipform-Safety Operation During Slipform Erection-Productivity Issues In Slipform Construction.

Total : 45 Hours

REFERENCE

1. Formwork for concrete structures by Kumar NeerajJha Tata Mcgraw Hill Education Private Limited New Delhi – 2012

P15STR512 Design of Tall Buildings 3 0 0 3

COURSE OUTCOMES

Upon completion of this course the student will be able to,

CO1 Study the behaviour, analysis and design of tall structures

CO2 Study the effects of various loads on tall buildings

CO3 Describe the factors to be considered in the design of tall buildings

CO4 Learn the behavior of various structural systems

CO5 Study the different methods of analysis of tall building systems

UNIT I

Design Principles and Loading **9**

Design philosophy – Loading - Sequential loading - Materials - High performance - concrete - Fibre reinforced Concrete - Light weight concrete - Design mixes. Gravity loading - Wind loading -Earthquake loading

UNIT II

Structural Elements **9**

Sectional shapes - Properties and resisting capacity -Design, deflection, cracking – Prestressing -Shear flow - Design for differential movement, creep and shrinkage effects, temperature effects and fire resistance.

UNIT III

Behaviour of Various Structural Systems **9**

Factors affecting growth, Height and Structural form - High rise behavior - Rigid frames - Braced frames - Infilled frames - Shear walls - Coupled shear walls - Wall-frames – Tubulars , cores, futrigger - Braced and hybrid mega systems.

UNIT IV

Analysis and Design **9**

Modelling for approximate analysis - Accurate analysis and reduction techniques - Analysis of buildings as total structural system considering overall integrity and major subsystem interaction - Analysis for member forces - Drift and twist - Computerised general three dimensional analysis.

UNIT V

Stability of Tall Buildings **9**

Overall buckling analysis of frames - Wall-frames -Approximate methods - Second order effects of gravity of loading - P-Delta analysis - Simultaneous first-order and P-Delta analysis - Translational, Torsional instability-, out of plumb effects - Stiffness of member in stability -Effect of foundation rotation.

Total: 45

References

1. Bryan Stafford Smith and Alexcoull, "Tall Building Structures - Analysis and Design", John Wiley and Sons, Inc., 1991.

2. Taranath B.S., "Structural Analysis and Design of Tall Buildings", McGraw Hill, 1988.

3. Gupta.Y.P.,(Editor), Proceedings of National Seminar on High Rise Structures - Design and Construction Practices for Middle Level Cities, New Age International Limited, New Delhi,1995.

4. Lin T.Y and Stotes Burry D, "Structural Concepts and systems for Architects and Engineers", John Wiley, 1988.

5. Beedle.L.S., "Advances in Tall Buildings", CBS Publishers and Distributors, Delhi, 1986.

Semester	3	Type	Generic Core
Course Code	**P15STR613**		
		Open Elective	NA
Course Title	**HUMAN RESOURCE MANAGEMANT**		
		L:T:P:C	3:0:0:3

Course Outcomes

Upon completion of this course the student will be able to,

1. Understand and identify the fundamental of Human Resource Management
2. Understand the process of recruitment and selection
3. Discuss the training and development methods in organizations.
4. Find out effective performance appraisal programs and to design an effective compensation structure for a give context
5. Understand the emerging trends in Human Resource Management

Unit	Syllabus Contents	Number of Sessions
1	**Introduction and Human Resource Planning** Human Resource Management – Evolution, Nature, Scope, Function, Objectives, Importance, Model, and Challenges – Human Resource Manager – Difference between Personnel Management and Human Resource Management Other relate topics : Concept of Strategic HRM, Concept of International HRM Job Analysis : Process – Methods of collecting job related data's, Design of job description and specification.	9
2	**Recruitment and Selection** JOB Design – Factors affecting job Design – Contemporary issues in job design- Human Resource Planning – Process – Recruitment and Selection – Nature and purpose – Sources of Recruitment - Factors influencing Recruitment – Recruitment Process – Evaluation – Nature and Process of Selection – Employee Mobility – Induction, Placement, Promotion, Transfer, Separation, Layoff.	9
3	**Training and Development** Training Vs Development – Need – Approaches – Types of Training – Training methods – Designing of Training Programs and implementation – Methods of Evaluation of Training programs – Employee development – Training Vs Development – Designing and implementing employee development programs.	9
4	**Performance and Compensation Management** Objectives – Challenges – Performance Appraisal Process – Methods of Appraisal – Compensation – Components of Indian pay structure, Incentives and Benefits – Job Evaluation: Concept, Job Evaluation Methods – Employee Retention – Need – Retention techniques.	10
5	**Current Trends In HRM** Competency Mapping – Human Resource Accounting – Quality Work Life- Knowledge Management – Learning Organization – Outsourcing of HRM Processes – HRIS – HR Analytics	8
	Total No. of Sessions	45

Learning Resources:

1	Text Books	1. Gary Dessler, Human Resource Management, 12th edition, Pearson Education , 2011 2. VSP Rao, Human Resource Management – Text and Cases, 3ed edition, Excel Books, 2010
2	Reference Books	1. David A.Decenzo, SephenP.Robbins, Fundamentals of Human Resource Management, 10thedition,Wiley Publication 2. John M.Ivancevich, Human Resource Management, 10th edition Mc.Graw Hill 2012 3. Udyay Kumar Haldar, Juthika Sarkar. Human Resource Management. Oxford Publication , 2012 4. Scott, Snell, George, Bohlander, Human Resource Management – A South Asian Perspective, Cengage Learning 5. Subbarao, Personnel Human Resource Management, Himalaya Publishing House, 2010 6. Klerman, Human Resource Management, Biztantra, 2008
3	Web Site / Links	1. http://nipm.in 2. http://www.shrmindia.org 3. http://www.nhrde.sc 4. http://www.thehrclub.net 5. http://www.humanresources.org/website/c/ 6. http://www.nationalhrd.org 7. www.shrm.org 8. www.citehr.com 9. www.nationalhrd.org 10. www.shrmindia.org 11. http://www.peoplematters.com/homepage.aspx 12. www.hrmguide.net

P15STR301 PRACTICAL TRAINING L T P C 0 0 0 1

COURSE OUTCOMES

Upon completion of this course the student will be able to,

- Train the students in the field work so as to have a firsthand knowledge of practical problems related to Construction Management in carrying out engineering tasks.
- Develop skills in facing and solving the problems experiencing in the field.

SYLLABUS:

The students individually undertake training in reputed engineering companies doing construction during the summer vacation for a specified duration of four weeks. At the end of training, a detailed report on the work done should be submitted within ten days from the commencement of the semester. The students will be evaluated through a viva-voce examination by a team of internal staff.

P15STR302 TECHNICAL SEMINAR L T P C 0 0 4 2

COURSE OUTCOMES

Upon completion of this course the student will be able to,

- Work on a specific technical topic in Construction Engineering and Management in order to acquire the skills of oral presentation.
- Acquire technical writing abilities for seminars and conferences.

SYLLABUS

The students will work for two Hours per week guided by a group of staff members. They will be asked to talk on any topic of their choice related to construction engineering and management and to engage in dialogue with the audience. A brief copy of their talk also should be submitted. Similarly, the students will have to present a seminar of not less than fifteen minutes and not more than thirty minutes on the technical topic. They will also answer the queries on the topic. The students as audience also should interact. Evaluation will be based on the technical presentation and the report and also on the interaction during the seminar.

TOTAL: 30 HOURS

P15STR303 PROJECT WORK PHASE- I L T P C 0 0 10 5

COURSE OUTCOMES

Upon completion of this course the student will be able to,

- Identify a specific problem for the current need of the society and collecting information related to the same through detailed review of literature.
- Develop the methodology to solve the identified problem.
- Train the students in preparing project reports and to face reviews and viva-voce examination.

SYLLABUS

The student individually works on a specific topic approved by the head of the division under the guidance of a faculty member who is familiar in this area of interest. The student can select any topic which is relevant to the area of construction engineering and management. The topic may be theoretical or case studies. At the end of the semester, a detailed report on the work done should be submitted which contains clear definition of the identified problem, detailed literature review related to the area of work and methodology for carrying out the work. The students will be evaluated through a viva-voce examination by a panel of examiners including one external examiner.

TOTAL: 180 HOURS

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for ME IV Semester under Regulations 2015
Civil Engineering
Branch: Structural Engineering

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
Practical						
1	P15STR401	Project Work Phase – II	0	0	24	12
					Total Credits	**12**

Approved by

Chairperson, Civil Engineering BOS
Dr.R.Malathy

Member Secretary, Academic Council
Dr.R.Shivakumar

Chairperson, Academic Council & Principal
Dr.S.R.R.Senthil Kumar

Copy to:-
HOD/Civil, Fourth Semester ME STR Students and Staff, COE